

National CAD Standard™ Version 3.1 CD-ROM

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National CAD Standard Version 3.1 CD-ROM

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United States
National CAD Standard

A Consensus Standard Incorporating Industry Publications

Introduction and Amendments to Industry Publications

Published by the National Institute of Building Sciences

CAD Layer Guidelines

Published by the American Institute of Architects

Uniform Drawing System (UDS)—Modules 1–8

Published by the Construction Specifications Institute

Tri-Service Plotting Guidelines

Published by Tri-Service and the Coast Guard

The National Institute of Building Sciences (NIBS) is a non-governmental, non-profit organization, authorized by Congress to encourage a more rational building regulatory environment and to accelerate the introduction of existing and new technology into the building process.

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Foreword

Thank you for purchasing The National CAD Standard. This Standard is an important first step in coordinating the efforts of the building design and construction industry. By classifying electronic building design CAD data consistently, communication among design and construction project teams can be streamlined, resulting in cost savings and greater efficiency in the design and construction process. By adopting this Standard, you are making a wise choice for the future of your company or organization. Broad implementation of this Standard will significantly improve building design and construction service delivery to all clients.

Recognizing the evolving nature of computer technology, The National CAD Standard Project Committee is committed to the continuous growth and development of the Standard to keep pace with technology as it develops. The evolution of the Standard is dependent upon the participation of a broad cross-section of industry professionals. You are invited to contribute to the development of the Standard by joining The National CAD Standards Project Committee. For further information, visit the NIBS Project Committee web site at: *<http://www.nationalcadstandard.org>*.

This Standard is intended as a foundation for information sharing. Undoubtedly, it will not meet the needs of all users in all cases. To the extent possible, we urge you to classify your basic data according to the Standard, augmenting it only in those cases where your data cannot be sufficiently classified, organized or represented according to it. In this way, you can ensure that a baseline of your construction data can be freely exchanged with others who adopt the Standard. Moreover, the task of educating others about your particular customized data-classification or organizational system for CAD can be minimized.

We would greatly appreciate feedback on any problems you encounter. Please use the form in Appendix H to record your comments.

An Overview

The National Institute of Building Sciences (NIBS) Facility Information Council (formerly the CADD Council) facilitated the development of The National CAD Standard, and will continue to support its evolution in the future. The Standard is comprised of three documents previously published by member organizations of the Facility Information Council, together with the Report of The National CAD Standard Project Committee. The NIBS Report includes this Foreword, Administration, Appendices, and Amendments to the constituent documents approved by the committee. The Report describes how the constituent documents are related to one another, resolves discrepancies between them, and ensures the full integration of the previously independent parts. The constituent documents include:

CAD Layer Guidelines, The American Institute of Architects;

The Uniform Drawing System (UDS), Modules 1-8, The Construction Specifications Institute;

Tri-Service Plotting Guidelines, Tri-Service CADD/GIS Technology Center and the U.S. Coast Guard.

The origins of the National CAD Standard (see “*A Brief History*,” below) can be traced to a Memorandum of Understanding (see Appendix C) signed by the above publishing organizations as well as the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and the U.S. General Services Administration. Broad building design and construction industry support is evidenced by the membership of the NIBS Facility Information Council Board of Direction (see Appendix G), under whose auspices the National CAD Standard Project Committee operates.

The constituent documents have undergone a thorough review and comment process by the National CAD Standard Project Committee, the body formed by the Council to review and comment on the existing publications that comprise the Standard. The Committee followed the NIBS Consensus Process (see Appendix E) in conducting its work. This process ensures broad, democratic participation by all interested persons and organizations. It provides a framework for the coordination and integration of the previously independent parts. And it establishes a mechanism for revising the constituent documents in the future to meet the needs of the broadest possible spectrum of users.

This Overview is intended to provide you with a brief history of the development of The National CAD Standard and to inform you of the process for its future evolution and development. The remainder of the Foreword is organized according to the following topics:

- Adoption and Implementation:
How Vision Becomes Reality
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Adoption and Implementation:

How Vision Becomes Reality

Adoption of the National CAD Standard by the building design and construction industry is voluntary. The success of the Standard in achieving its intended purpose of streamlining and simplifying the exchange of building design and construction data will be measured by the number of participants in the building design and construction industry who choose to adopt it. The decision to adopt the Standard will be made by thousands of individuals and organizations on the basis of whether or not the Standard adequately addresses this critical industry need.

Implementation:

The Role of Design Professionals

As a building design and construction industry professional and as representative of a company, organization, or association, you are an integral part of this process. We urge you to adopt the Standard throughout your business enterprise, and to participate in its ongoing development to ensure a Standard that reflects the broadest possible spectrum of viewpoints from throughout the industry.

How does a National CAD Standard enhance the business prospects of building industry professionals? There are three principal advantages. First, a common language of data classification and organization for CAD will improve communication and data transfer among building design and construction teams, helping to streamline the building design and construction process. Secondly, a national CAD standard will provide one component of a coherent and consistent electronic “information model,” or database, which can be made available throughout the life cycle of the building, for purposes other than the original construction. A single, nation-wide data classification and organization system for CAD will simplify the transfer of building data from the original building design CAD applications to facility management (FM) applications. A streamlined building design and construction process and a corresponding information model with a life span equal to the building it represents, results in a higher quality of service to both building owners and facility managers, who are the clients of the design and

construction teams. Finally, a “common language” of data classification and organization for CAD will reduce the need for training of staff and development and maintenance of office standards, enabling building design and construction organizations to devote valuable personnel resources to revenue-generating tasks.

Beyond the immediately tangible benefits, a common language for the classification and organization of electronic data for CAD will create new opportunities for building design professionals to develop additional sources of revenue by offering a broader range of value-added services to building owners and facility managers. It suggests the redefinition of the roles and the traditional relationships from independent, single project contracts to long-term, service-oriented relationships. A national CAD standard for classifying electronic building data facilitates the development of these new business models.

Implementation:

The Role of Building Owners

Large-scale building owners, a group that includes corporations, government agencies, and educational or health care institutions, have a key role and interest in the full-scale implementation of The National CAD Standard. As high-volume consumers of building design and construction services, most large-scale building owners have developed company CAD standards that are required of all A/E firms providing them with building design services. By adopting the National CAD Standard, the burden of maintaining a proprietary standard is eliminated, and the maintenance of building information models is greatly streamlined and enhanced. Moreover, because large building owners represent a significant share of the building design and construction market, their adoption of the National CAD Standard is likely to have a singular impact on the entire building design and construction industry.

Implementation:

The Role of Building Design Software Developers

Incorporation of the National CAD Standard into the software products that practitioners use on a daily basis is a vital element in the promulgation of the Standard. For example, software tools such as macros can be developed to automatically create CAD data file names or CAD data file layer names in the National CAD Standard format. Templates could be included in applications to automatically create drawing file sheets in the National CAD Standard graphic format. Incorporation of such tools will become a vital feature of future CAD, Facilities Management, and other building design, construction and maintenance applications. Software developers who develop such tools will enjoy a significant competitive advantage in the marketplace.

The NCS Business Management Group intends to license software companies to implement the National CAD Standard in their products.

Benefits:

Why Should You Adopt the National CAD Standard?

For anyone faced with organizing (or simply understanding the organization of) electronic building design data for CAD produced in a multitude of formats, the value of organizing the data in a consistent format is immediately apparent. In the absence of a single National CAD Standard, many companies and organizations have developed internal “office standards” as a way of consistently organizing their own electronic CAD data. The value of such office standards is limited to their realm of influence. For design firms, that realm may not extend beyond the firm itself, except in cases where design sub-consultants can be compelled to adopt it. Large building and property owners may require adoption of a “company standard” as a condition for providing design services to them, and thus influence a realm well beyond their immediate organizations. However, the effort required to develop office standards is a now an unnecessary cost of doing business, and the duplication of effort required to develop multiple office standards is a gross and blatant inefficiency.

Computerization of the building design process was intended to result in increased efficiency and lower costs. The lack of a single, comprehensive, consistent data classification and organizational system for the exchange of electronic building design CAD data seriously hampers that goal. A National CAD Standard will benefit all participants in the building design and construction process, but particular benefits for particular players, are outlined below.

Benefits for building design professionals:

- Consistent classification, organization and representation of CAD data for all projects, regardless of the project type or client.
- Seamless transfer of information between architects, engineers, and other design team members.
- Reduced preparation time for translation of electronic data files between different proprietary software file formats; predictable file translation results.
- Reduced data file formatting and set-up time as a result of adoption of the Standard by software application vendors.

- Greatly reduced staff training time to teach multiple “office standards.”
- Streamlined process for checking drawings for references, omissions, etc.
- Automated updating of data files as the Standard evolves.
- New opportunities for expanded services and revenue beyond building design.
- New marketing opportunity; design firms complying with the Standard can feature compliance as a benefit to prospective clients.

Benefits for the general contractor and related sub-contractors

- Consistent organization of CAD data for all projects, from all sources.
- Consistent drawing sheet order and sheet organization; information appears in the same place in all drawing sets, regardless of the source.
- Reduction of discrepancies, reducing the potential for errors, change orders, and construction delays.
- Consistent detail reference system.

Benefits for the Client/Building Owner

- Consistent organization of data for all projects, from all sources.
- Greater clarity of communication of design intent to the client.
- Streamlined electronic data management of Facility Management data.
- Enhanced potential for automated document storage and retrieval.
- Streamlined construction document checking process.

Benefits for the entire building design and construction industry

- Reduced costs for training resulting from the common language of data classification and organization for CAD.
- Improved preparation and training of prospective employees at undergraduate and graduate institutions of higher learning.
- Enhanced potential for automated training and distance learning.

- Elimination or reduction of a major barrier to the free exchange of building construction data, creating an opportunity to improve quality, improve efficiency and reduce costs in the building design, construction and maintenance process.

The National CAD Standard:

One Element of a Larger Framework

Why should there be a national standard for the organization of CAD data? While the primary purpose is to establish a common basis for the classification and organization of electronic CAD data throughout the building design industry, the broader objective is to improve communication throughout the entire construction industry, including contractors, building product manufacturers, CAD software developers, and facility managers.

The U.S. National CAD Standard is only one of a number of ongoing efforts aimed at integrating electronic information. Other efforts include the International Alliance for Interoperability (IAI), Overall Construction Classification System (OCCS) hosted by CSI, STEP activities of the National Institute of Standards and Technology (NIST), Manufacturing Information Management Open Systems Alliance (MIMOSA), and the International Standards Organization (ISO), to name just a few.

The scope of The National CAD Standard is limited to the classification and organization of electronic data within CAD data files. It addresses issues such as layer names, discipline designators, line weights, pen assignments, and the graphic organization of construction drawing sheets. It facilitates the exchange of data between current CAD software, but does not yet address the more complex issues of electronic data file format compatibility between software applications using object-oriented programming, which is the focus of IAI IFCs or (Industry Foundation Classes).

The OCCS will be a hierarchical classification system addressing information “disconnects” in the building lifecycle process and outlines a vision, or specification, for an integrated electronic model. The IAI aecXML effort is coordinating the development of standards to facilitate the exchange of web-based data. NIBS has developed an XML standard to allow equipment manufacturers to deliver electronic operations and maintenance manuals that plug right in to computerized maintenance management systems (CMMS). This XML XSD schema was contributed to and is now incorporated into the IAI IFCs.

While these efforts began separately and are independent, they are not mutually exclusive. In an ideal world, no barrier of any kind, either at the application code level, the data classification and

organization level, or at the process level would obstruct the free flow of building design and construction information. All of the current efforts are intended to accomplish that same goal.

One might ask why the current efforts are independent of each other? Two principal reasons are that the work is very complex and it makes sense to begin with what you know. Different elements of the problem can be addressed most effectively by different groups with each group focusing its unique expertise on the appropriate aspect of the challenge. As an example, the development of data classification and organizational standards can be done by an informed group of CAD users, independently of software programming considerations, and can be implemented across a broad array of software applications. Meanwhile, the challenge of interoperability, that is, the ability to transfer electronic data files seamlessly from one software application to another, can be addressed by software application programmers, in close consultation with CAD users. Concurrently, a vision of an integrated information model can be developed in collaboration with software vendors, CAD users, building owners and facility managers, general practitioners and other building team members.

Many of the independent efforts have reached a level of maturity that makes it increasingly important to collaborate with related activities. The NIBS Whole Building Design Guide www.wbdg.org has emerged as a focal point for improving communication within the industry, as well as a forum for structuring various collaboration activities.

In May 2002, the North American chapter of IAI became the newest council of NIBS. The NIBS Building Seismic Safety Council is currently organizing a domain within IAI to address data requirements related earthquake design.

The National CAD Standard:

A Brief History

In 1990, the American Institute of Architects (AIA) published the first Edition of *CAD Layer Guidelines*. This was the first effort in the building design industry to develop a data classification system for organizing electronic building data specifically addressing the names of CAD data files and the names of layers within CAD data files.

In 1990, the Construction Specifications Institute (CSI) published a technical document entitled *Standard Reference Symbols* and in 1994 began formal development of the *Uniform Drawing System* (UDS), an organizational standard and system for drawings. CSI's *MasterFormat*, a sixteen-division industry standard classification system for building product data and building construction specifications, provides uniformity for written building design information. UDS provides uniformity for graphical building design information in drawings. CSI established a comprehensive long-range plan for the UDS to address all facets of construction drawing organization, including the naming of layers in CAD data files. Since a layer guideline already existed, CSI decided, in the best interest of the industry, to work cooperatively with the AIA to revise CAD Layer Guidelines in lieu of creating a new document. The second Edition of *CAD Layer Guidelines* was published by the AIA in 1997 and with amendments was a part of the National CAD Standard Version 1.0.

In 1997, CSI published the first three modules of *The Uniform Drawing System*. These modules, with amendments, were part of Version 1.0 of the National CAD Standard. In June 1999, Modules 4 – 6 of the UDS; Drafting Conventions, Terms and Abbreviations, and Symbols; were published. Modules 7 and 8 of the UDS; Notations and Code Conventions; were published in June of 2000. All of the UDS modules have now been submitted to the NIBS Consensus Process and approved for incorporation into Version 2.0 of the National CAD Standard.

The U.S. Department of Defense has also played a significant role in the development of CAD standards. In 1993, DOD formed the Tri-Service CADD/GIS Technology Center, headquartered in Vicksburg, MS, the former site of the Army Corps of Engineers CADD Center. Tri-Service was created in an effort to develop a single “office CAD standard,” for the Army, Navy, and Air Force, which, until that time (and reflecting the state of the industry as a whole), employed many organizational systems throughout their building design and construction operations. As a large

consumer of building design and construction services, DOD's efforts had the effect of bringing some semblance of order to data classification for a significant segment of the industry. In 1994, Secretary of Defense Perry strongly promoted the adoption of private sector standards by DOD, and further promoted the involvement of DOD in the development of such standards. As a result, the CAD Standards developed by the Tri-Service Center were based strongly on ***CAD Layer Guidelines*** and ***The Uniform Drawing System***. The Tri-Service Center continues to be actively involved in the development of The National CAD Standard.

In 1997, key building design and construction industry organizations with an interest in the development of a national CAD standard signed a **Memorandum of Understanding** that formed the basis of a cooperative, collaborative relationship for the development of The National CAD Standard. Signatories included the National Institute of Building Sciences, the American Institute of Architects, the Construction Specifications Institute, the DOD Tri-Service CADD/GIS Technology Center, the Sheet Metal and Air Conditioning Contractors' National Association, the U.S. Coast Guard, and the U.S. General Services Administration.

The publishing signatories, AIA and CSI, as well as the Tri-Service CADD/GIS Technology Center and the Coast Guard, agreed to contribute their documents to a consensus process facilitated and financed by NIBS and the Facility Information Council with the anticipated outcome of a National CAD Standard. Each organization retains full ownership, including copyright, of their respective documents.

Most importantly, the publishing signatories agreed to maintain, revise and support the continued publication of their documents in cooperation with the National CAD Standard Project Committee. The Memorandum of Understanding is an agreement for cooperation and collaboration that is unprecedented in the building design and construction industry, and has no equal in the computer industry.

The Facility Information Council:

History, Mission, Governance

The United States Congress authorized the National Institute of Building Sciences to assemble, store and disseminate technical data and other information directly related to its technological and regulatory responsibilities. The Facility Information Council of NIBS fulfills a part of that responsibility by providing an industry-wide forum for the standardization and integration of facility information throughout the entire life cycle of buildings, from design, construction, and maintenance, through re-use or retirement.

The need for an integrated system for storing electronic building design and construction data has been recognized since the 1960s, when the commercial use of computers in the construction industry first began. During this period, several individuals and organizations published research papers and developed organizational plans for integrated computer systems for the building industry. The limitations of early computer systems, the rapidly evolving nature of computer technology and the rapid obsolescence of contemporaneous computer systems rendered these data-organization efforts impractical.

With its introduction in 1982, the personal computer emerged as the platform of choice for business computing. The building design industry shifted rapidly from manual production to a computer-based process. Today, nearly all design and documentation in the building construction industry is accomplished using CADD. Computer-aided design and drafting software applications have evolved to a point of maturity that now makes a single, coherent system for classification of building design and construction data possible. It is now incumbent on the industry to harness this computer technology to maintain national competence and assert U.S. resourcefulness to successfully compete in the global marketplace.

The Computer Aided Design and Drafting (CADD) Council was established by NIBS in 1994. The inaugural meeting was held on June 23 of that year in conjunction with the A/E/C SYSTEMS show in Washington, D.C. In 1999, the name of the Council was changed to the Facility Information Council to more fully reflect its charter as well as to better align its mission with the strategic goals of NIBS.

The purpose of the Council is to improve the performance of the life-cycle of facilities including design, engineering, construction, operations, maintenance and retirement by fostering:

- A common integrated lifecycle “information model” for the A/E/C industry.
- Standards that allow for the free flow of graphic and non-graphic information throughout the information model.
- Communication and interaction between the United States and the International Standards Organization (ISO) on CADD related efforts.

Membership on the Council is open to all individuals and organizations with an interest in and commitment to the Council's purposes. The full Council meets annually at the A/E/C SYSTEMS show. The Council's Board of Direction is comprised of representatives from industry organizations and associations, private software developers and vendors, governmental agencies, and the public. A complete roster of the membership of the Facility Information Council Board of Direction at the time of publication of Version 1.0 of **The United States National CAD Standard** can be found in Appendix G.

The National CAD Standard Project Committee:

How You Can Participate

The key to success and longevity of a standard is long-term care and feeding. The NIBS Facility Information Council will continue to facilitate the evolution of the National CAD Standard. Likewise, the major contributing organizations are committed to supporting the development of their constituent documents.

With publication of Version 1.0 of the National CAD Standard in July of 1999, the National CAD Standard Project Committee accomplished its original mission. Immediately thereafter, the Facility Information Council re-opened membership on the Project Committee to all persons with interest in developing Version 2.0 of the National CAD Standard. Beginning with the start of work on Version 3.0 the project committee became a standing committee open to new applicants at any time.

The first three committees operated under the rules described in Appendix E. Succeeding committees will operate under new governance rules described in Appendix F. Members who attend project committee meetings do so at their own expense or at the expense of their sponsoring organizations. The majority of meetings are held at the NIBS offices in Washington, D.C. To the maximum extent possible, the work of the project committee and its task teams is conducted via the Internet using list-serves and extranets.

The only requirement for participation is that members be in possession of the latest version of the National CAD Standard, currently Version 3.0.

If you wish to participate, please visit the U.S. National CAD Standard web site at ***<http://www.nationalcadstandard.org>*** and complete the online application for the project committee and specific task teams that are being formed.

In conclusion and on behalf of the Council, we would like to thank all who have participated in the development of Versions 3.0, 2.0, and 1.0 of the National CAD Standard. Their names are listed in Appendix D. As the tag line in the title indicates, the National CAD Standard is a “Consensus Standard Incorporating Industry Publications”. This would not have been possible without industry-wide participation. Many individuals and organizations have contributed countless hours toward development of the constituent publications and the establishment of a National CAD Standard. The benefit of these efforts will be appreciated by many users.

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Washington, D.C.
June 2004

Administration

Admin-1: Title

1.1 This document is known as the United States National CAD Standard, and is referred to herein as “The U.S. National CAD Standard for Architecture, Engineering, and Construction (A/E/C)” or “NCS.”

Admin-2: Current Version

2.1 Version 3.0 of the NCS published in June 2004.

Admin-3: Intent

3.1 The intent of the National CAD Standard is to assist in classifying electronic design data consistently, streamlining and simplifying the exchange of data within the design and construction industry, and to illustrate the appropriate presentation of two-dimensional graphic standards.

3.2 During design, use of the NCS is intended to speed the transfer of information between owner, designer, consultants, and contractors/subcontractors.

During construction, use of the NCS is intended to reduce time in finding and referencing information between owner, designer, consultants, product suppliers, and manufactures.

3.4 After occupancy, use of the NCS is intended to facilitate continued use of archived construction documents.

Admin-4: Scope

4.1 Data Organization: The National CAD Standard assists in classifying and organizing electronic data within CAD data files. It addresses issues such as layer names, discipline designators, line weights, pen assignments, and the graphic organization of construction drawing sheets.

4.2 Data Exchange: Implementation of the NCS by users and software vendors is intended to facilitate the exchange of data between current and future CAD software and help guarantee the future utility of today's CAD data files.

Admin-5: Implementation by CAD Users

5.1 Voluntary Implementation: Implementation of the NCS in whole or in part is voluntary. Each organization shall determine their degree of conformance with the NCS. (The agreement between owner and design professional or between design professional and consultant may specify degree of conformance required).

5.2 Disclosure Statement: Projects claiming substantial or partial conformance with the NCS shall include an NCS Statement of Substantial Conformance. (see Appendix A).

Admin-6: Publishers of Software and Electronic Building Data

6.1 Registration: Any software vendor, manufacturer, material supplier, or any other organization, commercial or non-profit, may apply to the National Institute of Building Sciences (NIBS) to be registered as a "Publisher of Electronic Data". Upon acceptance of registration application, agreement with the terms and conditions, and payment of the yearly registration fee, the publisher may state that their product is in full or partial conformance with the NCS.

6.2 Disclosure Statement: Publishers claiming substantial or partial conformance with the NCS shall include an NCS Statement of Substantial Conformance with their product and also make the Statement readily available at no charge directly from the publisher.

Admin-7: Assumptions

7.1 Type of Construction: The National CAD Standard is for use in organizing CAD documents for all types of construction, even though the examples in the NCS are shown primarily for building construction.

7.2 Type of Documents: The NCS assumes that the final construction document product will consist of one or more sheets of graphic images (plans, elevations, sections, details, perspectives, isometrics) and applicable text as projected on a static two-dimensional surface. Such images may be viewed on a computer monitor or printed on a sheet of paper. (Note: standards for three-dimensional computer models - produced by object-oriented programs - are not currently part of the NCS).

7.3 Options: It is anticipated that users will implement a sub-set of the NCS, depending on the size and type of project. Portions of the NCS are labeled “optional” or “recommended” and substantial conformance with the NCS would not necessarily require use of all or any of these items.

7.4 Minor Variations: It is not expected that project documents will fully conform with the NCS in every respect and detail. Most projects will include several minor variations from the NCS. Provided these minor variations are listed as part of the Statement of Substantial Conformance, the project will then be considered in Substantial Conformance.

Admin-8: Consensus Standard

8.1 The NCS is a voluntary consensus standard, following NIBS Consensus Process rules, as set forth in Appendix E. Membership on the Project Committee is open to anyone, as either Active Member or Reviewer Member. The only requirement for membership is that members own a current version of the NCS (3.0).

8.2 Active Members commit to attend (at their own expense or at the expense of their sponsoring organizations) a minimum of two of every three successive meetings. Meetings are held at the NIBS offices in Washington, D.C. Reviewer Members commit to read and comment on all draft reports. All members are required to submit a ballot on the final report. To the maximum extent possible, the work of the project committee and its task teams is conducted via the Internet using listservs and extranets.

8.3 Refer to the NCS website at <http://www.nationalcadstandard.org> for information about joining the project committee and about the specific task teams.

Admin-9: Definitions

CAD: An acronym for Computer-Aided Design (or Drawing).

CAD file: An electronic computer file, containing CAD data entities, which can be changed and manipulated by a CAD software program.

Drawing: The Drawings are the graphic and pictorial portions of the documents showing the design, location and dimensions of the project, generally including plans, elevations, sections, details, schedules and diagrams.

Guidelines: Part of the National CAD Standard. Required.

Optional: Not required. If item is left out, documents will still be in substantial conformance with NCS. If included, however, must follow NCS guidelines (see Appendix B).

Recommended: Not required. Suggested method only. Other consistent methods, if listed on the NCS Statement of Substantial Conformance, are equally acceptable in order for documents to be in substantial conformance with NCS (see Appendix A).

Required: Items to be followed if claiming substantial conformance with NCS.

Plot file: An electronic computer file containing information necessary to print one drawing sheet formatted for output to a printing or plotting devices no longer stored in its native CAD file format.

Admin-10: Copyright

10.1 AIA CAD Layer Guidelines: The American Institute of Architects, 1735 New York Avenue NW, Washington, DC 20006-5292 owns the copyright to the section of the NCS entitled AIA CAD Layer Guidelines.

10.2 Uniform Drawing System™: The Construction Specifications Institute, 99 Canal Center Plaza, Suite 300, Alexandria, VA 22314 owns the copyright to the sections of the NCS entitled Uniform Drawing System.

10.3 Remainder of the NCS: The National Institute of Building Sciences, 1090 Vermont Avenue NW, Suite 700, Washington, DC 20005-4905 owns the copyright to all other portions of the NCS.

10.4 Non-exclusive License: As purchaser of a copy of the National CAD Standard, the AIA, CSI and NIBS grant you a non-exclusive license to:

Use the NCS solely and exclusively for internal purposes within your organization.

Transfer information, data, symbols and templates from the NCS to other documents in connection with preparing construction documents, so long as such transfer of data is not performed or used in a manner that is competitive with NIBS distribution of the NCS.

You may not, otherwise, copy, distribute, rent, lease, loan, disseminate, publish, sell or transfer any portion of the NCS.

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AIA CAD Layer Guidelines:

U.S. National CAD Standard Version 3

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To order additional copies of the National CAD Standard, go to www.nationalcadstandard.org.

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Introduction

Overview

Virtually all vector-based CAD systems support the concept of layers. This function allows building design information to be organized in a systematic fashion, facilitates the visual display of the information on a computer screen, and allows the information to be efficiently converted to the conventional print media of drawings. Efficient use of layers can reduce document preparation time and improve document coordination. Organizing data by layers allows a single CAD file to contain a wealth of information about a building or facility. By turning selected layers on or off, data can be created, reviewed and edited according to a hierarchy that simulates the physical organization of building systems, the relative position of building elements, or the sequence of construction.

A Brief History of CAD Layer Guidelines

The American Institute of Architects published the first edition of *CAD Layer Guidelines* in 1990. The early success of the first edition and rapidly evolving technology resulted in the second edition being published in 1997. The most significant change between the first and second editions was the elimination of the “short” layer name format and the adoption of the long layer name format as a single standard. The second edition also included additional layer field codes for remodeling projects, added new discipline designations for interiors, telecommunications, and other disciplines, and improved the method of organizing drawing annotation.

In July 1997, the AIA agreed to incorporate *CAD Layer Guidelines* into the emerging *U.S. National CAD Standard* (U.S. NCS), a project of the National Institute of Building Sciences (NIBS). The AIA and NIBS were joined in that effort with the Construction Specifications Institute (CSI) and the (then-known) Tri-Service CADD/GIS Technology Center of the U.S. Army Corps of Engineers. CSI and Tri-Service agreed to incorporate their own publications into the U.S. NCS, the *Uniform Drawing System* and the *Plotting Guidelines*, respectively. These four

constituent publishers, as they came to be known, were joined by a number of building design and construction industry organizations in developing and publishing the U.S. NCS.

In March 1999, the U.S. National CAD Standard Project Committee formally accepted *CAD Layer Guidelines, Second Edition* (with minor amendments) as a constituent document of the *U.S. National CAD Standard, Version 1.0*, published in July 1999. The U.S. NCS Project Committee immediately set to work on publication of Version 2.0, which was published in 2002.

Considerable confusion resulted from the lack of “alignment” between the “**Second Edition**” of *CAD Layer Guidelines* and “**Version 1.0**” of the *U.S. National CAD Standard*. Because *CAD Layer Guidelines, Second Edition* was published before, and later incorporated into, the *U.S. National CAD Standard, Version 1.0*, this could not be avoided. With publication of the *U.S. National CAD Standard, Version 2.0*, this problem was corrected by giving the constituent document an entirely new name. For the first time, “AIA” became part of the title of the publication, and the numbered “editions” were abandoned. As a result, this publication is known as *AIA CAD Layer Guidelines: U.S. NCS Version 2.0*. No doubt some confusion will still arise between the *U.S. NCS Version 2.0* and the old *CAD Layer Guidelines, Second Edition*, but the problem should be resolved with the publication of the new U.S. NCS, Version 3.0.

Version 2

AIA CAD Layer Guidelines, version 2, was designed and formatted to match its companion document, CSI's Uniform Drawing System. It was also carefully coordinated with that document, so that the two function as a whole.

Additions and improvements to version 2 of *AIA CAD Layer Guidelines*:

- Incorporation of NCS v1 amendments, including the change from a four-character to a single character Status field.
- An expanded Layer Format that includes a two-character discipline designator and a second optional Minor Group.
- An expanded Drawing View Layer List for users with a need to organize data by drawing type rather than by building system.
- Expanded Layer Lists for Civil, Structural, Mechanical, Plumbing, and Telecommunications Disciplines.

- New Discipline Designators for Survey/Mapping, Geotechnical, Civil Works, Process, and Operations Disciplines.
- An entirely new Layer List for the Survey/Mapping Discipline.
- New Annotation Minor Groups, and a new “free agent” rule permitting Annotation Minor Groups to modify any Major Group.
- Clarification of the existing “free agent” rule, emphasizing that any reasonable combination of Discipline Designator, Major Group and Minor Group is permitted.
- New rules and a detailed Commentary to facilitate conformance with the ISO CAD Standard.

New in Version 3

Highlights of revisions and additions to Version 3 include the following:

- User-defined Minor Group field codes may now be four alphabetic and/or numeric characters (0–9) and/or “~”.
- Additions to the Process Layer List allow users to define layers by individual systems or groups of systems.
- Expanded the Landscape Layer List.
- New Major and Minor Groups added to the Equipment, Mechanical, and Interior Layer Lists.
- Equipment layer added to the Fire Protection Layer List.

Layer Name Format

Hierarchy of Data Fields

The layer name format is organized as a hierarchy. This arrangement allows users to select from a number of options for naming layers according to the level of detailed information desired. Layer names consist of distinct data fields separated from one another by dashes. A detailed list of abbreviations, or field codes, is prescribed to define the content of layers. Most field codes are mnemonic English abbreviations of construction terminology that are easy to remember.

There are four defined layer name data fields: **Discipline Designator**, **Major Group**, two **Minor Groups**, and **Status**. The Discipline Designator and Major Group fields are mandatory. The Minor Group and Status fields are optional. Each data field is separated from adjacent fields by a dash (“-”) for clarity.

The complete U.S. NCS layer name format, showing the Discipline Designator, the Major Group, two Minor Groups, and the Status fields.

A	I	-	W	A	L	L	-	F	U	L	L	-	D	I	M	S	-	N

Before You Begin

The U.S. NCS allows you to select from a number of format options for creating layer names. It is recommended that you select the options that you wish to use for layer names on a given project, and then apply the resulting format consistently for all layer names on that project.

Note that for *conceptual conformance* to ISO 13567, *Organization and Naming of Layers for CAD*, the layer name format and length must be the same for all layers on a given project. See “Commentary: U.S. NCS and ISO 13567” (p. 91) at the end of *AIA CAD Layer Guidelines* for detailed information about ISO conformance.

A typical layer name showing the required data fields only.

Note that only the mandatory discipline character is shown, creating a Level 1 Discipline Designator.

A - WALL

Discipline Designator, Level 1

The Discipline Designator denotes the category of subject matter contained on the specified layer. The Discipline Designator is a two-character field. The first character is the discipline character, and the second character is an optional modifier. The Discipline Designator is described in greater detail on page UDS-01.14. For a complete list of Discipline Designators, see Appendix A of UDS Module 1 beginning on page UDS-01.35.

LEVEL 1 DISCIPLINE DESIGNATORS	
G	General
H	Hazardous Materials
V	Survey / Mapping
B	Geotechnical
W	Civil Works
C	Civil
L	Landscape
S	Structural
A	Architectural
I	Interiors
Q	Equipment
F	Fire Protection
P	Plumbing
D	Process
M	Mechanical
E	Electrical
T	Telecommunications
R	Resource
X	Other Disciplines
Z	Contractor / Shop Drawings
O	Operations

Discipline Designator, Level 2

The optional second character is used to further define the discipline character. As an example, the Level 2 Discipline Designators for Architectural are shown:

A typical layer name showing the required data fields only.

Note that the mandatory Level 1 discipline character is supplemented by the optional discipline modifier to create a Level 2 Discipline Designator.



Designator	Description	New
A	Architectural	
AS	Architectural Site	
AD	Architectural Demolition	
AE	Architectural Elements	
AI	Architectural Interiors	
AF	Architectural Finishes	
AG	Architectural Graphics	
AJ	User-Defined	●
AK	User-Defined	●

For a complete list of Discipline Designators, see Appendix A of UDS Module 1 beginning on page UDS-01.35.

A typical layer name showing the required data fields only.

The mandatory Major Group field is highlighted:

A - WALL

A typical layer name showing one optional Minor Group field:

A - WALL - FULL

A typical layer name showing two optional Minor Group fields:

A - WALL - FULL - TEXT

Major Group

The Major Group is a four-character field that identifies a major building system. The prescribed Major Group field codes (four-character abbreviations) shown on the Layer List are logically grouped with specific discipline designators. However, any Major Group may be combined with any prescribed Discipline Designator, provided that the definition of the Major Group remains unchanged. Therefore, any reasonable combination of the prescribed Discipline Designators and Major Groups is permitted.

NOTE: User-defined Major Group field codes are not permitted.

NOTE: For *conceptual conformance* to ISO 13567, *Organization and Naming of Layers for CAD*, the use of the Major Group “ANNO” is not permitted. See “Commentary: U.S. NCS and ISO 13567” (p. 91) at the end of *AIA CAD Layer Guidelines* for detailed information about ISO conformance.

Minor Group

This is an optional, four-character field to further define the Major Groups. For example, *A-WALL-FULL* denotes *Architectural, Wall, Full-height*. A second minor group may be used for still further delineation of the data contained on a layer. For example, *A-WALL-FULL-TEXT* indicates *Architectural, Wall, Full-height, Text*.

The prescribed Minor Group field codes (four-character abbreviations) shown on the Layer List are logically grouped with specific Major Groups. However, any Minor Group may be used to modify any Major Group, provided that the definition of the Minor Group remains unchanged. Therefore, any reasonable combination of the prescribed Major and Minor Groups is permitted.

NOTE: User-defined Minor Group field codes are permitted. They must contain four alphabetic and/or numeric characters and/or “~”, and must be fully documented on the U.S. NCS Compliance Disclosure Statement for the project on which they are used.

NOTE: For *conceptual conformance* to ISO 13567, *Organization and Naming of Layers for CAD*, the use of certain Minor Group field codes is restricted. See “Commentary: U.S. NCS and ISO 13567” (p. 91) at the end of *AIA CAD Layer Guidelines* for detailed information about ISO conformance.

Status (Phase)

A typical layer name showing the location of the optional Status field:

A - WALL - FULL - TEXT - N

The status field is an optional single-character field that distinguishes the data contained on the layer according to the status of the work or the construction phase. The prescribed field codes for this field are as follows:

STATUS FIELD CODES	
N	New work
E	Existing to remain
D	Existing to demolish
F	Future work
T	Temporary work
M	Items to be moved
X	Not in contract
1-9	Phase numbers

Note that for *conceptual conformance* to ISO 13567, *Organization and Naming of Layers for CAD*, this field may be used to denote either “Status” OR “Phase,” but not BOTH. See “Commentary: U.S. NCS and ISO 13567” (p. 91) at the end of *AIA CAD Layer Guidelines* for detailed information about ISO conformance.

Drawing View Layer List

Drawing View Field Codes

The Drawing View field codes are specialized codes for layers that are organized primarily by drawing type, rather than by major building system. The field codes DETL, ELEV, and SECT may also be used as Minor Group field codes to modify a major building system.

For data sets that are organized by drawing type, an optional alphanumeric Minor Group field code, ANNN, is prescribed to further distinguish drawings within a single CAD file. This Minor Group may be used ONLY to modify the prescribed Drawing View Major Groups; it may not be used to modify any other Major Group. The format of ANNN is also prescribed. It must consist of a single alphabetic character followed by a three-digit number between 001 and 999. The definition of ANNN is not prescribed; it must be defined by the user. The definition must be documented on the U.S. NCS Compliance Disclosure Statement for the project on which it is used.

The Minor Group field codes MCUT, MBND, PATT, and IDEN may be used to modify any Major or Minor Group in the Layer List. The definitions of these prescribed field codes cannot be changed. See page CLG-8 for rules and options governing the use of field codes.

Drawing View Layer Names

Layer Name	Description	New
□□-DETL	Detail	
□□-ELEV	Elevation	
□□-SECT	Section	
□□-□□□□-ANNN	Drawing View Major Group: optional number (A = letter, NNN = number between 001 and 999)	
□□-□□□□-ANNN-MCUT	Drawing View Major Group: optional number: material cut by the view	
□□-□□□□-ANNN-MBND	Drawing View Major Group: optional number: material beyond cut	
□□-□□□□-ANNN-PATT	Drawing View Major Group: optional number: textures and hatch patterns	
□□-□□□□-ANNN-IDEN	Drawing View Major Group: optional number: component identification numbers	
□□-□□□□-ANNN-OTLN	Drawing View Major Group: optional number: outline of object drawn	

Annotation Layer List

Annotation Field Codes

Annotation consists of text, dimensions, notes, sheet borders, detail references and other elements on CAD drawings that do not represent physical aspects of a building. Use of the Major Group ANNO allows all annotation to be placed in a defined group of layers.

Annotation Layer Names

The Layer Names shown below provide examples for the use of Minor Group field codes for annotation. **These Minor Groups may be used to modify any Major or Minor Group in the Layer List.** See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Layer Name	Description	New
□□-ANNO	Annotation	
□□-□□□□-BRNG	Bearings and distance labels (survey coordinates)	
□□-□□□□-DIMS	Dimensions	
□□-□□□□-IDEN	Identification tags	
□□-□□□□-KEYN	Keynotes	
□□-□□□□-LABL	Labels	
□□-□□□□-LEGN	Legends, symbol keys	
□□-□□□□-MARK	Markers, break marks, leaders	
□□-□□□□-MATC	Match lines	
□□-□□□□-NOTE	Notes	
□□-□□□□-NPLT	Non-plotting graphic information	

Layer Name	Description	New
□□-□□□□-RDME	Read-me layer (not plotted)	
□□-□□□□-REDL	Redlines	
□□-□□□□-REFR	Reference, external files	
□□-□□□□-REVC	Revision clouds	
□□-□□□□-REVS	Revisions	
□□-□□□□-SCHD	Schedules	
□□-□□□□-SYMB	Reference symbols	
□□-□□□□-TEXT	Text	
□□-□□□□-TABL	Data tables	
□□-□□□□-TITL	Drawing or detail titles	
□□-□□□□-TTLB	Border and title block	

General Layer List

General Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

General Layer List

Layer Name	Description	New
G□-ACCS	Access plan	
G□-CODE	Code compliance plan	
G□-EVAC	Evacuation plan	
G□-FIRE	Fire protection plan	
G□-PLAN	Key plan (floor plan)	
G□-SITE	Key plan (site plan)	

General Discipline Designators

Designator	Description	New
G	General	
GI	General Informational	
GC	General Contractual	
GR	General Resource	
GJ	User-Defined	
GK	User-Defined	

Hazardous Materials Layer List

Hazardous Materials Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Hazardous Materials Layer List

Layer Name	Description	New
H□-PLAN	Key plan (floor plan)	
H□-SITE	Key plan (site plan)	

Hazardous Materials Discipline Designators

Designator	Description	New
H	Hazardous Materials	
HA	Asbestos	
HC	Chemicals	
HL	Lead	
HP	PCB	
HR	Refrigerants	
HJ	User-Defined	
HK	User-Defined	

Survey/Mapping Layer List

Survey/Mapping Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Survey/Mapping Layer Names

Layer Name	Description	New
V□-BLDG	Buildings and primary structures	
V□-BLDG-DECK	Buildings and primary structures: outdoor decks (attached, no roof overhead)	
V□-BLDG-OTLN	Buildings and primary structures: outline	
V□-BLDG-OVHD	Buildings and primary structures: overhead (overhang)	

Survey/Mapping Discipline Designators

Designator	Description	New
V	Survey / Mapping	
VA	Aerial Survey	
VF	Field Survey	
VI	Digital Survey	
VJ	User-Defined	
VK	User-Defined	

Layer Name	Description	New
V□-BLDG-PRCH	Buildings and primary structures: porch (attached, roof overhead)	
V□-BNDY	Political boundaries	
V□-BNDY-BORO	Political boundaries: borough	
V□-BNDY-CITY	Political boundaries: city	
V□-BNDY-CNTY	Political boundaries: county	
V□-BNDY-CORP	Political boundaries: corporation	
V□-BNDY-NATL	Political boundaries: national	

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Layer Name	Description	New
Survey/Mapping (continued)		
V□-BNDY-POLI	Political boundaries: all	
V□-BNDY-PROV	Political boundaries: province	
V□-BNDY-STAT	Political boundaries: state	
V□-BNDY-TSHP	Political boundaries: town or township	
V□-BNDY-ZONE	Political boundaries: zoning	
V□-BRDG	Bridge	
V□-BRDG-BENT	Bridge: top of bent	
V□-BRDG-CNTR	Bridge: centerline	
V□-BRDG-CTLJ	Bridge: control joint	
V□-BRDG-DECK	Bridge: top of deck	
V□-BRDG-RAIL	Bridge: railing	
V□-BRKL	Break / fault lines	
V□-BRKL-BOTB	Break / fault lines: bottom of bank	
V□-BRKL-FLOW	Break / fault lines: flowline (lowest point of ditch)	
V□-BRKL-TOPB	Break / fault lines: top of bank	
V□-BRLN	Building restriction line	
V□-BZNA	Buffer zone area	
V□-CHAN	Navigable channels	
V□-CHAN-BWTR	Navigable channels: breakwater	
V□-CHAN-CNTR	Navigable channels: channel centerline and survey report lines	
V□-CHAN-DACL	Navigable channels: de-authorized channel limits, anchorages, etc.	
V□-CHAN-DOCK	Navigable channels: decks, docks, floats, piers	
V□-CHAN-NAID	Navigable channels: navigation aids	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-COMM	Communications	
V□-COMM-MHOL	Communications: manhole	
V□-COMM-OVHD	Communications: overhead lines	
V□-COMM-POLE	Communications: box / pole	
V□-COMM-UNDR	Communications: underground lines	
V□-CTRL	Control points	
V□-CTRL-BMRK	Control points: benchmarks	
V□-CTRL-FLYS	Control points: fly station	
V□-CTRL-GRID	Control points: grid lines	
V□-CTRL-HCPT	Control points: horizontal	
V□-CTRL-HVPT	Control points: horizontal / vertical	
V□-CTRL-PNPT	Control points: panel points	
V□-CTRL-TRAV	Control points: traverse	
V□-CTRL-VCPT	Control points: vertical	
V□-DRIV	Driveways	
V□-DRIV-ASPH	Driveways: asphalt surface	
V□-DRIV-CNTR	Driveways: centerline	
V□-DRIV-CONC	Driveways: concrete surface	
V□-DRIV-CURB	Driveways: curb	
V□-DRIV-FLNE	Driveways: fire lane	
V□-DRIV-GRVL	Driveways: gravel surface	
V□-DRIV-MRKG	Driveways: pavement markings	
V□-DRIV-UPVD	Driveways: unpaved surface	
V□-DTCH	Ditches or washes	
V□-DTCH-BOTD	Ditches or washes: bottom	
V□-DTCH-CNTR	Ditches or washes: centerline	
V□-DTCH-EWAT	Ditches or washes: edge of water	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-DTCH-TOPD	Ditches or washes: top	
V□-ESMT	Easements	
V□-ESMT-ACCS	Easements: access (pedestrian only; private access)	
V□-ESMT-CATV	Easements: cable television	
V□-ESMT-CONS	Easements: conservation	
V□-ESMT-CSTG	Easements: construction / grading	
V□-ESMT-ELEC	Easements: electrical	
V□-ESMT-FDPL	Easements: flood plain	
V□-ESMT-INEG	Easements: ingress / egress (vehicles; private access)	
V□-ESMT-LSCP	Easements: landscape	
V□-ESMT-NGAS	Easements: natural gas line	
V□-ESMT-PHON	Easements: telephone line	
V□-ESMT-ROAD	Easements: roadway	
V□-ESMT-ROAD-PERM	Easements: roadway: permanent	
V□-ESMT-ROAD-TEMP	Easements: roadway: temporary	
V□-ESMT-RWAY	Easements: right-of-way (public access)	
V□-ESMT-SGHT	Easements: sight distance	
V□-ESMT-SSWR	Easements: sanitary sewer	
V□-ESMT-STRM	Easements: storm sewer	
V□-ESMT-SWMT	Easements: storm water management	
V□-ESMT-TRAL	Easements: trail / path (public access)	
V□-ESMT-UTIL	Easements: utilities	
V□-ESMT-WATR	Easements: water supply	
V□-FLHA	Flood hazard area	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-FUEL	Fuel gas	
V□-FUEL-MHOL	Fuel gas: manhole	
V□-FUEL-PIPE	Fuel gas: above-ground piping	
V□-FUEL-TANK	Fuel gas: storage tanks	
V□-FUEL-UNDR	Fuel gas: underground piping	
V□-NGAS	Natural gas	
V□-NGAS-MHOL	Natural gas: manhole	
V□-NGAS-PIPE	Natural gas: above-ground piping	
V□-NGAS-UNDR	Natural gas: underground piping	
V□-NGAS-TANK	Natural gas: storage tanks	
V□-NODE	Node	
V□-NODE-DASP	Node: description attributes for survey points	
V□-NODE-EASP	Node: elevation attributes for survey points	
V□-NODE-PASP	Node: point number attributes for survey points	
V□-NODE-ABUT	Node: abutment	
V□-NODE-ACTL	Node: aerial horizontal and vertical control points	
V□-NODE-BLIN	Node: baseline	
V□-NODE-BLDG	Node: building points	
V□-NODE-BRDG	Node: bridge survey points	
V□-NODE-BRKL	Node: break lines, spot elev. points and lines for creation of break lines as top of bank	
V□-NODE-BROW	Node: brush row points	
V□-NODE-BRSH	Node: brush points	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-NODE-CABL	Node: underground cable points	
V□-NODE-CNTL	Node: baseline, property line and centerline points	
V□-NODE-CURB	Node: curb points	
V□-NODE-DECK	Node: bridge deck points	
V□-NODE-DRIV	Node: driveway points	
V□-NODE-EXPJ	Node: expansion joint	
V□-NODE-GRND	Node: ground points indicating elevations	
V□-NODE-MRKG	Node: pavement marking points (yellow / white stripes)	
V□-NODE-MHOL	Node: manhole points	
V□-NODE-NGAS	Node: gas line & appurtenances points	
V□-NODE-PIPE	Node: pipe points (driveway / roadway culverts)	
V□-NODE-POLE	Node: pole points (power, telephone, etc.)	
V□-NODE-PVMT	Node: pavement points	
V□-NODE-SIGN	Node: sign	
V□-NODE-SSWR	Node: sanitary sewer and appurtenances points	
V□-NODE-STRM	Node: storm sewer and appurtenances points	
V□-NODE-SWLK	Node: sidewalk points	
V□-NODE-TREE	Node: tree points	
V□-NODE-TROW	Node: tree row points	
V□-NODE-WATR	Node: water line and appurtenances points	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-POWR	Power	
V□-POWR-FENC	Power: fence enclosure	
V□-POWR-INST	Power: instrumentation (meters, transformers)	
V□-POWR-MHOL	Power: manholes	
V□-POWR-OVHD	Power: overhead lines	
V□-POWR-POLE	Power: box / pole	
V□-POWR-STRC	Power: structures	
V□-POWR-UNDR	Power: underground lines	
V□-PRKG	Parking lots	
V□-PRKG-ASPH	Parking lots: asphalt surface	
V□-PRKG-CNTR	Parking lots: centerline	
V□-PRKG-CONC	Parking lots: concrete surface	
V□-PRKG-CURB	Parking lots: curb	
V□-PKNG-DRAIN	Telephone systems: drainage slope indications	
V□-PRKG-FLNE	Parking lots: fire lane	
V□-PRKG-GRVL	Parking lots: gravel surface	
V□-PRKG-MRKG	Parking lots: pavement markings	
V□-PRKG-STRP	Parking lots: striping	
V□-PRKG-UPVD	Parking lots: unpaved surface	
V□-PROP	Property boundary	
V□-PROP-LINE	Property boundary: property lines, survey benchmarks, property corners	
V□-PROP-QTRS	Property boundary: quarter section	
V□-PROP-RSRV	Property boundary: reserve	
V□-PROP-SBCK	Property boundary: setback lines	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-PROP-SECT	Property boundary: section boundary	
V□-PROP-SUBD	Property boundary: subdivision (interior) lines	
V□-PROP-SXTS	Property boundary: sixteenth section	
V□-PVMT	Property boundary: pavement	
V□-PVMT-ASPH	Property boundary: asphalt surface	
V□-PVMT-CONC	Property boundary: concrete surface	
V□-PVMT-GRVL	Property boundary: gravel surface	
V□-RAIL	Railroad	
V□-RAIL-CNTR	Railroad: centerline	
V□-RAIL-EQPM	Railroad: equipment (gates, signals, etc.)	
V□-RAIL-TRAK	Railroad: track	
V□-RIVR	River	
V□-RIVR-BOTM	River: bottom	
V□-RIVR-CNTR	River: centerline	
V□-RIVR-EDGE	River: edge	
V□-RIVR-TOPB	River: top of bank	
V□-ROAD	Roads, streets and highways	
V□-ROAD-ASPH	Roads, streets and highways: asphalt surface	
V□-ROAD-CNTR	Roads, streets and highways: centerline	
V□-ROAD-CONC	Roads, streets and highways: concrete surface	
V□-ROAD-CURB	Roads, streets and highways: curb	
V□-ROAD-FLNE	Roads, streets and highways: fire lane	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-ROAD-GRVL	Roads, streets and highways: gravel surface	
V□-ROAD-MRKG	Roads, streets and highways: pavement markings	
V□-ROAD-UPVD	Roads, streets and highways: unpaved surface	
V□-RRAP	Riprap	
V□-RWAY	Right-of-way	
V□-RWAY-CTLA	Right-of-way: controlled access	
V□-RWAY-CNTR	Right-of-way: centerline	
V□-RWAY-LINE	Right-of-way: lines	
V□-RWAY-LMTA	Right-of-way: limited access	
V□-RWAY-MRKR	Right-of-way: marker	
V□-RWAY-STAN	Right-of-way: stationing	
V□-SITE	Site features	
V□-SITE-EWAT	Site features: edge of water	
V□-SITE-FENC	Site features: fences	
V□-SITE-ROCK	Site features: rocks and rock outcroppings	
V□-SITE-RTWL	Site features: retaining wall	
V□-SITE-SIGN	Site features: signs	
V□-SITE-VEGE	Site features: trees, shrubs, and other vegetation	
V□-SSWR	Sanitary sewer system	
V□-SSWR-MHOL	Sanitary sewer system: manhole	
V□-SSWR-PIPE	Sanitary sewer system: above-ground piping	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-SSWR-STRC	Sanitary sewer system: structures	
V□-SSWR-UNDR	Sanitary sewer system: underground piping	
V□-STEM	Steam system	
V□-STEM-INST	Steam system: instrumentation (meters, valves, pumps)	
V□-STEM-MHOL	Steam system: manhole	
V□-STEM-PIPE	Steam system: above-ground pipe	
V□-STEM-STRC	Steam system: structures	
V□-STEM-UNDR	Steam system: underground piping	
V□-STRM	Storm drainage and sewer system	
V□-STRM-DTCH	Storm drainage and sewer system: ditches and swales	
V□-STRM-MHOL	Storm drainage and sewer system: manhole	
V□-STRM-PIPE	Storm drainage and sewer system: above-ground piping	
V□-STRM-POND	Storm drainage and sewer system: retention pond	
V□-STRM-STRC	Storm drainage and sewer system: structures	
V□-STRM-UNDR	Storm drainage and sewer system: underground	
V□-SURV	Survey	
V□-SURV-DATA	Survey: data	
V□-SURV-LINE	Survey: control Line	
V□-SWLK	Sidewalks	
V□-SWLK-ASPH	Sidewalks: asphalt	
V□-SWLK-CONC	Sidewalks: concrete	

Layer Name	Description	New
Survey/Mapping (continued)		
V□-TOPO	Topography	
V□-TOPO-BORE	Topography: test borings	
V□-TOPO-EWAT	Topography: edge of water	
V□-TOPO-GRID	Topography: coordinate grids	
V□-TOPO-MAJR	Topography: major topographical contours	
V□-TOPO-MINR	Topography: minor topographical contours	
V□-TOPO-SPOT	Topography: spot elevations	
V□-TOPO-SOUN	Topography: soundings	
V□-UNID	Unidentified site objects	
V□-UNID-CABL	Unidentified site objects: cable	
V□-UNID-PIPE	Unidentified site objects: above-ground piping	
V□-UNID-TANK	Unidentified site objects: storage tanks	
V□-UNID-UTIL	Unidentified site objects: utility lines	
V□-UNID-UTIL-OVHD	Unidentified site objects: utility lines: overhead	
V□-UNID-UTIL-UNDR	Unidentified site objects: utility lines: underground	
V□-WATR	Water supply	
V□-WATR-INST	Water supply: instrumentation (meters, valves, pumps)	
V□-WATR-MHOL	Water supply: manhole	
V□-WATR-PIPE	Water supply: above-ground piping	
V□-WATR-STRC	Water supply: structures	
V□-WATR-UNDR	Water supply: underground piping	

Geotechnical Layer List

Geotechnical Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Geotechnical Layer List

Layer Name	Description	New
B□-BORE	Borings	
B□-BORE-FDTA	Borings: field data	
B□-BORE-HOLE	Borings: perc holes	
B□-BORE-LDTA	Borings: laboratory data	
B□-DETL- ANNN	Detail: optional detail number (A = letter, NNN = number between 001 and 999)	
B□-DETL- ANNN -BORE	Detail: optional detail number: borings and perc holes	
B□-DETL- ANNN -CONC	Detail: optional detail number: concrete	
B□-DETL- ANNN -ERTH	Detail: optional detail number: earth	

Geotechnical Discipline Designators

Designator	Description	New
B	Geotechnical	
BJ	User-Defined	
BK	User-Defined	

Layer Name	Description	New
B□-DETL- ANNN -FILL	Detail: optional detail number: fill and cover material	
B□-DETL- ANNN -FDTA	Detail: optional detail number: field data	
B□-DETL- ANNN -GENF	Detail: optional detail number: general features	
B□-DETL- ANNN -GNDW	Detail: optional detail number: ground water	
B□-DETL- ANNN -LDTA	Detail: optional detail number: laboratory data	
B□-DETL- ANNN -PVMT	Detail: optional detail number: pavement	

Layer Name	Description	New
Geotechnical (continued)		
B□-DETL- ANNN -SPCL	Detail: optional detail number: special features	
B□-DETL- ANNN -STRM	Detail: optional detail number: storm water	
B□-DETL- ANNN -SUBS	Detail: optional detail number: sub-surface areas	
B□-DETL- ANNN -SURF	Detail: optional detail number: surface areas	

Civil Works Layer List

Civil Works Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

The Civil Works discipline is defined as large-scale projects that usually cross property boundaries, such as highways, tunnels, dams, utility distribution systems, water supply systems, and sewer systems. The selection of the Civil or Civil Works Discipline Designator is at the discretion of the user, but should generally be used to distinguish projects in terms of scale.

Civil Works Layer List

Layer Name	Description	New

No layer names have been prescribed for this discipline. However, in addition to the rules on page CLG-8 allowing any combination of Discipline Designator, Major Group and Minor Group, the layer names prescribed in the Civil and Survey / Mapping Layer Lists are particularly applicable to the Civil Works Discipline.

Civil Works Discipline Designators

Designator	Description	New
W	Civil Works	
WJ	User-Defined	
WK	User-Defined	

Civil Layer List

Civil Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

The Civil Discipline is defined as a project or a portion of a project that is usually contained within a single property boundary. The selection of the Civil or Civil Works Discipline Designator is at the discretion of the user, but should generally be used to distinguish projects in terms of scale.

Civil Layer List

Layer Name	Description	New
C□-AFLD	Airfields	
C□-AFLD-ASPH	Airfields: asphalt surface	
C□-AFLD-CNTR	Airfields: centerline	
C□-AFLD-CONC	Airfields: concrete surface	

Civil Discipline Designators

Designator	Description	New
C	Civil	
CD	Civil Demolition	
CS	Civil Site	
CG	Civil Grading	
CP	Civil Paving	
CI	Civil Improvements	
CT	Civil Transportation	
CU	Civil Utilities	
CJ	User-Defined	
CK	User-Defined	

Layer Name	Description	New
C□-AFLD-FLNE	Airfields: fire lane	
C□-AFLD-FLNE-MRKG	Airfields: fire lane: pavement markings	
C□-AFLD-FLNE-SIGN	Airfields: fire lane: signage	

Layer Name	Description	New
Civil (continued)		
C□-AFLD-GRVL	Airfields: gravel surface	
C□-AFLD-MRKG	Airfields: pavement markings	
C□-AFLD-SIGN	Airfields: signs	
C□-AFLD-STAN	Airfields: stationing	
C□-AFLD-WHIT	Airfields: white paint	
C□-AFLD-WHIT-TICK	Airfields: white paint: tick marks	
C□-AFLD-YELO	Airfields: yellow paint	
C□-AFLD-YELO-TICK	Airfields: yellow paint: tick marks	
C□-BLDG	Buildings and primary structures	
C□-BLDG-DECK	Buildings and primary structures: outdoor decks (attached, no roof overhead)	
C□-BLDG-OTLN	Buildings and primary structures: outline	
C□-BLDG-OVHD	Buildings and primary structures: overhead (overhang)	
C□-BLDG-PRCH	Buildings and primary structures: porch (attached, roof overhead)	
C□-BLIN	Baseline	
C□-BLIN-STAN	Baseline: stationing	
C□-BORE	Test borings	
C□-BRDG	Bridge	
C□-BRDG-FALT	Bridge: deck fault / break line	
C□-BRDG-CNTJ	Bridge: construction joint	
C□-BRDG-CNTR	Bridge: centerline	
C□-BRDG-DECK	Bridge: deck	
C□-BRDG-EXPJ	Bridge: expansion joint	

Layer Name	Description	New
Civil (continued)		
C□-BRDG-HIDD	Bridge: objects or lines hidden from view	
C□-BRDG-OBJT	Bridge: objects	
C□-BRDG-OBJT-PRIM	Bridge: objects: primary	
C□-BRDG-OBJT-SECD	Bridge: objects: secondary	
C□-BRDG-RBAR	Bridge: reinforcing bar	
C□-CATV	Cable TV	
C□-CATV-OVHD	Cable TV: overhead lines	
C□-CATV-POLE	Cable TV: box / pole	
C□-CATV-UNDR	Cable TV: underground lines	
C□-CEME	Cemetery	
C□-CHAN	Navigable channels	
C□-CHAN-DACL	Navigable channels: de-authorized channel limits, anchorages, etc.	
C□-CHAN-CNTR	Navigable channels: channel centerline and survey report lines	
C□-CHAN-NAID	Navigable channels: navigation aids	
C□-CHAN-DOCK	Navigable channels: decks, docks, floats, piers	
C□-CHAN-BWTR	Navigable channels: breakwater	
C□-COMM	Communications	
C□-COMM-OVHD	Communications: overhead lines	
C□-COMM-POLE	Communications: box / pole	
C□-COMM-UNDR	Communications: underground lines	
C□-CTRL	Control points	
C□-CTRL-BMRK	Control points: benchmarks	
C□-CTRL-FLYS	Control points: fly station	
C□-CTRL-GRID	Control points: grid lines	

Layer Name	Description	New
Civil (continued)		
C□-CTRL-HCPT	Control points: horizontal	
C□-CTRL-HVPT	Control points: horizontal / vertical	
C□-CTRL-PNPT	Control points: panel points	
C□-CTRL-TRAV	Control points: traverse	
C□-CTRL-VCPT	Control points: vertical	
C□-DFLD	Drain fields	
C□-DFLD-OTLN	Drain fields: outline	
C□-DFLD-PROF	Drain fields: profile	
C□-DRIV	Driveways	
C□-DRIV-ASPH	Driveways: asphalt surface	
C□-DRIV-CNTR	Driveways: centerline	
C□-DRIV-CONC	Driveways: concrete surface	
C□-DRIV-CURB	Driveways: curb	
C□-DRIV-CURB-FACE	Driveways: curb: face	
C□-DRIV-CURB-BACK	Driveways: curb: back	
C□-DRIV-FLNE	Driveways: fire lane	
C□-DRIV-FLNE-MRKG	Driveways: fire lane: pavement markings	
C□-DRIV-FLNE-SIGN	Driveways: fire lane: signs	
C□-DRIV-GRVL	Driveways: gravel surface	
C□-DRIV-MRKG	Driveways: pavement markings	
C□-DRIV-SIGN	Driveways: signs	
C□-DRIV-UPVD	Driveways: unpaved surface	
C□-DRIV-WHIT	Driveways: white paint	
C□-DRIV-WHIT-TICK	Driveways: white paint: tick marks	
C□-DRIV-YELO	Driveways: yellow paint	
C□-DRIV-YELO-TICK	Driveways: yellow paint: tick marks	

Layer Name	Description	New
Civil (continued)		
C□-DTCH	Ditches or washes	
C□-DTCH-BOTD	Ditches or washes: bottom	
C□-DTCH-CNTR	Ditches or washes: centerline	
C□-DTCH-EWAT	Ditches or washes: edge of water	
C□-DTCH-TOPD	Ditches or washes: top	
C□-EROS	Erosion and sediment control	
C□-EROS-CIPR	Erosion and sediment control: culvert inlet protection	
C□-EROS-CNTE	Erosion and sediment control: construction entrance	
C□-EROS-DDIV	Erosion and sediment control: drainage divides	
C□-EROS-DVDK	Erosion and sediment control: diversion dike	
C□-EROS-INPR	Erosion and sediment control: inlet protection	
C□-EROS-SILT	Erosion and sediment control: silt fence	
C□-EROS-SSLT	Erosion and sediment control: super silt fence	
C□-ESMT	Easements	
C□-ESMT-ACCS	Easements: access (pedestrian only; private access)	
C□-ESMT-CATV	Easements: utility - cable television	
C□-ESMT-CONS	Easements: conservation	
C□-ESMT-CSTG	Easements: construction / grading	
C□-ESMT-ELEC	Easements: utility - electrical	
C□-ESMT-FDPL	Easements: flood plain	

Layer Name	Description	New
Civil (continued)		
C□-ESMT-INEG	Easements: ingress / egress (vehicles; private access)	
C□-ESMT-LSCP	Easements: landscape	
C□-ESMT-NGAS	Easements: natural gas line	
C□-ESMT-PHON	Easements: telephone line	
C□-ESMT-ROAD	Easements: roadway	
C□-ESMT-ROAD-PERM	Easements: roadway: permanent	
C□-ESMT-ROAD-TEMP	Easements: roadway: temporary	
C□-ESMT-RWAY	Easements: right-of-way (public access)	
C□-ESMT-SGHT	Easements: sight distance	
C□-ESMT-SSWR	Easements: sanitary sewer	
C□-ESMT-STRM	Easements: storm sewer	
C□-ESMT-SWMT	Easements: storm water management	
C□-ESMT-TRAL	Easements: trail or path (public access)	
C□-ESMT-UTIL	Easements: utilities	
C□-ESMT-WATR	Easements: water supply	
C□-FENC	Fences	
C□-FENC-GRAL	Fences: guard rail	
C□-FENC-POST	Fences: posts	
C□-FENC-STEL	Fences: steel (barbed wire and/or chain link)	
C□-FENC-WOOD	Fences: wood	
C□-FIRE	Fire protection system	
C□-FIRE-HYDR	Fire protection system: hydrants and connections	
C□-FIRE-PIPE	Fire protection system: piping	

Layer Name	Description	New
Civil (continued)		
C□-FIRE-UNDR	Fire protection system: underground piping	
C□-FLHA	Flood hazard area	
C□-FLHA-025Y	Flood hazard area: 25 year mark	
C□-FLHA-050Y	Flood hazard area: 50 year mark	
C□-FLHA-100Y	Flood hazard area: 100 year mark	
C□-FLHA-200Y	Flood hazard area: 200 year mark	
C□-FUEL	Fuel gas	
C□-FUEL-EQPM	Fuel gas: equipment (pumps, motors)	
C□-FUEL-INST	Fuel gas: instrumentation (meters, valves, etc.)	
C□-FUEL-MHOL	Fuel gas: manhole	
C□-FUEL-PIPE	Fuel gas: piping	
C□-FUEL-TANK	Fuel gas: storage tanks	
C□-FUEL-UNDR	Fuel gas: underground piping	
C□-LOCN	Limits of construction	
C□-NGAS	Natural gas	
C□-NGAS-EQPM	Natural gas: equipment (pumps, motors)	
C□-NGAS-INST	Natural gas: instrumentation (meters, valves, etc.)	
C□-NGAS-MHOL	Natural gas: manhole	
C□-NGAS-PIPE	Natural gas: piping	
C□-NGAS-TANK	Natural gas: storage tanks	
C□-NGAS-UNDR	Natural gas: underground piping	
C□-PERC	Perc testing	
C□-PERC-HOLE	Perc testing: test holes	
C□-PRKG	Parking lots	

Layer Name	Description	New
Civil (continued)		
C□-PRKG-ASPH	Parking lots: asphalt surface	
C□-PRKG-CARS	Parking lots: cars and other vehicles	
C□-PRKG-CONC	Parking lots: concrete surface	
C□-PRKG-CURB	Parking lots: curb	
C□-PRKG-CURB-FACE	Parking lots: curb: face	
C□-PRKG-CURB-BACK	Parking lots: curb: back	
C□-PRKG-DRAN	Parking lots: drainage slope indications	
C□-PRKG-FIXT	Parking lots: fixtures (wheel stops, parking meters, etc.)	
C□-PRKG-FLNE	Parking lots: fire lane	
C□-PRKG-FLNE-MRKG	Parking lots: fire lane: pavement markings	
C□-PRKG-FLNE-SIGN	Parking lots: fire lane: signage	
C□-PRKG-GRVL	Parking lots: gravel surface	
C□-PRKG-MRKG	Parking lots: pavement markings	
C□-PRKG-SIGN	Parking lots: signs	
C□-PRKG-STRP	Parking lots: striping	
C□-PRKG-UPVD	Parking lots: unpaved surface	
C□-PRKG-WHIT	Parking lots: white paint	
C□-PRKG-WHIT-TICK	Parking lots: white paint: tick marks	
C□-PRKG-YELO	Parking lots: yellow paint	
C□-PRKG-YELO-TICK	Parking lots: yellow paint: tick marks	
C□-POND	Ponds	
C□-POND-EDGE	Ponds: edge	
C□-POND-TOPB	Ponds: top of bank	
C□-POWR	Power	

Layer Name	Description	New
Civil (continued)		
C□-POND-SWAY	Ponds: spillway	
C□-POWR-FENC	Power: enclosure fence	
C□-POWR-INST	Power: instrumentation (meters, transformers)	
C□-POWR-MHOL	Power: manhole	
C□-POWR-OVHD	Power: overhead lines	
C□-POWR-POLE	Power: box / pole	
C□-POWR-STRC	Power: structures	
C□-POWR-UNDR	Power: underground lines	
C□-PROP	Property	
C□-PROP-LINE	Property: property lines, survey benchmarks, property corners	
C□-PROP-SBCK	Property: setback lines	
C□-PVMT	Pavement	
C□-PVMT-ASPH	Pavement: asphalt surface	
C□-PVMT-CONC	Pavement: concrete surface	
C□-PVMT-GRVL	Pavement: gravel surface	
C□-RAIL	Railroad	
C□-RAIL-CNTR	Railroad: centerline	
C□-RAIL-EQPM	Railroad: equipment (gates, signals, etc.)	
C□-RAIL-TRAK	Railroad: track	
C□-RIVR	River	
C□-RIVR-BOTM	River: bottom	
C□-RIVR-CNTR	River: centerline	
C□-RIVR-EDGE	River: edge	
C□-RIVR-TOPB	River: top of bank	

Layer Name	Description	New
Civil (continued)		
C□-ROAD	Roadways	
C□-ROAD-ASPH	Roadways: asphalt surface	
C□-ROAD-CNTR	Roadways: centerline	
C□-ROAD-CONC	Roadways: concrete surface	
C□-ROAD-CURB	Roadways: curb	
C□-ROAD-CURB-FACE	Roadways: curb: face	
C□-ROAD-CURB-BACK	Roadways: curb: back	
C□-ROAD-FLNE	Roadways: fire lane	
C□-ROAD-FLNE-MRKG	Roadways: fire lane: pavement markings	
C□-ROAD-FLNE-SIGN	Roadways: fire lane: signs	
C□-ROAD-GRVL	Roadways: gravel surface	
C□-ROAD-MRKG	Roadways: pavement markings	
C□-ROAD-PROF	Roadways: profile	
C□-ROAD-SIGN	Roadways: signs	
C□-ROAD-STAN	Roadways: stationing	
C□-ROAD-UPVD	Roadways: unpaved surface	
C□-ROAD-WHIT	Roadways: white paint	
C□-ROAD-WHIT-TICK	Roadways: white paint: tick marks	
C□-ROAD-YELO	Roadways: yellow paint	
C□-ROAD-YELO-TICK	Roadways: yellow paint: tick marks	
C□-RRAP	Riprap	
C□-SGHT	Sight distance	
C□-SGHT-PROF	Sight distance: profile	
C□-SOIL	Soils	
C□-SSWR-DIAG	Sanitary sewer: plan diagram	
C□-SSWR-FORC	Sanitary sewer: force main	

Layer Name	Description	New
Civil (continued)		
C□-SSWR	Sanitary sewer	
C□-SSWR-LATL	Sanitary sewer: lateral line	
C□-SSWR-MHOL	Sanitary sewer: manhole	
C□-SSWR-PIPE	Sanitary sewer: piping	
C□-SSWR-PIPE-RCON	Sanitary sewer: piping: reinforced concrete	
C□-SSWR-PIPE-STEL	Sanitary sewer: piping: steel	
C□-SSWR-PROF	Sanitary sewer: profile	
C□-SSWR-STAN	Sanitary sewer: stationing	
C□-SSWR-STRC	Sanitary sewer: structures	
C□-SSWR-UNDR	Sanitary sewer: underground piping	
C□-STEM	Steam system	
C□-STEM-INST	Steam system: instrumentation (meters, valves, etc.)	
C□-STEM-MHOL	Steam system: manhole	
C□-STEM-PIPE	Steam system: piping	
C□-STEM-STRC	Steam system: structures	
C□-STEM-UNDR	Steam system: underground piping	
C□-STRM	Storm sewer	
C□-STRM-CNTR	Storm sewer: centerline	
C□-STRM-DIAG	Storm sewer: plan diagram	
C□-STRM-HWAL	Storm sewer: headwall	
C□-STRM-MHOL	Storm sewer: manhole	
C□-STRM-PIPE	Storm sewer: piping	
C□-STRM-PIPE-RCON	Storm sewer: piping: reinforced concrete	

Layer Name	Description	New
Civil (continued)		
C□-STRM-PIPE-CMTL	Storm sewer: piping: corrugated metal	
C□-STRM-PROF	Storm sewer: profile	
C□-STRM-STAN	Storm sewer: stationing	
C□-STRM-STRC	Storm sewer: structures	
C□-STRM-UNDR	Storm sewer: underground piping	
C□-SWLK	Sidewalks	
C□-SWLK-ASPH	Sidewalks: asphalt	
C□-SWLK-CONC	Sidewalks: concrete	
C□-TINN	Triangulated irregular network	
C□-TINN-BNDY	Triangulated irregular network: boundary	
C□-TINN-FALT	Triangulated irregular network: fault / break lines	
C□-TINN-VIEW	Triangulated irregular network: triangulation	
C□-TINN-VOID	Triangulated irregular network: void regions	
C□-TOPO	Topography	
C□-TOPO-BORE	Topography: test borings	
C□-TOPO-DEPR	Topography: depression contours	
C□-TOPO-MAJR	Topography: major contours	
C□-TOPO-MINR	Topography: minor contours	
C□-TOPO-SPOT	Topography: spot elevations	
C□-TOPO-TPIT	Topography: test pits	
C□-TRAL	Trails or paths	
C□-TRAL-ASPH	Trails or paths: asphalt surface	
C□-TRAL-GRVL	Trails or paths: gravel surface	
C□-TRAL-MRKG	Trails or paths: pavement markings	

Layer Name	Description	New
Civil (continued)		
C□-TRAL-CONC	Trails or paths: concrete surface	
C□-TRAL-SIGN	Trails or paths: signs	
C□-TRAL-UPVD	Trails or paths: unpaved surface	
C□-WALL	Walls	
C□-WALL-SHEA	Walls: structural bearing or shear walls	
C□-WALL-CTLJ	Walls: control joints	
C□-WALL-NSBR	Walls: noise barrier	
C□-WALL-RTWL	Walls: retaining	
C□-WATR	Water supply systems	
C□-WATR-DIAG	Water supply systems: plan diagram	
C□-WATR-INST	Water supply systems: instrumentation (meters, valves, etc.)	
C□-WATR-PIPE	Water supply systems: piping	
C□-WATR-PROF	Water supply systems: profile	
C□-WATR-STAN	Water supply systems: stationing	
C□-WATR-STRC	Water supply systems: structures	
C□-WATR-UNDR	Water supply systems: underground piping	
C□-WATR-WELL	Water supply systems: well	
C□-WETL	Wetlands	

Landscape Layer List

Landscape Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Landscape Layer List

Layer Name	Description	New
L□-ANNO	Annotation	●
L□-ANNO-ALIN	Annotation: alignment stationing	●
L□-ANNO-ALIN-LABL	Annotation: alignment stationing: labels	●
L□-ANNO-ALIN-INFO	Annotation: alignment stationing: information	●
L□-ANNO-CURV-LABL	Annotation: curve: labels	●
L□-ANNO-CURV-TABL	Annotation: curve: tables	●

Landscape Discipline Designators

Designator	Description	New
L	Landscape	
LD	Landscape Demolition	
LI	Landscape Irrigation	
LP	Landscape Planting	
LJ	User-Defined	
LK	User-Defined	

Layer Name	Description	New
L□-ANNO-CURV-TABL-BRDR	Annotation: curve: tables: border	●
L□-ANNO-CURV-TABL-HEDR	Annotation: curve: tables: header	●
L□-ANNO-CURV-TABL-TEXT	Annotation: curve: tables: text	●
L□-ANNO-LINE-LABL	Annotation: line: labels	●
L□-ANNO-LINE-TABL	Annotation: line: tables	●

Layer Name	Description	New
Landscape (continued)		
L□-ANNO-LINE-TABL-BRDR	Annotation: line: tables: border	●
L□-ANNO-LINE-TABL-HEDR	Annotation: line: tables: header	●
L□-ANNO-LINE-TABL-TEXT	Annotation: line: tables: text	●
L□-IRRG	Irrigation	
L□-IRRG-COVR	Irrigation: coverage	
L□-IRRG-DRIP	Irrigation: drip irrigation tubing	●
L□-IRRG-EQPM	Irrigation: equipment (pumps, valves, and controllers)	●
L□-IRRG-LTRL	Irrigation: lateral pipe	●
L□-IRRG-MAIN	Irrigation: mainline	●
L□-IRRG-PIPE	Irrigation: piping	
L□-IRRG-SLVE	Irrigation: pipe sleeve	●
L□-IRRG-SPKL	Irrigation: sprinklers (rotors, heads)	
L□-IRRG-VALV	Irrigation: valves*	●
L□-PLNT	Plant and landscape material	●
L□-PLNT-BEDS	Plant and landscape material: perennial and annual beds	●
L□-PLNT-BUSH	Plant and landscape material: bushes and shrubs	●
L□-PLNT-CONI	Plant and landscape material: coniferous trees	●
L□-PLNT-CTNR	Plant and landscape material: container or planter	●
L□-PLNT-EDGR	Plant and landscape material: planting bed edger	●

Layer Name	Description	New
Landscape (continued)		
L□-PLNT-EVGR	Plant and landscape material: evergreen trees - broadleaf	●
L□-PLNT-GRND	Plant and landscape material: ground covers	●
L□-PLNT-PALM	Plant and landscape material: palm trees	●
L□-PLNT-REMN	Plant and landscape material: material to remain	●
L□-PLNT-REMV	Plant and landscape material: material to be removed	●
L□-PLNT-SEED	Plant and landscape material: seeding areas	●
L□-PLNT-SHAD	Plant and landscape material: shadow area	●
L□-PLNT-SHRB	Plant and landscape material: shrub symbols	●
L□-PLNT-TREE	Plant and landscape material: trees	●
L□-PLNT-TURF	Plant and landscape material: lawn areas	●
L□-PLNT-PLTS	Plant and landscape material: planting plants	●
L□-PLNT-VINE	Plant and landscape material: vines	●
L□-SITE	Site improvements	
L□-SITE-BRDG	Site improvements: bridges (pedestrian)	●
L□-SITE-CURB	Site improvements: curbs	●
L□-SITE-CURB-BACK	Site improvements: curbs: back of curb	●

Layer Name	Description	New
Landscape (continued)		
L□-SITE-CURB-FACE	Site improvements: curbs: face of curb	●
L□-SITE-DECK	Site improvements: raised decks (wood, typ.)	●
L□-SITE-FENC	Site improvements: fencing	●
L□-SITE-FENC-LINK	Site improvements: fencing: chain link	●
L□-SITE-FENC-LINK-04FT	Site improvements: fencing: chain link: four feet high	●
L□-SITE-FENC-LINK-06FT	Site improvements: fencing: chain link: six feet high	●
L□-SITE-FENC-PRVC	Site improvements: fencing: privacy fence	●
L□-SITE-FENC-WOOD	Site improvements: fencing: wood	●
L□-SITE-FURN	Site improvements: furnishings	
L□-SITE-PKNG	Site improvements: parking	●
L□-SITE-PKNG-STRP	Site improvements: parking: paint striping	●
L□-SITE-PLAY	Site improvements: play structures	
L□-SITE-PLAY-EQPM	Site improvements: play structures: equipment	●
L□-SITE-PLAY-ZONE	Site improvements: play structures: fall zones	●
L□-SITE-POOL	Site improvements: pools and spas	
L□-SITE-POOL-BACK	Site improvements: pools and spas: back of pool wall	●
L□-SITE-POOL-FACE	Site improvements: pools and spas: face of pool wall	●
L□-SITE-PVMT	Site improvements: pavement edge	●

Layer Name	Description	New
Landscape (continued)		
L□-SITE-PVMT-ASPH	Site improvements: pavement edge: asphalt	●
L□-SITE-PVMT-BRCK	Site improvements: pavement edge: brick	●
L□-SITE-PVMT-CONC	Site improvements: pavement edge: concrete	●
L□-SITE-PVMT-CONC-AGGR	Site improvements: pavement edge: concrete: exposed aggregate	●
L□-SITE-PVMT-GRAV	Site improvements: pavement edge: gravel	●
L□-SITE-PVMT-JNTC	Site improvements: pavement edge: control joint	●
L□-SITE-PVMT-JNTE	Site improvements: pavement edge: expansion joint (for concrete only)	●
L□-SITE-PVMT-PAVR	Site improvements: pavement edge: unit pavers	●
L□-SITE-PVMT-RAMP	Site improvements: pavement edge: accessible ramp	●
L□-SITE-PVMT-STEP	Site improvements: pavement edge: stair tread	●
L□-SITE-ROAD	Site improvements: edge of road line	●
L□-SITE-RPRP	Site improvements: riprap	●
L□-SITE-SPRT	Site improvements: sports fields	
L□-SITE-SPRT-EQPM	Site improvements: sports fields: equipment	●
L□-SITE-SPRT-PRIM	Site improvements: sports fields: perimeter	●
L□-SITE-STEP	Site improvements: steps	
L□-SITE-RTWL	Site improvements: retaining walls	
L□-SITE-TRAL	Site improvements: trail edge	●

Layer Name	Description	New
Landscape (continued)		
L□-SITE-TRAL-ASPH	Site improvements: trail edge: asphalt	●
L□-SITE-TRAL-CONC	Site improvements: trail edge: concrete	●
L□-SITE-TRAL-GRVL	Site improvements: trail edge: gravel	●
L□-SITE WALK	Site improvements: walks and steps	
L□-SITE WALL	Site improvements: walls	●
L□-SITE WEIR	Site improvements: pool weir	●
L□-TOPO	Proposed grading	●
L□-TOPO-DEPR	Proposed grading: depression	●
L□-TOPO-INDX	Proposed grading: index contour	●
L□-TOPO-INTR	Proposed grading: intermediate contours	●
L□-TOPO-LIMI	Proposed grading: limit of earthwork	●
L□-TOPO-SPOT	Proposed grading: spot elevations	●

Structural Layer List

Structural Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Structural Layer List

Layer Name	Description	New
S□-BEAM	Beams	
S□-BEAM-ALUM	Beams: aluminum	
S□-BEAM-CONC	Beams: concrete	
S□-BEAM-STEL	Beams: steel	
S□-BEAM-WOOD	Beams: wood	
S□-BRAC	Bracing	
S□-BRAC-ALUM	Bracing: aluminum	
S□-BRAC-ALUM-HORZ	Bracing: aluminum: horizontal	

Structural Discipline Designators

Designator	Description	New
S	Structural	
SD	Structural Demolition	
SS	Structural Site	
SB	Structural Substructure	
SF	Structural Framing	
SJ	User-Defined	
SK	User-Defined	

Layer Name	Description	New
S□-BRAC-ALUM-VERT	Bracing: aluminum: vertical	
S□-BRAC-STEL	Bracing: steel	
S□-BRAC-STEL-HORZ	Bracing: steel: horizontal	
S□-BRAC-STEL-VERT	Bracing: steel: vertical	
S□-BRAC-WOOD	Bracing: wood	
S□-BRAC-WOOD-HORZ	Bracing: wood: horizontal	
S□-BRAC-WOOD-VERT	Bracing: wood: vertical	
S□-COLS	Columns	

Layer Name	Description	New
Structural (continued)		
S□-COLS-ALUM	Columns: aluminum	
S□-COLS-CONC	Columns: concrete	
S□-COLS-STEL	Columns: steel	
S□-COLS-WOOD	Columns: wood	
S□-DECK	Structural deck	
S□-DECK-FLOR	Structural deck: floor	
S□-DECK-FLOR-OPNG	Structural deck: floor: openings	
S□-DECK-ROOF	Structural deck: roof	
S□-DECK-ROOF-OPNG	Structural deck: roof: openings	
S□-FNDN	Foundation	
S□-FNDN-FTNG	Foundation: footings	
S□-FNDN-GRBM	Foundation: grade beams	
S□-FNDN-PCAP	Foundation: pile caps	
S□-FNDN-PIER	Foundation: drilled piers	
S□-FNDN-PILE	Foundation: piles	
S□-FNDN-RBAR	Foundation: reinforcing	
S□-GRID	Column grid	
S□-GRID-EXTR	Column grid: exterior columns	
S□-GRID-INTR	Column grid: interior columns	
S□-JNTS	Joints	
S□-JNTS-CNTJ	Joints: construction	
S□-JNTS-CTLJ	Joints: control	
S□-JNTS-EXPJ	Joints: expansion	
S□-JOIS	Joists	
S□-JOIS-BRGX	Joists: bridging	
S□-PROP	Property lines	
S□-SLAB	Slab	

Layer Name	Description	New
Structural (continued)		
S□-SLAB-CONC	Slab: cast-in-place concrete	
S□-SLAB-OPNG	Slab: openings and depressions	
S□-SLAB-OPNX	Slab: opening indication ("x")	
S□-SLAB-EDGE	Slab: edge of slab	
S□-SLAB-STEL	Slab: steel slab	
S□-SLAB-WOOD	Slab: wood	
S□-STRS	Stairs	
S□-STRS-LADD	Stairs: ladders & ladder assemblies	
S□-TRUS	Trusses	
S□-WALL	Walls	
S□-WALL-CMUW	Walls: concrete masonry unit	
S□-WALL-CONC	Walls: cast-in-place concrete	
S□-WALL-MSNW	Walls: masonry	
S□-WALL-PCST	Walls: pre-cast concrete	
S□-WALL-SHEA	Walls: structural shear walls	
S□-WALL-STEL	Walls: steel stud	
S□-WALL-WOOD	Walls: wood	
S□-□□□□-ABLT	Any major group: anchor bolts	
S□-□□□□-METL	Any major group: misc. metals	
S□-□□□□-GRAT	Any major group: grates	
S□-□□□□-GRAT-OVHD	Any major group: grates: overhead	
S□-□□□□-RBAR	Any major group: reinforcing bar	
S□-□□□□-RBAR-BOT1	Any major group: reinforcing bar: bottom group 1	
S□-□□□□-RBAR-BOT2	Any major group: reinforcing bar: bottom group 2	

Layer Name	Description	New
Structural (continued)		
S□-□□□□-RBAR-TOP1	Any major group: reinforcing bar: top group 1	
S□-□□□□-RBAR-TOP2	Any major group: reinforcing bar: top group 2	

Architectural Layer List

Architectural Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Architectural Layer List

Layer Name	Description	New
□□-□□□□-FNSH	Any major group: finishes	
□□-□□□□-CASE	Any major group: casework	
□□-□□□□-FIXT	Any major group: plumbing fixtures	
□□-□□□□-GRID	Any major group: grid	
□□-□□□□-SIGN	Any major group: signs	

Architectural Discipline Designators

Designator	Description	New
A	Architectural	
AS	Architectural Site	
AD	Architectural Demolition	
AE	Architectural Elements	
AI	Architectural Interiors	
AF	Architectural Finishes	
AG	Architectural Graphics	
AJ	User-Defined	
AK	User-Defined	

Layer Name	Description	New
□□-AREA	Area	
□□-AREA-OCCP	Area: occupant or employee names	
□□-CLNG	Ceiling	
□□-CLNG-ACCS	Ceiling: access	
□□-CLNG-OPEN	Ceiling: openings	

Layer Name	Description	New
Architectural (continued)		
A□-CLNG-TEES	Ceiling: main tees	
A□-CLNG-SUSP	Ceiling: suspended elements	
A□-COLS	Columns	
A□-CONV	Conveying systems	
A□-DOOR	Doors	
A□-DOOR-FULL	Doors: full-height (swing and leaf)	
A□-DOOR-PRHT	Doors: partial height (swing and leaf)	
A□-EQPM	Equipment	
A□-EQPM-ACCS	Equipment: access	
A□-EQPM-FIXD	Equipment: fixed equipment	
A□-EQPM-MOVE	Equipment: moveable equipment	
A□-EQPM-NICN	Equipment: not in contract	
A□-EQPM-OVHD	Equipment: overhead	
A□-FLOR	Floor	
A□-FLOR-CASE	Floor: casework	
A□-FLOR-EVTR	Floor: elevator cars and equipment	
A□-FLOR-HRAL	Floor: handrails, guard rails	
A□-FLOR-LEVL	Floor: level changes, ramps, pits, depressions	
A□-FLOR-OTLN	Floor: outline	
A□-FLOR-OVHD	Floor: overhead (objects above)	
A□-FLOR-RAIS	Floor: raised	
A□-FLOR-RISR	Floor: stair risers	
A□-FLOR-SIGN	Floor: signs	
A□-FLOR-SPCL	Floor: specialties (toilet room accessories, display cases)	
A□-FLOR-STRS	Floor: stair treads, escalators, ladders	
A□-FLOR-TPTN	Floor: toilet partitions	

Layer Name	Description	New
Architectural (continued)		
A□-FLOR-WDWK	Floor: architectural woodwork	
A□-FURN	Furnishings	
A□-FURN-FILE	Furnishings: file cabinets	
A□-FURN-FIXD	Furnishings: fixed in place	
A□-FURN-FREE	Furnishings: freestanding	
A□-FURN-PLNT	Furnishings: plants	
A□-FURN-PNLS	Furnishings: system panels	
A□-FURN-SEAT	Furnishings: seating	
A□-FURN-STOR	Furnishings: system storage components	
A□-FURN-WKSF	Furnishings: system work surface components	
A□-GLAZ	Glazing	
A□-GLAZ-FULL	Glazing: full-height	
A□-GLAZ-PRHT	Glazing: partial-height	
A□-GLAZ-SILL	Glazing: window sills	
A□-HVAC	HVAC	
A□-HVAC-SDFF	HVAC: supply diffusers	
A□-HVAC-RDFF	HVAC: return air diffusers	
A□-LITE	Lighting fixtures	
A□-ROOF	Roof	
A□-ROOF-HRAL	Roof: handrails	
A□-ROOF-LEVL	Roof: level changes	
A□-ROOF-OTLN	Roof: outline	
A□-ROOF-RISR	Roof: stair risers	
A□-ROOF-STRS	Roof: stair treads, ladders	
A□-WALL	Walls	
A□-WALL-CAVI	Walls: cavity	

Layer Name	Description	New
Architectural (continued)		
A□-WALL-CNTR	Walls: centerline	
A□-WALL-FIRE	Walls: fire wall	
A□-WALL-FULL	Walls: full-height	
A□-WALL-HEAD	Walls: door and window headers	
A□-WALL-JAMB	Walls: door and window jambs	
A□-WALL-MOVE	Walls: moveable partitions	
A□-WALL-PRHT	Walls: partial-height	
A□-WALL-PATT	Walls: texture or hatch patterns	

Interiors Layer List

Interiors Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Interiors Layer List

Layer Name	Description	New
I□-□□□□-FIXT	Any major group: plumbing fixtures	
I□-□□□□-GRID	Any major group: grid	
I□-□□□□-SIGN	Any major group: signs	
I□-AREA	Area	
I□-AREA-OCCP	Area: occupant or employee names	
I□-CASE	Casework	
I□-CLNG	Ceiling	

Interiors Discipline Designators

Designator	Description	New
I	Interior	
ID	Interior Demolition	
IN	Interior Design	
IF	Interior Furnishings	
IG	Interior Graphics	
IJ	User-Defined	
IK	User-Defined	

Layer Name	Description	New
I□-CLNG-ACCS	Ceiling: access	
I□-CLNG-OPEN	Ceiling: openings	
I□-CLNG-SUSP	Ceiling: suspended elements	
I□-CLNG-TEES	Ceiling: main tees	
I□-COLS	Columns	
I□-DOOR	Doors	
I□-DOOR-FULL	Doors: full-height	

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Layer Name	Description	New
Interiors (continued)		
I□-DOOR-PRHT	Doors: partial height	
I□-EQPM	Equipment	
I□-EQPM-ACCS	Equipment: access	
I□-EQPM-FIXD	Equipment: fixed equipment	
I□-EQPM-MOVE	Equipment: moveable equipment	
I□-EQPM-NICN	Equipment: not in contract	
I□-EQPM-OVHD	Equipment: overhead	
I□-EQPM-STOR	Equipment: storage	
I□-FLOR	Floor	
I□-FLOR-EVTR	Floor: elevator cars and equipment	
I□-FLOR-FIXT	Floor: plumbing fixtures	
I□-FLOR-HRAL	Floor: handrails, guard rails	
I□-FLOR-LEVL	Floor: level changes, ramps, pits, depressions	
I□-FLOR-OTLN	Floor: outline	
I□-FLOR-OVHD	Floor: overhead (objects above)	
I□-FLOR-RAIS	Floor: raised	
I□-FLOR-RISR	Floor: stair risers	
I□-FLOR-SIGN	Floor: signs	
I□-FLOR-STRS	Floor: stair treads, escalators, ladders	
I□-FLOR-SPCL	Floor: architectural specialties (toilet room accessories, display cases)	
I□-FLOR-TPTN	Floor: toilet partitions	
I□-FLOR-WDWK	Floor: architectural woodwork	
I□-FNSH	Finishes	●
I□-FURN	Furnishings	
I□-FURN-FILE	Furnishings: file cabinets	
I□-FURN-FREE	Furnishings: freestanding	

Layer Name	Description	New
Interiors (continued)		
I□-FURN-PLNT	Furnishings: plants	
I□-FURN-PNLS	Furnishings: system panels	
I□-FURN-SEAT	Furnishings: seating	
I□-FURN-STOR	Furnishings: system storage components	
I□-FURN-WKSF	Furnishings: system work surface components	
I□-GLAZ	Glazing	
I□-GLAZ-FULL	Glazing: full-height	
I□-GLAZ-PRHT	Glazing: partial-height	
I□-GLAZ-SILL	Glazing: window sills	
I□-HVAC	HVAC	
I□-HVAC-SDFF	HVAC: supply diffusers	
I□-HVAC-RDFF	HVAC: return air diffusers	
I□-MILL	Millwork	●
I□-PRTN	Partitions	●
I□-PRTN-FULL	Partitions: full-height	●
I□-PRTN-PRHT	Partitions: partial-height	●
I□-PRTN-MOVE	Partitions: moveable partitions	●
I□-PRTN-HEAD	Partitions: door and window headers	●
I□-PRTN-JAMB	Partitions: door and window jambs	●
I□-PRTN-FIRE	Partitions: fire wall	●

Equipment Layer List

Equipment Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Equipment Discipline Designators

Designator	Description	New
Q	Equipment	
QA	Athletic Equipment	
QB	Bank Equipment	
QC	Dry Cleaning Equipment	
QD	Detention Equipment	
QE	Educational Equipment	
QF	Food service Equipment	
QH	Hospital Equipment	
QL	Laboratory Equipment	
QM	Maintenance Equipment	
QP	Parking Lot Equipment	
QR	Retail Equipment	
QS	Site Equipment	
QT	Theatrical Equipment	
QV	Video / Photographic Equipment	
QY	Security Equipment	
QJ	User-Defined	
QK	User-Defined	

Equipment Layer List

Layer Name	Description	New
Q□-□□□□-OTLN	Any major group: outline	
Q□-□□□□-PIPE	Any major group: piping	
Q□-CASE	Casework	●
Q□-CASE-DVDR	Casework: thin dividers	●
Q□-CASE-EDGE	Casework: cabinet and worksurface edging	●
Q□-CASE-ELEV	Casework: casework elevation	●
Q□-CASE-FIXT	Casework: plumbing/service fixtures	●
Q□-CASE-FRAM	Casework: casework structural framing	●
Q□-CASE-FULL	Casework: full height cabinets/lockers	●
Q□-CASE-GLAZ	Casework: casework glazing	●
Q□-CASE-GRND	Casework: cabinet grounds, wall backing	●
Q□-CASE-HRDW	Casework: hardware	●
Q□-CASE-IDEN	Casework: cabinet section/model number	●
Q□-CASE-LOWR	Casework: lower cabinets	●
Q□-CASE-PATT	Casework: casework hatching	●
Q□-CASE-SHLF	Casework: wall mounted shelving	●
Q□-CASE-SUBA	Casework: cabinet sub-assemblies, drawer boxes	●
Q□-CASE-UCTR	Casework: undercounter cabinets-for layout	●
Q□-CASE-UPPR	Casework: upper cabinets	●
Q□-CASE-WKSF	Casework: worksurface	●

Layer Name	Description	New
Q□-CMPQ	Computer equipment	●
Q□-ELEV-EQPM	Elevation: equipment outlines	●
Q□-ELEV-FIXT	Elevation: plumbing/service fixtures	●
Q□-ELEV-GLAZ	Elevation: glass, glazing hardware	●
Q□-ELEV-HRDW	Elevation: locks, pulls, supports, other hardware	●
Q□-ELEV-OVHD	Elevation: elevation object	●
Q□-ELEV-PATT	Elevation: section hatch	●
Q□-ELEV-STRC	Elevation: structural support components	●
Q□-EXHS	Exhaust	
Q□-MAJQ	Major equipment	●
Q□-MAJQ-ACCS	Major equipment: access and clearance lines	●
Q□-MAJQ-ENGR	Major equipment: engineering information	●
Q□-MAJQ-FIXD	Major equipment: fixed	●
Q□-MAJQ-MOVE	Major equipment: movable	●
Q□-MAJQ-MVNG	Major equipment: moving or suspended	●
Q□-MAJQ-OVHD	Major equipment: overhead or ceiling mounted	●
Q□-MAJQ-PATT	Major equipment: patterns	●
Q□-MAJQ-UCTR	Major equipment: undercounter	●
Q□-MINQ	Minor equipment	●
Q□-NICN	Not in contract equipment	●

Layer Name	Description	New
Equipment (continued)		
Q□-POWR	Power	
Q□-SPCQ	Special equipment	●
Q□-SPCQ-ACCS	Specialized equipment: access and clearance lines	●
Q□-SPCQ-ENGR	Specialized equipment: engineering information	●
Q□-SPCQ-FIXD	Specialized equipment: fixed	●
Q□-SPCQ-MOVE	Specialized equipment: movable	●
Q□-SPCQ-MVNG	Specialized equipment: moving or suspended	●
Q□-SPCQ-OVHD	Specialized equipment: overhead or ceiling mounted	●
Q□-SPCQ-PATT	Specialized equipment: patterns	●
Q□-SPCQ-UCTR	Specialized equipment: undercounter	●

Fire Protection Layer List

Fire Protection Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Fire Protection Layer List

Layer Name	Description	New
F□-AFFF	Aqueous film-forming foam system	
F□-AFFF-EQPM	Aqueous film-forming foam system: equipment	
F□-AFFF-PIPE	Aqueous film-forming foam system: piping	
F□-CO2S	CO2 system	
F□-CO2S-EQPM	CO2 system: equipment	
F□-CO2S-PIPE	CO2 system: piping	
F□-HALN	Halon	
F□-HALN-EQPM	Halon: equipment	

FIRE PROTECTION LAYER LIST

Fire Protection Discipline Designators

Designator	Description	New
F	Fire Protection	
FA	Fire Detection and Alarm	
FX	Fire Suppression	
FJ	User-Defined	
FK	User-Defined	

Layer Name	Description	New
F□-HALN-PIPE	Halon: piping	
F□-IGAS	Inert gas	
F□-IGAS-EQPM	Inert gas: equipment	
F□-IGAS-PIPE	Inert gas: piping	
F□-PROT	Fire protection system	
F□-PROT-ALRM	Fire protection system: alarm	
F□-PROT-EQPM	Fire protection system: equipment	
F□-PROT-SMOK	Fire protection system: smoke detector / heat sensors	
F□-PROT-STAN	Fire protection system: standpipe	

Layer Name	Description	New
Fire Protection (continued)		
F□-SPRN	Sprinkler system	
F□-SPRN-CLHD	Sprinkler system: ceiling heads	
F□-SPRN-EQPM	Sprinkler system: equipment	●
F□-SPRN-OTHD	Sprinkler system: other heads	
F□-SPRN-PIPE	Sprinkler system: piping	
F□-SPRN-STAN	Sprinkler system: standpipe	

Plumbing Layer List

Plumbing Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Plumbing Layer List

Layer Name	Description	New
P□-ACID	Acid waste systems	
P□-ACID-EQPM	Acid waste systems: equipment	●
P□-ACID-PIPE	Acid waste systems: piping	
P□-ACID-VENT	Acid waste systems: vents	●
P□-DOMW	Domestic water systems	

Plumbing Discipline Designators

Designator	Description	New
P	Plumbing	
PS	Plumbing Site	
PD	Plumbing Demolition	
PP	Plumbing Piping	
PQ	Plumbing Equipment	
PL	Plumbing	
PJ	User-Defined	
PK	User-Defined	

Layer Name	Description	New
P□-DOMW-CPIP	Domestic water systems: cold water piping	
P□-DOMW-EQPM	Domestic water systems: equipment	
P□-DOMW-HPIP	Domestic water systems: hot water piping	
P□-DOMW-RISR	Domestic water systems: hot and cold water risers	

Layer Name	Description	New
Plumbing (continued)		
P□-DOMW-RPIP	Domestic water systems: hot water recirculation piping	
P□-MDGS	Medical gas	
P□-MDGS-CAIR	Medical gas: compressed air	
P□-MDGS-EQPM	Medical gas: equipment	
P□-MDGS-NITG	Medical gas: nitrogen	
P□-MDGS-NOXG	Medical gas: nitrous oxide	
P□-MDGS-OXYG	Medical gas: pure O2	
P□-MDGS-PIPE	Medical gas: piping	
P□-MDGS-SAIR	Medical gas: scavenge air	
P□-MDGS-VACU	Medical gas: medical vacuum	
P□-SANR	Sanitary drainage systems	
P□-SANR-PIPE	Sanitary drainage systems: piping	
P□-SANR-FIXT	Sanitary drainage systems: plumbing fixtures	
P□-SANR-FLDR	Sanitary drainage systems: floor drains	
P□-SANR-RISR	Sanitary drainage systems: risers	
P□-SANR-EQPM	Sanitary drainage systems: equipment	
P□-SANR-VENT	Sanitary drainage systems: vent piping	●
P□-STRM	Storm drainage systems	●
P□-STRM-PIPE	Storm drainage systems: piping	●
P□-STRM-RISR	Storm drainage systems: risers	●
P□-STRM-RFDR	Storm drainage systems: roof drains	●

Process Layer List

Process Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Process Discipline Designators

Designator	Description	New
D	Process	
DS	Process Site	
DD	Process Demolition	
DJ	User-Defined	
DK	User-Defined	
DL	Process Liquids	
DG	Process Gases	
DP	Process Piping	
DQ	Process Equipment	
DE	Process Electrical	
DI	Process Instrumentation	
DW	Process Waters	●
DC	Process Chemicals	●
DA	Process Airs	●
DX	Process Exhaust	●
DR	Process Drains and Reclaims	●
DM	Process HPM Gases	●
DY	Process Slurry	●
DO	Process Oils	●
DV	Process Vacuum	●

Process Layer List

Layer Name	Description	New
Process (continued)		
D□-□□□□-□□□□-ANNO	Any major group: any minor group: notes, callouts, specifications	●
D□-□□□□-□□□□-BOLD	Any major group: any minor group: heavy	●
D□-□□□□-□□□□-CNTR	Any major group: any minor group: center line	●
D□-□□□□-□□□□-DIMS	Any major group: any minor group: dimensions	●
D□-□□□□-□□□□-EQPM	Any major group: any minor group: equipment	●
D□-□□□□-□□□□-FINE	Any major group: any minor group: light	●
D□-□□□□-□□□□-HDLN	Any major group: any minor group: hidden line	●
D□-□□□□-□□□□-IDEN	Any major group: any minor group: labels, identifiers	●
D□-□□□□-□□□□-MEDM	Any major group: any minor group: medium	●
D□-□□□□-□□□□-MISC	Any major group: any minor group: miscellaneous	●
D□-□□□□-□□□□-PATT	Any major group: any minor group: cross hatch	●
D□-□□□□-□□□□-PHTM	Any major group: any minor group: phantom	●
D□-□□□□-□□□□-PIPE	Any major group: any minor group: piping systems	●
D□-□□□□-□□□□-SPEC	Any major group: any minor group: specialty items	●
D□-□□□□-□□□□-SUPT	Any major group: any minor group: general pipe supports	●

Layer Name	Description	New
Process (continued)		
D□-□□□□-□□□□-UGRD	Any major group: any minor group: underground	●
D□-DETL-BOLD	Details: bold lines	●
D□-DETL-FINE	Details: fine lines	●
D□-DETL-MEDM	Details: medium lines	●
D□-DETL-NPLT	Details: nonplot layer	●
D□-DETL-TEXT	Details: text	●
D□-PAIR-AA~~	Air: agitation air - system	●
D□-PAIR-BA~~	Air: breathable air - system	●
D□-PAIR-CA~~	Air: compressed air - system	●
D□-PAIR-CDA~	Air: clean dry air - system	●
D□-PAIR-HCDA	Air: high pressure clean dry air - system	●
D□-PAIR-IA~~	Air: instrument air - system	●
D□-PAIR-OA~~	Air: outside air - system	●
D□-PAIR-OFA~	Air: oil free air - system	●
D□-PAIR-PA~~	Air: plant air - system	●
D□-PAIR-V~~~	Air: vent - system	●
D□-PCHM-ARC~	Chemical: regenerative caustic - system	●
D□-PCHM-C~~~	Chemical: caustic - system	●
D□-PCHM-DEV~	Chemical: developer - system	●
D□-PCHM-EG~~	Chemical: ethylene glycol - system	●
D□-PCHM-H2O2	Chemical: hydrogen peroxide - system	●
D□-PCHM-HCL~	Chemical: hydrochloric acid - system	●
D□-PCHM-HF~~	Chemical: hydrofluoric acid - system	●
D□-PCHM-IPA~	Chemical: isopropyl alcohol - system	●

Layer Name	Description	New
Process (continued)		
D□-PCHM-PHOS	Chemical: phosphoric acid - system	●
D□-PCHM-RER~	Chemical: solvent - system	●
D□-PCHM-SULF	Chemical: sulfuric acid - system	●
D□-PCHM-TMAH	Chemical: tmah - system	●
D□-PDRN-AMW~	Drains: ammonia waste - system	●
D□-PDRN-CD~~	Drains: condensate drain - system	●
D□-PDRN-CLW~	Drains: concentrated lead waste - system	●
D□-PDRN-CMW~	Drains: concentrated metals waste - system	●
D□-PDRN-CUPW	Drains: copper plating waste - system	●
D□-PDRN-CURW	Drains: copper rinse waste - system	●
D□-PDRN-CUSW	Drains: copper slurry waste - system	●
D□-PDRN-DIRC	Drains: di reclaim - system	●
D□-PDRN-DLW~	Drains: dilute waste - system	●
D□-PDRN-EGW~	Drains: ethylene glycol waste - system	●
D□-PDRN-HFW~	Drains: hydrofluoric waste - system	●
D□-PDRN-IW~~	Drains: industrial waste - system	●
D□-PDRN-MW~~	Drains: metals waste - system	●
D□-PDRN-NPWR	Drains: non-potable water reuse - system	●
D□-PDRN-OIW~	Drains: organic industrial waste - system	●
D□-PDRN-OLW~	Drains: organic liquid waste - system	●
D□-PDRN-OSW~	Drains: organic solvent waste - system	●
D□-PDRN-PHRC	Drains: phosphoric acid reclaim - system	●
D□-PDRN-PSW~	Drains: photo solvent waste - system	●

Layer Name	Description	New
Process (continued)		
D□-PDRN-SDD~	Drains: scrubber duct drains - system	●
D□-PDRN-SLW~	Drains: slurry waste - system	●
D□-PDRN-SULF	Drains: sulfuric acid waste - system	●
D□-PDRN-SULR	Drains: sulfuric acid reclaim - system	●
D□-PDRN-SW~~	Drains: solvent waste - system	●
D□-PDRN-SWF~	Drains: solvent waste flammable - system	●
D□-PDRN-SWNF	Drains: solvent waste non-flammable - system	●
D□-PEXH-AMEX	Exhaust: ammonia exhaust - system	●
D□-PEXH-AREX	Exhaust: arsenic exhaust - system	●
D□-PEXH-HTEX	Exhaust: heat exhaust - system	●
D□-PEXH-SCEX	Exhaust: scrubber exhaust - system	●
D□-PEXH-SVEX	Exhaust: solvent exhaust - system	●
D□-PGAS-AR~~	Gas: argon - system	●
D□-PGAS-ARB~	Gas: argon bulk - system	●
D□-PGAS-BUT~	Gas: butane - system	●
D□-PGAS-CLG~	Gas: chlorine gas - system	●
D□-PGAS-H2~~	Gas: hydrogen - system	●
D□-PGAS-HE~~	Gas: helium - system	●
D□-PGAS-HPN2	Gas: high purity nitrogen - system	●
D□-PGAS-HPO2	Gas: high purity oxygen - system	●
D□-PGAS-LCHE	Gas: leak check helium - system	●
D□-PGAS-N2~~	Gas: nitrogen - system	●
D□-PGAS-N2O~	Gas: nitrous oxide - system	●
D□-PGAS-NG~~	Gas: natural gas - system	●
D□-PGAS-O2~~	Gas: oxygen - system	●
D□-PGAS-PRO~	Gas: propane - system	●
D□-PGAS-SG~~	Gas: specialty gas - system	●
D□-PGAS-UN2~	Gas: utility nitrogen - system	●

Layer Name	Description	New
Process (continued)		
D□-PGAS-VN2~	Gas: venturi nitrogen - system	●
D□-PGAS-WAR~	Gas: weld argon - system	●
D□-PIPE-CNTR	General: center line	●
D□-PIPE-EQPM	General: equipment	●
D□-PIPE-HDLN	General: hidden line	●
D□-PIPE-IDEN	General: labels & identifiers	●
D□-PIPE-MISC	General: misc.	●
D□-PIPE-PATT	General: crosshatch	●
D□-PIPE-PIPE	General: piping systems	●
D□-PIPE-UGRD	General: underground	●
D□-PLQD-LPG~	Liquid: liquid petroleum gas - system	●
D□-POIL-LO~~	Oil: lube oil - system	●
D□-PSLR-SLR~	Slurry: slurry return - system	●
D□-PSLR-SLS~	Slurry: slurry supply - system	●
D□-PVAC-CLV~	Vacuum: chlorine vacuum - system	●
D□-PVAC-CV~~	Vacuum: chemical vacuum - system	●
D□-PVAC-EV~~	Vacuum: equipment vacuum - system	●
D□-PVAC-HV~~	Vacuum: house vacuum - system	●
D□-PVAC-HVA~	Vacuum: arsenic house vacuum - system	●
D□-PVAC-PV~~	Vacuum: vacuum - system	●
D□-PWTR-BFW~	Water: boiler feed water - system	●
D□-PWTR-DIR~	Water: deionized water return - system	●
D□-PWTR-DIS~	Water: deionized water supply - system	●
D□-PWTR-DIWP	Water: di polishing loop - system	●
D□-PWTR-FW~~	Water: fire water - system	●
D□-PWTR-HDIR	Water: hot di return - system	●
D□-PWTR-HDIS	Water: hot di supply - system	●

Layer Name	Description	New
Process (continued)		
D□-PWTR-HDRC	Water: hot di reclaim - system	●
D□-PWTR-HPDR	Water: high ph di return - system	●
D□-PWTR-HPDS	Water: high ph di supply - system	●
D□-PWTR-ICW~	Water: industrial city water - system	●
D□-PWTR-NPW~	Water: non-potable water - system	●
D□-PWTR-PCWR	Water: cooling water return - system	●
D□-PWTR-PCWS	Water: cooling water supply - system	●
D□-PWTR-PW~~	Water: potable water - system	●
D□-PWTR-RO~~	Water: reverse osmosis water - system	●
D□-PWTR-ROR~	Water: reverse osmosis reject water - system	●
D□-PWTR-TDIR	Water: tempered di return - system	●
D□-PWTR-TDIS	Water: tempered di supply - system	●
D□-PWTR-TW~~	Water: tempered water - system	●
D□-PWTR-UPRW	Water: ultra pure recycle water - system	●
D□-PWTR-UPW~	Water: ultra pure water - system	●

Mechanical Layer List

Mechanical Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Mechanical Discipline Designators

Designator	Description	New
M	Mechanical	
MS	Mechanical Site	
MD	Mechanical Demolition	
MH	Mechanical HVAC	
MP	Mechanical Piping	
MI	Mechanical Instrumentation	
MJ	User-Defined	
MK	User-Defined	

Mechanical Layer List

Layer Name	Description	New
M□-ANNO	Annotation	●
M□-ANNO-DLTA	Annotation: revision delta	●
M□-ANNO-TTLB	Annotation: titleblock	●
M□-ANNO-TTLB-PROS	Annotation: titleblock: date/time/file name stamp	●
M□-BRIN	Brine systems	

Layer Name	Description	New
M□-BRIN-EQPM	Brine systems: equipment	
M□-BRIN-PIPE	Brine systems: piping	
M□-CHIM	Chimneys and stacks	
M□-CMPA	Compressed / processed air systems	
M□-CMPA-ANNO	Compressed / processed air systems: annotation	●

Layer Name	Description	New
Mechanical (continued)		
M□-CMPA-EQPM	Compressed air systems: equipment	●
M□-CMPA-PIPE	Compressed air systems: piping	
M□-CMPA-PEQP	Compressed air systems: process equipment	
M□-CMPA-PPIP	Compressed air systems: process piping	
M□-CNDW	Condenser water systems	
M□-CNDW-ANNO	Condenser water systems: annotation	●
M□-CNDW-CONP	Condenser water systems: condensate piping	●
M□-CNDW-EQPM	Condenser water systems: equipment	
M□-CNDW-PIPE	Condenser water systems: piping	●
M□-CNDW-RETN	Condenser water systems: return	●
M□-CNDW-RETN-PIPE	Condenser water systems: return: piping	●
M□-CNDW-RETN-SKCH	Condenser water systems: return: sketch	●
M□-CNDW-SUPP	Condenser water systems: supply	●
M□-CNDW-SUPP-PIPE	Condenser water systems: supply: piping	●
M□-CNDW-SUPP-SKCH	Condenser water systems: supply: sketch	●
M□-CNDW-SYMB	Condenser water systems: symbol	●
M□-CONT	Controls and instrumentation	
M□-CONT-THER	Controls and instrumentation: thermostats	
M□-CONT-WIRE	Controls and instrumentation: low voltage wiring	
M□-CWTR	Chilled water systems	

Layer Name	Description	New
Mechanical (continued)		
M□-CWTR-ANNO	Chilled water systems: annotation	●
M□-CWTR-CONP	Chilled water systems: condensate piping	●
M□-CWTR-PIPE	Chilled water systems: piping	
M□-CWTR-EQPM	Chilled water systems: equipment	
M□-CWTR-RETN	Chilled water systems: return	●
M□-CWTR-RETN-PIPE	Chilled water systems: return: piping	●
M□-CWTR-RETN-SKCH	Chilled water systems: return: sketch	●
M□-CWTR-SUPP	Chilled water systems: supply	●
M□-CWTR-SUPP-PIPE	Chilled water systems: supply: piping	●
M□-CWTR-SUPP-SKCH	Chilled water systems: supply: sketch	●
M□-CWTR-SYMB	Chilled water systems: symbols	●
M□-DOMW	Domestic water systems	●
M□-DOMW-ANNO	Domestic water systems: annotation	●
M□-DOMW-MKUP	Domestic water systems: make-up water	●
M□-DUAL	Dual temperature systems	●
M□-DUAL-ANNO	Dual temperature systems: annotation	●
M□-DUAL-RETN	Dual temperature systems: return	●
M□-DUAL-RETN-PIPE	Dual temperature systems: return: piping	●
M□-DUAL-RETN-SKCH	Dual temperature systems: return: sketch	●
M□-DUAL-SUPP	Dual temperature systems: supply	●
M□-DUAL-SUPP-PIPE	Dual temperature systems: supply: piping	●
M□-DUAL-SUPP-SKCH	Dual temperature systems: supply: sketch	●

Layer Name	Description	New
Mechanical (continued)		
M□-DUAL-SYMB	Dual temperature systems: symbols	●
M□-DUST	Dust and fume collection systems	
M□-DUST-DUCT	Dust and fume collection systems: ductwork	
M□-DUST-EQPM	Dust and fume collection systems: equipment	
M□-ELHT	Electric heat	
M□-ELHT-EQPM	Electric heat: equipment	
M□-ENER	Energy management systems	
M□-ENER-EQPM	Energy management systems: equipment	
M□-ENER-WIRE	Energy management systems: wiring	
M□-EXHS	Exhaust system	
M□-EXHS-CDFF	Exhaust system: ceiling diffusers	
M□-EXHS-DUCT	Exhaust system: ductwork	
M□-EXHS-EQPM	Exhaust system: equipment	
M□-EXHS-RFEQ	Exhaust system: rooftop equipment	
M□-FUEL	Fuel systems	
M□-FUEL-EQPM	Fuel systems: equipment	
M□-FUEL-GGEP	Fuel systems: gas general piping	
M□-FUEL-GGEP-ANNO	Fuel systems: gas general piping: annotation	●
M□-FUEL-GGEP-HPIP	Fuel systems: gas general piping: high pressure	●
M□-FUEL-GGEP-LPIP	Fuel systems: gas general piping: low pressure	●
M□-FUEL-GGEP-LQPG	Fuel systems: gas general piping: liquid petroleum gas	●

Layer Name	Description	New
Mechanical (continued)		
M□-FUEL-GGEP-MPIP	Fuel systems: gas general piping: medium pressure	●
M□-FUEL-GPRP	Fuel systems: gas process piping	
M□-FUEL-OPRP	Fuel systems: oil process piping	
M□-FUEL-OGEP	Fuel systems: oil general piping	
M□-FUEL-OGEP-ANNO	Fuel systems: oil general piping: annotation	●
M□-FUEL-OGEP-DISC	Fuel systems: oil general piping: discharge	●
M□-FUEL-OGEP-FLLW	Fuel systems: oil general piping: flow	●
M□-FUEL-OGEP-GAGE	Fuel systems: oil general piping: gauge	●
M□-FUEL-OGEP-RETN	Fuel systems: oil general piping: return	●
M□-FUEL-OGEP-SUPP	Fuel systems: oil general piping: supply	●
M□-FUEL-OGEP-VENT	Fuel systems: oil general piping: vent	●
M□-FUEL-RPIP	Fuel systems: return piping	●
M□-FUEL-SPIP	Fuel systems: supply piping	●
M□-FUME	Fume hood	
M□-FUME-DUCT	Fume hood: exhaust ductwork	●
M□-FUME-EQPM	Fume hood: equipment	
M□-GLYC	Glycol systems	●
M□-GLYC-ANNO	Glycol systems: annotation	●
M□-GLYC-RETN	Glycol systems: return	●
M□-GLYC-RETN-PIPE	Glycol systems: return: piping	●
M□-GLYC-RETN-SKCH	Glycol systems: return: sketch	●
M□-GLYC-SUPP	Glycol systems: supply	●

Layer Name	Description	New
Mechanical (continued)		
M□-GLYC-SUPP-PIPE	Glycol systems: supply: piping	●
M□-GLYC-SUPP-SKCH	Glycol systems: supply: sketch	●
M□-GLYC-SYMB	Glycol systems: symbol	●
M□-HOTW	Hot water heating system	
M□-HOTW-ANNO	Hot water heating system: annotation	●
M□-HOTW-EQPM	Hot water heating system: equipment	
M□-HOTW-PIPE	Hot water heating system: piping	
M□-HOTW-RETN	Hot water heating system: return	●
M□-HOTW-RETN-PIPE	Hot water heating system: return: piping	●
M□-HOTW-RETN-SKCH	Hot water heating system: return: sketch	●
M□-HOTW-SUPP	Hot water heating system: supply	●
M□-HOTW-SUPP-PIPE	Hot water heating system: supply: piping	●
M□-HOTW-SUPP-SKCH	Hot water heating system: supply: sketch	●
M□-HOTW-SYMB	Hot water heating system: symbol	●
M□-HVAC	HVAC systems	
M□-HVAC-ANNO	HVAC systems: annotation	●
M□-HVAC-BOXD	HVAC systems: mixing box, dual duct	●
M□-HVAC-BOXS	HVAC systems: mixing box, single duct	●
M□-HVAC-CDFF	HVAC systems: ceiling diffusers	
M□-HVAC-CLDA	HVAC systems: cold air	●
M□-HVAC-CLDA-ANNO	HVAC systems: cold air: annotation	●
M□-HVAC-CLDA-DUCT	HVAC systems: cold air: ductwork	●

Layer Name	Description	New
Mechanical (continued)		
M□-HVAC-CLDA-EQPM	HVAC systems: cold air: ductwork equipment	●
M□-HVAC-CLDA-RSCH	HVAC systems: cold air: sketch line round or oval duct	●
M□-HVAC-CLDA-SECT	HVAC systems: cold air: ductwork section	●
M□-HVAC-CLDA-SIZE	HVAC systems: cold air: ductwork size	●
M□-HVAC-CLDA-SSCH	HVAC systems: cold air: sketch line rectangular duct	●
M□-HVAC-DMPR	HVAC systems: fire, smoke, volume damper	●
M□-HVAC-DOOR	HVAC systems: equipment doors	
M□-HVAC-EFAN	HVAC systems: equipment with electric fans	●
M□-HVAC-EPDU	HVAC systems: equipment with piping, ductwork and electricity	●
M□-HVAC-EPIP	HVAC systems: equipment with piping and electricity	●
M□-HVAC-EQPM	HVAC systems: equipment	
M□-HVAC-EXHS	HVAC systems: exhaust air	●
M□-HVAC-EXHS-ANNO	HVAC systems: exhaust air: annotation	●
M□-HVAC-EXHS-DUCT	HVAC systems: exhaust air: ductwork	●
M□-HVAC-EXHS-EQPM	HVAC systems: exhaust air: ductwork equipment	●
M□-HVAC-EXHS-GRIL	HVAC systems: exhaust air: grilles	●
M□-HVAC-EXHS-RSCH	HVAC systems: exhaust air: sketch line round or oval duct	●

Layer Name	Description	New
Mechanical (continued)		
M□-HVAC-EXHS-SECT	HVAC systems: exhaust air: ductwork section	●
M□-HVAC-EXHS-SIZE	HVAC systems: exhaust air: ductwork size	●
M□-HVAC-EXHS-SSCH	HVAC systems: exhaust air: sketch line rectangular duct	●
M□-HVAC-HOTA	HVAC systems: hot air	●
M□-HVAC-HOTA-ANNO	HVAC systems: hot air: annotation	●
M□-HVAC-HOTA-DUCT	HVAC systems: hot air: ductwork	●
M□-HVAC-HOTA-EQPM	HVAC systems: hot air: ductwork equipment	●
M□-HVAC-HOTA-RSCH	HVAC systems: hot air: sketch line round or oval duct	●
M□-HVAC-HOTA-SECT	HVAC systems: hot air: ductwork section	●
M□-HVAC-HOTA-SIZE	HVAC systems: hot air: ductwork size	●
M□-HVAC-HOTA-SSCH	HVAC systems: hot air: sketch line rectangular duct	●
M□-HVAC-IDEN	HVAC systems: identification tags	●
M□-HVAC-ODFF	HVAC systems: other diffusers	
M□-HVAC-PIPE	HVAC systems: piping	●
M□-HVAC-RDFF	HVAC systems: return air diffusers	
M□-HVAC-RDFF-IDEN	HVAC systems: return air diffusers: identification tags	●
M□-HVAC-RETN	HVAC systems: return ductwork	
M□-HVAC-RETN-ANNO	HVAC systems: return ductwork: annotation	●
M□-HVAC-RETN-DUCT	HVAC systems: return ductwork: ductwork	●

Layer Name	Description	New
Mechanical (continued)		
M□-HVAC-RETN-EQPM	HVAC systems: return ductwork: equipment	●
M□-HVAC-RETN-RSCH	HVAC systems: return ductwork: sketch line round or oval duct	●
M□-HVAC-RETN-SECT	HVAC systems: return ductwork: ductwork section	●
M□-HVAC-RETN-SIZE	HVAC systems: return ductwork: ductwork size	●
M□-HVAC-RETN-SSCH	HVAC systems: return ductwork: sketch line rectangular duct	●
M□-HVAC-SUPP	HVAC systems: supply ductwork	
M□-HVAC-SUPP-ANNO	HVAC systems: supply ductwork: annotation	●
M□-HVAC-SUPP-DUCT	HVAC systems: supply ductwork: ductwork	●
M□-HVAC-SUPP-EQPM	HVAC systems: supply ductwork: equipment	●
M□-HVAC-SUPP-RSCH	HVAC systems: supply ductwork: sketch line round or oval duct	●
M□-HVAC-SUPP-SECT	HVAC systems: supply ductwork: ductwork section	●
M□-HVAC-SUPP-SIZE	HVAC systems: supply ductwork: ductwork size	●
M□-HVAC-SUPP-SSCH	HVAC systems: supply ductwork: sketch line rectangular duct	●
M□-HVAC-SDFF	HVAC systems: supply diffusers	
M□-HVAC-SDFF-IDEN	HVAC systems: supply diffusers: identification tags	●
M□-LGAS	Laboratory gas systems	

Layer Name	Description	New
Mechanical (continued)		
M□-LGAS-EQPM	Laboratory gas systems: equipment	
M□-LGAS-PIPE	Laboratory gas systems: piping	
M□-MACH	Machine shop	
M□-MDGS	Medical gas	
M□-MDGS-CAIR	Medical gas: compressed air	
M□-MDGS-EQPM	Medical gas: equipment	
M□-MDGS-NITG	Medical gas: nitrogen	
M□-MDGS-NOXG	Medical gas: nitrous oxide	
M□-MDGS-OXYG	Medical gas: pure O2	
M□-MDGS-PIPE	Medical gas: piping	
M□-MDGS-SAIR	Medical gas: scavenge air	
M□-MDGS-VACU	Medical gas: medical vacuum	
M□-MKUP	Make-up air systems	
M□-MKUP-CDFF	Make-up air systems: ceiling diffusers	
M□-MKUP-DUCT	Make-up air systems: supply ducts	
M□-MKUP-EQPM	Make-up air systems: equipment	
M□-MPIP	Miscellaneous piping systems	●
M□-MPIP-ANNO	Miscellaneous piping systems: annotation	●
M□-MPIP-IDEN	Miscellaneous piping systems: identification tags	●
M□-MPIP-PIPE	Miscellaneous piping systems: piping	●
M□-MPIP-SYMB	Miscellaneous piping systems: symbols	●
M□-NGAS	Natural gas systems	
M□-NGAS-EQPM	Natural gas systems: equipment	
M□-NGAS-PIPE	Natural gas systems: piping	

Layer Name	Description	New
Mechanical (continued)		
M□-PROC	Process systems	
M□-PROC-EQPM	Process systems: equipment	
M□-PROC-PIPE	Process systems: piping	
M□-RAIR	Relief air systems	
M□-RCOV	Energy recovery systems	
M□-RCOV-EQPM	Energy recovery systems: equipment	
M□-RCOV-PIPE	Energy recovery systems: piping	
M□-REFG	Refrigeration systems	
M□-REFG-ANNO	Refrigeration systems: annotation	●
M□-REFG-DISC	Refrigeration systems: discharge	●
M□-REFG-EQPM	Refrigeration systems: equipment	
M□-REFG-PIPE	Refrigeration systems: piping	
M□-REFG-RETN	Refrigeration systems: return	●
M□-REFG-SUPP	Refrigeration systems: supply	●
M□-SMOK	Smoke extraction systems	
M□-SMOK-CDFF	Smoke extraction systems: ceiling diffusers	
M□-SMOK-DUCT	Smoke extraction systems: duct	
M□-SMOK-EQPM	Smoke extraction systems: equipment	
M□-SPCL	Special systems	
M□-SPCL-EQPM	Special systems: equipment	
M□-SPCL-PIPE	Special systems: piping	
M□-STEM	Steam systems	
M□-STEM-ANNO	Steam systems: annotation	●
M□-STEM-BLBD	Steam systems: boiler blow down piping	●

Layer Name	Description	New
Mechanical (continued)		
M□-STEM-BLBD-PIPE	Steam systems: boiler blow down piping: piping	●
M□-STEM-CONP	Steam systems: condensate piping	
M□-STEM-CONP-PIPE	Steam systems: condensate piping: piping	●
M□-STEM-CONP-SKCH	Steam systems: condensate piping: sketch	●
M□-STEM-EQPM	Steam systems: equipment	
M□-STEM-HPIP	Steam systems: high-pressure steam piping	
M□-STEM-HPIP-PIPE	Steam systems: high-pressure steam piping: piping	●
M□-STEM-HPIP-SKCH	Steam systems: high-pressure steam piping: sketch	●
M□-STEM-LPIP	Steam systems: low-pressure steam piping	
M□-STEM-LPIP-PIPE	Steam systems: low-pressure steam piping: piping	●
M□-STEM-LPIP-SKCH	Steam systems: low-pressure steam piping: sketch	●
M□-STEM-MPIP	Steam systems: medium-pressure steam piping	
M□-STEM-MPIP-PIPE	Steam systems: medium-pressure steam piping: piping	●
M□-STEM-MPIP-SKCH	Steam systems: medium-pressure steam piping: sketch	●
M□-STEM-SYMB	Steam systems: symbols	●
M□-TEST	Test equipment	

Electrical Layer List

Electrical Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Electrical Layer List

Layer Name	Description	New
EQ-□□□□-1LIN	Any major group: one-line diagrams	
EQ-□□□□-RISR	Any major group: riser diagram	
EQ-ALRM	Alarm system	
EQ-AUXL	Auxiliary systems	

Electrical Discipline Designators

Designator	Description	New
E	Electrical	
ES	Electrical Site	
ED	Electrical Demolition	
EP	Electrical Power	
EL	Electrical Lighting	
EI	Electrical Instrumentation	
ET	Electrical Telecommunications	
EY	Electrical Auxiliary Systems	
EJ	User-Defined	
EK	User-Defined	

Layer Name	Description	New
EQ-BELL	Bell system	
EQ-CABL	Cable system	●
EQ-CABL-ANNO	Cable system: annotation	●
EQ-CABL-ANNO-KEYN	Cable system: annotation: keynotes	●

Layer Name	Description	New
Electrical (continued)		
E□-CABL-ANNO-NOTE	Cable system: annotation: notes	●
E□-CABL-COAX	Cable system: coax cable	●
E□-CABL-FIBR	Cable system: fiber optics cable	●
E□-CABL-MULT	Cable system: multi-conductor cable	●
E□-CABL-REVC	Cable system: revision clouds	●
E□-CABL-REVS	Cable system: revisions	●
E□-CABL-TRAY	Cable system: cabletray and wireways	●
E□-CCTV	Closed-circuit TV	
E□-CLOK	Clock system	
E□-CLOK-ANNO	Clock system: annotation	●
E□-CLOK-ANNO-KEYN	Clock system: annotation: keynotes	●
E□-CLOK-ANNO-NOTE	Clock system: annotation: notes	●
E□-CLOK-CIRC	Clock system: circuits	●
E□-CLOK-CLNG	Clock system: ceiling-mounted	●
E□-CLOK-CNMB	Clock system: circuit numbers	●
E□-CLOK-EQPM	Clock system: equipment	●
E□-CLOK-FLOR	Clock system: floor-mounted	●
E□-CLOK-IDEN	Clock system: identification and text	●
E□-CLOK-REVC	Clock system: revision clouds	●
E□-CLOK-REVS	Clock system: revisions	●
E□-CLOK-WALL	Clock system: wall-mounted	●
E□-COMM	Telephone, communication outlets	
E□-COMM-ANNO	Telephone, communication outlets: annotation	●
E□-COMM-ANNO-KEYN	Telephone, communication outlets: annotation: keynotes	●

Layer Name	Description	New
Electrical (continued)		
E□-COMM-ANNO-NOTE	Telephone, communication outlets: annotation: notes	●
E□-COMM-CIRC	Telephone, communication outlets: circuits	●
E□-COMM-CLNG	Telephone, communication outlets: ceiling-mounted	●
E□-COMM-CNMB	Telephone, communication outlets: circuit numbers	●
E□-COMM-EQPM	Telephone, communication outlets: equipment	●
E□-COMM-IDEN	Telephone, communication outlets: identification and text	●
E□-COMM-REVC	Telephone, communication outlets: revision clouds	●
E□-COMM-REVS	Telephone, communication outlets: revisions	●
E□-COMM-WALL	Telephone, communication outlets: wall-mounted	●
E□-CTRL	Control systems	
E□-CTRL-DEVC	Control systems: devices	
E□-CTRL-WIRE	Control systems: wiring	
E□-DATA	Data outlets	
E□-DATA-ANNO	Data outlets: annotation	●
E□-DATA-ANNO-KEYN	Data outlets: annotation: keynotes	●
E□-DATA-ANNO-NOTE	Data outlets: annotation: notes	●
E□-DATA-CIRC	Data outlets: circuits	●
E□-DATA-CLNG	Data outlets: ceiling-mounted	●
E□-DATA-CNMB	Data outlets: circuit numbers	●
E□-DATA-EQPM	Data outlets: equipment	●

Layer Name	Description	New
Electrical (continued)		
E□-DATA-FLOR	Data outlets: floor-mounted	●
E□-DATA-IDEN	Data outlets: identification and text	●
E□-DATA-REVC	Data outlets: revision clouds	●
E□-DATA-REVS	Data outlets: revisions	●
E□-DATA-WALL	Data outlets: wall-mounted	●
E□-DIAG	Diagrams	●
E□-DIAG-ANNO	Diagrams: annotation	●
E□-DIAG-ANNO-KEYN	Diagrams: annotation: keynotes	●
E□-DIAG-ANNO-NOTE	Diagrams: annotation: notes	●
E□-DIAG-BKRS	Diagrams: breakers	●
E□-DIAG-BUSS	Diagrams: bus duct	●
E□-DIAG-ENCL	Diagrams: equipment enclosures	●
E□-DIAG-EQPM	Diagrams: equipment	●
E□-DIAG-FEED	Diagrams: feeders	●
E□-DIAG-FLOR	Diagrams: floor lines	●
E□-DIAG-GRND	Diagrams: grounding	●
E□-DIAG-REVC	Diagrams: revision clouds	●
E□-DIAG-REVS	Diagrams: revisions	●
E□-DIAG-SWCH	Diagrams: switches	●
E□-DIAG-XFMR	Diagrams: transformers	●
E□-DICT	Central dictation system	
E□-DICT-ANNO	Central dictation system: annotation	●
E□-DICT-ANNO-KEYN	Central dictation system: annotation: keynotes	●
E□-DICT-ANNO-NOTE	Central dictation system: annotation: notes	●
E□-DICT-CIRC	Central dictation system: circuits	●

Layer Name	Description	New
Electrical (continued)		
E□-DICT-CLNG	Central dictation system: ceiling-mounted	●
E□-DICT-CNMB	Central dictation system: circuit numbers	●
E□-DICT-EQPM	Central dictation system: equipment	●
E□-DICT-IDEN	Central dictation system: identification and text	●
E□-DICT-REVC	Central dictation system: revision clouds	●
E□-DICT-REVS	Central dictation system: revisions	●
E□-DICT-WALL	Central dictation system: wall-mounted	●
E□-FIRE	Fire alarm, fire extinguishers	
E□-FIRE-ANNO	Fire alarm, fire extinguishers: annotation	●
E□-FIRE-ANNO-KEYN	Fire alarm, fire extinguishers: annotation: keynotes	●
E□-FIRE-ANNO-NOTE	Fire alarm, fire extinguishers: annotation: notes	●
E□-FIRE-CIRC	Fire alarm, fire extinguishers: circuits	●
E□-FIRE-CLNG	Fire alarm, fire extinguishers: ceiling-mounted	●
E□-FIRE-CNMB	Fire alarm, fire extinguishers: circuit numbers	●
E□-FIRE-EQPM	Fire alarm, fire extinguishers: equipment	●
E□-FIRE-IDEN	Fire alarm, fire extinguishers: identification and text	●
E□-FIRE-REVC	Fire alarm, fire extinguishers: revision clouds	●

Layer Name	Description	New
Electrical (continued)		
E□-FIRE-REVS	Fire alarm, fire extinguishers: revisions	●
E□-FIRE-WALL	Fire alarm, fire extinguishers: wall-mounted	●
E□-GRND	Ground system	
E□-GRND-ANNO	Ground system: annotation	●
E□-GRND-ANNO-KEYN	Ground system: annotation: keynotes	●
E□-GRND-ANNO-NOTE	Ground system: annotation: notes	●
E□-GRND-CIRC	Ground system: circuits	
E□-GRND-CLNG	Ground system: ceiling-mounted	●
E□-GRND-CNMB	Ground system: circuit numbers	●
E□-GRND-DIAG	Ground system: diagram	
E□-GRND-EQPM	Ground system: equipment	●
E□-GRND-IDEN	Ground system: identification and text	●
E□-GRND-REFR	Ground system: reference	
E□-GRND-REVC	Ground system: revision clouds	●
E□-GRND-REVS	Ground system: revisions	●
E□-GRND-WALL	Ground system: wall-mounted	●
E□-GRND-EQUI	Ground system: equipotential	
E□-INST	Instrumentation system	●
E□-INST-ANNO	Instrumentation system: annotation	●
E□-INST-ANNO-KEYN	Instrumentation system: annotation: keynotes	●
E□-INST-ANNO-NOTE	Instrumentation system: annotation: notes	●
E□-INST-CIRC	Instrumentation system: circuits	●
E□-INST-CLNG	Instrumentation system: ceiling-mounted	●

Layer Name	Description	New
Electrical (continued)		
E□-INST-CNMB	Instrumentation system: circuit numbers	●
E□-INST-EQPM	Instrumentation system: equipment	●
E□-INST-IDEN	Instrumentation system: identification and text	●
E□-INST-REVC	Instrumentation system: revision clouds	●
E□-INST-REVS	Instrumentation system: revisions	●
E□-INST-WALL	Instrumentation system: wall-mounted	●
E□-INTC	Intercom system	
E□-LEGN	Legend of symbols	
E□-LITE	Lighting	
E□-LITE-ANNO	Lighting: annotation	●
E□-LITE-ANNO-KEYN	Lighting: annotation: keynotes	●
E□-LITE-ANNO-NOTE	Lighting: annotation: notes	●
E□-LITE-CIRC	Lighting: circuits	
E□-LITE-CIRC-CRIT	Lighting: circuits: critical	●
E□-LITE-CIRC-EMER	Lighting: circuits: emergency	●
E□-LITE-CIRC-NUMB	Lighting: circuits: numbers	
E□-LITE-CLNG	Lighting: ceiling-mounted	
E□-LITE-CLNG-CRIT	Lighting: ceiling-mounted: critical	●
E□-LITE-CLNG-EMER	Lighting: ceiling-mounted: emergency	●
E□-LITE-CLNG-EXIT	Lighting: ceiling-mounted: exit	●
E□-LITE-CNMB	Lighting: circuit numbers	●
E□-LITE-CNMB-CRIT	Lighting: circuit numbers: critical	●
E□-LITE-CNMB-EMER	Lighting: circuit numbers: emergency	●
E□-LITE-EMER	Lighting: emergency	
E□-LITE-EQPM	Lighting: equipment	●

Layer Name	Description	New
Electrical (continued)		
E□-LITE-EQPM-CRIT	Lighting: equipment: critical	●
E□-LITE-EQPM-EMER	Lighting: equipment: emergency	●
E□-LITE-EXIT	Lighting: exit	
E□-LITE-EXTR	Lighting: exterior and site	
E□-LITE-FLOR	Lighting: floor-mounted	
E□-LITE-OTLN	Lighting: outline for background	
E□-LITE-SPCL	Lighting: special	
E□-LITE-REVC	Lighting: revision clouds	●
E□-LITE-REVS	Lighting: revisions	●
E□-LITE-ROOF	Lighting: roof lighting	
E□-LITE-WALL	Lighting: wall-mounted	
E□-LITE-WALL-CRIT	Lighting: wall-mounted: critical	●
E□-LITE-WALL-EMER	Lighting: wall-mounted: emergency	●
E□-LITE-WALL-EXIT	Lighting: wall-mounted: exit	●
E□-LITE-SWCH	Lighting: switches	
E□-LITE-SWCH-CRIT	Lighting: switches: critical	●
E□-LITE-SWCH-EMER	Lighting: switches: emergency	●
E□-LITE-IDEN	Lighting: identification and text	
E□-LITE-IDEN-CRIT	Lighting: identification and text: critical	●
E□-LITE-IDEN-EMER	Lighting: identification and text: emergency	●
E□-LITE-JBOX	Lighting: junction box	
E□-LTNG	Lightning protection system	
E□-LTNG-ANNO	Lightning protection system: annotation	●
E□-LTNG-ANNO-KEYN	Lightning protection system: annotation: keynotes	●

Layer Name	Description	New
Electrical (continued)		
E□-LTNG-ANNO-NOTE	Lightning protection system: annotation: notes	●
E□-LTNG-CIRC	Lightning protection system: circuits	●
E□-LTNG-CLNG	Lightning protection system: ceiling-mounted	●
E□-LTNG-CNMB	Lightning protection system: circuit numbers	●
E□-LTNG-EQPM	Lightning protection system: equipment	●
E□-LTNG-IDEN	Lightning protection system: identification and text	●
E□-LTNG-REVC	Lightning protection system: revision clouds	●
E□-LTNG-REVS	Lightning protection system: revisions	●
E□-LTNG-WALL	Lightning protection system: wall-mounted	●
E□-NURS	Nurse call system	
E□-NURS-ANNO	Nurse call system: annotation	●
E□-NURS-ANNO-KEYN	Nurse call system: annotation: keynotes	●
E□-NURS-ANNO-NOTE	Nurse call system: annotation: notes	●
E□-NURS-CIRC	Nurse call system: circuits	●
E□-NURS-CLNG	Nurse call system: ceiling-mounted	●
E□-NURS-CNMB	Nurse call system: circuit numbers	●
E□-NURS-EQPM	Nurse call system: equipment	●
E□-NURS-FLOR	Nurse call system: floor-mounted	●
E□-NURS-IDEN	Nurse call system: identification and text	●
E□-NURS-REVC	Nurse call system: revision clouds	●

Layer Name	Description	New
Electrical (continued)		
E□-NURS-REVS	Nurse call system: revisions	●
E□-NURS-WALL	Nurse call system: wall-mounted	●
E□-PGNG	Paging system	
E□-POWR	Power	
E□-POWR-ANNO	Power: annotation	●
E□-POWR-ANNO-KEYN	Power: annotation: keynotes	●
E□-POWR-ANNO-NOTE	Power: annotation: notes	●
E□-POWR-BUSW	Power: busways	
E□-POWR-CABL	Power: cable trays	
E□-POWR-CIRC	Power: circuits	
E□-POWR-CIRC-CRIT	Power: circuits: critical	●
E□-POWR-CIRC-NUMB	Power: circuits: numbers	
E□-POWR-CLNG	Power: ceiling-mounted	●
E□-POWR-CLNG-CRIT	Power: ceiling-mounted: critical	●
E□-POWR-CNMB	Power: circuit numbers	●
E□-POWR-CNMB-CRIT	Power: circuit numbers: critical	●
E□-POWR-DEVC	Power: devices	
E□-POWR-EQPM	Power: equipment	
E□-POWR-EQPM-CRIT	Power: equipment: critical	●
E□-POWR-EXTR	Power: exterior	●
E□-POWR-FEED	Power: feeders	
E□-POWR-FLOR	Power: floor-mounted	●
E□-POWR-FLOR-CRIT	Power: floor-mounted: critical	●
E□-POWR-IDEN	Power: identification and text	●
E□-POWR-JBOX	Power: junction box	
E□-POWR-PANL	Power: panels	

Layer Name	Description	New
Electrical (continued)		
E□-POWR-SWBD	Power: switchboards	
E□-POWR-URAC	Power: underfloor raceways	
E□-POWR-UCPT	Power: under-carpet wiring	
E□-POWR-ROOF	Power: roof	
E□-POWR-REVC	Power: revision clouds	●
E□-POWR-REVS	Power: revisions	●
E□-POWR-WALL	Power: wall-mounted	●
E□-POWR-WALL-CRIT	Power: wall-mounted: critical	●
E□-SERT	Security	
E□-SERT-ANNO	Security: annotation	●
E□-SERT-ANNO-KEYN	Security: annotation: keynotes	●
E□-SERT-ANNO-NOTE	Security: annotation: notes	●
E□-SERT-CIRC	Security: circuits	●
E□-SERT-CLNG	Security: ceiling-mounted	●
E□-SERT-CNMB	Security: circuit numbers	●
E□-SERT-EQPM	Security: equipment	●
E□-SERT-FLOR	Security: floor-mounted	●
E□-SERT-IDEN	Security: identification and text	●
E□-SERT-REVC	Security: revision clouds	●
E□-SERT-REVS	Security: revisions	●
E□-SERT-WALL	Security: wall-mounted	●
E□-SITE	Site	
E□-SITE-UNDR	Site: underground lines	
E□-SITE-POLE	Site: electric poles	
E□-SITE-OVHD	Site: overhead lines	
E□-SOUN	Sound/PA system	
E□-TVAN	TV antenna system	

Layer Name	Description	New
Electrical (continued)		
E□-TVAN-ANNO	TV antenna system: annotation	●
E□-TVAN-ANNO-KEYN	TV antenna system: annotation: keynotes	●
E□-TVAN-ANNO-NOTE	TV antenna system: annotation: notes	●
E□-TVAN-CIRC	TV antenna system: circuits	●
E□-TVAN-CLNG	TV antenna system: ceiling-mounted	●
E□-TVAN-CNMB	TV antenna system: circuit numbers	●
E□-TVAN-EQPM	TV antenna system: equipment	●
E□-TVAN-IDEN	TV antenna system: identification and text	●
E□-TVAN-REVC	TV antenna system: revision clouds	●
E□-TVAN-REVS	TV antenna system: revisions	●
E□-TVAN-WALL	TV antenna system: wall-mounted	●

Telecommunications Layer List

Telecommunications Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Telecommunications Discipline Designators

Designator	Description	New
T	Telecommunications	
TA	Audio Visual	
TC	Clock and Program	
TI	Intercom	
TM	Monitoring	
TN	Data Networks	
TT	Telephone	
TY	Security	
TJ	User-Defined	
TK	User-Defined	

Telecommunications Layer List

Layer Name	Description	New
T□-□□□□-1LIN	Any major group: one-line diagrams	
T□-□□□□-DIAG	Any major group: diagrams	
T□-□□□□-EQPM	Any major group: equipment	
T□-□□□□-JACK	Any major group: jacks	
T□-□□□□-JBOX	Any major group: junction boxes	

Layer Name	Description	New
T□-□□□□-RISR	Any major group: riser diagrams	
T□-ALRM	Alarm system	
T□-BELL	Bell system	
T□-CABL	Cable systems	
T□-CABL-COAX	Cable systems: coax cable	

Layer Name	Description	New
Telecommunications (continued)		
T□-CABL-FIBR	Cable systems: fiber optics cable	
T□-CABL-MULT	Cable systems: multi-conductor cable	
T□-CABL-TRAY	Cable systems: cable tray & wireway	
T□-CATV	Cable television system	
T□-CLOK	Clock systems	
T□-CCTV	Closed-circuit television system	
T□-DATA	Data / LAN system	
T□-DICT	Dictation system	
T□-ELEC	Electrical system, telecom plan	
T□-EMCS	Energy monitoring control system	
T□-FIRE	Fire alarm system	
T□-INTC	Intercom / PA systems	
T□-NURS	Nurse call system	
T□-PGNG	Paging system	
T□-PHON	Telephone system	
T□-SERT	Security system	
T□-SOUN	Sound system	
T□-TVAN	Television antenna system	

Resource Layer List

Resource Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Resource Layer List

Layer Name	Description	New

No layer names have been prescribed for this discipline.

Resource Discipline Designators

Designator	Description	New
R	Resource	
RC	Resource Civil	
RS	Resource Structural	
RA	Resource Architectural	
RM	Resource Mechanical	
RE	Resource Electrical	
RJ	User-Defined	
RK	User-Defined	

Other Disciplines Layer List

Other Disciplines Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Other Disciplines Layer List

Layer Name	Description	New

No layer names have been prescribed for this discipline.

Other Disciplines Discipline Designators

Designator	Description	New
X	Other Disciplines	
XJ	User-Defined	
XK	User-Defined	

Contractor/Shop Drawing Layer List

Contractor/Shop Drawing Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Contractor/Shop Drawing Layer List

Layer Name	Description	New

No layer names have been prescribed for this discipline.

Contractor/Shop Drawing Discipline Designators

Designator	Description	New
Z	Contractor/Shop Drawings	●
ZJ	User-Defined	●
ZK	User-Defined	●

Operations Layer List

Operations Field Codes

The Layer Names shown below provide examples for the use of Major and Minor Group field codes for this discipline. See page CLG-8 for complete rules and options governing the use of Major and Minor Group field codes.

Operations Layer List

Layer Name	Description	New

No layer names have been prescribed for this discipline.

Operations Discipline Designators

Designator	Description	New
O	Operations	
OJ	User-Defined	
OK	User-Defined	

Commentary: U.S. NCS and ISO 13567

Overview

The International Standards Organization (ISO) is the only recognized international body promulgating standards in the area of electronic building design data. ISO Standard 13567, *Organization and Naming of Layers for CAD*, can be purchased at <http://www.ansi.org>. The complete document is in three parts: 13567-1, 13567-2, and 13567-3.

While the U.S. NCS and ISO 13567 differ somewhat in their approach to standards for CAD layers, they are alike in several important respects. Both standards specify the names of the data fields that make up a typical layer name, define the field names, specify which fields are mandatory (required) and which fields are optional, specify the number of characters in each field, and specify the order in which the fields are to appear.

When one compares the NCS and ISO layer formats shown at left, the question immediately arises whether it is possible to produce electronic building design documents that conform to both the U.S. NCS and ISO 13567. The answer is a qualified “yes.”

Both standards provide several options for naming layers. The range of options allows either standard to meet the needs of diverse users and projects. By carefully choosing from among the available U.S. NCS options for naming CAD layers, and by establishing and adhering to the guidelines at the end of this Commentary, documents can be produced that are in *full conformance* with the U.S. NCS and in *conceptual conformance* with ISO 13567 for the naming of CAD layers (an acceptable alternative to ISO *default conformance*). Adoption of the approach outlined herein could arguably reduce the effort required to produce documents in conformance with ISO 13567 by eliminating the ISO-mandated task of prescribing valid field codes for each project.

(MANDATORY FIELDS)										(OPTIONAL FIELDS)																			
A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C										
Agent Responsible					Presentation					Phase																			
[Building] Element					Status					Projection																			
					Sector					Scale																			
										Work																			
ISO 13567 Layer Format																													
(REQUIRED FIELDS)										(OPTIONAL FIELDS)																			
A	I	-	W	A	L	L	-	F	U	L	-	T	E	X	T	-	N												
Major Group					Minor Group 1					Minor Group 2					Status														
Discipline Designator																													
U.S. NCS Layer Format																													

TWO STANDARDS OR ONE?

- The U.S. NCS offers users an opportunity to comply with both U.S. and ISO CAD standards. By adhering to the guidelines in this commentary, summarized in ten (10) steps on the last page, the U.S. NCS becomes a “country-specific” implementation of the ISO CAD Standard.
- For design firms doing international work, using the U.S. NCS can simplify the ISO-mandated task of preparing the layer naming system definition file that must accompany the project data files on every project.
- A default ISO Layer Naming System Definition File based on the U.S. NCS is available at:

<http://www.nationalcadstandard.org>

Users may customize this file for specific projects.

Field Codes

The U.S. NCS and ISO 13567 differ in one important respect. The U.S. NCS prescribes the valid alpha-numeric field codes that can appear in each data field, and the definitions of the field codes (e.g., EQPM = equipment). Users of ISO 13567 must determine, for each project, the valid field codes for that project and their definitions. ISO 13567 users are required to document this information in a metadata file known as a ***layer naming system definition file*** that must accompany the project data files. In its simplest form, this is nothing more than a tab-delimited text file.

There are valid reasons for both approaches. The prescriptive approach of the U.S. NCS relieves users of the task of developing and documenting field codes for every project. However, in order to accommodate all possible users, the list of prescribed NCS field codes must be comprehensive. By not prescribing field codes, ISO 13567 allows the ISO layer format to be applied uniformly without having to define all possible field codes in advance.

Field Codes and Language

By not prescribing field codes, ISO 13567 also allows the ISO layer format to be applied uniformly without regard to language. Users may, if they wish, develop codes endowed with language-specific meaning. Citing our earlier example, English users might use the field code “EQPM” to represent the [major building] element “equipment,” while users in another language group might use another field code that has similar mnemonic association to the word for “equipment” in that language.

While the field codes themselves might differ, the category of information contained in any given field is defined by the standard, facilitating translation of the actual content. In practice, ISO 13567 users tend to favor numeric codes to define the content of data fields. This eliminates any need to “translate” the field codes themselves. If, for example, the field code “720” is prescribed to mean “equipment,” then only the definition, and not the code itself, would need to be translated. This eliminates the need for “translating” the actual file or layer name.

Default ISO Layer Format

(Mandatory Fields)

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Agent Responsible

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

[Building] Element

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Presentation

(Optional Fields)

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Status

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Sector

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Phase

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Projection

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Scale

A	1	B	2	1	0			D		N	B	1	0	1	3	1	F	R	C

Work Package

ISO 13567 Conformance

CAD data sets that adhere to ISO 13567 with respect to field names, field length, field definition and field order (as shown at left), and that are accompanied by the required *layer naming system definition file*, are defined by ISO to be in *default conformance* with the ISO standard.

ISO 13567 anticipates that groups of users or national standards bodies might not only wish to prescribe a list of valid field codes (as the U.S. NCS has done), but might also wish to vary from the specified ISO layer format. 13567-3 is explicitly designed “to allow national standards bodies (or projects where agreement is reached between the parties) to implement layer naming conventions which satisfy the requirements of the [ISO] standard while using alternative and more convenient layer naming structures and codes.”

To permit this, ISO 13567-3 establishes rules for modifying the layer format itself. As with the field codes, users are required to fully document layer format modifications in the *layer naming system definition file*. CAD data sets that adhere to these rules are defined by ISO as being in *conceptual conformance* with the ISO standard, an approved alternative to default conformance.

The rules for *conceptual conformance* specify that the mandatory data fields must always be used, but the order of all fields in the layer name (both mandatory and optional), the number of optional fields used, and the number of characters in each field can vary from the default ISO layer format. Additionally, the *names* of the fields can differ from the names specified, as long as the *conceptual definition* of each field conforms to the ISO standard. All modifications to the default layer format *must be applied uniformly throughout the project*. Layer names must all be of the same length, use the same set of mandatory and optional fields in the same order, and have the same number of characters per field.

These rules allow data sets created in *conceptual conformance* with ISO 13567 to be mapped to the ISO 13567 *default layer format*. However, ISO does not require users to actually “map” or otherwise convert the data into the default layer format.

<i>Field Name Comparison Table</i>	
<i>NCS Field Name</i>	<i>ISO Field Name</i>
Discipline Designator	Agent Responsible
Major & Minor Groups	Element
Annotation Minor Group*	Presentation
Status**	Status
<i>(none)</i>	Sector
Status (Phase)**	Phase
Dwg. View Minor Group***	Projection
<i>(none)</i>	Scale
<i>(none)</i>	Work Package

- * ISO compliance requires that the last NCS Minor Group field be reserved for annotation.
- ** ISO compliance requires that this field be reserved for status OR project phase, but not both; duplicate use of the field is not permitted.
- *** ISO compliance requires that Drawing View field names not appear in the same fields as Major or Minor Group fields that define major building elements. If both annotation and drawing view are to be included in any layer names, one Minor Group Field must be reserved for Annotation and the other for Drawing View.

Field Names and Definitions

Though the specified field names in the U.S. NCS layer format differ from the specified field names in the ISO layer format, the definitions of the field names are *conceptually* the same (with one important exception, discussed in the next paragraph below). This allows NCS-compliant data to meet the principal ISO 13567 criterion for *conceptual conformance*. The Field Name Comparison Table at left highlights additional rules that must be followed to create data that is in conformance with both the U.S. NCS and ISO 13567.

“Discipline Designator” vs. “Agent Responsible”

The *conceptual definitions* of these corresponding field names in the U.S. NCS and ISO 13567 differ sufficiently to merit detailed discussion. The definition for **Discipline Designator** is defined in NCS Version 2.0 as *“the category of subject matter contained in the file or layer designated.”* In other words, if the information contained is “structural,” the file or layer name will begin with the Discipline Designator “S,” regardless of who created the data.

ISO 13567 defines **Agent Responsible** as *“the construction specialist responsible for the data.”* Regrettably, ISO 13567 does not further define the terms *“construction specialist”* and *“responsible for.”*

“Construction specialist” could be interpreted to mean “design professional,” “design drafter,” or even “skilled tradesperson or contractor.” Though the text of ISO 13567 does not define which of these individuals is the “agent responsible,” one can reasonably infer from the sample *layer naming system definition file* shown in Annex A of ISO 13567-3 that “construction specialist” is defined as the design professional.

“Agent Responsible” and Professional Liability

Identifying the design professional as the “construction specialist” still allows considerable room for interpretation of the definition for “agent responsible.” It could be interpreted to mean either *“design professional who is professionally liable for the*

information by virtue of professional licensure and role on the project,” or, alternatively, *“design professional who is professionally liable for the information by virtue of having signed and sealed the document in question.”* An example is a lighting plan prepared under the supervision of, and signed and sealed by, the architect. Should the field code for this drawing file or layer name be “E” or “A?” If the field code is “E,” is the Electrical Engineer still the designated “Agent Responsible,” and therefore professionally liable for data created by others not under his/her supervision?

The burden of professional liability borne by design professionals is generally less in other countries than it is in the U.S. Perhaps for this reason, the issue of defining *agent responsible* more precisely with respect to professional liability did not arise when this field name was defined by ISO 13567.

In the U.S., however, use of the imprecise ISO definition for *agent responsible* might possibly expose design professionals to professional liability for data over which they had no oversight.

“Discipline Designator” and the Building Life Cycle

The U.S. NCS definition for the field *Discipline Designator* was agreed-upon following considerable debate by the U.S. NCS Project Committee, and with the full understanding that it differed from the conceptual definition of the corresponding ISO 13567 field *Agent Responsible*. In addition to the liability issues cited above, it was the consensus of the Project Committee that the ability to identify the data by subject matter *throughout the life-cycle of a building facility* was ultimately more important than the identity of the person or persons who originally created the data.

“Discipline Designator” and ISO 13567 Conformance

The difference in the conceptual definitions of *Discipline Designator* and *Agent Responsible* would seem to be an insurmountable obstacle to creating data in conformance with both the U.S. NCS and ISO 13567. This is not necessarily true. In most cases, the content of the fields *Discipline Designator* and *Agent Responsible* are one and the same, regardless of the definition. For example, if the subject matter

*U.S. NCS Field Code Restrictions
(for conceptual conformance to ISO 13567)*

The field code “ANNO” may NOT be used, because “annotation” is not a major building “element.”

A I - ANNO - TEXT - N
Major Group (Element)

The Annotation Minor Group field codes MAY be used, provided the field is reserved for these codes. Two allowable formats are shown:

A I - WALL - TEXT - N
(Presentation) Annotation

A I - WALL - FULL - TEXT - N
(Presentation) Annotation

Figure 1 - Annotation Field Codes

Two allowable formats for Drawing View field codes:

A I - WALL - ELEV - N
(Projection) Drawing View

A I - WALL - FULL - ELEV - N
(Projection) Drawing View

Figure 2 - Drawing View Field Codes

Two allowable formats for Status field codes.

A - WALL - ELEV - TEXT - N
(Status) Status

A - WALL - ELEV - TEXT - 2
(Phase) Status

Figure 3 - “Status” field codes

contained in the drawing file or layer is “mechanical systems,” the mechanical engineer is likely to be the design professional under whose supervision the data was created.

Users who wish to produce data that is in conformance with the U.S. NCS and in conceptual conformance with ISO 13567 can do so by establishing a rule for their projects that data will be created only under the supervision of the design professional *typically* responsible for the subject matter. In this way, the *conceptual definition* for the data field can be BOTH “*category of subject matter contained in the file or layer designated*” AND “*construction specialist responsible for the data.*” Implementation of this rule can help reduce the risk of professional liability by minimizing the likelihood of conflicts that might arise when different elements of the same building system are designed by more than one design professional.

Field Code Restrictions

A key principal of the ISO 13567 layer format is that each data field can be used to define only one category of data. Duplicate use of a field is prohibited. This ensures that data sets in *conceptual conformance* can be readily mapped to the ISO default layer format. Adherence to this provision requires U.S. NCS users to restrict their use of certain U.S. NCS field codes.

The U.S. NCS allows “ANNO” to be used as a Major Group, which allows all annotation to be placed in a defined group of layers. This results in a duplicate use of the Major Group field. The corresponding field in ISO, “Element,” is reserved for major building elements. Therefore, the field code “ANNO” cannot be used at all (Figure 1). However, the prescribed annotation Minor Group field codes (TEXT, DIMS, etc.) can be used to modify any preceding Major/Minor Group, provided that the field in which they appear is reserved for annotation field codes.

If Drawing View field codes are used (Figure 2), the Minor Group field in which they appear must likewise exclude any other field codes.

If the Status field is used (Figure 3), the allowable field codes must be restricted to the specified letters (to correspond to the ISO field “Status”) or to the specified numbers (to correspond to the ISO field “Phase”) but not both.

*Example U.S. NCS Layer Formats
(in conceptual conformance to ISO 13567)*

AI - WALL - FULL - TEXT - N

Level 2 Discipline Designator (Agent Responsible)

AI - WALL - FULL - TEXT - N

Major, Minor Group (Element)

AI - WALL - FULL - TEXT - N

(Presentation) Annotation

AI - WALL - FULL - TEXT - N

(Status) Status

Example 1

A - WALL - ELEV - TEXT - 2

Level 1 Discipline Designator (Agent Responsible)

A - WALL - ELEV - TEXT - 2

Major Group (Element)

A - WALL - ELEV - TEXT - 2

Drawing View (Projection)

A - WALL - ELEV - TEXT - 2

(Presentation) Annotation

A - WALL - ELEV - TEXT - 2

(Phase) Status

Example 2

U.S. NCS and ISO 13567 Implementation Options

The examples shown here illustrate two possible U.S. NCS layer formats that are in conceptual conformance with ISO 13567. Note that ISO 13567 does not use dashes as field delimiters. For purposes of ISO conformance, the dashes in the NCS layer format are defined as an additional character of the field preceding it.

Example 1 shows the optional two-character U.S. NCS Level 2 Discipline Designator; together with the dash that follows it, this field is defined as three (3) characters in length. A Major and one Minor Group are defined as corresponding to the ISO field [Building] “Element.” The field is ten (10) characters in length. The second Minor Group is reserved for Annotation field codes, corresponds to the ISO field “Presentation,” and is five (5) characters in length. The final field is Status, which corresponds to the ISO field of the same name, and is one (1) character in length.

Example 2 shows the U.S. NCS required Level 1 Discipline Designator only, and is defined as two (2) characters in length. The Major Group is defined as corresponding to the ISO field [Building] “Element,” and is five (5) characters in length. The first Minor Group is reserved for Drawing View field codes, corresponds to the ISO field “Projection,” and is five (5) characters in length. The second Minor Group is reserved for Annotation field codes, corresponds to the ISO field “Presentation,” and is five (5) characters in length. The final field is reserved for Phase field codes, corresponds to the ISO field “Phase,” and is one (1) character in length.

Note that for ISO conformance, the total length of the layer name must be the same for all layers on a given project. Layer names that do not require a certain field, such as “Annotation,” must use placeholders (usually dashes or underscores) to maintain the length of the layer name and the relative position of the fields.

While the ISO 13567 rules for conceptual conformance allow the fields to appear in any order, *this is not permitted by the U.S. NCS*. The fields must be in the order of Discipline Designator, Major Group, Minor Group 1, Minor Group 2, Status. If a Minor Group field is used to modify the “building element” shown in the Major Group, that Minor Group must appear immediately following the Major Group.

*Required Use of Placeholders
(for conceptual conformance to ISO 13567)*

Layers in which reserved field codes are not used must have placeholders in the reserved fields.

A	-	W	A	L	L	-	E	L	E	V	-					-	N

A	-	W	A	L	L	-	E	L	E	V	-	T	E	X	T	-	N

Figure 4

U.S. NCS and ISO 13567 Implementation Guidelines

The information in this Commentary is summarized in the following steps for preparing documents with layer names in conformance with the U.S. NCS and in conceptual conformance with ISO 13567. While these guidelines are intended to aid U.S. NCS users, adherence to these rules in some form would be required by ISO 13567 whether or not the U.S. NCS layer format were used.

1. Require that all documents be prepared only under the supervision of the design professional typically responsible for the subject matter contained in the documents.
2. Do not use the field code “ANNO” in any layer name.
3. Determine whether the Discipline Designator will be one character (Level 1) or two characters (Level 2) in length.
4. Determine whether the “building element” will consist of a Major Group only, or of a Major Group and one Minor Group.
5. Determine whether a Minor Group is to be reserved for Drawing View field codes, and fix its position in the sequence of fields.
6. Determine whether a Minor Group is to be reserved for Annotation field codes, and fix its position in the sequence of fields.
7. Note that only two Minor Groups are available. Of the three options described in 4, 5, and 6 above, only two can be exercised on a given project.
8. Determine whether to include the Status field in the layer name and whether to use the specified letters to denote “Status,” or the specified numbers to denote “Phase.”
9. For layer names in which one or more fields are not required, use placeholders (dashes or underscores) to maintain consistent layer name length and the relative positions of fields (Figure 4).
10. Prepare a layer naming system definition file in accordance with ISO 13567-3 that defines the selected layer format for the project.

Uniform Drawing System

U.S. National CAD Standard Version 3.1

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Uniform Drawing System

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INTRO

Uniform Drawing System (UDS)

In 1989, The Construction Specifications Institute (CSI) recognized the need for an organizational structure and standards for drawings. In 1990, CSI created a drawings-related subcommittee of the Technical Committee to address this issue. The first product developed was *Technical Document TD-2-6, Standard Reference Symbols*, published in 1990. An electronic version was released in 1991. During the following few years, CSI extensively researched the availability of, and need for, graphic standards in the construction industry. It was determined that there were few standards relating to drawings.

In 1994, CSI began development of the Uniform Drawing System (UDS). This system initially identified modules for the organization and presentation of drawing sets, sheets, schedules, and diagrams. Graphic standards for drafting conventions and color, and standard systems for keynotes, attributes, and **CAD** layering were also identified as necessary.

CAD: *Computer-Aided Drafting.*

CADD: *Computer-Aided Design and Drafting.*

In February 1995, representatives from CSI, the American Institute of Architects (AIA), the Tri-Service CADD/GIS Technology Center, the United States Coast Guard, and the National Institute of Building Sciences (NIBS) **CADD** Council met to discuss ways in which the graphic standards efforts of the attending organizations could work together. CSI's Uniform Drawing System was accepted by the representatives of these organizations as being the core group of graphic standards needed in the industry. These organizations have since worked cooperatively in the development of several graphic standards, notably CAD layering.

In 1997, CSI published the first three modules of UDS. These have been submitted to the NIBS CADD Council for consideration as part of a proposed national CAD standard.

Overview

UDS is composed of interrelated modules consisting of standards, guidelines, and other tools for the organization and presentation of drawing information used for the planning, design, construction, and operation of facilities. UDS provides uniformity for graphical information in drawings, just as **MasterFormat™**, **SectionFormat™**, and **PageFormat™** provide uniformity for textual information in specifications.

UDS organizes drawings and

- Establishes a uniform set of standards for all drawing types.
- Functions for all drawing users involved in the facility cycle.
- Organizes project information needed for drawings and allows it to be integrated with other information sources involved in a project.
- Establishes a standard drawing format that users can recognize and understand, resulting in more efficient production, reduced errors and omissions, and better coordination among all project documents.
- Promotes effective communication among drawing users as graphical information is more consistently organized and presented.
- Allows drawing users to capture evolving information for use throughout the facility cycle and for future projects.
- Fosters integration and accuracy of facility information while providing for new and improved project delivery methodologies.
- Complements *MasterFormat* and **UniFormat™** to provide a complete organizational system for construction documents.
- Aids electronic organization, storage, and transfer of graphical information related to facilities.

MasterFormat: *A master list of numbers and titles classified by work results or construction practices that is primarily used to organize project manuals and detailed cost information, and relate drawing notations to specifications.*

SectionFormat: *A format that provides a uniform approach to organizing specification text contained in a project manual by establishing a structure consisting of three primary parts.*

PageFormat: *A format for an orderly and uniform arrangement of text on the pages of specification section contained in a project manual.*

UniFormat: *A classification system for construction information based on construction elements including systems and assemblies that perform a given function without regard to the design solution, specified material, or construction method.*

The initial focus of UDS is the development of construction drawings for buildings, as indicated in *Figure IN.1*. However, UDS also considers drawing users' needs during the design process as well as facility management and other post-construction activities.

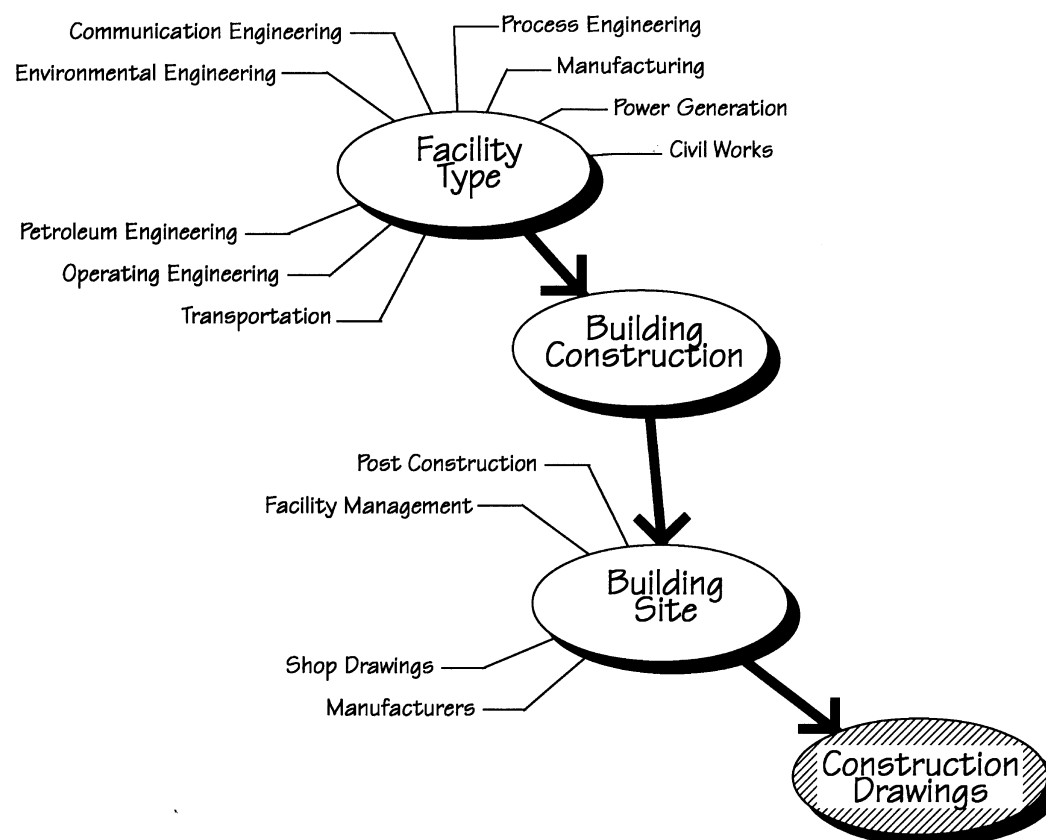


Figure IN.1 Current UDS focus is construction drawings for buildings.

Facility and Project Life Cycles

Facility: *A physical structure or group of structures, including site construction, serving one or more purposes.*

Project: *A set of related activities taking place in, around, and in connection with a facility.*

Drawings: *Graphic and textual information organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.*

A **facility** is a physical structure or group of structures, including site construction, serving one or more purposes. Buildings are types of facilities composed of partially or totally enclosed spaces. Site construction includes changes to terrain, and systems such as transportation and utilities. All facilities go through cycles during their useful life, beginning with inception, including changes over time, and eventually ending in reuse or demolition, as illustrated in *Figure IN.2*.

A **project** is a set of related activities taking place in, around, and in connection with a facility, and may include planning and pre-design activities, design and construction documents, bidding/negotiation, construction, and post-construction activities. Post-construction activities may include facilities management and operation and maintenance documents.

Projects go through cycles, beginning with the identification of a need, development of a response to the need through programming and design, performance and physical implementation, facility commissioning and operation, and possible modification to meet new needs. This cycle may be repeated numerous times throughout the life of a facility.

During the design process, information concerning a project is collected, analyzed, and recorded for incorporation into the proposed facility. **Drawings** allow users to document and share graphical information for a project. A drawing is a place where information is cataloged, stored, and distributed. This information is recorded as part of the drawings, and evolves as the project cycle runs its course and as drawing users change. Drawings can also evolve, be modified, and change over time. UDS allows the continuing use of drawings as the needs of the project change.

The need for information contained within drawings is different for each phase of a facility or project cycle. Often, information in one cycle is the basis for developing new information for the next cycle. Therefore, it is critical that this information is accurate and organized in a way that facilitates easy retrieval and reuse.

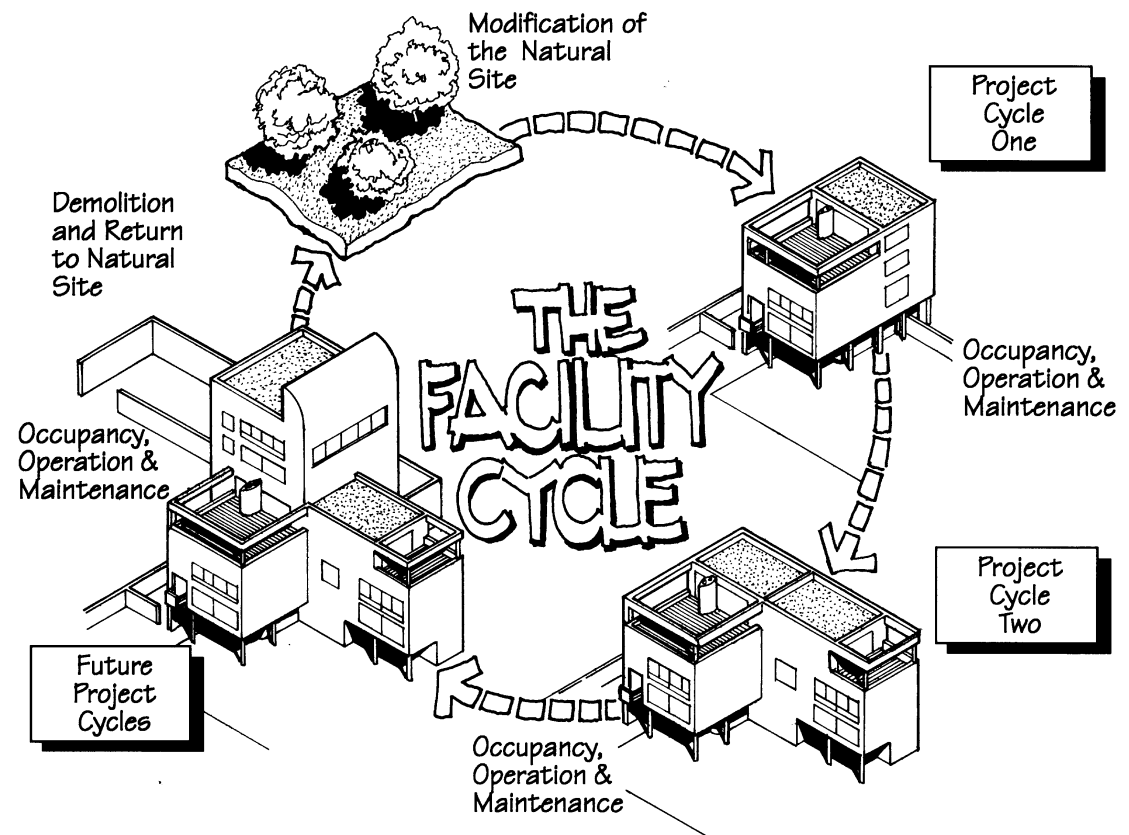


Figure IN.2 Drawings are used throughout the multiple project cycles that may take place for any given facility.

Meeting the Needs of Drawing Users

Drawing Users:

Owner
Design Professional
Contractor

Owner's Representative
Consultant
Subcontractor

Material Supplier
Product Manufacturer
Building Official
Government Official
Accountant
Attorney
Lender

End User

Drawing users are a changing group of individuals and organizations that participate in a project at various points in the facility life cycle. The initial users of drawings may consist of the parties traditionally bound to each other to design and construct a project: an owner, a design professional, and a contractor. Other users of drawings related to a project include the various owner's representatives, consultants, and subcontractors that form the next tier of the project team. There is also a broader group of users that includes material suppliers, product manufacturers, building officials, government officials, accountants, attorneys, lenders, other construction professionals, and end users of the project. *Figure IN.3* illustrates that communication through drawings enables users to share their understanding and to translate that common vision into constructed reality.

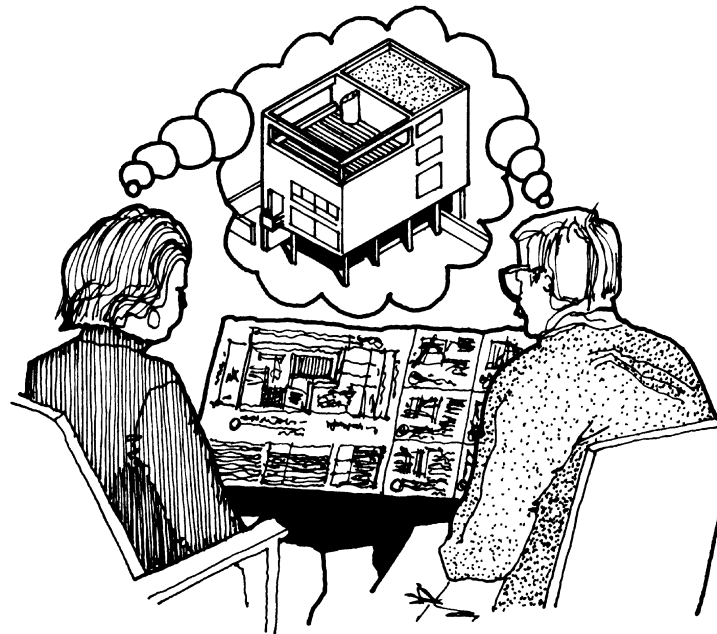


Figure IN.3 The common vision of drawing users.

Facility Model: *All information created relating to a particular facility.*

Each drawing user brings a different level of experience, understanding, capability, and purpose to a project. This group constantly evolves and changes throughout the project cycle. As one project cycle leads to another, the user group forms, disbands, and reforms many times and with many different users. As facilities grow more sophisticated and regulated, there is a need for clear, correct, complete, and concise information in the form of drawings that does not duplicate, misplace, or conflict with previously generated information.

UDS provides a framework for the organization of drawing-related facility information, creation of the **facility model**, and presentation through drawings. The facility model is all information created relating to a particular facility.

The principles of UDS are organized around the precepts of modularity, flexibility, consistency, and linking.

Modular Structure

- UDS is an open system composed of a series of application modules organized around the phases of a facility cycle. (Refer to *Figure IN.2.*) The modular structure of UDS provides a place for the integration of existing non-drawing formats, such as *MasterFormat* and *UniFormat*, for keynoting, specifications, and other customized applications. UDS, because of its open structure, allows the integration of new drawing techniques and information types. UDS modules provide a framework for the location and organization of information, and the presentation of drawings appropriate to the context of drawing users and their tasks relative to the project cycle. (Refer to *Figure IN.4.*)
- The modular precept extends to the organizational standards and formats in each module. The organization of drawings on a sheet is based on a standard module, providing a framework for locating and retrieving information contained in drawings.

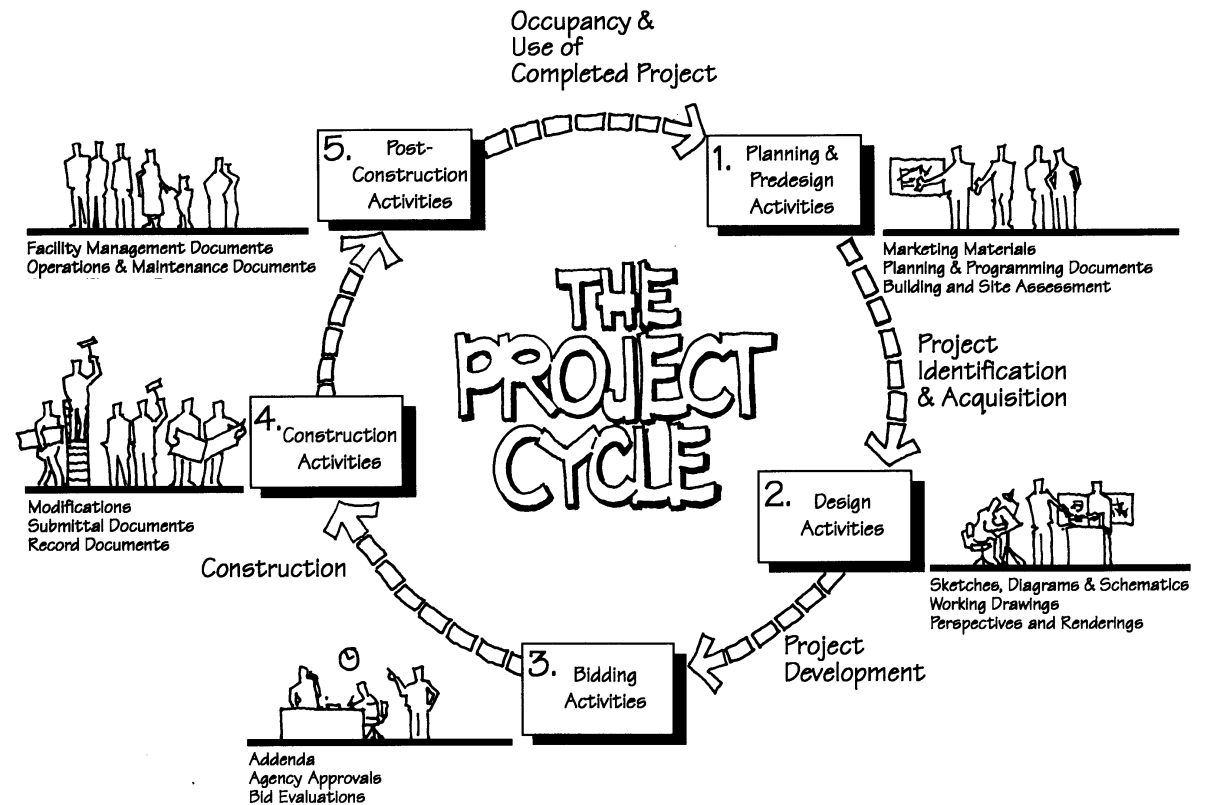


Figure IN.4 Drawing users change throughout facility and project cycles.

Flexibility

UDS meets the requirements of different users of drawings at progressive stages of the project cycle. Project delivery methods vary from project to project and may include fast-track, design-build, multiple prime contracts, and construction management, as well as the traditional design-bid-build method. Project methodologies may reflect regional circumstances and economies. In a global market, the methodologies are tailored to an international set of priorities and customs. Project scopes vary with each project; some large, some small. UDS offers a familiar format and location of subject matter for a wide spectrum of uses.

- UDS is structured in a hierarchical set of systems and subsystems. Information used and presented through UDS and its facility database vary with the context of the facility life cycle and the composition of the project's drawing users. UDS-based information has the flexibility to be presented differently depending on the targeted audience and application. For example, a geographer or urban planner requires site information that is related, but distinctly different than that needed by an irrigation subcontractor. UDS provides assistance in filtering these information subsets and in presenting them appropriately.
- Flexibility is integral to UDS's organization of drawing sets, which can use as many of the disciplines as necessary.

Consistency

- UDS establishes a uniform set of standards for different drawing types. It functions for all drawing users throughout the project cycle. This standardization aids consistency of drawings prepared by multiple design professionals. Drawing users are better able to communicate with each other because of this consistency. UDS allows the project team to present solutions in a uniform and integrated manner, resulting in more efficient production of drawings, reduced errors and omissions, and better document coordination. UDS organizes project information needed for drawings and integrates it with other information sources involved in a project.

- UDS set organization provides consistency among different disciplines. Thus, a floor plan may be located and identified consistently, for example:

S - 101 Structural First Floor Plan

A - 101 Architectural First Floor Plan

M - 101 Mechanical First Floor Plan

E - 101 Electrical First Floor Plan

Linking

- UDS forms the basis for a relationship among individual electronic applications that exchange drawing information by providing standard formats. UDS enhances both manual and computer-aided methods and formats familiar to users. UDS provides standards for linking notes and terminology to specifications and for linking facility management information.
- By using UDS formats in digital form, the facility database allows electronic storage, linking, and retrieval of project information.

UDS Modules

Drawing Set Organization

Organizing a set of drawings is influenced by many factors, including project size, complexity, regulatory and client requirements, and the type and number of contracts. UDS provides guidelines for organizing drawing sets to accommodate these influences. The basic method for organizing drawing sets is based on use by the traditional architectural/engineering disciplines. The *Drawing Set Organization Module* establishes standard discipline designators for each discipline, such as **A** for Architectural, as well as for unique types of construction elements. UDS also establishes modifiers for each designator, allowing for more detail if required by project needs. UDS establishes the order of presentation of these disciplines within a drawing set.

UDS establishes consistency through the use of standard sheet types that are common to all disciplines. Sheet types are classified as plans, elevations, sections, large-scale views, details, schedules/diagrams, and three-dimensional (3D) representations. These classifications create consistency and facilitate use of the drawing set. A numerical sheet type designator is assigned to each sheet type classification.

The identification of sheets within a set is based on a discipline designator and a sheet type designator. The UDS system accommodates both simple and complex projects. This module includes a file naming system for project files and for library files. Project file names are based on the sheet identifier. Detail library file names are based on *MasterFormat* and/or *UniFormat* numbers.

Sheet Organization

The most important aspect of the *Sheet Organization Module* is the sheet format. UDS provides standards for sheet sizes for both metric (SI) and inch-pound measurement systems. UDS establishes a graphic layout that divides the sheet into the drawing area, the title block area, and the production data area. The *Sheet Organization Module* includes a grid system of blocks or modules for organizing drawing information on a sheet. The system for identifying each drawing on the sheet is based on the location of the drawing relative to this sheet module.

UDS also provides a format for title blocks that includes locations and content of data areas. The format is intentionally flexible, allowing design professionals to continue to create their own distinctive title block designs consistent with UDS principles.

Schedules

The *Schedules Module* provides standard formats for numerous schedules used in construction documents. These formats provide consistent format, heading terminology, and organization of content.

Additionally, UDS provides guidelines on creating project-specific schedules. These guidelines allow users to tailor standard schedule formats to accommodate the unique needs of individual projects.

Just as the *Drawings Set Organization Module* provides a system for identifying sheets and drawings, the *Schedules Module* provides an organizational system for identifying and filing schedules. This system groups and identifies schedule types, and is based on *MasterFormat* numbers with cross-references to *UniFormat*.

Drafting Conventions

The *Drafting Conventions Module* is a joint effort of CSI and the CADD/GIS Technology Center. It provides a standard format for both graphic and textual information within drawings. Subjects covered include drawing standards, scale, lines, dimensions, material indications, notations, sheet types, and mock-up drawing sets.

Terms and Abbreviations

The *Terms and Abbreviations Module* establishes guidelines for consistent terminology used in the construction industry. Consistent terms ensure clear and concise communication among the lead designer, owner, contractor, and consultants. The purpose of this module is to provide a standard for preferred construction document terms and abbreviations.

Symbols

The *Symbols Module* compiles a full range of standard symbols used throughout the construction industry. Covered in this module are standard symbols, their graphic representation, and their role in creating, understanding, and fulfilling the intent of construction documents. Standard symbols ensure clear and concise communication among the lead designer, owner, contractor, and consultants. This module is a joint effort of CSI and the CADD/GIS Technology Center.

Notations

The *Notations Module* establishes guidelines for the systematic presentation of textual information on drawings. Subjects covered include note types, use of notes, placement of notes, formats for notes, note terminology, and linking notes to specifications.

Code Conventions

The *Code Conventions Module* establishes guidelines for consistency in identifying necessary regulatory information to be shown in the construction documents. This is needed to facilitate both the design process and the permit application process.

Drawings

Drawings: *Graphic and textual information organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.*

Assembly: *A collection of elements and components that relate to each other and combine to form a whole construction object.*

Component: *A collection of elements that relate to each other and combine to form a constituent part of a construction object, e.g., a window frame (metal extrusion + gaskets + seals).*

Drawings are visual communication tools documenting the existing world and graphically indicating proposed changes to it. Drawings in the construction industry are generated to record and communicate information more readily understood through pictures rather than just words. Drawings may depict an existing site condition, delineate proposed designs, record the ongoing process of construction, or provide data for facility operation and management.

Drawings depict spatially related objects in a flat, two-dimensional (2D) format represented by a shorthand of lines, symbols, text, and other graphic symbols. These representations take many forms: highly abstract and symbolic sketches, or more accurately scaled plans, elevations, sections, and details.

Drawings are generally produced manually or electronically on physical media such as paper or mylar. However, drawings may be distributed and viewed entirely in digital form. Increasingly, computer-generated 3D models are being created, from which 2D drawings are extracted.

Drawings indicate relationships among elements and show the following characteristics for each material, **assembly**, **component**, and accessory

- location
- identification
- dimension and size
- details and diagrams of connections
- shape and form

Plans: Views of horizontal planes, showing components in their horizontal relationship.

Elevations: Views of vertical planes, showing components in their vertical relationship, viewed perpendicularly from a selected vertical plane.

Sections: Views of vertical cuts through and perpendicular to components, showing their detailed arrangement.

Large-Scale Views: Views of plans, elevations, or sections at a larger scale and with more detail than the referenced view.

Details: Plans, elevations, or sections that provide more specific information about a portion of a project component or element than smaller-scale drawings.

Schedules: Tables or charts that include data about materials, products, and equipment.

Diagrams: Nonscaled views showing arrangements of special system components and connections not possible to clearly show in scaled views.

3D Representations: Perspectives, isometric drawings, and electronic CAD models.

Drawings consist of plans, elevations, sections, large-scale views, details, schedules, diagrams, and 3D representations.

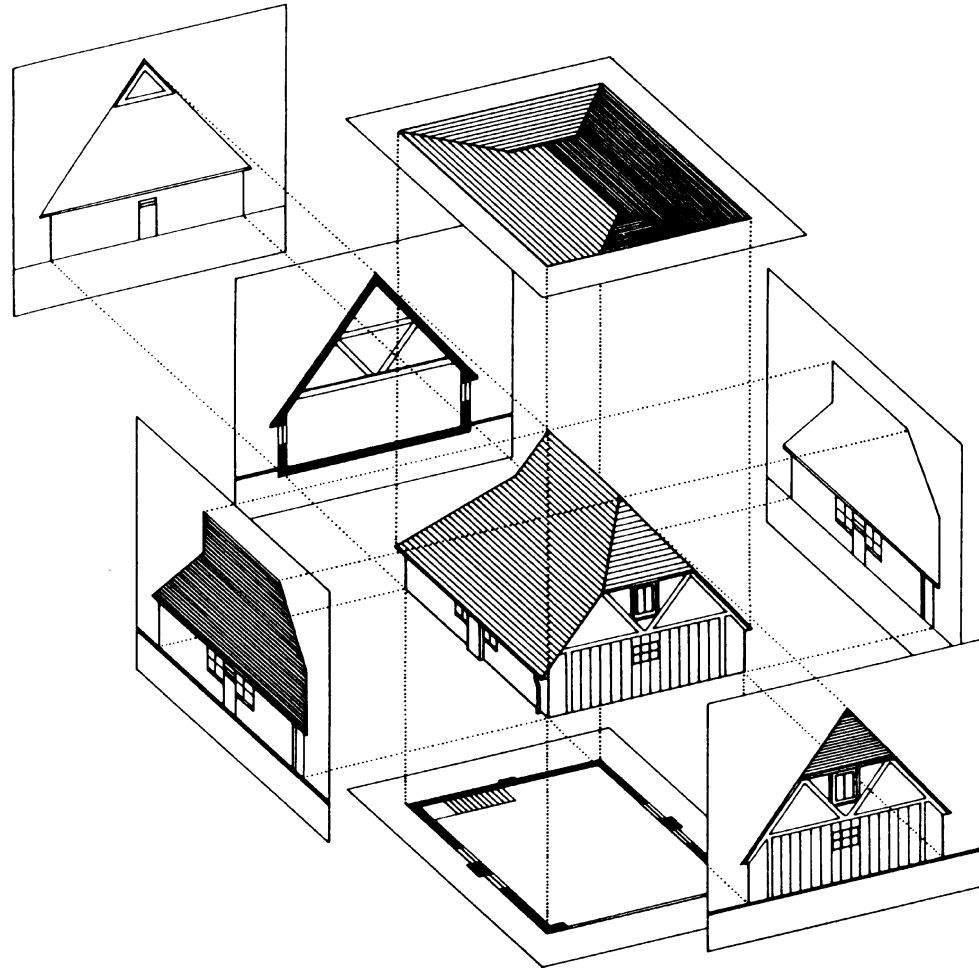


Figure IN.5 Drawing views.

Summary

UDS applies to drawings for all facilities, regardless of how they are produced or by whom. It focuses on the systematic organization and presentation of drawing information. UDS provides a logical basis for the organization and production of drawings that allows the use of time-honored manual drawing techniques as well as CAD technologies. It also recognizes and accommodates both a metric (SI) measurement system and an inch-pound measurement system.

UDS serves as the foundation for the development and application of future advances in design, construction, and facility management.

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Drawing Set Organization

U.S. National CAD Standard Version 3.1

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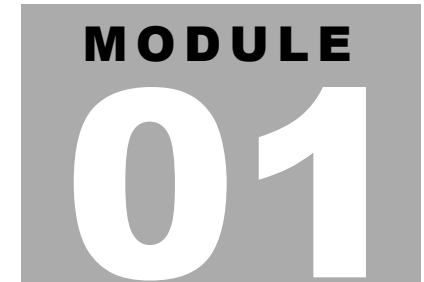
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Introduction

Drawing Set Organization is a standardized method for organizing information about a facility that is presented graphically. Effective organization facilitates accurate communication between the drawing creator and those who use that drawing. Organization also promotes information retrieval and preservation.

Organization standards affect production, delivery, and identification of hardcopy drawings as well as electronic (CAD) drawings. A solitary determination made on how or where to display information has a domino effect on multiple aspects of the drawing set.

The *Drawing Set Organization Module* provides a consistent, familiar environment for producing and viewing construction drawings. Particularly suited to buildings, the standards easily adapt to other types of facilities including civil and process dominant projects.

The following brief synopsis provides an overview of where to look for help in making decisions about organizing a drawing set.

Set Content and Order

- Organizes graphical information into subsets to create convenient work partitions for multiple design and construction disciplines

Sheet: *As a delivery media, the document sheet is the hardcopy representation of information presented on a vellum or mylar “original” or “tracing.” In an electronic media sense, the document sheet is the screen window.*

Discipline Designator: *The first component of the sheet identification format, based on the traditional system of alphabetical discipline designators.*

Modifier: *The second character of a two-character discipline designator, used to further subdivide the discipline for a specific use or purpose.*

- Provides an order for displaying subsets in a logical sequence for review and construction
- Identifies types of electronic files (or **sheets**) that best illustrate categories of drawing information
- Utilizes an electronic model concept to share information common to multiple disciplines without duplicating work

Sheet Identification

- Provides a list of **discipline designators** and **modifiers**
- Organizes the categories of information into drawing sheet types
- Provides guidelines for a sheet numbering sequence

File Naming

- Handles special situations created by internal and external influences
- Identifies drawing categories
 - Project files** for project specific drawings and sheets; used once
 - Library files** for generic drawings and master sheet or template files; used many times
- Provides file naming standards for different types of project files
 - Model
 - Details
 - Sheet
 - Schedules
 - Text
 - Database
- Provides file management strategies for each category
- Provides additional references for easy reading

Influences

Provides a table illustrating how various factors influence drawing set content and order, sheet identification, and the naming of files.

Set Content and Order

The organization of a drawing set should support the requirements and facilitate the production efforts of the design and construction team. The organization system must be flexible and adaptive to the influences of project size and complexity, including delivery requirements. Uniform Drawing System (UDS) provides the methodology to organize drawing sets in the following manner:

- Segregate the information by disciplines (both design and construction) to form subsets of the total drawing package
- Order the subsets to correspond to the natural sequence of construction, closely associating disciplines where topics are similar
- Collect and present each drawing (plan, elevation, section ...) on a sheet dedicated to that drawing type so that different drawing types may be combined for small projects
- Present information within each subset from general to specific

A drawing set for a project or a facility must also provide for the inclusion of each of the various types of construction drawings, as follows:

Procurement Drawings

Contract Drawings

Resource Drawings

Addenda Drawings

Modification Drawings

Although the initial purpose of construction drawings is to build or modify a facility, portions of a drawing set can be reused for facility management or for future projects. Logical set organization and sheet identification procedures facilitate retrieval and use of information.

Procurement Drawings: *Drawings issued for bidding or negotiating before signing of an agreement.*

Contract Drawings: *Drawings that describe the work of the project.*

Resource Drawings: *Drawings that show existing conditions, or new construction related to the work, but are not included in the contract.*

Addenda and Modification Drawings: *Collectively known as Supplemental Drawings.*

Subsets

Following the cover sheet, sheets should be organized into subsets in the order illustrated in *Figure 01.1*. All of the subsets may not apply, or more specific additional categories may be required depending on the size, scope, and complexity of the project.

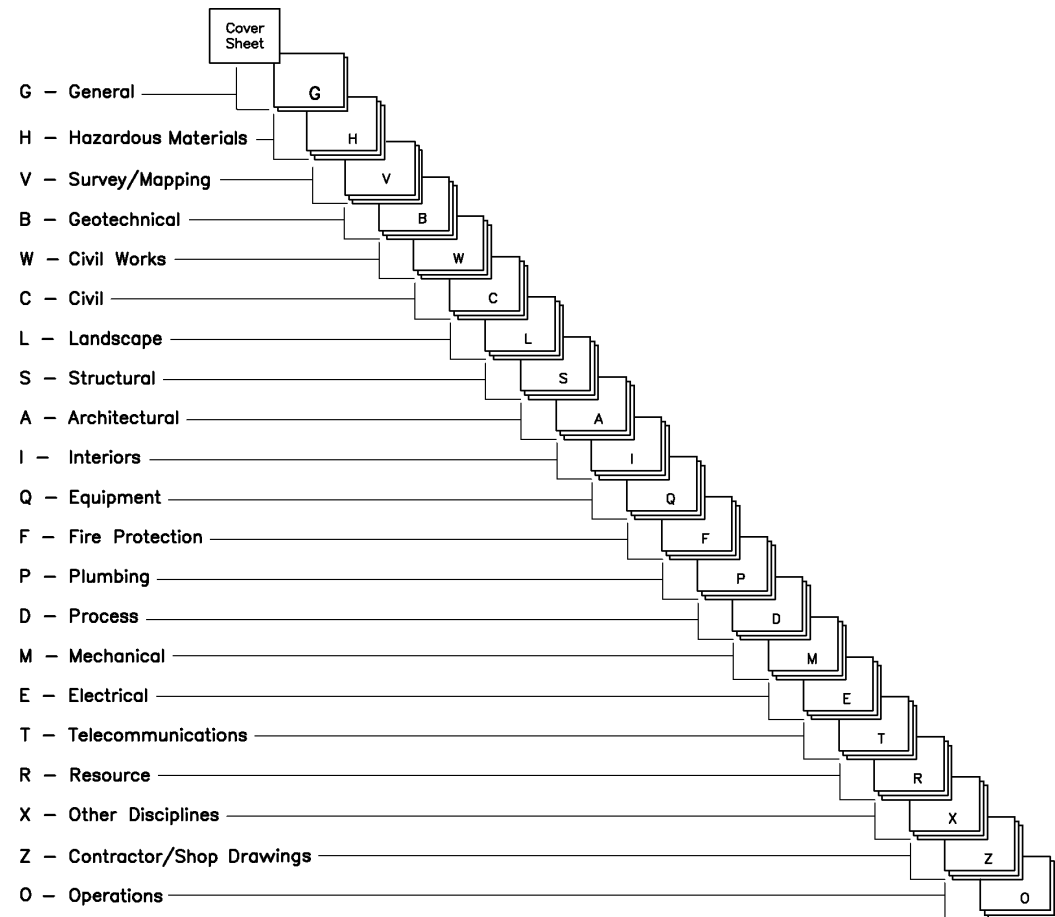


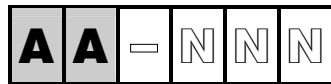
Figure 01.1 Illustration of a typical drawing set.

Electronic Models

The use of electronic models is a common method of sharing information among design disciplines when using CAD to produce construction drawings. A model file contains elements of a facility that are created by one designer and referenced but not modified by another. One example is simply the floor plan that is used to overlay the duct work or electrical power information. That floor plan can contain the reflected ceiling grid or the grid can be referenced also. The *AIA CAD Layer Guidelines* is a valuable tool in segregating information in a model because it organizes information into subsets similar to those described above.

Sheet Identification

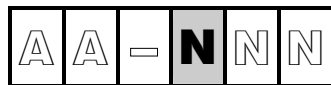
The sheet identification format has its roots in traditional construction drawing techniques. However, the advent of systems methods, overlay drafting, and CAD has demanded more consistency in labeling and organizing sheets. These technologies have also provided an opportunity to expand the role of the sheet identifier. Accordingly, the sheet identification format is a key part of UDS.



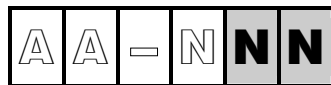
Discipline Designator



Hyphen



Sheet Type Designator



Sheet Sequence Number

A = alphabetical character

N = numerical character

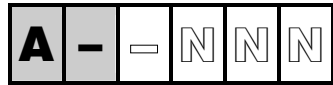
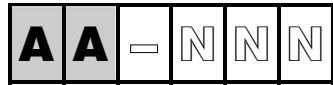
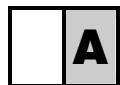
Standard Sheet Identification

The sheet identification format is applicable to both manual and CAD drawing production. It is consistent, yet flexible enough for a wide range of project scopes. The UDS sheet identification format depicted here has four components:

- the **discipline designator**, consisting of one or two alphabetical characters
- the **hyphen** separates the disciplined designator from the sheet type designator
- the **sheet type designator**, consisting of one numerical character
- the **sheet sequence number**, consisting of two numerical characters

The one- or two-character discipline designator identifies the sheet as a member of a subset. A sheet type designator that identifies the type of information on the sheet is followed by the sheet sequence number.

Recognizing the wide variance in project complexity, UDS allows two levels of sheet identification. Either of these or a combination of the two can be used to suit the project or the intended use of the drawings. Level 1 offers the simplest identification format and would be suitable for all but the most complex projects. Level 2 provides guidance for complex or special types of projects. Refer to Appendix A for examples of the two levels of sheet identification.

**Level 1 Discipline Designator****Level 2 Discipline Designator****Discipline Designator****Discipline Character****Modifier Character**

Note that the hyphen in the Level 1 discipline designator is a required place holder in the absence of the second character. The hyphen is preferred rather than a decimal point due to the use of the “dot” in electronic file names. Alternatively, an underscore may be used to replace the hyphen when a particular operating system does not accept hyphens in file names.

Abbreviated Sheet Identification

UDS also provides for an abbreviated sheet identification format. While a large, complex project can obviously make use of the full set of discipline designators, sheet type designator, and sheet sequence numbers, a small project’s one sheet could simply use the identifier **A-1**. For example, **A-1** represents the designation **A- -1** with the modifier character, sheet type designator, and the first of the two sheet sequence numbers as an understood entity. The lack of the second, third, and fourth characters in the middle does not make finding a particular piece of information more difficult because all the information is contained on one sheet. For this reason, and because “understood” place holders may be misinterpreted, the standard sheet identification format makes use of all designators.

Discipline Designator

The first component of the sheet identification format, the discipline designator, is based on the traditional system of alphabetical discipline designators, using either a single alphabetical character with a hyphen (Level 1) or two alphabetical characters (Level 2).

The discipline designator denotes the category of subject matter contained in the file or on the layer designated. A dash always follows the discipline designator, to separate the one- or two-character discipline designator from the sheet number.

LEVEL 1 DISCIPLINE DESIGNATORS	
G	General
H	Hazardous Materials
V	Survey/Mapping
B	Geotechnical
W	Civil Works
C	Civil
L	Landscape
S	Structural
A	Architectural
I	Interiors
Q	Equipment
F	Fire Protection
P	Plumbing
D	Process
M	Mechanical
E	Electrical
T	Telecommunications
R	Resource
X	Other Disciplines
Z	Contractor/Shop Drawings
O	Operations

For example, the electrical engineer may be the designer for a telephone system. The drawings required may be included on the **E** (Electrical) sheets along with the rest of the drawings produced by that designer. If the level of detail demands it, the electrical engineer may decide to segregate the telephone system information onto sheets with the Level 2 designator **ET** (Electrical Telecommunications).

For an even more complex project involving voice, data, security, and signal systems, separate drawings for each communications system may be required, perhaps even produced by a network specialist. In this case the discipline designator **T** (Telecommunications) could be used, combined with specific modifier characters to create the Level 2 discipline designators **TN** (Telecommunications Network), **TT** (Telecommunications Telephone), or **TY** (Telecommunications Security).

For additional examples of discipline designators for other disciplines, refer to Appendix A. A detailed example of discipline designators based on the Telecommunications discipline follows.

Designator		Description of Suggested Name	Content
Level 1	Level 2		
T	-	Telecommunications	
-	TA	Audio Visual	Cable, music, and closed-circuit television (CCTV) systems
-	TC	Clock and Program	Time generators and bell program systems
-	TI	Intercom	Intercom and public address systems
-	TM	Monitoring	Monitoring and alarm systems
-	TN	Data Networks	Network cabling and equipment
-	TT	Telephone	Telephone systems, wiring, and equipment
-	TY	Security	Access control and alarm systems

**Sheet Type Designator**

Sheet Type Designator

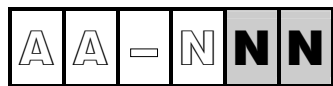
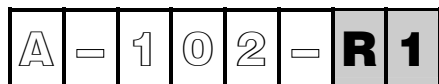
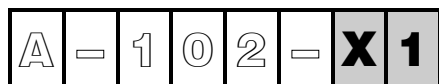
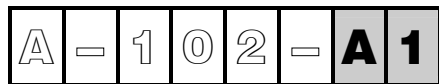
The second component of the sheet identification format is the sheet type designator. The sheet type is identified by a single numerical character. All sheet types may apply to all discipline designators. It is not necessary to use all the sheet types for a project or within a discipline.

SHEET TYPE DESIGNATORS	
0	General (symbols legend, notes, etc.)
1	Plans (horizontal views)
2	Elevations (vertical views)
3	Sections (sectional views, wall sections)
4	Large-Scale Views (plans, elevations, stair sections, or sections that are not details)
5	Details
6	Schedules and Diagrams
7	User Defined (for types that do not fall in other categories, including typical detail sheets)
8	User Defined (for types that do not fall in other categories)
9	3D Representations (isometrics, perspectives, photographs)

The use of sheet type designators does not preclude combining different types of drawings on the same sheet for simplicity. For instance, it is acceptable to

- Place profile drawings on sanitary sewer or road plan sheets
- Place same scale sections on the same sheet as large-scale plans of stairs or escalators
- Place schedules on a plan sheet when the information is closely associated
- Different types of drawings may be combined on the same sheet on small projects

When the type of drawings on a sheet is mixed, clearly identify all of the drawings contained on the sheet in the sheet title block.

**Sheet Sequence Number****User-Defined Designators****A-102-R1** for a partially revised floor plan.**A-102-X1** for a totally revised floor plan.**A-102-A1** for Phase 1 of a sequenced construction floor plan.

Sheet Sequence Number

The third component of the sheet identification format, a two-digit sheet sequence number, identifies each sheet in a series of the same discipline and sheet type. Sequence numbering starts with 01; sheet number 00 is not permitted. The first sheet of each series is numbered **01**, followed by **02** through **99**. Sequence numbers need not be sequential, to permit future insertion of sheets during design. While many projects may not require more than a single digit, standardization of a two-digit sequence number allows for efficient electronic file sorting and facility management databases.

On plan sheets, it may be desirable to replicate the floor name within each discipline. This makes sheets **A-102**, **M-102**, and **E-102** the second floor plan for each of the various disciplines. This system may become cumbersome when basements and mezzanines or split-level plans are involved. Evaluate each project carefully before deciding to implement this option.

Additional drawings inserted in a set of drawings after a sheet identification organization has already been established can be identified with a suffix. This suffix may be comprised of three user-defined designators.

Supplemental Drawings

Small changes on a drawing are normally accomplished with the use of revision clouds and numbers accompanied with a brief description in the revision block. Occasionally an entire drawing must be altered and reissued for supplementary work involving a change in scope. When this occurs, a user-defined suffix character to the sheet identifier may be introduced. Descriptors include **R** for revised issues of similar scope, **X** for complete changes, and **A**, **B**, **C...** for phased work where multiple versions of the same drawing are expected. A dash always follows the sheet sequence number to separate it from the numbering for supplemental drawings.

File Naming

A sheet of drafting film or vellum provides the media to organize and present the graphical and nongraphical elements necessary for the design and construction of a facility. The electronic equivalent, the data file, collects and records the same elements in a similar manner. However, the flexibility and ease of use of the electronic form of that information has created new opportunities for building owners, facility managers, space planners, and others. Construction drawings developed for a project have value throughout the entire life of the building.

The electronic data file is now the sheet that not only documents the efforts of a design team, but also organizes information needed for the operation and maintenance of a facility. The way the data file is structured, how members of the team access and contribute to the file, and who uses the file in the future are all new thought processes to a firm making the transition from a manual production system.

Consistent file naming and folder (directory) structures are necessary for management of the information that is reusable from project to project, as well as effective management of the graphical and nongraphical information related to a construction project.

File Categories

The two broad categories of files, library and project, require consistent but different approaches to developing a file name format.

Library Files

Library files are those used as sources of information for more than one project. They can be detail, schedule, text, database, symbol, border, and title block files. The term “reference” file is not used here because that has taken on a specific meaning in current CAD software. It is recommended that manufacturers, suppliers, vendors, and all associated parties who intend to produce library files for use on multiple projects present these library files in full compliance with the U.S. National CAD Standard. The naming of these files shall follow either the *MasterFormat*™ or *UniFormat*™ file naming method as adopted by the U.S. National CAD Standard.

Library File Format

N	N	N	N	N	N	U	U	U

MasterFormat**User ID**

A	N	N	N	N	U	U	U

UniFormat**User ID**

Naming Library Files - Library files should be named differently from project files because the classification and indexing requirements are different. Library file naming should be grouped by building systems, assemblies, or usage because that is the most natural way to search for them. *MasterFormat* and *UniFormat* numbers provide a useful method of organization for this purpose.

There are growing numbers of trade associations, manufacturers, and suppliers who supply details and product information in an electronic catalog. These catalogs are classified as a specific type of library file. Currently, manufacturers and industry associations are developing conventions for library file naming.

Library files are not intended to be edited directly for a project. If a drawing is needed from the library, the library file should always be copied into the project directory and assigned a file name appropriate to the project. It can then be modified to suit the project requirements while the original library file is preserved for another use. A project detail is simply a drawing that is specifically indexed and cross-referenced within a project.

Project Files

Project files are specific to a project and must be organized to make it easy to produce contract documents, record documents, and facility management documents from many different files. Project files can be building and site models, details, sheets, schedules, text, database, symbols, borders, title blocks, and other files created for the project.

Naming Project Files - For a given project, the project file name must be consistent from firm to firm. These files may be used by clients, consultants, regulatory agents, facility managers, and others. UDS provides a guideline for the uniform naming of files.

Project File Types

The type of file directly affects the format of the file name of project files. The following types of files may be used in electronic construction documentation:

- Model
- Detail
- Sheet
- Schedule
- Text
- Database
- Symbols
- Border
- Title Block

Building Model: *An electronic representation of a building.*

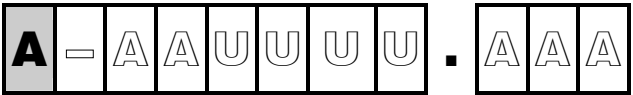
Model Files

A **building model** is an electronic representation of a building. Elements graphically representing the building or site should always be created at their “real-world” size in their “real-world” units. A model file contains a whole or partial full-scale digital model of the building or site. A model is not intended to represent an ideal, standard, or template as in “a model to follow.”

There are three main variations in the processes of building digital models and extracting or composing construction drawings from them. There can be

- a single multi-discipline building model
- a single model for each construction discipline
- several models per discipline

These models may be 2D or 3D, but they all must be accurate, complete, and in conformance to emerging industry standards in regard to layer/level usage and symbology.



Discipline Designator



Placeholder



Type of Model



Optional Prefix



User-Defined Model Type Modifiers



File Extension

Naming Model Files - The first character is the single letter discipline designator. These are presented in the sheet identification format section of this module.

The second character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage.

The third and fourth characters define the type of model. The following designations are examples.

The optional prefix is for project identification for use by computer operation systems that allow more than 8.3 characters.

MODEL FILE TYPES	
FP	Floor Plan
SP	Site Plan
DP	Demolition Plan
QP	Equipment Plan
XP	Existing Plan
EL	Elevation
SC	Section
DT	Detail
SH	Schedules
3D	Isometric/3D
DG	Diagrams

The fifth through eighth positions are alphanumeric user-defined modifiers for the model types.

The three remaining characters after the required decimal point are defined by the CAD software and represent file extensions such as **.dgn**, **.dwg**, **.dwf**, and **.dxf**.

Detail File Name Format**Sheet Identification****Placeholder****Detail Identification Number****Example of Detail Identification****Detail Files**

Project detail files are a specific type of model file. They can include plans, elevations, sections, and details. They are discussed here because they form the majority of the individual files in a project.

When project detail files are incorporated on a sheet, they are indexed using sheet grid coordinates. Their file names require close coordination with the sheet file upon which they are placed. The identification of details is part of the system that includes the drawing blocks (drawing area coordinate system), the sheet identification format, and the use of a two-part reference bubble.

Naming Detail Files - The first five characters are identical to the sheet identification of the sheet file that contains the detail. This coordinates the individual detail file to the specific detail sheet.

The sixth character is the hyphen. It serves as a placeholder that makes the name more readable and easier to manage.

The seventh and eighth characters are used for the detail identification number.

This is an example of a file name of a specific project detail found on sheet **A-501**. The detail identification number **B3** indicates that it is located on the sheet at grid coordinates **B3**. The two-part reference bubble for this detail would be **B3/A-501**. Refer to the *Sheet Organization Module* of UDS for further explanation.

Sheet Files

When there is sufficient information to “print” a sheet, it becomes necessary to create a “sheet” file. The “electronic sheet file” may be comprised of a border template (a file that contains graphic and text elements common to all sheets of a specific size), text, symbols, and views of files, representing everything that appears on the final sheet.

Sheet files are sometimes erroneously referred to as “plot” files. Plot files are the files that result from CAD software, using a specific plotter or printer device driver. Plot files exist in the plotter’s native language (such as HP-GL or Postscript®) and are generally usable only by the specific device.

Sheet files are created by and can be edited by CAD software.

Naming Sheet Files - Because the main purpose of the sheet file is to prepare information for the production of a specific sheet, the format of the file name should be consistent with the format for the sheet identification. The sheet file name should categorize the contents of each electronic “sheet” file to the same degree as the sheet identification categorizes the physical sheet of drawings.

OLE: *Allows objects like tables and spreadsheets to be linked or inserted (format intact) from other software.*

Schedule Files

The *Schedules Module* provides discussion on schedule files. Several issues related to electronic applications are important to note. Unlike model and sheet files, schedule files (and the following file types of text and database) may be produced by software other than CAD, for example, word processing, spreadsheets, and databases. In addition to CAD software, word processor, spreadsheet, and database applications can be used to create and modify schedule templates.

If CAD software is used to create schedule file graphics, the graphics should be created full size. This will allow library schedule templates to be used more easily in the project sheet composition process for electronic sheet files. It will also make it simpler to use the template in a word processor, if schedules reside in the specifications.

If the CAD software is object linking and embedding (**OLE**) compatible, schedule templates will most likely exist as a database report template, spreadsheet template, or word processing table, not as an element of CAD graphics.

Regardless of the origin of the schedule, copy the library master template into the project sheet file. After adding project specific information to the schedule, insert, reference, or link the schedule into the project sheet file.

Naming Schedule Files - For project schedule file naming, the format is similar to the project detail format. Note that this naming format does not rely on any specific file extension, which makes it valid for all types of software.

To the left is an example of a file name of a specific project mechanical schedule found on the sheet labeled **M-601**. The number **C1** indicates that the schedule is located at grid coordinate **C1** on that sheet.

Refer to the discussions in “Naming Library Files” and the *Schedules Module* of the UDS for library schedule file naming.

Using Schedule Files - These files are similar in use to library detail files, in that they provide a resource that is usable from project to project.

M	-	6	0	1	-	C	1

Example of Schedule Identification

Text Files

Text files that are usable from project to project may be general notes, discipline specific notes, sheet type specific notes (for example, notes that always apply only to foundation plans), and symbol legends. Word processors or databases are almost always the originating software of text files.

Refer to the discussions in “Naming Library Files” for library text file naming. Project text file naming is more complex, and is closely tied to the degree of segregation desired.

A project text file name, for example, may not be needed under the following scenario. The library text file for “General Demolition Notes” is inserted without linkage or embedment into the project sheet file **G-003**. Using the CAD software, the text is edited to suit the project requirements, and the sheet file saved with that information. The project specific text file then exists integrally with the sheet file and does not require a separate file or file name.

Using the same “General Demolition Notes” example above, the library text file is first copied into the name **G-003-DN.TXT**. Then using the word processor, the project text file is edited before referencing or inserting the text file into the sheet.

If the latter approach is used, the text file name format parallels that of the detail files described above.

Database Files

Database files include tables that predefine and label “fields” (columns) of data. The process of creating a table requires that each field be labeled uniquely, and that the allowable kind of data be identified (for example, whether or not field values must be alphanumeric, text, graphics, dates, integers, real numbers, etc.). Most applications also let the creator define valid ranges of values for the fields. In addition, all databases provide the means to set up formats for both data input and report output and index files to optimize performance.

Examples of database tables include just about any schedule used in construction documents, inventory listings for equipment and furnishings, master keynote listings, and numerous other lists or tabulations.

As mentioned in the previous “Text File” discussion, file naming of database files is dependent on how much optimizing and linking information among various software applications is needed within a project. In addition, integration of database tools into CAD varies with the choice of CAD software and is very dependent on the degree of customization within the application. Examples of the potential may be found in Geographic Information Systems (GIS) and Facility Management (FM) software.

As noted earlier, a schedule can be a report from a database table. As a start, consider the creation of database tables for some of the more common schedules, and if keynoting is used, for the master keynote listing. The project specific files will be text file reports from the tables and named similarly to the detail, schedule, and text files discussed previously.

File Management Recommendations

Effective file management is an important part of an efficient design and production operation. Unless properly controlled, there will be no end to the quantity of CAD files that accumulate on a computer's disk drive during the course of a project. Computer operating systems provide a tool that carries the office metaphor into the electronic environment. This tool is the folder or directory.

Project Folders

There will usually be more than one project on a computer's hard drive at any point in time. Because the file name uses the available eight-character limitation of the current DOS- or Mac-based system (and the software applies the three-character extension), the preceding file naming system recommendations will obviously create many files with the same name. Operating systems software will not allow two identical file names to exist in the same folder in the system. Separate folders are required, and because they offer powerful disk management capability, they are also desired.

1	P	R	E	D	E	S	

Programming and predesign phase

2	S	C	H	E	M		

Schematic design and concept phase

3	D	E	S	D	E	V	

Design development phase

4	C	O	N	D	O	C	

Construction document phase

5	C	O	N	T	R	A	C

Contract submittal phase

6	R	E	C	O	R	D	

Record document phase

7	F	A	C	M	A	N	

Facility management phase

Naming Project Folders

While rules for folder tree structures are described in the operating system user's manuals, they do not offer any constructive naming conventions. Most organizations base folder names on the system used for project identification.

DOS allows a maximum of eight characters in a folder name, while other operating systems may allow up to 255 characters. Subfolder names follow the same pattern, and are useful in classifying information by level of detail.

A unique project identification name or number up to eight characters long should be used to identify the project folder so that files can be shared with all users. The next level of subfolders could consist of names identifying the progression of the project files according to their development phase. The next lower level of subfolders could identify the type of project files described in "Project File Types."

In the format for suggested folder names, a prefix number is included to preserve the sorting of subfolders by development sequence.

File Backups

In addition to providing a consistent place for each document as it progresses through the project cycle, the project folder structure simplifies file management tasks. Specific projects or individual phases may be easily identified for file searches, making backup or archive copies, and transferring files for distribution.

Evolving drawings should be placed in an unrestricted volume or folder and backed up daily.

Data Protection

Even when an effective folder tree and file naming system are in place, the possibility of operator error resulting in overwriting or erasing an important file still exists. There are procedures that, when followed, can protect valuable work. Frequently saving work in progress, using the application's automatic timed-save function, and automatically backing up files to a tape drive on a daily basis are a few ways to avoid losing files. Deleted files may also be recovered from the trash can or recycle bin of some operating systems, but these files are permanently lost in the event of a hard-drive failure.

Protecting the computer system from power outages with an uninterruptible power supply (UPS) is an additional measure of protection recommended to reduce the loss of completed work.

Archiving and Distributing Data

As each drawing reaches a milestone, it should be copied to an archive folder. Weekly archival backups are highly recommended.

The entire drawing set should be transferred to an archival record medium at the completion of each stage of work. In a networked office, this can be a dedicated hard drive, tape drive, or recordable CD-ROM. In a smaller firm, this archive can be a partition or folder on a hard disk, a library of high-capacity removable disks, or one of the available file compression software programs.

Password restriction to a limited number of qualified people who can responsibly manage the task is mandatory.

Appendix A - Discipline Designators

Designator		Description of Suggested Name	Content
Level 1	Level 2		
G	-	General	All or any portion of subjects included in Level 2
-	GI	General Informational	List of sheets and symbols, code summary, symbol legend, orientation maps
-	GC	General Contractual	Phasing, schedules, contractor staging areas, fencing, haul routes, erosion control, temporary and special requirements
-	GR	General Resource	Photographs, soil borings
<i>Note: A few resource items may be inserted here. A subset of many sheets should be placed at the end under R = Resource.</i>			
H	-	Hazardous Materials	All or any portion of subjects included in Level 2
-	HA	Asbestos	Asbestos abatement, identification, or containment
-	HC	Chemicals	Toxic chemicals handling, removal, or storage
-	HL	Lead	Lead piping or paint removal
-	HP	PCB	PCB containment and removal
-	HR	Refrigerants	Ozone-depleting refrigerants

Designator		Description of Suggested Name	Content
Level 1	Level 2		
C	-	Civil	All or any portion of subjects included in Level 2
-	CD	Civil Demolition	Structure removal and site clearing
-	CS	Civil Survey (Site)	Plats, topographic, dimension control
-	CG	Civil Grading	Excavation, grading, drainage, retention ponds
-	CP	Civil Paving	Roads, bridges, drives, and parking lots
-	CI	Civil Improvements	Pavers, flagstone, exterior tile, furnishings, retaining walls, and water features
-	CT	Civil Transportation	Waterway construction, wharves, docks, trams, railway systems, and people movers
-	CU	Civil Utilities	Water, sanitary sewer, storm sewer, power, and communications
L	-	Landscape	All or any portion of subjects included in Level 2
-	LD	Landscape Demolition	Protection and removal of existing landscaping
-	LI	Landscape Irrigation	
-	LP	Landscape Planting	
S	-	Structural	All or any portion of subjects included in Level 2
-	SD	Structural Demolition	Protection and removal
-	SS	Structural Site	
-	SB	Structural Substructure	Foundations, piers, slabs, and retaining walls
-	SF	Structural Framing	Floors and roofs

Designator		Description of Suggested Name	Content
Level 1	Level 2		
A	-	Architectural	All or any portion of subjects included in Level 2
-	AS	Architectural Site	
-	AD	Architectural Demolition	Protection and removal
-	AE	Architectural Elements	General architectural
-	AI	Architectural Interiors	
-	AF	Architectural Finishes	
-	AG	Architectural Graphics	
I	-	Interiors	All or any portion of subjects included in Level 2
-	ID	Interior Demolition	
-	IN	Interior Design	
-	IF	Interior Furnishings	
-	IG	Interior Graphics	Murals and visuals

Designator		Description of Suggested Name	Content
Level 1	Level 2		
Q	-	Equipment	All or any portion of subjects included in Level 2
-	QA	Athletic Equipment	Gymnasium, exercise, aquatic, and recreational
-	QB	Bank Equipment	Vaults, teller units, ATMs, drive-through
-	QC	Dry Cleaning Equipment	Washers, dryers, ironing, and dry cleaning
-	QD	Detention Equipment	Prisons and jails
-	QE	Educational Equipment	Chalkboards, library
-	QF	Food Service Equipment	Kitchen, bar, service, storage, and processing
-	QH	Hospital Equipment	Medical, exam, and treatment
-	QL	Laboratory Equipment	Science labs, planetariums, observatories
-	QM	Maintenance Equipment	Housekeeping, window washing, and vehicle servicing
-	QP	Parking Lot Equipment	Gates, ticket and card access
-	QR	Retail Equipment	Display, vending, and cash register
-	QS	Site Equipment	Bicycle racks, benches, playgrounds
-	QT	Theatrical Equipment	Stage, movie, rigging systems
-	QV	Video/Photographic Equipment	Television, darkroom, and studio
-	QY	Security Equipment	Access control and monitoring, surveillance

Designator		Description of Suggested Name	Content
Level 1	Level 2		
F	-	Fire Protection	All or any portion of subjects included in Level 2
-	FA	Fire Detection and Alarm	
-	FX	Fire Suppression	Fire extinguishing systems and equipment
P	-	Plumbing	All or any portion of subjects included in Level 2
-	PS	Plumbing Site	Extension and connections to civil utilities
-	PD	Process /Plumbing Demolition	Protection, termination, and removal
-	PP	Process Piping	Piping, valves, insulation, tanks, pumps
-	PQ	Process Systems	Systems and equipment for thermal, electrical, materials handling, assembly and manufacturing, nuclear, power generation, chemical, refrigeration, and industrial processes
-	PE	Process Electrical	Electrical exclusively associated with a process and not the facility
-	PI	Process Instrumentation	Instrumentation, measurement, recorders, devices, and controllers (electrical and mechanical)
-	PL	Plumbing	Domestic water, sanitary and storm drainage, fixtures

Designator		Description of Suggested Name	Content
Level 1	Level 2		
M	-	Mechanical	All or any portion of subjects included in Level 2
-	MS	Mechanical Site	Utility tunnels and piping between facilities
-	MD	Mechanical Demolition	Protection, termination, and removal
-	MH	Mechanical HVAC	Ductwork, air devices, and equipment
-	MP	Mechanical Piping	Chilled and heating water, steam
-	MI	Mechanical Instrumentation	Instrumentation and controls
E	-	Electrical	All or any portion of subjects included in Level 2
-	ES	Electrical Site	Utility tunnels, site lighting
-	ED	Electrical Demolition	Protection, termination, and removal
-	EP	Electrical Power	
-	EL	Electrical Lighting	
-	EI	Electrical Instrumentation	Controls, relays, instrumentation, and measurement devices
-	ET	Electrical Telecommunications	Telephone, network, voice, and data cables
-	EY	Electrical Auxiliary Systems	Alarms, nurse call, security, CCTV, PA, music, clock, and program

Designator		Description of Suggested Name	Content
Level 1	Level 2		
T	-	Telecommunications	All or any portion of subjects included in Level 2
-	TA	Audio Visual	Cable, music, and CCTV systems
-	TC	Clock and Program	Time generators and bell program systems
-	TI	Intercom	Intercom and public address systems
-	TM	Monitoring	Monitoring and alarm systems
-	TN	Data Networks	Network cabling and equipment
-	TT	Telephone	Telephone systems, wiring, and equipment
-	TY	Security	Access control and alarm systems
R	-	Resource	Data furnished without warrant as to accuracy
-	RC	Resource Civil	Surveyor's information and existing civil drawings
-	RS	Resource Structural	Existing facility structural drawings
-	RA	Resource Architectural	Existing facility architectural drawings
-	RM	Resource Mechanical	Existing facility mechanical drawings
-	RE	Resource Electrical	Existing facility electrical drawings

Appendix B - Sheet Identification Examples

The following table illustrates hypothetical indexes of drawings for two similar construction projects. The Level 1 project is a typical two-story professional office building. The Level 2 project is a four-story medical rehabilitation care facility. In the examples, the Level 1 drawing sheet may contain all the information listed for the Level 2 sheets below it, if required for the project.

Although not included in these examples, Plumbing, Mechanical, and Electrical sheets would be required for both projects. Those sheets should be identified according to the Level 1 and Level 2 designators presented in Appendix A, and arranged in the appropriate sequence.

Note: This table is ordered by the Level 2 discipline designators. Level 1 sheet identification numbers below may not be shown in order, but should be assembled in numerical sequence within each discipline designator.

Level 1	Level 2	Sheet Title
General Drawings		
G-001	GI-001	List of Sheets and Symbols
	GI-101	Location and Area Maps
	GI-102	Code Summary Fire Exiting and Separation
G-002	GC-001	General Requirements Notes
G-101	GC-101	Site Utilization Plan
	GC-102	Phasing Plans
	GC-601	CPM Schedules

Level 1	Level 2	Sheet Title
Civil Drawings		
	CD-101	Site Demolition Plan
	CD-102	Utilities Demolition Plan
C-101	CS-101	Dimension Control Plan
	CG-001	Grading and Excavation Notes
	CG-101	Excavation Plan
C-102	CG-102	Grading Plan
	CG-201	Grading Profiles
	CG-301	Excavation Sections
	CG-302	Grading Sections
	CG-501	Grading Details
	CP-001	Paving Notes
C-103	CP-101	Paving Plan
	CP-301	Paving Sections
C-501	CP-501	Paving Details
	CI-101	Exercise Walk & Equipment
	CI-501	Aerobic Equipment Details
	CT-101	Heliport Plan
	CT-301	Heliport Sections
	CT-501	Heliport Details
	CT-502	Heliport Details
C-104	-----	Site Utilities Plan
	CU-001	Utilities Distribution Notes and Symbols
	CU-101	Domestic Water Distribution Plan and Profile

Level 1	Level 2	Sheet Title
	CU-102	Fire Protection Water Distribution Plan and Profile
	CU-103	Sanitary Sewer Plan and Profile
	CU-104	Electrical Power Distribution
	CU-401	Large-Scale Plan at Medical Gas Storage Pad
C-502	-----	Site Utilities Details
	CU-501	Domestic Water Distribution Details
	CU-502	Sanitary Sewer Details
	CU-503	Site Electrical Utilities Details

Landscape Drawings

L-101	-----	General Landscape Architectural Plan
L-101	LD-101	Landscape Demolition Plan
	LD-102	Irrigation Demolition Plan
	LD-103	Planting Removal Plan
L-101	LG-101	Landscape Grading Plan
L-102	-----	Landscape Irrigation Plan
	LI-001	Landscape Irrigation Plan
	LI-002	Irrigation Notes and Symbols
	LI-401	Large-Scale Irrigation Plans
	LI-501	Irrigation Details
	LI-601	Irrigation Schedules
	LI-602	Irrigation Diagrams
L-103	LL-101	Landscape Lighting Plan
	LP-001	Planting Notes and Symbols

Level 1	Level 2	Sheet Title
L-103	LP-101	Landscape Planting Plan
	LP-401	Large-Scale Planting Plans
	LP-501	Landscape Details
	LP-601	Plant Materials Schedules
	LP-602	Planting Diagrams
	LP-901	Landscape 3D Representations
L-104	LR-101	Landscape Relocation Plan
L-104	LS-101	Landscape Site Hardscape Plan

Structural Drawings

S-101	SB-102	Foundation and First Floor Plan
	SB-201	Foundation Wall Elevations
S-301	SB-301	Foundation Sections
	SB-401	Large-Scale Foundation Plans
	SB-501	Foundation Details
	SB-601	Foundation Schedules
	SB-602	Foundation Load Diagrams
	SF-001	Framing Notes
S-102	SF-101	Second Floor Framing Plan
	SF-102	Third Floor Framing Plan
	SF-103	Fourth Floor Framing Plan
S-103	SF-104	Roof Framing Plan
	SF-201	Framing Elevations
S-302	SF-301	Framing Sections

Level 1	Level 2	Sheet Title
	SF-302	Wall Sections
	SF-401	Large-Scale Plan at Physical Therapy
S-501	SF-501	Framing Details
S-502	SF-502	Stair and Elevator Details
S-601	SF-601	Reinforcing Schedules
	SF-602	Column and Beam Schedules
S-602	SF-603	Framing Schedules
	SF-604	Load Diagrams
	SF-901	Framing Isometrics

Architectural Drawings

A-101	AS-101	Architectural Site Plan
A-001	AE-001	Architectural Notes and Symbols
A-102	AE-101	First Floor Plan
A-103	AE-102	Second Floor Plan
	AE-103	Third Floor Plan
	AE-104	Fourth Floor Plan
A-104	AE-105	First Floor Reflected Ceiling Plan
A-105	AE-106	Second Floor Reflected Ceiling Plan
	AE-107	Third Floor Reflected Ceiling Plan
	AE-108	Fourth Floor Reflected Ceiling Plan
A-106	AE-109	Roof Plan
A-201	AE-201	Exterior Elevations
	AE-202	Exterior Elevations

Level 1	Level 2	Sheet Title
A-202	AE-203	Interior Elevations
	AE-204	Interior Elevations
A-301	AE-301	Building Sections
	AE--302	Building Sections
A-302	AE-303	Wall Sections
	AE-304	Wall Sections
A-401	AE-401	Large-Scale Toilet Plans
A-402	AE-402	Stair and Elevator Plans and Sections
	AE-403	Treatment Room Plan
	AE-404	Physical Therapy Room Plan
	AE-405	Kitchen and Dining Room Plan
A-501	AE-501	Exterior Details
	AE-502	Exterior Details
A-502	AE-503	Interior Details
	AE-504	Interior Details
A-601	AE-601	Door and Window Schedules
	AE-602	Diagrams
	AE-901	3D Representations and Isometrics
A-701	AF-101	First Floor Finishes Plan
A-702	AF-102	Second Floor Finishes Plan
	AF-103	Third Floor Finishes Plan
	AF-104	Fourth Floor Finishes Plan
A-602	AF-601	Room Finish Schedules
A-107	AG-101	Signage Plan

Level 1	Level 2	Sheet Title
	AG-201	Signage Elevations
	AG-301	Signage Sections
	AG-401	Large-Scale Signage Drawings
	AG-501	Signage Details
A-603	AG-601	Signage Schedules

Interior Design Drawings

I-001	IN--001	Interior Design Notes and Symbols
I-101	IN-101	First Floor Interior Design Plan
I-102	IN-102	Second Floor Interior Design Plan
	IN-103	Third Floor Interior Design Plan
	IN-104	Fourth Floor Interior Design Plan
I-103	IN-105	First Floor Interior Design Reflected Ceiling Plan
I-104	IN-106	Second Floor Interior Design Reflected Ceiling Plan
	IN-107	Third Floor Interior Design Reflected Ceiling Plan
	IN-108	Fourth Floor Interior Design Reflected Ceiling Plan
I-201	IN-201	Interior Design Elevations
I-301	IN-301	Interior Design Sections
I-401	IN-401	Large-Scale Interior Design Plans
	IN-501	Interior Design Details
	IN-601	Interior Design Schedules
	IN-602	Interior Design Diagrams
	IN-901	Interior Design Isometrics
	IF-001	Interior Furnishing Symbols

Level 1	Level 2	Sheet Title
I-105	IF-101	First Floor Interior Furnishing Plan
I-106	IF-102	Second Floor Interior Furnishing Plan
	IF-103	Third Floor Interior Furnishing Plan
	IF-104	Fourth Floor Interior Furnishing Plan
I-202	IF-201	Interior Furnishing Elevations
I-302	IF-301	Interior Furnishing Sections
	IF-401	Large-Scale Interior Furnishing Plans
	IF-501	Interior Furnishing Details
	IF-601	Interior Furnishing Schedules
	IF-602	Interior Furnishing Diagrams
	IF-901	Interior Furnishing Isometrics
I-002	IG-001	Interior Graphics Notes and Symbols
I-107	IG-101	First Floor Interior Graphics Plan
I-108	IG-102	Second Floor Interior Graphics Plan
	IG-103	Third Floor Interior Graphics Plan
	IG-104	Fourth Floor Interior Graphics Plan
I-203	IG-201	Interior Graphics Elevations
	IG-301	Interior Graphics Sections
	IG-401	Large-Scale Interior Graphics Plans
I-501	IG-501	Interior Graphics Details
	IG-601	Interior Graphics Schedules
	IG-602	Interior Graphics Diagrams

Appendix C - Influences Table

The following table illustrates how various physical, regulatory, workflow, contract, and delivery system influences affect sheet identification and drawing set organization.

PHYSICAL INFLUENCES	AFFECTED CHARACTER								EFFECT ON SHEET IDENTIFICATION	EFFECT ON SET ORGANIZATION	
	A	A	–	N	N	N	U	U	U		
Scope - size of project	A	E	–	1	0	1				Use Level 2 discipline designators for large projects A-101 vs. AE-101	Grouping and sequence of sheets
Scope - number of buildings	A	E	–	1	0	1	1			Use 1, 2, 3, etc. or A, B, C, etc. for different buildings A-1011 or AE-1011	Subsets may be required
Scope - number of floors	A		–	1	0	1				Coordinate floor level with sheet sequence number A-101 for 1st floor plan A-102 for 2nd floor plan A-109 for 9th floor plan	Quantity of sheets
Scope - number of systems	A	E	–	1	0	1	1			Use Level 2 discipline designator and user-defined character AE-1011 or AG-1011	Quantity of sheets and subsets
Media - sheet size										No effect	Size and quantity of sheets
Media - required scale	A	E	–	4	0	1				Use appropriate sheet type designator A-401 or AE- 401	Size and quantity of sheets

A = Alphabetical Character

N = Numerical Character

U = User-Defined Character

REGULATORY INFLUENCES	AFFECTED CHARACTER								EFFECT ON SHEET IDENTIFICATION	EFFECT ON SET ORGANIZATION
	A	A	N	N	N	U	U	U		
Code compliance requirements	A	–	1	0	1	–	H	C	Use to designate special sheets A-101-HC (for ADA review)	May require additional sheets
Building official requirements	A	–	1	0	1	–	B	D	Use to designate special sheets A-101-BD (for building department)	May require additional sheets
Client requirements	A	–	1	0	1	–	L	S	Use to designate special sheets A-101-LS (for leasable space)	May require additional sheets
Facility management requirements	A	–	1	0	1	–	F	M	Use to designate special sheets A-101-FM (for facility management)	May require additional sheets or subsets

A = Alphabetical Character**N** = Numerical Character**U** = User-Defined Character

WORKFLOW INFLUENCES	AFFECTED CHARACTER								EFFECT ON SHEET IDENTIFICATION	EFFECT ON SET ORGANIZATION
	A	A	N	N	N	U	U	U		
Master planning	A	–	1	0	1	–	O	C	Treat as special architectural sheets A-101-OC (for occupancy code)	Include in facility management set
Project definition									Minimal or no effect	Internal to A/E firm
Conceptual design									No effect—use subfolder 1PREDES, 2SCHEM ... to indicate phase	Defines concept subset
Construction documents	A A	– E	1 1	0 0	1 1				Final sheet identification A-101, A-102 , etc. AE-101, AE-102 , etc.	Defines bid set
Project record drawings	A	–	1	0	1	–	R	D	Use RD for record drawing, and/or use subfolder 6RECORD to indicate phase A-101-RD	Defines project record set
Facility management	A	–	6	0	1	–	P	S	Use facility management work codes A-601-PS (for painting schedule)	Defines facility management set
Partially revised drawing	A	–	1	0	1	R	1		Use R for revisions of similar scope A-101R1 (first revision)	
Totally revised drawing	A	–	1	0	1	X	1		Use X for complete changes requiring new sheet A-101X1 (first revised drawing)	
Addenda drawing	A	–	1	0	1	–	A	D	Use AD for addenda drawing A-101-AD	

A = Alphabetical Character**N** = Numerical Character**U** = User-Defined Character

CONTRACT INFLUENCES	AFFECTED CHARACTER								EFFECT ON SHEET IDENTIFICATION	EFFECT ON SET ORGANIZATION
	A	A	N	N	N	U	U	U		
Type of construction contract									No effect—influence in sheet content	Types of sheets in bid set
Number of construction contracts									No effect—information in title block	Group common details in first set
Number of professional disciplines	A A	– G	1 1	0 0	1 1				Use only disciplines needed A-101 (for Architectural) AG-101 (for Architectural Graphics)	Determines discipline subsets
Number of construction trades									No effect—not organized by trade	May require additional sheets
Phases of construction	A A	– –	1 1	0 0	1 1	A B			Use A , B , etc. to indicate construction phase A-101A or A-101B	Sequence of sheets and subsets
Conformed Drawing	A	–	1	0	1	–	C	D	Use CD for conformed drawing A-101-CD	
Clarification Drawing	A	–	1	0	1	–	C	L	Use CL for clarification drawing A-101-CL	

A = Alphabetical Character**N** = Numerical Character**U** = User-Defined Character

DELIVERY SYSTEM INFLUENCES	AFFECTED CHARACTER								EFFECT ON SHEET IDENTIFICATION	EFFECT ON SET ORGANIZATION
	A	A	N	N	N	U	U	U		
Media type									Not applicable	Larger project sets may require higher-capacity media such as CD-ROM or rewritable-optical disks
Production vs. delivery format									Must work for manual and electronic methods	"Portable" digital set (independent of operating system and hardware)
Sheet Identification system									Not applicable	Expedites communication of data
File naming system	A A	- E	1 1	0 0	1 1	- —	- —	- —	If eight-character limit, fill unused positions with dashes (— — —) or underscores (_ _ _) A-101 — — —, AE-101 _ _ _	Coordinates digital version with hardcopy output

A = Alphabetical Character
N = Numerical Character
U = User-Defined Character

Sheet Organization

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
99 Canal Center Plaza
Alexandria, VA 22314-1588**

(800) 689-2900

www.csinet.org

www.nationalcadstandard.org

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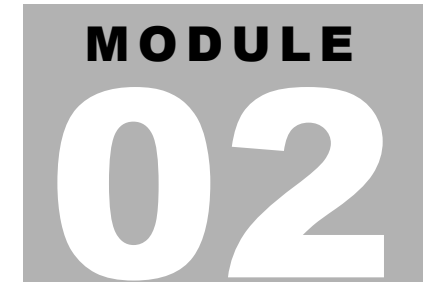
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Introduction

The *Sheet Organization Module* establishes guidelines for consistency in the systematic presentation of drawings organized on sheets. Sheets thus organized are suitable for compiling into sets according to the *Drawing Set Organization Module* guidelines, thereby providing a uniform location of graphical data.

The *Sheet Organization Module*:

- Provides a consistent sheet format
- Presents usable examples of sheet formats
- Provides a location system for drawings on a sheet
- Establishes guidelines for management, notation, and title block information

The benefits of sheet organization standards are:

- Enhanced communication among drawing preparers and users
- Improved quality control by providing a quality assurance standard
- Easier data management
- Consistent sheet format among design disciplines, conveying a coordinated image

Sheet Sizes

Many commercial sheet sizes are available. Sheet size selection is dependent on many factors. A common sheet size for all projects facilitates filing hard copy documents, provides efficiencies in reducing multiple media requirements, and maintains consistency for users of printed documents. Other factors influencing sheet size may include plotter capabilities, project complexity or size, filing capabilities, and handling of hard copy deliverables. Some firms or owners also require reduced size sheets for bidding or office use.

The single most important determinant in selecting the sheet size is to prepare a floor plan drawing on a single sheet without dividing the plan into sections. Large projects, however, may require the plan to be divided into multiple parts depending upon sheet size and scale. When plans are divided, a key plan is necessary on each plan sheet to indicate the sector or quadrant location. The key plan location is described in the drawing area portion of this module.

As of January 1, 1992, the federal government requires all construction documents used for federal government projects to be developed using the International System of Units, (Système International d'Unités), or SI System, commonly called the metric system. Typically, government agencies also require that construction documents be prepared on American National Standards Institute (ANSI) sheet sizes. *Table 02.1* indicates the standard sheet sizes and their typical uses.

SHEET SIZES						
ANSI		ISO		Architectural		Typical Uses
Mark	Size mm (inches)	Mark	Size mm (inches)	Mark	Size mm (inches)	
A	216 x 279 (8.5 x 11)	A4	210 x 297 (8.3 x 11.7)	A	229 x 305 (9 x 12)	Project book. Supplemental drawings. Mock-up sheets.
B	279 x 432 (11 x 17)	A3	297 x 420 (11.7 x 16.5)	B	305 x 457 (12 x 18)	Reduced drawings from "D" size and "A1" originals. Supplemental drawings. Mock-up sheets.
C	432 x 559 (17 x 22)	A2	420 x 594 (16.5 x 23.4)	C	457 x 610 (18 x 24)	Small projects accommodating preferred plan scale.
D	559 x 864 (22 x 34)	A1	594 x 841 (23.4 x 33.1)	D	610 x 914 (24 x 36)	Projects accommodating preferred plan scale. Government projects.
E	864 x 1118 (34 x 44)	A0	841 x 1189 (33.1 x 46.8)	E	914 x 1219 (36 x 48)	Large projects accommodating preferred plan scale. Mapping and GIS.
—	—	—	—	F	762 x 1067 (30 x 42)	Alternate size for projects accommodating preferred plan scale.

Table 02.1 ANSI, International Organizations for Standardization, and all but F of Architectural size sheets have a consistent sheet module within each system. The sheet size for each type of sheet is an equal module to the next larger sheet size.

Sheet Layout

Drawing Area: *That portion of the sheet containing drawings, keynotes, key plans, schedules, and other graphic and text data necessary to illustrate the work.*

Title Block Area: *That portion of the sheet containing project, client, designer, sheet identification, and sheet management information needed by the user of the sheet.*

Production Data Area: *That portion of the sheet containing information on the production of the sheet.*

As illustrated in *Figure 02.1* sheets are divided into three main areas: **drawing area**, **title block area**, and **production data area**. The drawing area and title block area are required, while the production data area is optional. Each of these areas contains information concerning construction or reference information, project management or presentation information, and project production information.

Each of these areas contains different types of information necessary for the presentation and management of the project. These areas should be defined by a border, tick marks, or other means to graphically separate them from each other.

Sheet margins are the space between the edge of the sheet and the sheet area. The sheet margins may vary depending on plotter capabilities, sheet size, and sheet area dimensions.

The practical minimum sheet margins are as follows:

- Top and bottom margin: 20 mm (3/4 inch)
- Left margin: 40 mm (1-1/2 inch)
- Right margin: 20 mm (3/4 inch)

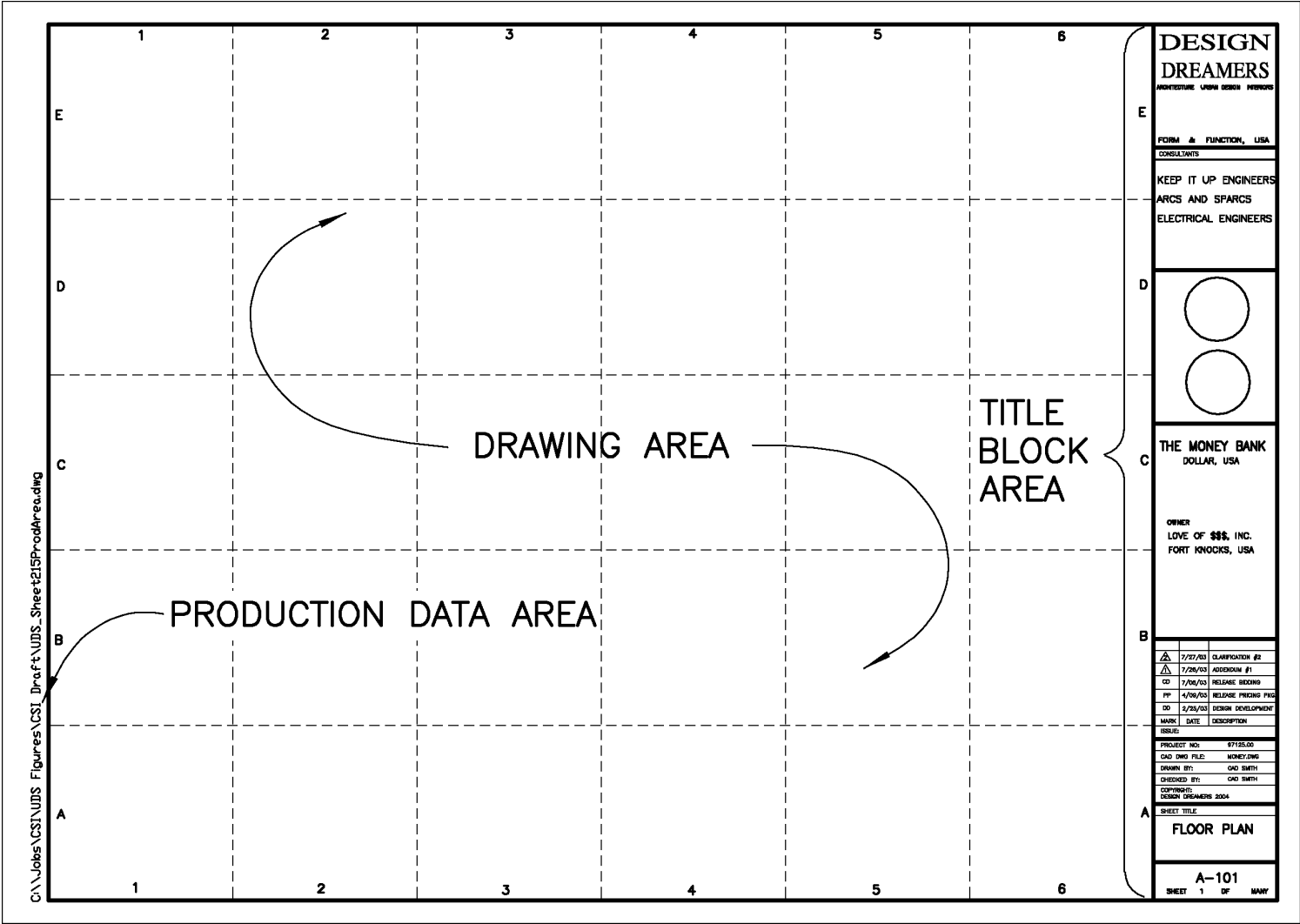


Figure 02.1 Overall sheet layout.

Drawing Area

The drawing area is that portion of the sheet containing drawings, keynotes, key plans, schedules, and other graphic and text data necessary to illustrate the work. The drawing area is divided into modules. Factors that may influence the number and size of modules include sheet size, margins, title block area, client requirements, and typical drawing block size. The user should establish a standard drawing module size as required to meet these factors. Examples of typical modules may be 38 mm × 38 mm, 75 mm × 75 mm, and 150 mm × 150 mm (1½" × 1½", 3" × 3", 6" × 6"). Modules should remain the same throughout the drawing set. This allows the creation of library files of standard graphic and text information that may be located easily within the drawing area grid or be moved between sheets or projects. Refer to the *Drawing Set Organization Module* for a discussion of library files.

Drawing Blocks: *Drawing modules containing graphic or textual information.*

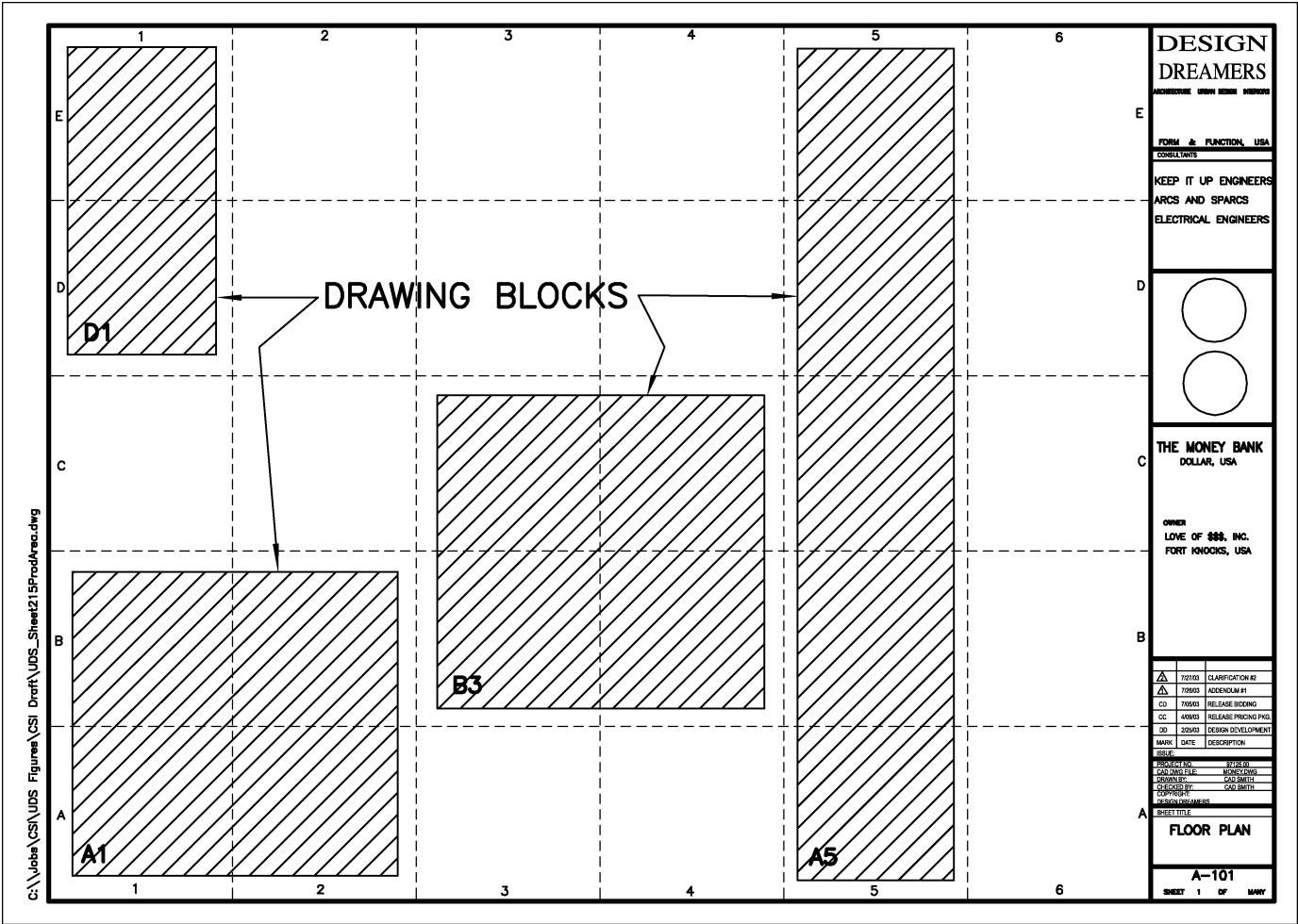
Individual drawings may comprise one or more drawing modules. Drawing modules containing graphic or textual information are called **drawing blocks**. Each drawing block is identified by the drawing area coordinate system.

Drawing Area Coordinate System

The drawing modules are arranged in columns and rows. Columns are identified with numerical characters starting with **1** and increasing to the right. Rows are identified with alphabetical characters beginning at the bottom starting with **A** and increasing toward the top of the sheet. Each module is therefore identified by a letter and a number. A drawing block may be composed of one or more drawing area modules and is identified based on the lower left hand location. Therefore, a drawing located in the lower left hand corner of the drawing area, two modules high by two modules wide, would be identified as **A1**. *Figure 02.2* indicates examples of how several drawings would be identified.

It is preferred that drawing area coordinates be positioned outside the drawing area itself, although some plotting hardware may require that the coordinates be located within the drawing area. At a minimum these coordinates should be placed on the right hand side as well as the top or bottom of the drawing area. However, it is preferred that they appear on all four sides of the drawing area. Coordinates are not required for schematic design drawings.

This numbering system allows drawings to be numbered during early stages of the project or as late as construction record drawings while providing for a consistent location throughout the drawing set and project cycle.



Note Block

The note block is the module or modules within the drawing area where keynotes, general notes, and key plans are located. Not all sheets will have a note block. The note block is located in the far right column of the drawing area. A key plan block, when used, should always be located in the lowest module of the note block. Refer to *Figure 02.3*.

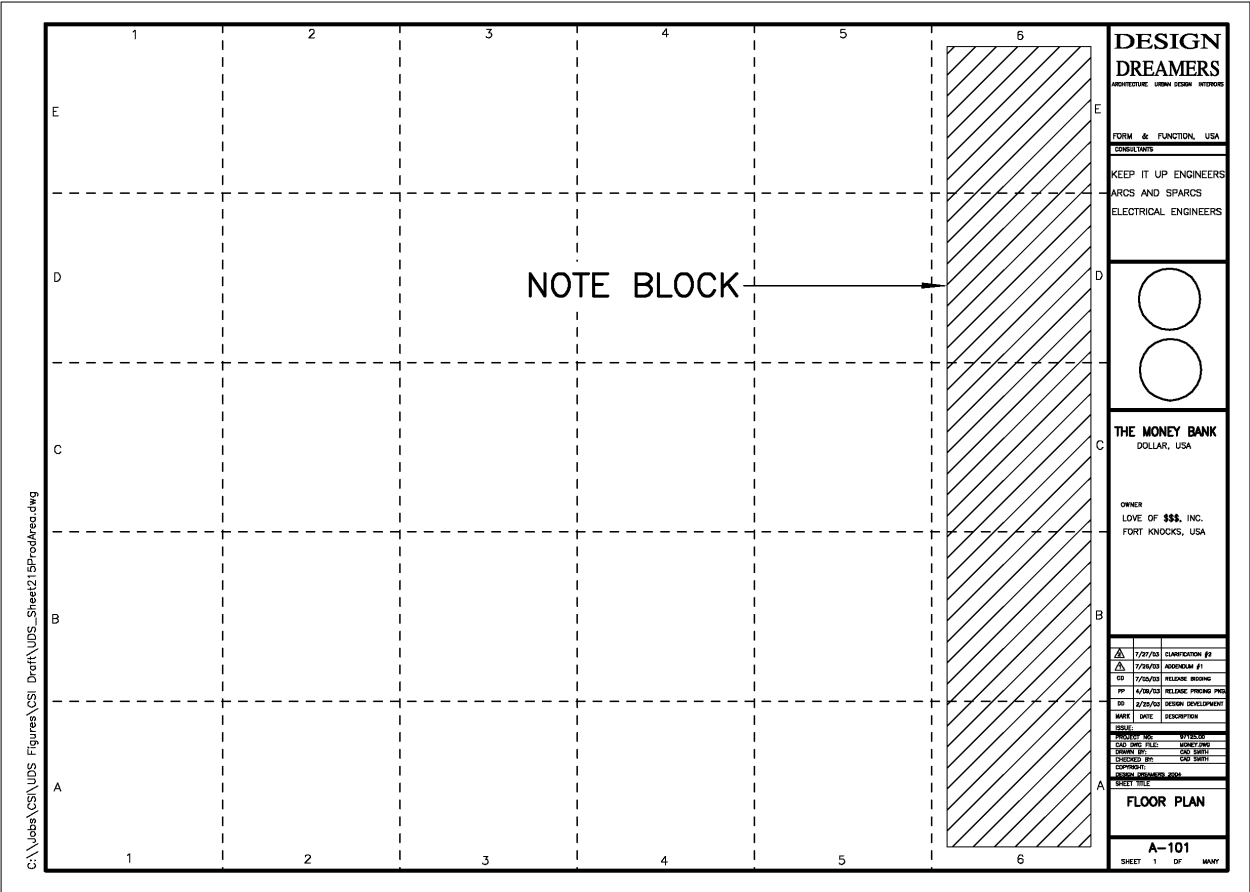


Figure 02.3 Note block.

Title Block Area

The title block area is that portion of the sheet containing project, client, designer, sheet identification, and sheet management information needed by the user of the sheet. Refer to *Figure 02.4*. The guidelines for the title block area provide criteria for the location of like information shown in data blocks within the title block area for easy and consistent retrieval and filing of drawings. Data blocks include the following:

- Designer Identification Block
- Project Identification Block
- Issue Block
- Management Block
- Sheet Title Block
- Sheet Identification Block

DESIGNER
IDENTIFICATION
BLOCK

PROJECT
IDENTIFICATION
BLOCK

ISSUE BLOCK

MANAGEMENT BLOCK

SHEET TITLE BLOCK

SHEET IDENTIFICATION BLOCK

DESIGN DREAMERS ARCHITECTURE URBAN DESIGN INTERIORS		
FORM & FUNCTION, USA		
CONSULTANTS		
KEEP IT UP ENGINEERS ARCS AND SPARCS ELECTRICAL ENGINEERS		
THE MONEY BANK DOLLAR, USA		
OWNER LOVE OF \$\$\$, INC. FORT KNOCKS, USA		
	7/27/03	CLARIFICATION #2
	7/28/03	ADDENDUM #1
CD	7/08/03	RELEASE BIDDING
PP	4/08/03	RELEASE PRICING PHAS
DD	2/25/03	DESIGN DEVELOPMENT
MARK	DATE	DESCRIPTION
ISSUE		
PROJECT NO: 07125.00		
CAD DWG FILE: MONEY.DWG		
DRAWN BY: CAD SMITH		
CHECKED BY: CAD SMITH		
COPYRIGHT: DESIGN DREAMERS 2004		
SHEET TITLE		
FLOOR PLAN		
A-101		
SHEET 1 OF MANY		

Figure 02.4 Title block.

Designer Identification Block

The designer identification block is that portion of the title block area identifying the designer or **preparer** of the sheet. Refer to *Figure 02.5*. This block may include information about the preparer including:

- Name
- Address
- Telephone and fax numbers
- E-mail address or other means of electronic communication

This block may also include the preparer's logo, professional seal(s), certifications, and the names and addresses of consultants. In the case of a design-build project it may include the entire project team.

The requirements for professional seals vary from jurisdiction to jurisdiction. Single seals are required by most states while others require both individual and corporate seals. Drawing preparers should familiarize themselves with the legal requirements for the use of professional seals in the state or jurisdiction of the work.

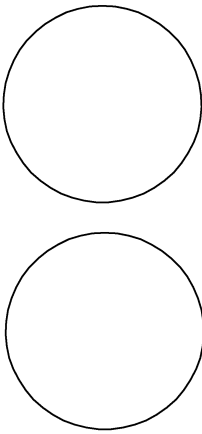
DESIGN DREAMERS ARCHITECTURE URBAN DESIGN INTERIORS FORM & FUNCTION, USA CONSULTANTS KEEP IT UP ENGINEERS ARCS AND SPARCS ELECTRICAL ENGINEERS


Figure 02.5 Designer identification block.

Preparer: *Registered and unregistered designers, manufacturers, contractors, material suppliers, and others.*

Project Identification Block

The project identification block is that portion of the title block area that identifies the project. Refer to *Figure 02.6*. This block may contain information on:

- Project name and address
- Building or facility name
- Construction phase sequence
- Project logo

The address, telephone and fax numbers, and logo of the owner/client may also be included in the project identification block.



THE MONEY BANK
DOLLAR, USA

OWNER
LOVE OF \$\$\$, INC.
FORT KNOCKS, USA

Figure 02.6 Project identification block.

Issue Block

The issue block is the portion of the title block area that shows the chronological issue of, and revisions to, the sheet. Refer to *Figure 02.7*. The issue block has three columns identified as mark, date, and description. The data fields in this block may include:

- Phase issue dates
- Addendum issue dates
- Clarification dates
- Revision issue dates

The number of data field lines is user dependent. The initial entry should be placed at the bottom of the issue block, with subsequent entries placed above each previous entry, allowing for expansion into the project identification block if necessary.

	7/27/03	CLARIFICATION #2
	7/26/03	ADDENDUM #1
CD	7/05/03	RELEASE BIDDING
PP	4/09/03	RELEASE PRICING PKG.
DD	2/25/03	DESIGN DEVELOPMENT
MARK	DATE	DESCRIPTION

Figure 02.7 Issue block.

Management Block

The management block is the portion of the title block area that contains the management information generally used for project filing, record keeping, or other project management information. Refer to *Figure 02.8*. Data fields in this block may include:

- Drawing preparer's project number
- Owner's contract number
- Owner's project number
- File number
- Design/construction phase number
- CAD drawing file number
- Drawn by
- Checked by
- Copyright

When projects require space to indicate special management information, such as owner approval, the management block should be expanded to include them.

PROJECT NO:	97125.00
CAD DWG FILE:	MONEY.DWG
DRAWN BY:	CAD SMITH
CHECKED BY:	CAD SMITH
COPYRIGHT: DESIGN DREAMERS 2004	

Figure 02.8 Management block.

Sheet Title Block

The sheet title block is the portion of the title block area that indicates the type of information presented on the sheet. Refer to *Figure 02.9*. The sheet may contain one or more types of drawings. The title block may only include the major type of information shown on the sheet, or may indicate multiple types of information (e.g., floor plan, schedules, and details).



Figure 02.9 Sheet title block.

Sheet Identification Block

The sheet identification block is the portion of the title block area that contains the sheet identifier. Refer to *Figure 02.10*. The system for determining the sheet identification and its format is contained in the *Drawing Set Organization Module*. It indicates the discipline designator, sheet type designator, and the sheet sequence number. Optional data as part of the sheet identification block includes a number indicating the sheet count and total number of sheets within the set. The sheet count can be for all sheets in the drawing set, or for the count within each discipline.



Figure 02.10 Sheet identification block.

Two standard title block formats have been identified as a part of the sheet organization format—**horizontal text format** (*Figure 02.11*) and **vertical text format** (*Figure 02.12*). The horizontal text format is most commonly used, and is the preferred format. This format allows titles to be easily read on hard copy drawings whether the drawings are in use, stored in rolls, or stored in flat files. In either horizontal or vertical text formats, the sheet identification block, the sheet title block, and the management block are always oriented horizontally.

Vertical Text Format: *Title block text is oriented parallel to the right side of the sheet.*

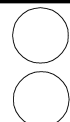
5	6	DESIGN DREAMERS ARCHITECTURE URBAN DESIGN INTERIORS E FORM & FUNCTION, USA CONTRACTANTS KEEP IT UP ENGINEERS ARCS AND SPARCS ELECTRICAL ENGINEERS																		
		D 																		
		C THE MONEY BANK DOLLAR, USA OWNER LOVE OF \$\$\$, INC. FORT KNOCKS, USA																		
		B <table border="1"> <tr> <td>△</td> <td>7/27/03</td> <td>CLAMPFORTH #1</td> </tr> <tr> <td>△</td> <td>7/28/03</td> <td>ANDREWS #1</td> </tr> <tr> <td>CC</td> <td>7/29/03</td> <td>RELING IRONS</td> </tr> <tr> <td>HW</td> <td>8/19/03</td> <td>RELING PILING PWS</td> </tr> <tr> <td>UT</td> <td>8/20/03</td> <td>SEWER DEVELOPMENT</td> </tr> <tr> <td>WMS</td> <td>8/26/03</td> <td>WINDSCREEN</td> </tr> </table> BOLD PROJECT NO: 071252 CDR: DRG FILE: WORKING DRAWN BY: CDR BATH CHECKED BY: CDR BATH COMMENTS: REVISION NUMBER 0004 SHEET TITLE	△	7/27/03	CLAMPFORTH #1	△	7/28/03	ANDREWS #1	CC	7/29/03	RELING IRONS	HW	8/19/03	RELING PILING PWS	UT	8/20/03	SEWER DEVELOPMENT	WMS	8/26/03	WINDSCREEN
△	7/27/03	CLAMPFORTH #1																		
△	7/28/03	ANDREWS #1																		
CC	7/29/03	RELING IRONS																		
HW	8/19/03	RELING PILING PWS																		
UT	8/20/03	SEWER DEVELOPMENT																		
WMS	8/26/03	WINDSCREEN																		
5	6	A FLOOR PLAN A-101 SHEET 1 OF MANY																		

Figure 02.11 Horizontal text format.

[illegible]

Figure 02.12 Vertical text format.

Production Data Area

The production data area is an optional portion of the sheet that contains information on the production of the sheet. This data is typically covered by the binding strip once the drawing set has been assembled. Because some plotters will not plot in the binding margin, this information may need to be inserted manually or within a preprinted production block. Refer to *Figure 02.13*. The production data area may include the following blocks of information.

Plotter Time and Date Block

The plotter time and date block is the portion of the production data area where the time and date of the plot are located. This information is typically located near the **A1** drawing block. The time and date can be automatically inserted by most CAD software.

Production Block

The production block is that portion of the production data area that contains management information concerning the production of the sheet. Data that may be assigned to this block includes:

- File path
- Sheet file name
- Default settings
- Pen assignments
- Printer/plotter commands
- Overlay drafting control data
- Reference file(s)
- Layers plotted
- Production hours

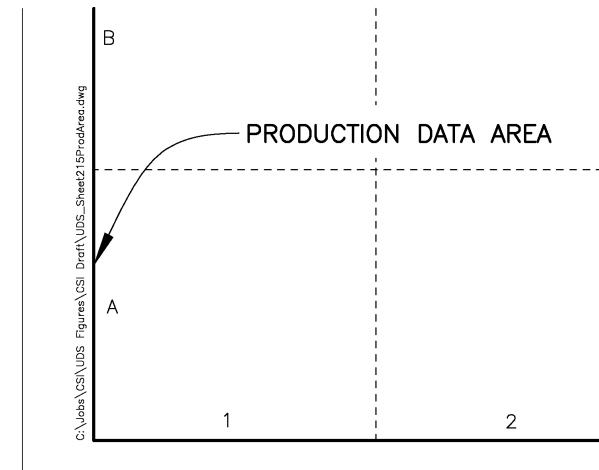


Figure 02.13 Production data area.

Scanning Scale Block

The scanning scale block contains a graphical scale that may be used if the sheet is to be scanned, photographically reduced, or microfilmed.

Cover Sheet

The cover sheet is unique to the sheet organization format. The cover sheet may identify the project, owner, and other project team members involved in preparing the drawings. The cover sheet may also contain a photograph, rendering of the project, or logo of the owner or preparer.

If the cover sheet contains specific project data such as a list of sheets, a listing of abbreviations, general notes, a building code summary, or a key plan, etc., it should be identified with a sheet identifier containing the discipline designator **G** for general, sheet type **0**, and the sequence number **01 (G-001)**. Refer to the *Drawing Set Organization Module* for further explanation of the sheet identification format.

Mock-up Sheets

Mock-up sheets are often developed to assist in the layout and production of the drawing set. Individual mock-up sheets are developed as a miniature of each proposed sheet, prior to production. Drawings, schedules, notes, and other data are located on the mock-up sheets within the drawing area modules. Planning with mock-up sheets enables one or more persons to work on a drawing set at the same time, while maintaining a coordinated effort.

Mock-up sheets are normally 216 mm × 279 mm (8-1/2 inches × 11 inches) or 279 mm × 432 mm (11 inches × 17 inches). A scaling factor is used to determine the size of the drawing or drawings to be located on the completed sheet. The drawing area module grid also assists in placing drawings on the mock-up sheet and determining the number of drawings that will fit on the sheet.

Scale factors for mock-up sheets are:

- Full size scale: 3" = 1'-0"
- 3" scale: 3/4" = 1'-0"
- 1-1/2" scale: 3/8" = 1'-0"
- 1" scale: 1/4" = 1'-0"
- 3/4" scale: 3/16" = 1'-0"
- 1/2" scale: 1/8" = 1'-0"
- 1/4" scale: 1/16" = 1'-0"
- 1/8" scale: 1/32" = 1'-0"
- 1/16" scale: 1/64" = 1'-0"

Figure 02.14 is included for use as a template for preparing scaled mock-up sheets.

Figure 02.14 11" × 17" Mock-up sheet of a full size ANSI D 34" × 44" sheet.

Supplemental Drawing Sheets

The supplemental drawing sheet format is similar to the standard sheet format, but modified to accommodate the reduced sheet size. This format should be used for project detail books and supplemental drawing sheets. Refer to *Figure 02.15* for an example of a supplemental drawing sheet.

The practical minimum margins for supplemental drawing sheets are:

- Top and bottom margin
15 mm (1/2 inch)
- Left and right margin:
15 mm
(1/2 inch)

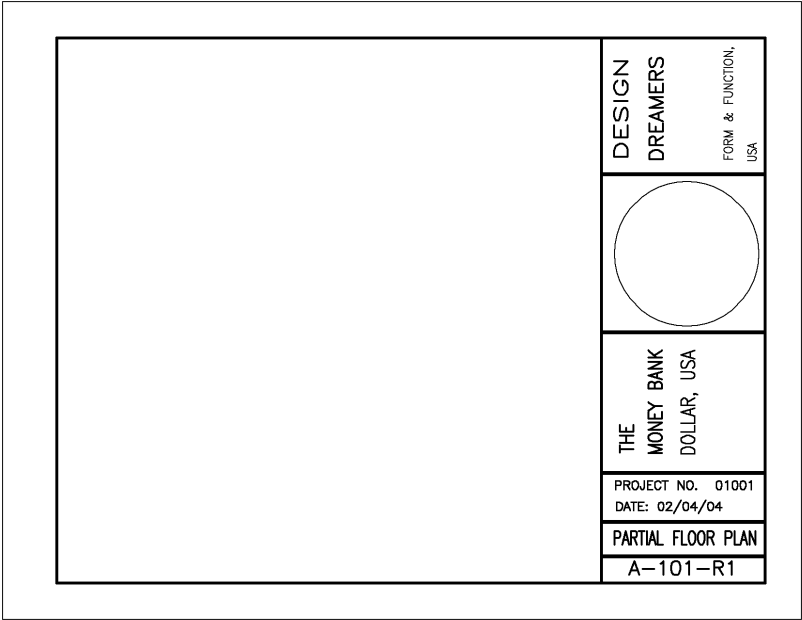


Figure 02.15 Supplemental drawing sheet.

Appendix A - Electronic Media

SHEET SIZES			
Sheet Type	Mark	mm	inches
ANSI	A	216 × 279	8.5 x 11
	B	279 × 432	11 x 17
	C	432 × 559	17 x 22
	D	559 × 864	22 x 34
	E	864 × 1118	34 x 44
ISO	A4	210 x 297	8.3 x 11.7
	A3	297 x 420	11.7 x 16.5
	A2	420 x 594	16.5 x 23.4
	A1	594 x 841	23.4 x 33.1
	A0	841 x 1189	33.1 x 46.8
Architectural	A	229 × 305	9 x 12
	B	305 × 457	12 x 18
	C	457 × 610	18 x 24
	D	610 × 914	24 x 36
	E	914 × 1219	36 x 48
	F	762 × 1067	30 x 42
Mock-up	D	216 × 279	24 x 36 (8.5 x 11)
	F	279 × 432	30 x 42 (11 x 17)

Schedules

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
99 Canal Center Plaza
Alexandria, VA 22314-1588**

(800) 689-2900

www.csinet.org

www.nationalcadstandard.org

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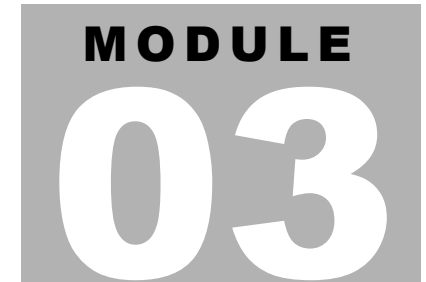
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Introduction

The objective of the *Schedules Module* is to provide a consistent format for written information in the form of schedules. Formats are provided for typical schedules used in building construction. These formats can be utilized in preparing schedules for construction projects. A system for identifying schedules is provided for filing, organizing, and data retrieval purposes.

The *Schedules Module* provides:

- A consistent schedule format.
- Examples of ready-to-use schedules.
- A system for identifying each schedule type.

The benefits of following the *Schedules Module* are:

- Effective communication for contract document preparers and users.
- Efficient quality control.
- Easier data management.

The *Schedules Module* is limited to schedules used in construction documents.

Purpose of Schedules

Schedules communicate information about a related group of items. In many drawing sets, information has been presented in a schedule format next to the item indicated on a drawing. For example, window descriptions have been compiled into a window schedule, noted on the floor plans, or noted in less detail on the exterior elevations. This practice is optional with small or simple projects.

Some schedules contain only text. These schedules can be developed as computer-generated databases or spreadsheets, and then incorporated into the drawings or specifications. Other schedules are part text and part symbol or diagram. For example, a partition schedule can contain both a graphic wall diagram and descriptive information.

Schedules provide uniform location, format, and information content that facilitates consistency and ease of use.

Definition of a Schedule

A schedule is a grouping of related items with corresponding distinguishing features, with a heading and a minimum of three columns of related information. A schedule formats information into rows and columns in order to more easily present design information.

In its simplest form, a schedule consists of four parts—a subject title (Heading), a column identifying an item (Mark), a column for the description of an item (Item Description), and a column for indicating some notable characteristic (Distinguishing Feature). *Figure 03.1* illustrates the four parts of a schedule.

HEADING		
MARK	ITEM DESCRIPTION	DISTINGUISHING FEATURE

Figure 03.1 A basic schedule has a heading and three columns.

A schedule is more than a list of paired items, such as a legend, key, or index. A list, often used for keynotes or merely to identify an item without distinguishing it from other items, is illustrated in Figure 03.2 as two columns of paired information.

LEGEND, KEY, or INDEX	
MARK	ITEM DESCRIPTION

Figure 03.2 A list is not considered a schedule.

Concepts

Consider the following concepts when preparing schedules:

- Consistent terms and abbreviations should be used throughout similar schedules.
- Schedules are space sensitive because information has to fit in available column space. The column title should be as short as possible to adjust for column width variations.
- Computer software can create schedules from information in CAD drawings by extracting data assigned to the various graphic representations of the drawing.
- When schedules are used on drawing sheets, they should be sized to fit within the dimensions of the drawing area module. Refer to the *Sheet Organization Module* for further discussion of the drawing area module.
- Schedules are expandable by adding rows and columns.
- Complex schedules allow horizontal separations by being subdivided into groups of related information, e.g., floor level or building phase.

Format

Information should be organized in every schedule in a similar format. Schedules may be a simple format containing limited information about a subject, or they may be expanded to contain more detailed and specific information depending on the scope of the project.

The format of schedules on drawings is limited by the size of the sheet. Likewise, schedules included in the specifications are limited by the page size of the project manual. Consider the following when determining the format of schedules:

- Client requirements
- Size
 - Drawing block, to fit within the grid of the drawing area
 - Drawing area, if the whole sheet is used for the schedule
 - Project Manual page size
- Method of creation
 - Generated by CAD or other computer software
 - Manually produced
- Reproduction method
- Degree of reduction or enlargement
- Minimum size of text used to remain legible
- End use
 - Office
 - Job site

Parts of a Schedule

Heading

The main subject or title of a schedule is described by the schedule heading.

Mark Column

Schedules have a Mark column as the first identifier column at the far left of the schedule. The mark may be alphanumeric, or can include a graphic symbol relating to the item's use on the drawings. In a large or wide schedule, an additional mark column located on the right side of the schedule can improve readability.

Item Description Column

The item description is the name or identification of each item provided with a separate mark in the schedule.

Distinguishing Feature Column(s)

Distinguishing features are distinct, different, or defining characteristics that specifically describe special information related to the items contained in the schedule. Depending on the schedule's complexity, each schedule may contain multiple distinguishing feature columns.

Notes Column

The notes column is a special type of distinguishing feature column used to locate special remarks about items in the schedule that do not necessarily warrant their own separate column identifier. It is usually located at the far right side of the schedule.

The notes column usually contains a unique or special description about a specific item in the identifier row. A note may be written as a complete sentence or just descriptive words. A note may also be a key letter or number that cross-references a general note located elsewhere. The note can also cross-reference other drawings or specification items. (Refer to *Figure 03.3.*)z

HEADING			
MARK	ITEM DESCRIPTION	DISTINGUISHING FEATURE	NOTES
			1, 2
			3
			5
			2, 3

- Notes Legend:**
- 1 Note A
 - 2 Note B
 - 3 Note C
 - 4 Note D
 - 5 Note E

Figure 03.3 Schedule with notes column.

The advantage of using a key letter or number in the notes column is the reduction in column width. With extensive written remarks, the notes column is often too small or the text becomes confusing when abbreviated or edited to fit within the available width of the column.

All schedules included in Appendix B in this module include a notes column.

Building a Schedule

A simple schedule can be expanded by including additional distinguishing feature columns for distinctive information. The following discussion illustrates how distinguishing features can expand a simple schedule.

Simple vs. Expanded Schedules

Schedules can be simple or expanded depending on the specific project requirements and information required. A simple schedule can be expanded with the addition of more data, resulting in a complex schedule. An expanded schedule can become a simple schedule by reducing content. In either case, information in the schedule should be located in a logical manner and presented in the format illustrated in *Figure 03.4*.

A							
B	B		B			B	B
	C	C	C	C	C		
D	E	E	E	E	E	E	E

Figure 03.4 Schedule format.

Heading	A	Contains the subject or title of the schedule.
Column Identifier	B	Contains subject titles that define specific information required for each line item listed in the schedule.
Column Sub-identifier	C	The column sub-identifier lists additional titles for more detailed information to be provided under a subject in the column identifier. This level of information can be further divided to allow for triple-tier column identifiers when necessary.
Row Identifier	D	Contains the mark or other identifier of the item (project, material, or assembly). This mark is used as a reference to locate the item on the drawings or in the specifications.
Description Cell	E	Contains specific information required by the column identifier and column sub-identifier related to each item referenced in the row identifier.

Column Identifier Options

The variations in schedules between simple and expanded is related to the amount or complexity of distinguishing features shown by adding distinct column identifiers.

Additional distinguishing features can be subdivisions within a class or subject of a distinguishing feature. These additions are shown by expanding the column identifier with additional column sub-identifiers.

A simple schedule can present distinguishing features using a single-tier column identifier. For example, *Figure 03.5* illustrates a simple room finish schedule with a single column identifier for the overall category of walls:

ROOM FINISH SCHEDULE						
NO	ROOM NAME	FLOOR	BASE	WALL	CEILING	NOTES
101	Entry			A		

Figure 03.5 Single-tier column identifier.

A column sub-identifier can be added as a second tier to expand the simple schedule to distinguish the four walls of a room that may receive different treatments, as indicated in *Figure 03.6*.

ROOM FINISH SCHEDULE									
NO	ROOM NAME	FLOOR	BASE	WALLS				CEILING	NOTES
				N	E	S	W		
101	Entry			A	A	A	C		

Figure 03.6 Double-tier column identifier with column sub-identifiers.

The schedule can further expand the distinguishing features of a wall with more information by adding a third tier of column sub-identifiers for material, finish, and color for each of the four walls. Refer to *Figure 03.7*.

ROOM FINISH SCHEDULE																	
NO	ROOM NAME	FLR	BASE	WALLS												CLG	NOTES
				N			E			S			W				
				MATL	FIN	CLR	MATL	FIN	CLR	MATL	FIN	CLR	MATL	FIN	CLR		
101	ENTRY			A	P1	1	A	V	2	A	P1	1	C	P2	3		

Figure 03.7 Triple-tier column identifier with column sub-identifiers.

The multiple tiers of information in the expanded schedules are somewhat like paragraph levels, presenting new information with the addition of each column sub-identifier.

For each of the previous examples, *Figure 03.8* illustrates the use of a key to relate additional notes and information to the schedule.

MATERIAL KEY		FINISH KEY		COLOR KEY	
A	GYPSUM BOARD	P1	PAINT, SEMI-GLOSS	1	OFF WHITE
B	CERAMIC TILE	P2	PAINT, FLAT	2	GRAY
C	CONCRETE MASONRY UNIT	V	VINYL WALL COVERING	3	TAN

Figure 03.8 Material key, finish key, and color key.

Content

Proprietary Schedules

A proprietary schedule provides a format for indicating criteria in a simplified manner by just specifying a manufacturer, product type, or model number, and any specific accessories or options. Generalized performance criteria can be left out of a proprietary schedule.

Proprietary schedules, like proprietary specifications, take less time and effort to prepare. Only one product is identified. Other choices and the determination of which performance criteria to indicate on the schedule are minimized or eliminated. Coordination should occur between specifications and schedules to provide consistency when using proprietary specifications. Refer to *The Project Resource Manual - CSI Manual of Practice* for further discussion of proprietary specifications.

Appendix B contains examples of proprietary schedules that include column identifiers for manufacturer and model number.

Abbreviations

Schedules often use abbreviations because of the limitation of space. As shown in *Figure 03.9*, the services connected to various items of equipment are abbreviated. Many of these abbreviations can be found in Module 5, *Terms and Abbreviations*.

EQUIPMENT SCHEDULE										
MARK	ITEM DESCRIPTION	SERVICES								NOTES
		MECHANICAL				ELECTRICAL				
		CW	HW	DR	EXH	AMP	V	PH	HP	

Figure 03.9 Schedule abbreviations.

In this example the abbreviations used for the column sub-identifiers include:

- CW**
- Cold Water
- HW**
- Hot Water
- DR**
- Drain
- EXH**
- Exhaust
- AMP**
- Ampere
- V**
- Volts
- PH**
- Phase
- HP**
- Horsepower

Location—Specifications or Drawings?

Certain schedules have traditionally been located in either the specifications or the drawings. The information contained in the schedule should not be repeated somewhere else in a different format. The choice of where to locate the schedule ultimately depends on specific project or client requirements.

MasterFormat™ allocates locations for scheduled information. In the simplest form, the schedule is included at the end of the specification section for the work involved. Examples include insulation (Section 07 20 00) and sealant (Section 07 90 00) schedules. Schedules cannot always be included in a single specification section because they may include information for multiple specification sections. For example, door schedules include information pertaining to wood doors, metal doors, and building entrances. Refer to Appendix A, Appendix B, *MasterFormat*, and *The Project Resource Manual - CSI Manual of Practice* for additional information.

Factors to consider when deciding where to locate schedules include:

- Size of schedule.
- How the schedule is produced.
- Ease of coordination of drawings and specifications.
- Use of graphic information to augment the schedule.
- Ease of use of schedules.

Computer-generated schedules are frequently printed during the course of the project for coordination and review purposes. For ease of handling, the schedules are usually printed on 216 mm by 279 mm (8-1/2" by 11") size paper for copying, filing, and distribution. If the schedules are designed to fit letter-size paper, it is often convenient to incorporate the schedules in the specifications.

Schedules may vary in size beyond practical use in the typical specifications format, or even a folded 279 mm by 432 mm (11” by 17”) format. Once this limit is reached, locating schedules on drawings allows for a more legible format. When located on drawings, schedules should be sized to fit within the drawing modules of the sheet. If necessary, schedules can be enlarged to fit across the full width of the sheet. Refer to *Figure 03*.

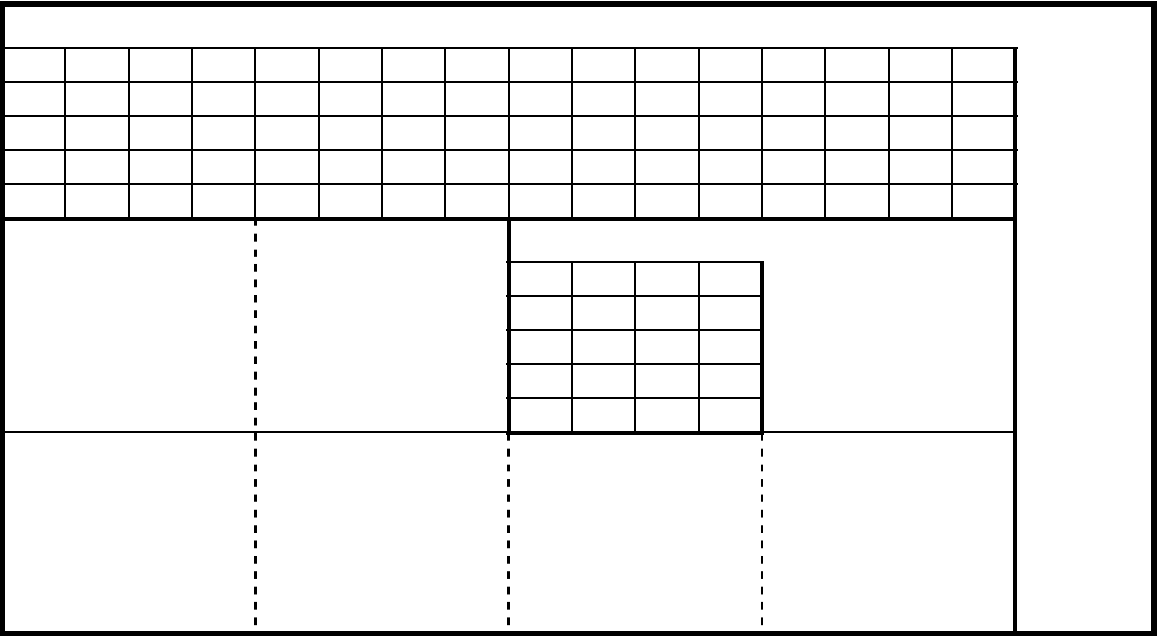


Figure 03.10 *Fitting a schedule into a drawing module.*

Schedules containing information that changes frequently over time may be considered for inclusion in the specifications (e.g., wall finishes, color schedules). Schedules should be included on the drawings for describing permanent portions of the facility (e.g., doors, windows, partitions).

Schedules may be located in the specifications or on the drawings. It is important to take the items mentioned above into consideration when deciding the appropriate location.

Electronic Applications

Computer-generated schedules are a common feature with current software programs. Schedules are created on word processing software, spreadsheet software, and database software. In addition, schedules can be created directly with the CAD program and plotted as a drawing.

When creating computerized schedules, the structure of the computer files needed to create the final schedule and who needs access to these files should be considered. Structure of computer files means how the files are created and stored to produce the final product. There are several possibilities from simple structures to more complex, multi-file structures:

- A single file produced from a single program.
- A database library used to create the final schedule.
- A file produced by one program and imported into another for final production.
- A file produced by one program and embedded into another for final production.
- A schedule created from extracting elements which are tagged with attributes as part of a CAD file.

Linking Schedules to Drawings

If schedules are created in a spreadsheet application, data can be linked to drawings for ease of extraction and insertion into the schedule.

CAD programs create a database of information as the electronic drawings are created. Drawing data or information can be extracted and electronically linked to a separate spreadsheet or schedule of information. CAD programs used in this way can create schedules, such as door and window schedules, that are updated automatically when the electronically prepared floor plans are revised. The type of data to be contained in the schedule, created from the drawing database,

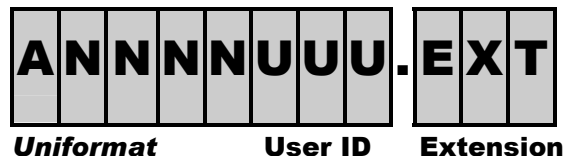
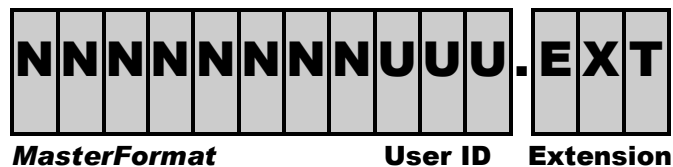
can be customized to the needs of the project. The schedule can be tailored to respond to the client's need for specific information choices or format requirements.

Attributes

When a CAD drawing is generated, it not only generates a graphical database, but also has the capability to store information about specific characteristics of the construction elements (e.g., doors or windows). These characteristics, or attributes, can be identified for later compilation into schedules.

Computer programs provide the ability to sort, search, and extract information from the drawing database. For example, a door schedule can be sorted by door number, by door type, or by hardware set. Fire-rated doors can be extracted from the database and, more specifically, pairs of fire-rated wood doors can be extracted, allowing a quick check of the hardware provided for these doors.

Library File Naming



A = Alphabetical character

N = Numerical character

U = User-defined character

EXT = File name extension

Naming Library Files

Schedules, like drawings, should be identified for filing, data retrieval, and master library organization. As discussed in the *Drawing Set Organization Module*, file naming conventions for library files differ from project file naming conventions.

A numbering system based on *MasterFormat* is recommended for naming library schedule files. A numbering system based on *UniFormat*TM can be used for schedules made up of assemblies of materials that otherwise might have multiple *MasterFormat* numbers.

Appendix A – Schedule Content Checklist

The following is a list of possible schedules that may be generated for a project. The list indicates distinguishing features that can be placed in the Identifier Column and the Sub-identifier Column, as well as a *MasterFormat* and *UniFormat* number relating to the subject matter of the schedule. Refer to the topic “Building a Schedule” in this module for an explanation of the schedule format.

System International (SI) or metric measurement units are listed first with inch/pound units in parentheses. Select one measurement system. Do not use both.

This list is not intended to be complete. It only suggests examples of potential content of schedules and their most logical location.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Div 01 - General Requirements			
Survey Layout Data	Point Number Station Offset Distance		Z1020
Testing and Inspection Schedule			Z1020
Submittals Schedule			Z1020
Div 02 - Existing Conditions			
Boring or Test Pit Log Schedule	Test Pit Number Existing Elevation Depth ***** Pit To Ground Water To Bedrock		G1010
Div 03 - Concrete			
Concrete Beam Reinforcing Schedule •	Mark Width Depth Reinforcing ***** Top Left Bottom Top Right Stirrups Diagram		A1030; B1010

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Concrete Slab Reinforcing Schedule •	Mark Thickness Reinforcing *****	Bottom Bars Top Bars Temperature Bars	A1030; B1010
Concrete Column Schedule	Floor Level Location Reinforcing		B1010
Concrete Slab Schedule			A1030; B1010
Concrete Shaft Schedule			B1010
Concrete Beam Schedule			B1010
Precast Concrete Panel Schedule			B2010
Div 04 - Masonry			
Masonry Unit Schedule			B2010
Div 05 - Metals			
Steel Column Schedule			B1010
Steel Beam Schedule			B1010
Steel Bar Joist Schedule			B1010
Div 06 - Wood, Plastics, and Composites			
Nailing Schedule			
Wood Beam Schedule			B1010; B1020
Plywood Shear Wall Schedule			B1010
Plywood Web Joist Schedule			B1010; B1020
Wood Truss Schedule			B1010; B1020

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Div 07 - Thermal and Moisture Protection			
Fireproofing Schedule	Structural Component Hourly Rating Testing Agency Design Number		B1010; B1020
Firestopping Schedule	Location Penetration Item Maximum Size Test Agency Design Number T Rating F Rating Detail Location		B1010; B1020
Joint Sealer Schedule			B2010
Expansion Control Schedule	Type Material Location ***** Fire Barrier	Floor Wall Ceiling Exterior Wall Roof	B1010; B2010

APPENDIX A - SCHEDULE CONTENT CHECKLIST**UDS – 03.22**

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Div 08 - Openings			
Door And Frame Schedule •	Door		B2030; C1020
	Mark		
	Size *****	Width	
		Height	
		Thick	
	Material		
	Elevation		
	Type		
	Glazing		
	Louver *****	Width	
		Height	
	Frame		
	Material		
	Type		
	Glazing		
	Detail *****	Head	
		Jamb	
		Sill	
	Fire Rating Label		
	Hardware *****	Hardware Set Number	
		Keyside Room Number	

APPENDIX A - SCHEDULE CONTENT CHECKLIST**UDS – 03.23**

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Door Schedule	Mark		B2030; C1020
	Size of Opening *****	Width Height Thickness	
	Material		
	Type		
	Glazing		
	Louver		
	Rating *****	Fire Rating Acoustic Rating	
	Hardware *****	Hardware Set Number Keyside Room Number Finish	
Frame Schedule	Mark		B2030; C1020
	Material		
	Type		
	Glazing		
	Detail *****	Head Jamb Sill	

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.24

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Window Schedule •	Mark Size *****	Width Height	B2020; C1010
	Type Material Glazing Horizontal Muntin Vertical Mullion Detail *****	Head Jamb Sill	
	Fire Rating Notes		
Skylight Schedule			B3020
Door Hardware Schedule	Set Number		B2030; C1020
	Hinges Lockset *****	Access Control Security	
	Closer Exit Device Push / Pull Stop Holder Bolt Kick Plate Threshold		

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.25

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Louver and Vent Schedule	Weatherstripping		
	Mark		B2010; C1030
	Type		
	Size *****	Width	
		Height	
	Material		
Div 09 - Finishes			
Room Finish Schedule •	Room Number		C3010; C3020; C3030
	Room Name		
	Floor		
	Walls *****	North Wall	
		South Wall	
		East Wall	
		West Wall	
	Wainscot		
	Ceiling *****	Material	
		Height	
	Molding *****	Casing Molding	
		Crown Molding	
Paint Schedule		C3010; C3030	
Div - 10 Specialties			
Exterior Signage Schedule •	Mark		G2040
	Sign Type		
	Sign Copy		
	Location		

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Interior Signage Schedule •	Mark		C1030
	Sign Type		
	Sign Copy		
	Floor		
	Building		
	Tactile-Braille		
	Symbol Graphics		
	Location		
Toilet, Bath, and Laundry Accessories	Bath		C1030
Div 11 - Equipment			
Teller & Service Equipment Schedule			E1010
Food Service Equipment Schedule			E1040
Healthcare Equipment Schedule			E1020
Div 12 - Furnishings			
Window Treatment Schedule			E2010
Manufactured Casework Schedule			E2010
Furnishing Schedule			E2020
Div 14 - Conveying Equipment			
Elevator Equipment Schedule			D1010
Lift Schedule			D1010
Div 21 - Fire Suppression			
Fire Suppression Schedule			D4010; D4020

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Div 22 - Plumbing			
Plumbing Pump Schedule •	Mark		D2020; D2030
	Type		
	Area Served		
	Size		
	Total Head		
	Pump Speed		
	Efficiency		
	Minimum Motor Power		
	Volts/Phase		
	Suction Pressure		
Water Heater Schedule •	Mark		D2020
	Manufacturer		
	Model		
	Volts		
	Phase		
	kW (Btu/s)		
	Recovery Rise		

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Plumbing Fixture Schedule (Expanded) •	Description Manufacturer Model Supply Fitting Supply Pipe(s) Trim Accessories Drain Trap Connections	***** Cold Water Hot Water Waste Vent	D2010
Plumbing Fixture Schedule (Simple) •	Mark		D2010
Div 23 - Heating, Ventilating, and Air Conditioning			
Solar Equipment Schedule			D3070
Heat Pump Schedule	Mark Area Served Manufacturer Model Cooling Capacity Heating Capacity Volts/Phase Amps		D3030

- Indicates example schedule provided in Appendix B.

APPENDIX A - SCHEDULE CONTENT CHECKLIST

- *Indicates example schedule provided in Appendix B.*

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
HVAC Fan Schedule •	Mark		D3040
	Manufacturer		
	Model		
	Area Served		
	Air Volume		
	Static Pressure		
	Drive		
	Fan Speed		
	Motor *****	Power	
		Speed	
	Volts/Phase		
Fan Schedule •	Mark		D3040
	Manufacturer		
	Model		
	Type		
	Air Volume		
	Fan Speed		
	Exterior Static Pressure		
	Wheel *****	Type	
		Minimum Diameter	
	Drive		
	Zones		
	Motor *****	Power	
		Voltage	
		Phase	

APPENDIX A - SCHEDULE CONTENT CHECKLIST

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Diffuser A308Register and Grille Schedule (Expanded) •	Manufacturer		D3040
	Model		
	Type		
	Use *****	Supply	
		Return	
		Exhaust	
	Mounting		
	Panel Size		
	Neck Size		
	Maximum Air Volume		
	Damper		
	Finish		
	Pattern		
Diffuser Register and Grille Schedule (Simple) •	Mark		D3040
Slot Diffuser Schedule	Mark		D3040
	Manufacturer		
	Model		
	Length		
	Slot Size		
	Neck Size		

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.32

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
HVAC Air Cleaning Device Schedule •	Mark		D3040
	Manufacturer		
	Pre-Filters *****	Type	
		Model	
		Efficiency	
		Initial Static Pressure	
		Final Static Pressure	
		Filters	
		Housing	
	Final Filters *****	Type	
		Model	
		Efficiency	
		Initial Static Pressure	
		Final Static Pressure	
		Filters	
		Housing	
Boiler Schedule			D3020
Packaged Water Chiller Schedule			D3030
Centrifugal Water Chiller Schedule			D3030

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.33

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Water Cooled Reciprocating Chiller Schedule •	Mark		D3030
	Nominal Capacity		
	Chilled Water Side *****	Discharge	
		Entering Water Temperature	
		Leaving Water Temperature	
		Maximum Pressure Drop	
	Condenser Water Side *****	Discharge	
		Entering Water Temperature	
		Leaving Water Temperature	
		Maximum Pressure Drop	
	Electrical *****	Voltage	
		Phase	
		Maximum kW+C373/Ton	
Packaged Air Cooled Reciprocating Chiller Schedule			D3030
Condensing Unit Schedule			D3030
Packaged Cooling Tower Schedule			D3030
Central Station Air Handling Unit (AHU) Schedule	Mark		D3030
	Manufacturer		
	Model		
	Air Volume		
	Minimum Outside Air		
	Exterior Static Pressure		
—	Fan Power		
	Motor Power		
	Electric Heat		

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.34

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
	Total kW/Stage		
	Volts/Phase		
Baseboard Heater Schedule			D3050
Terminal Heat Transfer Unit Schedule			D3050
Unit Heater Schedule			D3050
Packaged Terminal A/C Unit Schedule			D3050
Split System A/C Schedule			D3050
Div 26 - Electrical			
Equipment Power Connection Schedule	Equipment		D5020
	Full Load Amps		
	kW (hp)		
	Panel Circuit Number		
	Branch Circuit		
	Disconnect Switch		
Transformer Schedule			D5010
Switchboard Schedule			D5010
Distribution Panelboard Schedule •	Circuit Number		D5010
	Trip		
	Area Served		
	Wire & Conduit		
	kW (hp)		
	Phase A		
	Phase B		
	Phase C		

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Electrical Panel Schedule (Expanded) •	Poles Amps Frame Load Trip Area Served Phase A Phase B Phase C		D5010
Electrical Panel Schedule (Simple) •	Circuit Number		D5010
Motor Controller Schedule			D5010
Electrical Circuit Schedule •	Panel Circuit Poles Amps		D5010
Wiring Device Schedule			D5020
Lighting Fixture Schedule (Expanded) •	Manufacturer Description Lamps ***** Type Volts Watts Lens Finish Mounting		
Lighting Fixture Schedule (Simple) •	Mark		D5020, G5020

APPENDIX A - SCHEDULE CONTENT CHECKLIST

UDS – 03.36

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Lighting Panelboard Schedule	Pole Number Area Served Trip Amp Breaker Pole Wire Ground Wire Conduit Load		D5010
Div 27 - Communications			
Nurse Call Equipment Schedule			D5030
Div 28 - Electronic Safety and Security			
Security Access System Schedule	Keypad Sensors Wiring		D5030
Detection and Alarm Schedule			D5030
Div 31 - Earthwork			
Backfill Materials Schedule			A2010; G1040
Driven Pile Schedule	Shaft Diameter Vertical Reinforcing Reinforcing Ties		A1020
Caisson Schedule			A1020
Trench Dimension Schedule			A1030

APPENDIX A - SCHEDULE CONTENT CHECKLIST**UDS – 03.37**

- Indicates example schedule provided in Appendix B.

HEADING	COLUMN IDENTIFIER	COLUMN SUB-IDENTIFIER	UNIFORMAT
Div 32 - Exterior Improvements			
Pedestrian Walkway Schedule	Ramps *****	Railings	G2030
	Stairs *****	Treads	
		Railings	
Retaining Wall Schedule			G2040
Landscape Irrigation Piping Schedule			G2050
Landscape Planting Schedule			G2050
Div 33 - Utilities			
Storm Drainage Schedule	Catch Basin Number		G3030
	Manhole Number		
	Rim Elevation		
	Sump Elevation		
	Pipe Inverts *****	Inlet	
		Outlet	

APPENDIX A - SCHEDULE CONTENT CHECKLIST**UDS – 03.38**

- Indicates example schedule provided in Appendix B.

Appendix B – Schedule Formats

Examples of schedule formats are presented on the following pages. The schedules included are those generally regarded as the most commonly used for building projects. They may be used either on drawings or in specifications depending on project requirements. Schedules are listed by the order of the *MasterFormat* Divisions. They indicate dividing lines for columns and rows. Dividing lines and border lines are optional, and may be deleted to meet the requirements of the user.

Div 03	Concrete Beam Reinforcing Schedule
Div 03	Concrete Slab Reinforcing Schedule
Div 08	Door and Frame Schedule
Div 08	Window Schedule
Div 09	Room Finish Schedule
Div 10	Exterior Signage Schedule
Div 10	Interior Signage Schedule
Div 22	Plumbing Pump Schedule
Div 22	Water Heater Schedule
Div 22	Plumbing Fixture Schedule (Expanded)
Div 22	Plumbing Fixture Schedule (Simple)
Div 23	Variable / Constant Volume Air Terminal Unit Schedule
Div 23	HVAC (Exhaust) Fan Schedule
Div 23	Fan Schedule
Div 23	Diffuser, Register, and Grille Schedule (Expanded)
Div 23	Diffuser, Register, and Grille Schedule (Simple)
Div 23	HVAC Air Cleaning Device Schedule (Air Filter Schedule)
Div 23	Water Cooled Reciprocating Chiller Schedule
Div 26	Distribution Panelboard Schedule
Div 26	Electrical Panel Schedule (Expanded)
Div 26	Electrical Panel Schedule (Simple)
Div 26	Electrical Circuit Schedule
Div 26	Lighting Fixture Schedule (Expanded)
Div 26	Lighting Fixture Schedule (Simple)

CONCRETE BEAM REINFORCING SCHEDULE								
MARK	WIDTH	DEPTH	REINFORCING			STIRRUPS	DIAGRAM	NOTES
			TOP LEFT	BOTTOM	TOP RIGHT			

CONCRETE SLAB REINFORCING SCHEDULE					
MARK	THICKNESS	REINFORCING			NOTES
		BOTTOM BARS	TOP BARS	TEMP BARS	

DOOR AND FRAME SCHEDULE																		
DOOR									FRAME						FIRE RATING LABEL	HARDWARE		NOTES
MARK	SIZE			MATL	EL	GLZ	LOUVER		MATL	EL	GLZ	DETAIL				SET NO	KEYSIDE RM NO	
	W	HT	THK				W	HT				HEAD	JAMB	SILL				

WINDOW SCHEDULE												
MARK	SIZE		TYPE	MATL	GLZ	FIRE RATING	DETAIL					NOTES
	WIDTH	HEIGHT					HEAD	JAMB	SILL	HORIZ MULL	VERT MULL	

ROOM FINISH SCHEDULE									
ROOM NO	ROOM NAME	FLOOR	WALLS				CEILING		NOTES
			N	S	E	W	MATL	HEIGHT	

EXTERIOR SIGNAGE SCHEDULE				
MARK	SIGN TYPE	SIGN COPY	LOCATION	NOTES

INTERIOR SIGNAGE SCHEDULE								
MARK	SIGN TYPE	SIGN COPY	FLOOR	BUILDING	TACTILE BRAILLE	SYMBOL GRAPHICS	LOCATION	NOTES

PLUMBING PUMP SCHEDULE										
MARK	TYPE	AREA SERVED	SIZE L/s (GPM)	TOTAL HEAD	PUMP rpm	MIN % EFF	MIN MOTOR W (hp)	VOLTS/ PHASE	SUCTION PRESSURE	NOTES

WATER HEATER SCHEDULE							
MARK	MFR	MODEL	VOLTS	PHASE	kW	RECOVERY @ 21°C (70°F) RISE	NOTES

[illegible]

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PLUMBING FIXTURE SCHEDULE (Simple)								
MARK	DESCRIPTION	MFR	MODEL	CONNECTIONS				NOTES
				CW	HW	WASTE	VENT	

(Simple)

VARIABLE/CONSTANT VOLUME AIR TERMINAL UNIT SCHEDULE																		
MARK	MFR	MODEL	TYPE	SIZE	COOLING		HEATING COIL										NC RATING	NOTES
					m³/s (CFM)	SPD	m³/s (CFM)	EAT	LAT	W (MBtuH)	L/s (GPM)	EWT	LWT	WPD	APD	ROWS		

HVAC FAN SCHEDULE										
MARK	MFR	MODEL	m³/s (CFM)	ST PR	DRIVE	FAN RPM	MOTOR		VOLTS/ PHASE	NOTES
							W (HP)	RPM		

[illegible]

DIFFUSER, REGISTER, AND GRILLE SCHEDULE (Expanded)														
MARK	MFR	MODEL	TYPE	USE			MTG	PANEL SIZE	NECK SIZE	MAX m ³ /s (CFM)	DAMPER	FINISH	PATTERN	NOTES
				SPLY	RET	EXH								

(Expanded)

DIFFUSER, REGISTER, AND GRILLE SCHEDULE (Simple)						
MARK	MANUFACTURER	MODEL	PANEL SIZE	NECK SIZE	USE	NOTES

(Simple)

HVAC AIR CLEANING DEVICE SCHEDULE																
MARK	MFR	PRE-FILTERS							FINAL FILTERS							NOTES
		TYPE	MODEL	EFF	INITIAL ST PR	FINAL ST PR	FILTERS	HOUSING	TYPE	MODEL	EFF	INITIAL ST PR	FINAL ST PR	FILTERS	HOUSING	

[illegible]

DISTRIBUTION PANELBOARD SCHEDULE

VOLTS/PHASE/WIRE:		PANEL SIZE & TYPE:	MAIN SIZE & TYPE:	CABINET:	MIN SCC:		
FEEDER SIZE:			FED FROM:		NOTES:		
NO	TRIP	AREA SERVED	WIRE & CONDUIT	kW (HP)	A	B	C
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

ELECTRICAL PANEL “ ” SCHEDULE (Expanded)													
VOLTS/PHASE/WIRE:			PANEL SIZE & TYPE:		MAIN SIZE & TYPE:		CABINET:		MIN SCC:		FED FROM:	NOTES:	
NO	TRIP	AREA SERVED		A	B	C	A	B	C	AREA SERVED		TRIP	NO
1													2
3													4
5													6
7													8
9													10
11													12
13													14
15													16
17													18
19													20
21													22
23													24

(Expanded)

ELECTRICAL PANEL “ ” SCHEDULE (Simple)					
CIRCUIT	POLES	AMPS	FRAME	LOAD	NOTES

(Simple)

ELECTRICAL CIRCUIT SCHEDULE				
PANEL	CIRCUIT	POLES	AMPS	NOTES

LIGHTING FIXTURE SCHEDULE (Expanded)								
MARK	DESCRIPTION	LAMPS			LENS	FINISH	MOUNTING	NOTES
		TYPE	VOLTS	WATTS				

(Expanded)

LIGHTING FIXTURE SCHEDULE (Simple)				
MARK	MANUFACTURER	DESCRIPTION	LAMPS	NOTES

(Simple)

Drafting Conventions

U.S. National CAD Standard Version 3.1

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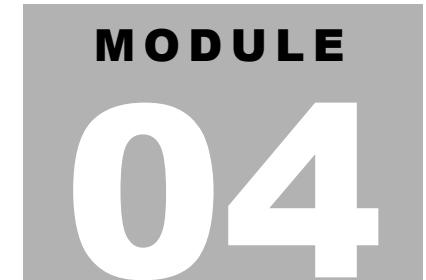
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Introduction

The *Drafting Conventions Module* provides a standard format for both graphic and textual information within drawings. This module provides the following:

- Standards for information consistent with both manual and computer-aided drafting (CAD)
- Guidelines for consistent placement of drawings on the sheet
- Guidelines for consistent orientation of dimensions related to drawings
- Line values
- A consistent method of using scale
- A system for creating a mock-up set at the commencement of the project

The *Drafting Conventions Module* sets a clear, concise, comprehensive, and consistent standard for facilitating cross-referencing, retrieval of information, and clear communication for drawing creators and those that use drawings.

Drawing Standards

Floor plans are the basis of drawing documentation. From these plans, elevations, sections, and details are developed in an interactive process. When a change occurs in one drawing, it triggers changes in the others. The order of information to be shown on a sheet layout is detailed in the *Sheet Organization Module*.

Drawing standards provide uniform guidelines for producing a set of construction drawings of consistent quality that eliminates duplication of information. These standards address the placement of the drawing grid and north arrow, recommended scales, type of lines used to represent different articles in the drawings, and the proper way to represent different materials graphically and the use of notations.

Drawing Orientation and North Arrow

The orientation of a building's main floor plan sets up the orientation of all floors above and below. Plans may be oriented on a sheet in a variety of ways to display the requirements of the project and the intent of the designer. Ideally, the entire floor plan should be shown on one sheet. If it cannot fit on one sheet, the floor plan should be subdivided into convenient segments with match lines provided to reference where the floor plan is continued. See Match Lines on page UDS-04.17.

Civil plans may orient the drawing in a manner that will allow the site plan to fit within the sheet boundary when drawn at the most appropriate scale. Refer to *Figure 04.1*. It is preferable to orient the site plan in the same manner as the floor plans whenever possible.

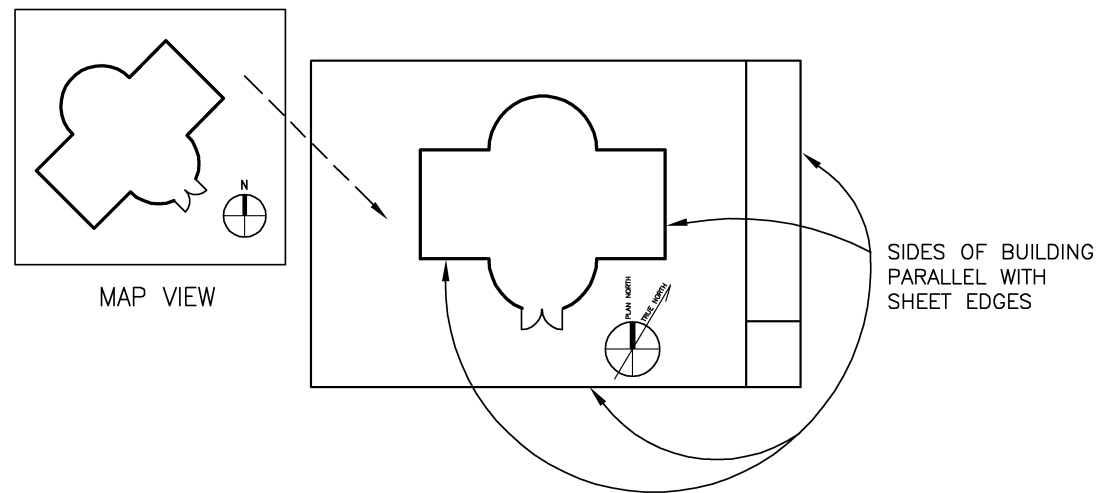


Figure 04.1 Sheet layout orientation.

The most common orientation of floor plans is one where the plan north arrow points to the top of the drawing block. The true north arrow is adjusted so that the building grid and plan north arrow are parallel to the sheet orientation. This approach follows the customary orientation for maps.

The plan north arrow should be shown on all plans and should remain consistent throughout the set of drawings. Plan north enables the designer to assign simple names to interior and exterior elevations. The *Symbols Module* contains an example of a north arrow symbol.

Three types of north arrows exist: true north, magnetic north, and plan north. True north points to the North Pole, and magnetic north is a compass point deviating slightly from true north and plan north. Magnetic north is rarely indicated and should be combined with true north unless the project is near the North Pole. Plan north provides a reference point parallel to the plan grid. Refer to *Figure 04.2*. The location of the north arrow and plan north arrow should be placed in the lower right-hand corner of the drawing block.

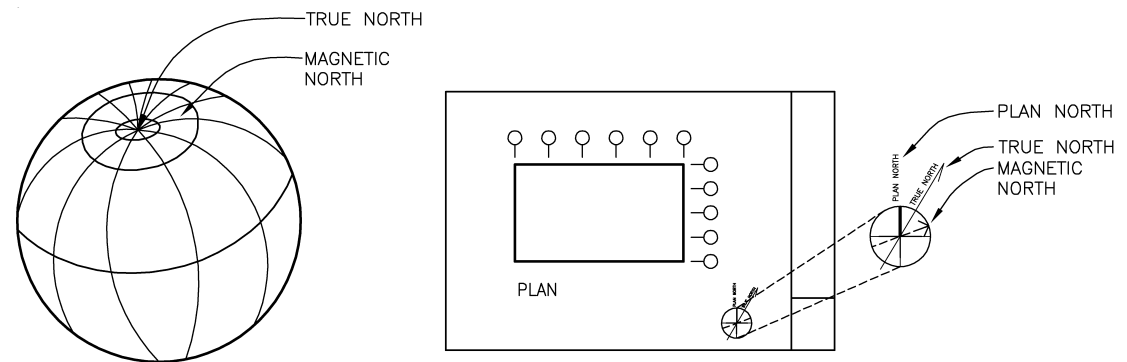


Figure 04.2 Diagrammatic illustration of north arrow.

In large or multistory projects, a sheet containing small scale plans for all levels drawn at 1:200 or 1:500 ($1/16''$ or $1/32'' = 1'-0''$) scale or smaller may be included in the set to provide an overview of the project and serve as a quick reference. This sheet is useful if the floor plan is divided into segments to fit in a standard size sheet. It is also useful if the project will be constructed in phases. Consistency of the display of information throughout the set is important. For example, a column plan detail should be shown in the same orientation as it is shown on the floor plan.

Refer to *Figure 04.3*. An enlarged section detail should also have the same orientation as the wall section or building section from which it is derived.

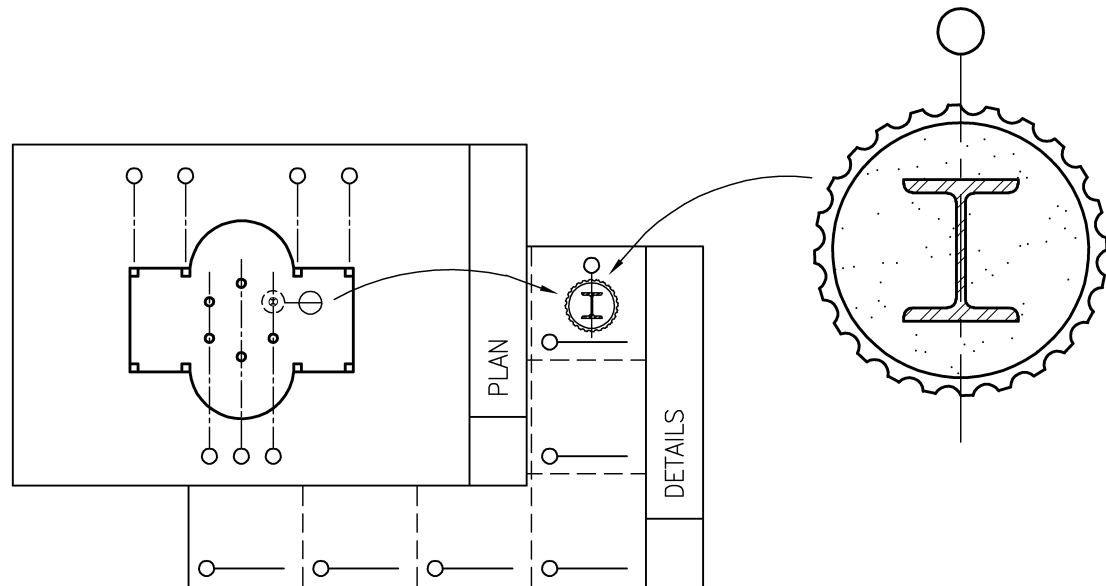


Figure 04.3 Plan detail having the same orientation as the floor plan.

Grid System Overview

A grid system is used to indicate structural columns, load-bearing walls, shear walls, and other structural elements on the drawings. It is used primarily for reference in schedules of structural data. A grid system is also used if the design of a building is based on a module system, regardless of the structural system. Grid lines are used as a basis for dimensioning. Proper planning and layout of a drawing on the selected sheet size requires the accommodation of alphanumeric grid designations within column indicators. Vertical grid lines should have designators at the top of the grid numbered from left to right. Horizontal grid lines should have

designators at the right side of the grid alphabetized from bottom to top. To eliminate confusion with the numerals **0** (zero) and **1** (one), do not use letters **O** or **I**.

Grid line and indicator formats should conform to the graphic guidelines under Reference Symbols in the *Symbols Module*. In some cases column indicators may be shown at both ends of the grid line to facilitate reference, especially if a modular grid system is used.

Where additional intermediate structural support elements occur between grid lines, a fractional designation is used. For example, a column occurring at mid-point between grid lines **2** and **3** would be designated **2.5**. In a similar manner, a column occurring between grid lines **B** and **C** would be represented as **B.5**. Refer to *Figure 04.4*. While the structural drawings must maintain the grid line number as long as the column is located under the floor, architectural drawings omit the indicator at the level where the column ceases to exist. For example, if a building steps back as it rises in height, unused columns and their associated grid marks are not shown on the architectural plans. Structural drawings will show them because columns below are supporting the floor.

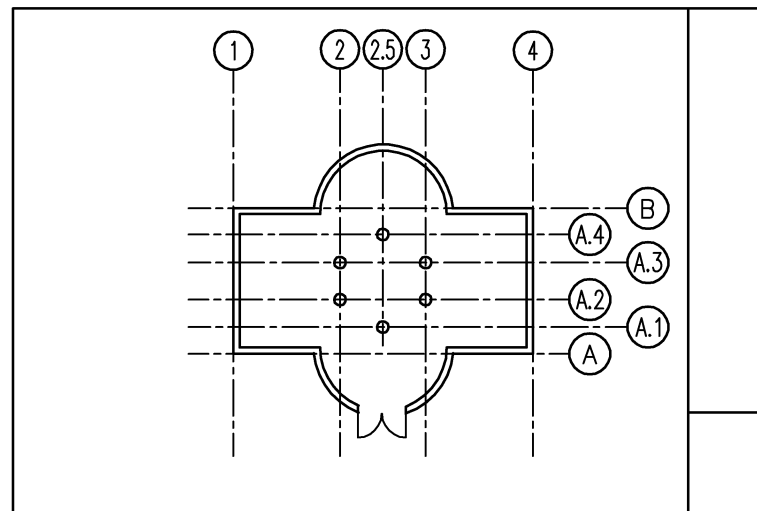


Figure 04.4 Illustration of column grid line.

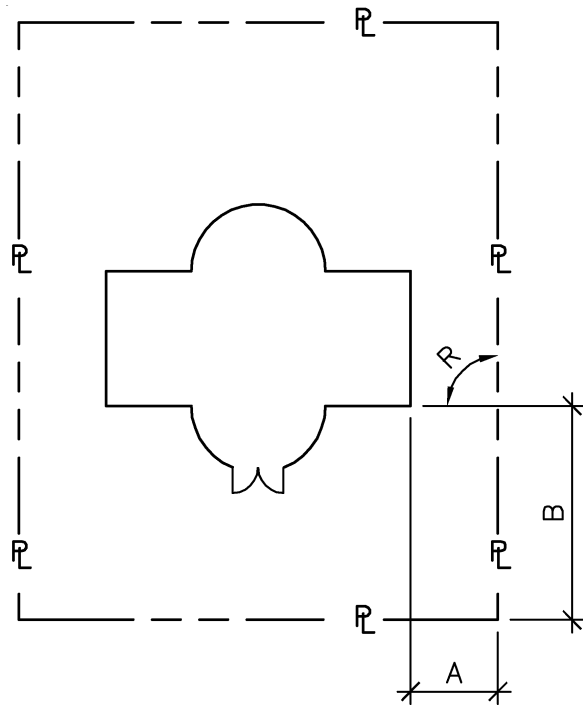


Figure 04.5 Horizontal dimensioning.

Coordinate System Overview

A coordinate system can be used with baseline dimensioning to locate various components of a building about a fixed point horizontally as well as vertically. To locate the building horizontally, fixed points in the building outline (usually two corners and angle of relevance) are dimensioned to the property lines. Refer to *Figure 04.5*. Alternatively, other fixed points such as the survey benchmark, adjacent street centerlines, easements, natural or man-made landmarks, and the closest longitude and latitude may be used to relate the building to the site. Not all the dimensions shown are necessary to locate the building on the site. Dimensions A and B would be sufficient in locating the building in *Figure 04.5*.

For vertical dimensioning, the ground-floor elevation is set on the site plan at its true relationship to the benchmark used as a survey datum. The benchmark should be referenced to National Geodetic Vertical Datums to coordinate grading, drainage, and utility elevations. For example, if the ground floor elevation is 3.05 m (10'-0") above a datum set at 208.89 m (685'-4"), the ground floor elevation will actually be 211.94 m (695'-4"). To simplify measurements used by the various trades, the ground-floor elevation on the drawings may be set at a hypothetical value such as 100 m in SI units or 100' in U.S. inch/pound units. A note should be added to the site plan stating that the actual ground floor elevation of **XXX** is represented by 100 m or 100' in the drawings. Setting the datum at 100 m or 100' instead of ± 0 eliminates the possibility of points below the ground floor (a basement, for instance) having a minus sign, e.g., -20 m (-65'-7-3/8"), which may confuse some users.

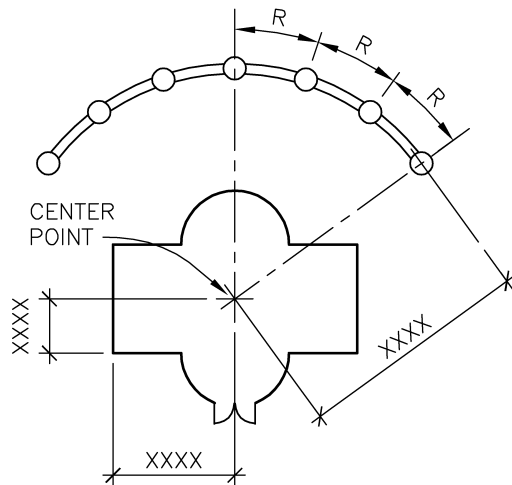


Figure 04.6 Radial dimensioning.

For plans containing arcs, dimensions are determined by the angles radiating from the center of the circle. Refer to *Figure 04.6*.

Drawing Layout

Using a uniform order to organize the drawings is important. This section provides the framework for organizing drawing components to make them easy to execute and prevent conflicts among the different types of information included in each. The dimensions shown on the illustrations may be the International System of Units (SI) or the U.S. inch/pound system of units and measures. Dimensions on the illustrations are indicated as an **XXX**. Refer to the *Sheet Organization Module* for information about sheet subdivision and title block organization.

Drawing Title Format

Each drawing block, whether it is a small detail or a large one such as a wall section, should include identifying elements such as the drawing block title, the identifying number, and a scale.

Drawing Areas

The drawing block is subdivided into separate areas to prevent overlapping of different types of information. For example, column grid lines, dimensions, notations, and the leaders connecting them to the drawings can be distributed in a haphazard way. In the absence of this subdivision, CAD can cause some of the information to be superimposed if a different layer is used for each category.

Assigning separate areas for the drawing, the reference column grid line, dimensions, and notations will prevent confusion. The drawings will have an order that is easy to comprehend and follow an orderly logic that can be applied to all the drawings in the set.

Sheet Layout

The drawing area is that portion of the sheet containing drawings, notations, key plans, schedules, and other graphic and text data necessary to illustrate the work. The sheet is divided into modules. Within each module is a drawing block containing graphic and textual information. Locate the most frequently used referenced drawing block at the lowest drawing module adjacent

to the title or notation block. Add additional drawings in order of priority, from bottom to top and from right to left. Starting the drawings from the right to the left makes it easier to use partially filled sheets. This eliminates the need to open a heavy set of drawings all the way to the binding to refer to a few details drawn on the left-hand side of the sheets.

Drafting Precision

Pen- or pencil-generated drawings are only as accurate as the thickness of the instrument's point and the person using these tools. CAD-generated drawings, in contrast, can be absolutely accurate. Various people throughout the design, construction, and post-construction phases use these drawings. In-house staff, consultants, contractors, owners, and tenants need to rely on the accuracy of the drawings.

Eliminate over-detailing drawings unless a drawing is specifically being done for a presentation. These drawings may become illegible when plotted. For example, a steel stud thickness may be represented by a double line. Should these studs be drawn at 400 mm (16") on center in a floor plan, the result would be a tremendous amount of useless data. This level of drafting detail is unnecessary and must be avoided.

The following points should be considered when creating any drawing:

- Drawings are abstract representations. They do not have to be realistic to be understood.
- Use the minimum number of lines possible to represent an object.
- Drawings should be large enough to be of appropriate size when plotted. Show only the amount of detail necessary for legibility when plotted at its intended scale.
- If an area of a drawing is to be enlarged when referenced/linked to another drawing, limit additional detail shown to the specific area that will be enlarged.
- Eliminate useless data that can be reproduced endlessly.

Ensure that lines join precisely at their ends. Do not allow them to overlap or fall short. Lines that do not meet precisely will end up causing errors when other items that rely on the precision of the intersections are created or inserted.

Use precise dimensions in Schematic Design Drawings when they are to be converted into Design Development and Construction Documents Drawings. If Schematic Design Drawings are not intended for use in subsequent phases, nominal dimensions may be used. In either case, a note informing the reader of the dimensioning method used should be included in the project notes. For instance, modular dimensions are used for items such as masonry units where the thickness of the joint is included with the length of the masonry unit.

Using the coordinates displayed on the monitor to locate anything will only create inaccuracies. Type in the actual dimensions or coordinates of a specific point in space or use identifiable points such as the intersection of two lines when drawing, copying, moving, offsetting, or inserting items. The following are examples:

- Move a line from its current location to a point exactly 3.15 m (10'-4") to the right.
- Insert a column at the intersection of two structural grid lines.
- Offset a wall line exactly 123.8 mm (4-7/8"), e.g., a nominal 127 mm (5") is also acceptable, to indicate the thickness of a wall composed of 92 mm (3-5/8") steel studs with 16 mm (5/8") gypsum board on each side.
- Establish a 200 mm x 200 mm (8" x 8") grid that the cursor will automatically snap to when initially laying out a masonry building.

Scale

Scale is the ratio of measuring units expressing a proportional relationship between a drawing and the full-size item it represents. In CAD, drawings are created at full scale and plotted at the selected scale.

Standards for Use

The selection of the proper scale determines the readability of the drawing. The scale chosen should be large enough to allow the drawing to display its graphic, dimensional, and textual content clearly, without congestion or ambiguity. For example, a window sill detail should be drawn at 1:5 (or 3" = 1'-0") scale to clearly indicate all its wall components, dimensions, and notations. Choosing a lesser scale would make it difficult for readers to understand the intent and may lead to misinterpretation. Clarity should always be considered in selecting a drawing scale.

Scale can be expressed numerically and graphically. All drawings or views should indicate the numeric scale at which that view is presented. All drawings that may be reduced or enlarged should include numeric and graphic scales.

Reduced drawing sets can render the numeric scale inaccurate. The organizer of the drawings should use a graphic expression of scale for clarity. See the *Symbols Module* for graphic scales. Refer to *Figure 04.7*.

The use of the word “scale” is recommended but not required. Refer to *Figures 04.8* and *04.9*.

Commonly Used Scales

All drawings or views should indicate the numeric scale at which that view is presented. Numeric scale can be expressed in metric, architectural, or engineering as is appropriate to the project. The table on page UDS-04.12 shows scales commonly used on construction drawings.



Figure 04.7 Graphic scale without numeric scale indication.

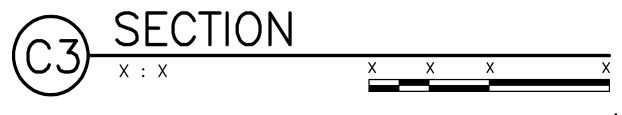


Figure 04.8 Graphic scale and numeric scale without the word “scale.”

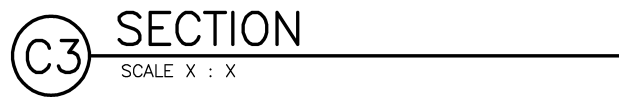


Figure 04.9 Numeric scale with the word “scale” indication and without graphic scale.

COMMON SCALES			
Metric	Architectural	Engineering	Typical Uses
—	—	1" = 5000'	Site Plans
—	—	1" = 2500'	Site Plans
—	—	1" = 1250'	Site Plans
—	—	1" = 1000'	Site Plans
1 : 5000	—	1" = 500'	Site Plans
1 : 2500	—	1" = 200'	Site Plans
1 : 1250	—	1" = 100'	Site Plans
1 : 1000	—	1" = 50'	Site Plans
1 : 500	—	1" = 40'	Site Plans
—	1/32" = 1'-0"	1" = 30'	Site Plans
1 : 200	1/16" = 1'-0"	1" = 20'	Floor Plans, Exterior Elevations, Building Sections
1 : 100	1/8" = 1'-0"	1" = 10'	Floor Plans, Exterior Elevations, Building Sections
1 : 50	1/4" = 1'-0"	1" = 5'	Floor Plans, Elevations, Sections
1 : 30	3/8" = 1'-0"	—	Interior Elevations
1 : 20	1/2" = 1'-0" 3/4" = 1'-0"	1" = 2'	Enlarged Floor Plans, Wall Sections, Foundation, Footing, Others
1 : 10	1" = 1'-0" 1-1/2" = 1'-0"	1" = 1'	Wall Sections, Foundation, Footing, Intersections of walls and roof to walls, Connections, Others
1 : 5	3" = 1'-0"	—	Door and Window Details, Cabinet Details, Intersections of walls and roof to walls, Connections, Others
1 : 2	Half Full Size	—	Door and Window Details, Cabinet Details, Intersections of roof to walls, Others
1 : 1	Full Size	—	Door and Window Details, Cabinet Details, Intersections of roof to walls, Others

Use of Multiple Scales

It is preferred to keep the same scale for drawings on a single sheet. However, many drawings may require different scaled views on the same sheet to adequately communicate drawing information. The organizer of CAD drawings should exercise care when planning whether or not to use multiple scales on a single drawing sheet. In all cases, the scale must be shown for each drawing or view.

CAD and Drawing Scale

Manual drafting uses scale to represent large objects, assemblies, and buildings on a relatively small sheet. CAD permits the user to work directly with a full-size model of the building to be constructed.

Graphic elements within the drawings such as notes, leaders, dimensions, and reference bubbles must be sized according to the scale of the final plot. See the *Symbols Module* for standard size of these graphic elements for the final plot.

Lines

Line width affects drawing clarity and legibility. Wider lines draw attention to that part of the drawing and place emphasis on certain elements. Screened or half-tone lines de-emphasize drawing elements. Architectural backgrounds used by another discipline as a background reference for their drawing are an example. Screened lines in an elevation may represent a distant wing or an existing building.

Interrupted lines (i.e., dash or dash-dot combinations) convey a message. Symbol lines representing the fire rating of a partition, match lines, and hidden items, for example, fall under this category. The following table shows line widths for different applications for both manual and CAD-produced drawings.

WIDTH OF LINE IN mm	USE OF LINE
Fine 0.18 	Material indications, surface marks, hatch lines, patterns.
Thin 0.25 	Text: 2.4 mm (3/32") to 10 mm (3/8") Dimension lines, leaders, extension lines, break lines, hidden objects, dotted lines, dashed lines, setback lines, center lines, grid lines, schedule grid lines.
Medium 0.35 	Text: 4 mm (5/32") to 10 mm (3/8") Object lines, property lines, text, lettering, terminator marks, door and window elevations, schedule grid accent lines.
Wide 0.50 	Text: 6 mm (7/32") to 10 mm (3/8") Titles, edges of interior and exterior elevations, profiling. Cut lines, property lines, section cutting plane lines, drawing block borders.
Extra Wide 0.70 	Text: 13 mm (1/2") to 25 mm (1") Match lines, large titles, footprints, title block borders, sheet borders, schedule outlines.
XX Wide 1.00 	Major title underlining and separating portions of designs.
XXX Wide 1.40 	Border sheet outlines and cover sheet line work.
XXXX Wide 2.00 	Border sheet outlines and cover sheet line work.

Common Line Types

In addition to object lines, the following lines apply to all disciplines and drawing organization:

- **Leaders** are lines that connect notes, dimensions, or symbols to a point or item in a drawing. Leaders terminate with an arrowhead in proximity to the item being described by the notation. Leaders should be drawn in a consistent fashion, either straight or curved throughout the set of drawings. To improve readability, they should be angled so that they may not be confused with lines in the drawing. They should not be allowed to cross dimension lines or each other. Leaders should start at the upper right side or upper left side of the notation. Refer to *Figure 04.10*.
- **Break Lines** are used to indicate the cut between two parts or levels. Examples include a drawing foreshortened to fit into a detail block or an inclined plane such as a stair or parking ramp connected between two floors. Never foreshorten parts of the drawing that require detailing. Refer to *Figure 04.11*.

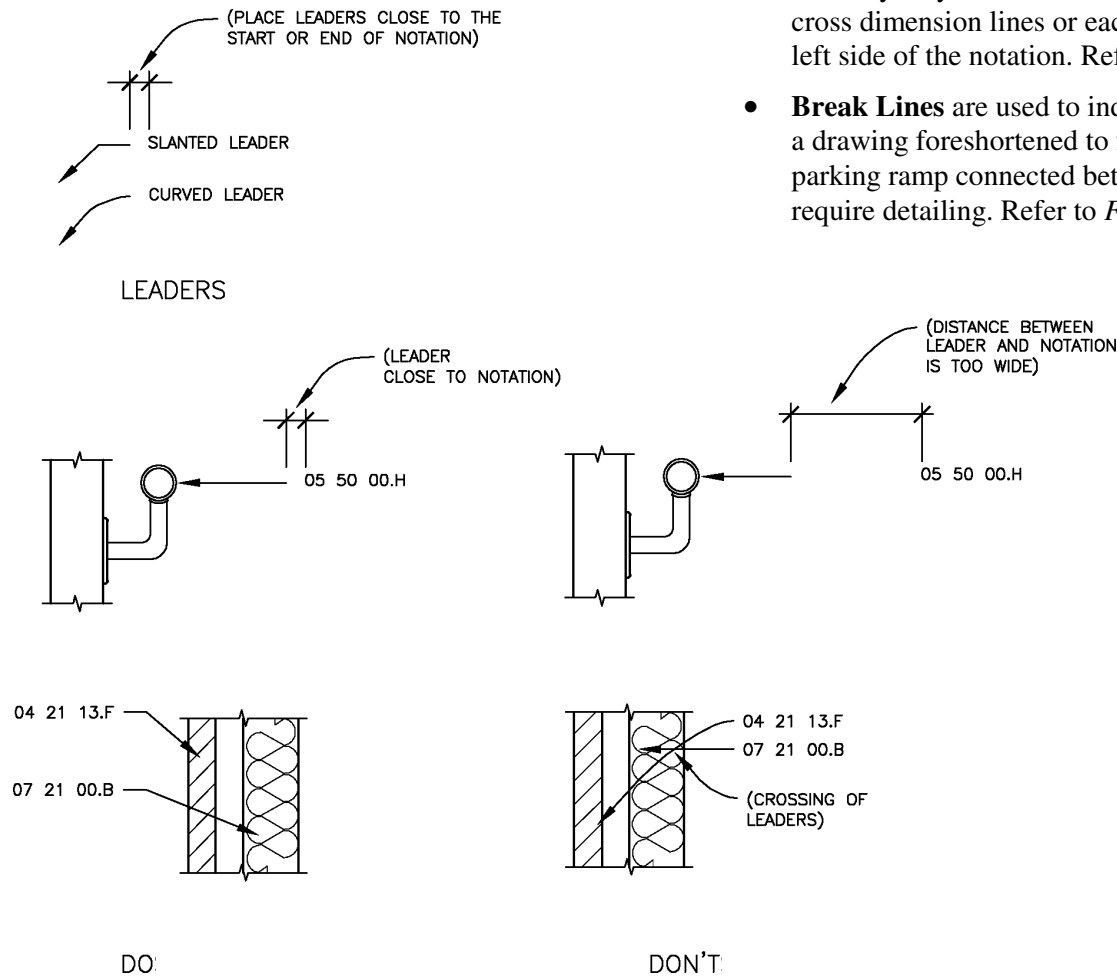


Figure 04.10 Leaders and pointers.

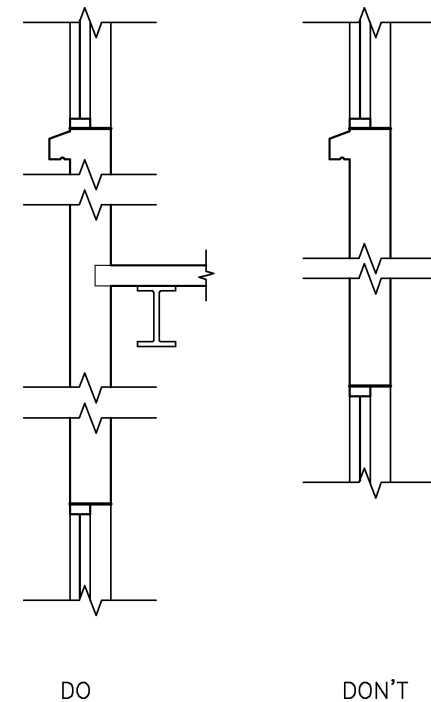


Figure 04.11 Break lines.

- **Centerlines** are used to indicate the center of a column, beam, wall, or opening. A thin line interrupted at intervals by a dot represents centerlines.
- **Dimension Lines** are represented by a thin line connecting between extension lines defining the beginning and end of the object being dimensioned. A terminator mark identifies the intersection between an extension line and a dimension line. Terminator marks should be angled consistently in the same direction. Refer to *Figure 04.12*.

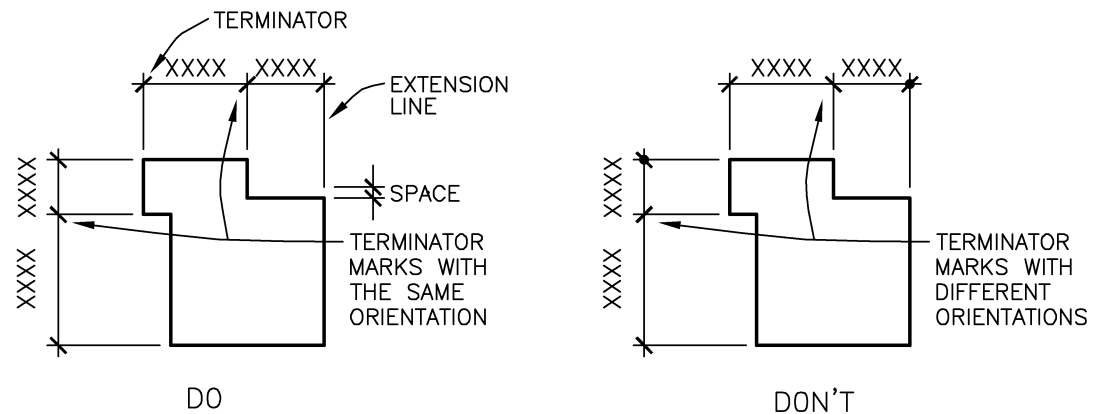


Figure 04.12 Dimension lines.

- **Limit of Construction Lines** define the area of work beyond which the contractor is not allowed to execute any work.

- **Match Lines** delineate division between two or more areas of a continuous structure that must be shown on separate sheets because of sheet size limitations. Do not locate match lines on column lines, grid lines, or expansion joints. Locate them instead at the centerline of a wall or corridor. Match lines should be shown at the same location on both sheets containing adjacent segments of the plan at the same location. A portion of plan overlap should be shown beyond the match line to establish the relationship between adjacent plan segments. This overlapped portion may be lightly shaded to avoid duplication during cost estimating. Match lines should extend beyond the area to be matched. Refer to *Figure 04.13*. They may jog to avoid important elements of the

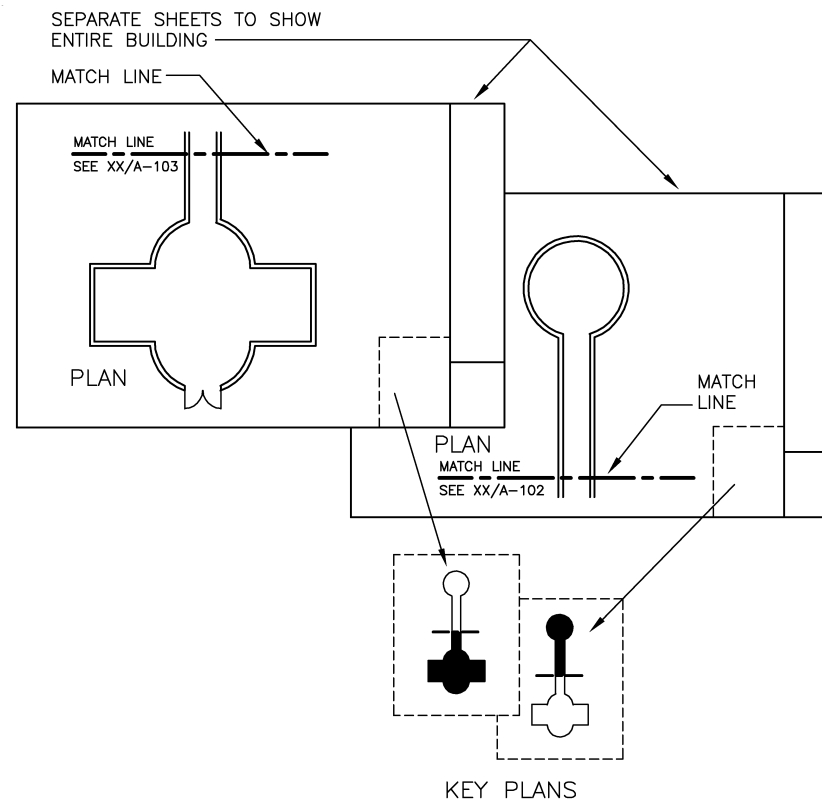


Figure 04.13 Illustration of portion of match line with key plan.

plan. All match lines should be shown on the Key plan. Refer to Sheet Type 1 – Plans on page UDS-04.37. The line width for match lines is shown in the table on page UDS-04.14.

- **Hidden Lines** represent items obscured from view by another material. Examples include steel lintels, relieving angles in elevations, and items above or below a floor plan. Thin dashed lines represent hidden lines.
- **Property Lines** are represented by a line interrupted by double dots. They indicate the boundary of the site.

Dimensions

Dimensioning is defined as the act of incorporating numerical values into a drawing as a means of sizing various components and locating parts of a building. Dimensions must be accurate and adequate. Inadequate dimensions require clarifications during construction and possible loss of time.

The purpose of dimensioning is to locate each element of the construction. Each wall or part of a detail must be tied to a fixed point such as a column centerline or an existing or bearing wall. This applies to plans and the enlargements associated with them. For wall sections and their details, the horizontal reference is the floor elevation.

Care must be taken to show a single dimension only once in its proper location. Avoid the tendency to over-dimension.

Graphic Conventions and Indications

- **Location:** Generally, dimensions should be located outside the floor plan or other view being dimensioned. This minimizes clutter and overlap with other graphics. Dimensions outside the view should be located at the top and/or the right side of the plans whenever possible. Offset dimension lines 10 mm (3/8"). Refer to *Figure 04.14*. When dimensions must be shown on the interior of a floor plan or other view, the dimensions should be arranged in continuous strings for clarity and consistency. Refer to *Figure 04.15*.
- **Types of Terminators:** Terminators define the junction between a dimension line and the extension lines leading to the start and finish of the dimension. These terminators are in the form of a short, slanted line (slash). Slashes should always be parallel.
- **Numerical Size and Location:** Numeral size should match the size of the text in the drawing. Where possible, the numeral should be placed at the midpoint and on top of the dimension line.

Hierarchy of Dimensions

Arrange dimensions from general to specific. Dimension the overall distances followed by the structural grid or floor-to-floor height. This is followed with more specific information such as window and partition location, or heights of various building components.

Extension lines leading from the building to the dimension lines may cross the structural grid as shown in *Figure 04.14*. To prevent confusion, interrupt one of the lines as shown in *Figure 04.16*.

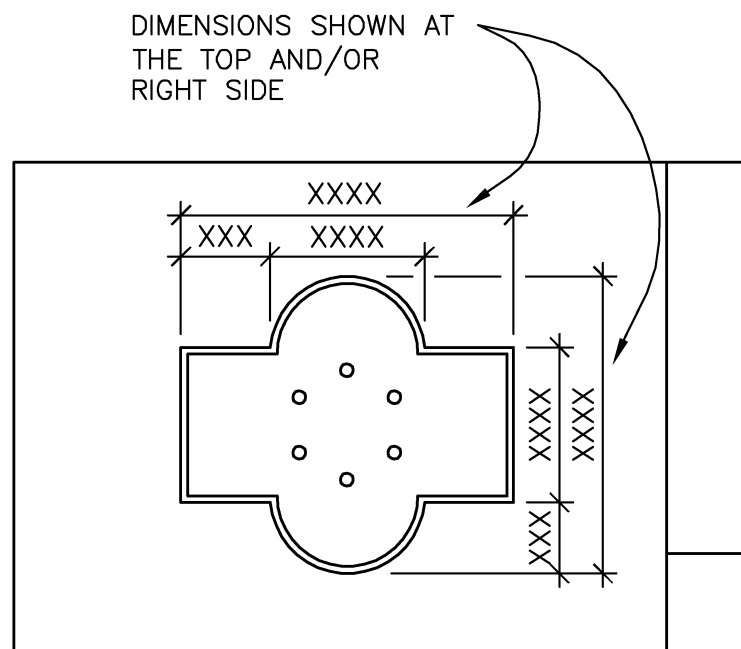


Figure 04.14 Dimensioned floor plan, exterior dimensions.

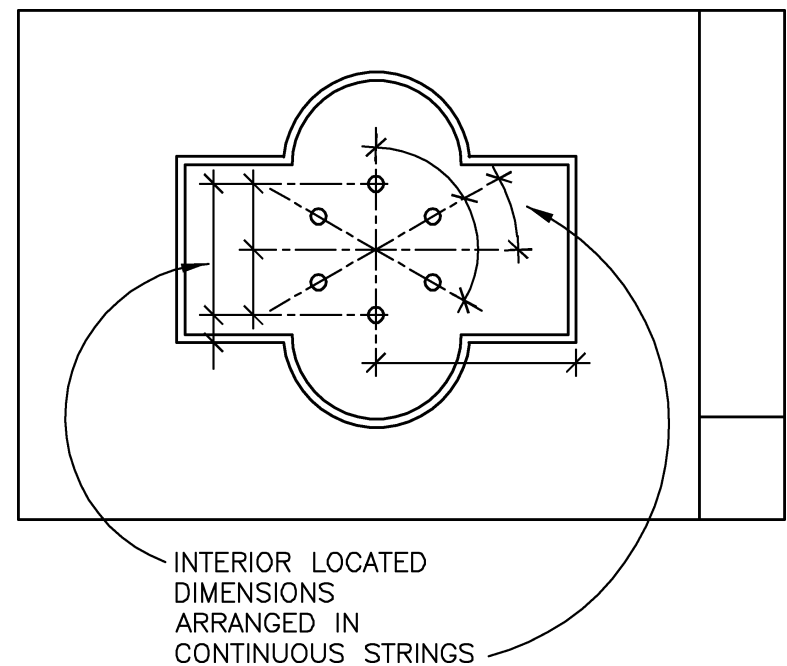


Figure 04.15 Dimensioned floor plan, interior dimensions.

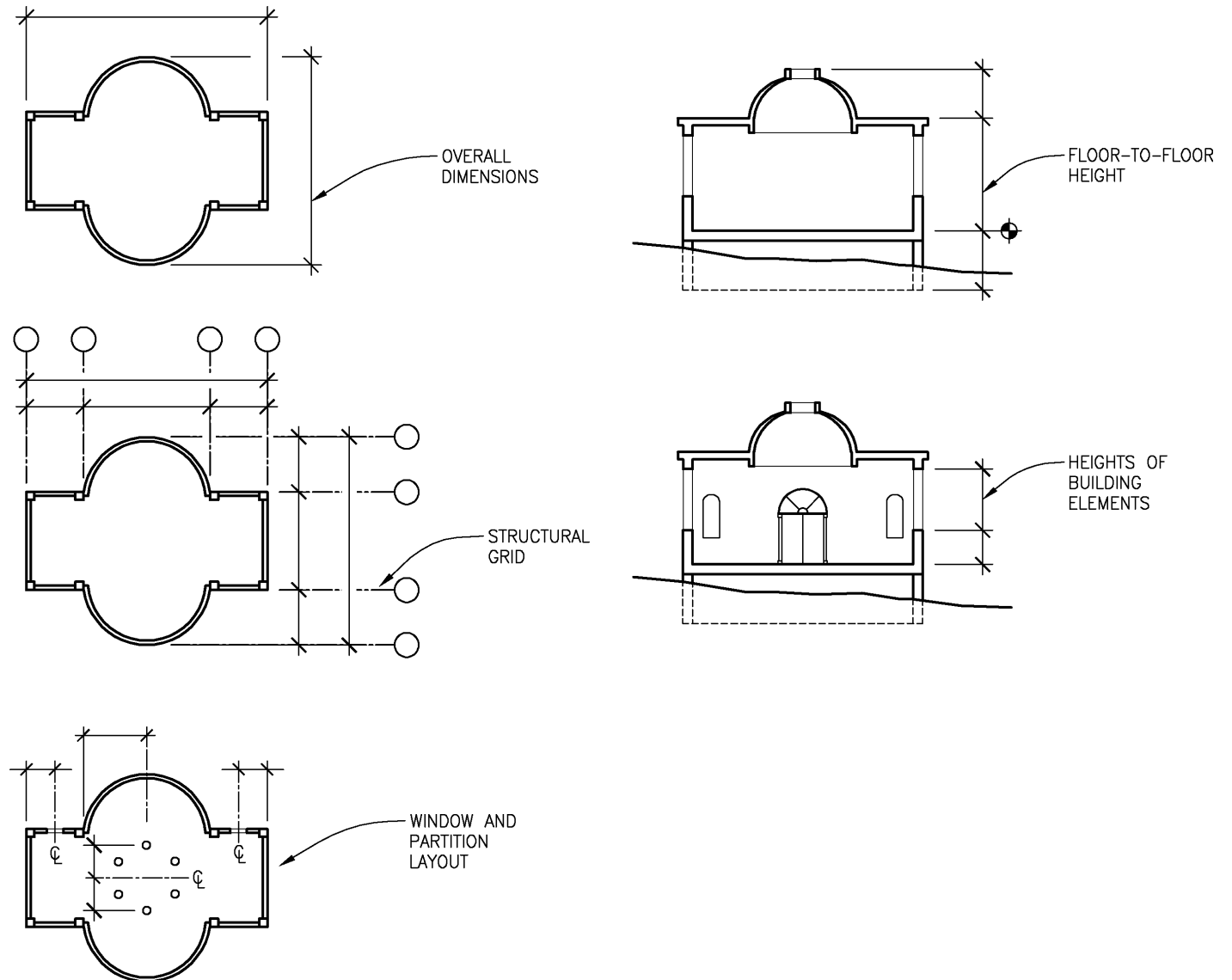


Figure 04.16 Hierarchy of dimensions.

Plan Dimensions

Dimensioning the Plan: What to dimension from and to depends on the structural system and the sequence and stage of construction of a given building type. Steel frame and reinforced concrete buildings are normally dimensioned from column centerline to column centerline. This should include an additional dimension to the face of the finished building. Refer to *Figure 04.17*. For concrete framed multistory buildings, perimeter columns may be dimensioned to the face of the column rather than the centerline if the column depth is reduced in upper floors while the building facade remains constant. Refer to *Figure 04.18*.

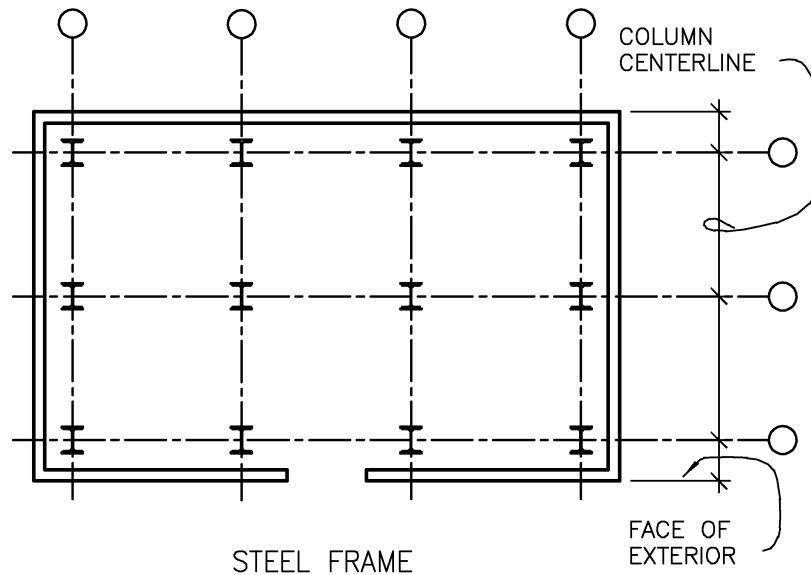


Figure 04.17 Structural systems dimensioning.

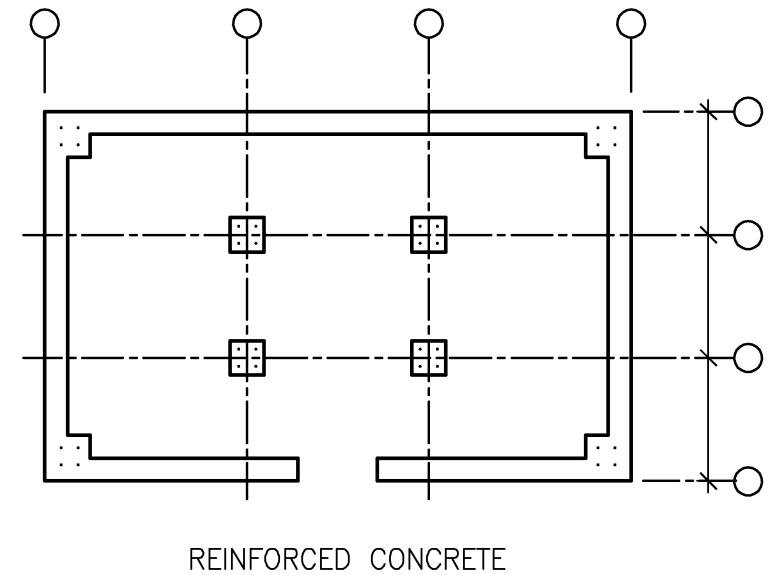


Figure 04.18 Structural systems dimensioning.

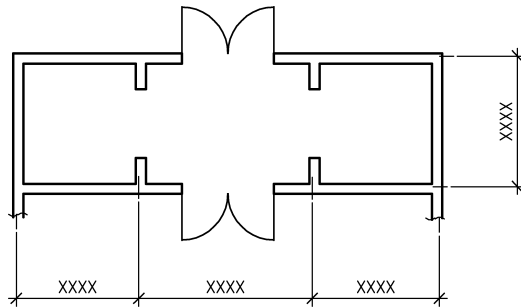


Figure 04.19 Face of stud, concrete or masonry wall dimensioning.

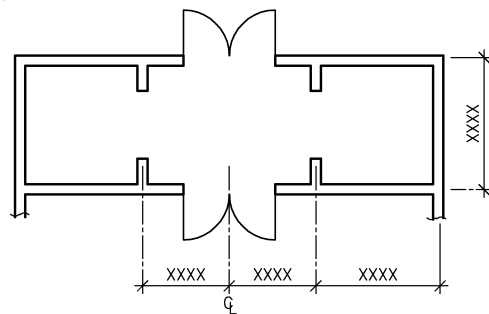


Figure 04.20 Centerline of wall dimensioning.

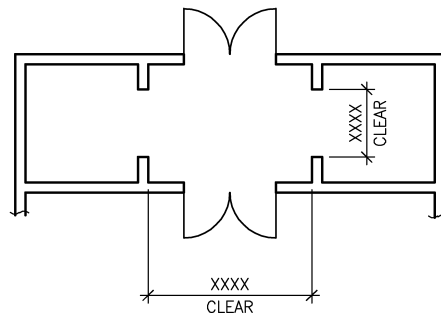


Figure 04.21 Face of finish wall dimensioning.

When dimensioning structural and non-structural walls and partitions, three different methods of dimensioning are in common use:

- Face of Stud, Concrete or Masonry Unit:** Dimensions should start on the exterior face of the left end or bottom of the plan and proceed continuously to the other side of the plan, ending again on the exterior face. A single dimension in the string may contain a “±” to allow for small variations at the site and to prioritize all other dimensions in the string. Refer to *Figure 04.19*. For masonry construction, dimensions should be the multiple of a masonry module. This minimizes the need for cutting units in the field.
- Centerline:** This is the most consistent system for some projects when all dimensions (except to exterior face) for walls, partitions, and window and door openings are shown to the centerline of that object. It provides more flexibility when exact sizes of components may change during the course of production drawings or construction. Refer to *Figure 04.20*.
- Face of Finish:** This is most appropriate for remodeling and interior work where the face of finish is already known or is highly critical. This method requires the installer or contractor to know exactly what the final finish of the walls will be when laying out the wall or partition. It can be used in some situations as reviewed above, but should be used only when required by the project. Refer to *Figure 04.21*.

In some building types, such as hospitals, critical dimensions are designated as “clear.” This means that after construction, the actual dimension is the clearance between finished surfaces. The actual dimension may never be less than the clear dimension, but may be greater. Refer to *Figure 04.21*.

For restoration, remodeling, and renovation plans, the interior string of dimensions should be used to determine the location of new construction only. For that reason, it should not be continuous but rather tie the location of new construction, such as walls and door openings, to the nearest fixed reference (existing wall or column centerline). Where a dimension cannot be determined in the field, such as a hidden object that will be uncovered after demolition, add **VIF** (Verify In Field) below the dimension.

Vertical dimensions follow a hierarchy similar to the one described under plans progressing from detailed dimensions close to the wall to overall dimensions farthest from it. Eliminate excessive repetition of dimensions from small scale to large scale.

Before the layout of building plans can proceed on site, a start point for vertical dimensioning must be located. In some areas, coast and geodetic datum relative to mean sea level are available and should be shown on the plans and sections. In other areas it is convenient to reference benchmarks or street curb datum as available. Refer to *Figure 04.22*.

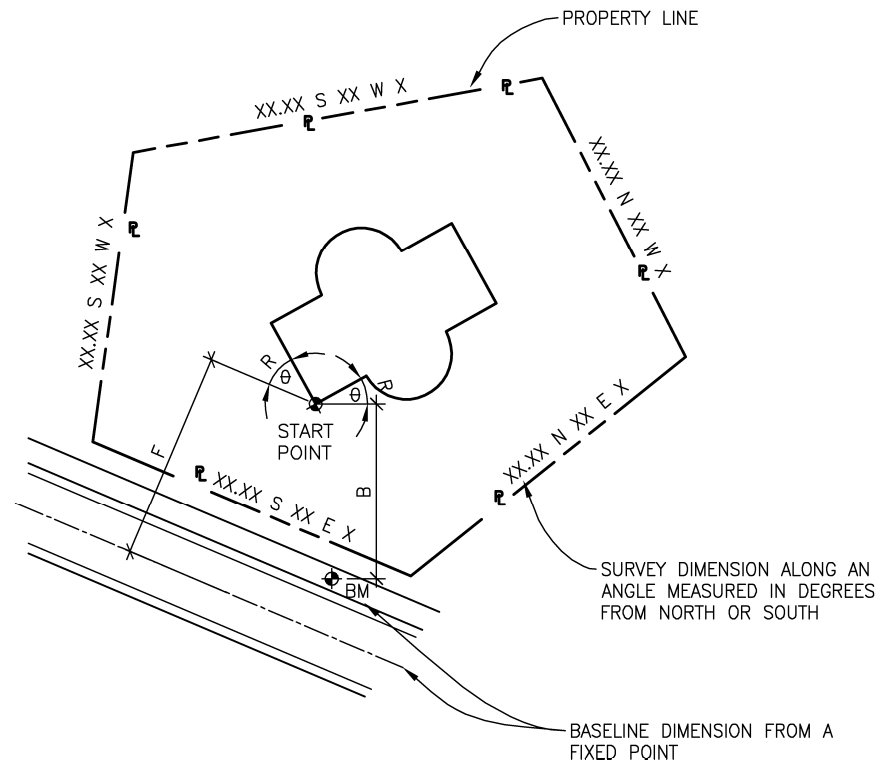


Figure 04.22 Layout of building plan.

On projects including an existing floor level that will be matched or altered, a reference to the elevation of the intended floor should be included on the plan. In all the above instances, the start point for vertical dimensions is established by criteria appropriate to the project. For convenience this start point can be set to a hypothetical project elevation such as 100 m in SI units or 100' in inch/pound units. Add a note stating that the elevation of 100 units equals **XXX** units (fill in the actual elevation and units from the site survey).

- **Dimensioning Building Sections and Elevations:** Sections and elevations should be consistently dimensioned within the reference grid and dimension area of the drawing. Refer to *Figure 04.22*. Provide an extension line at each subfloor. Provide a continuous dimension string connecting each extension line. All other vertical dimensions are to be shown on the wall sections and section details. Provide the elevation mark at the critical floor only and dimension all other floors and height from the fixed datum. The elevation mark is tied to a fixed datum from the site survey. Refer to *Figure 04.23*.

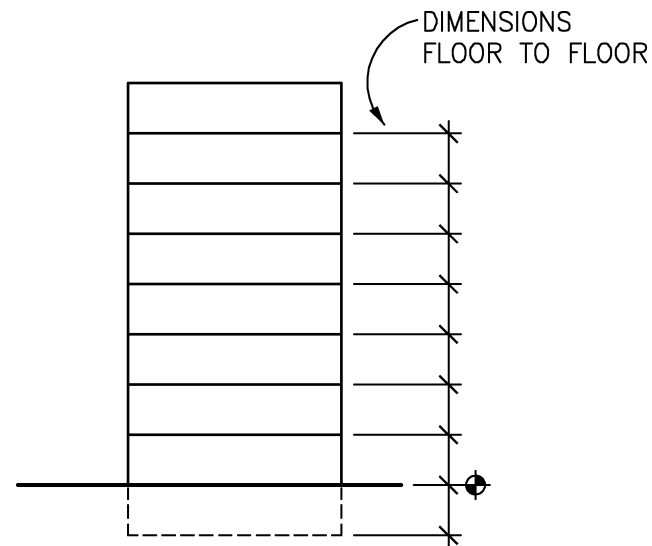


Figure 04.23 Vertical section or elevation dimensioning.

- **Dimensioning Wall Sections and Section Details:** Dimension strings for these drawings are usually placed outside the wall within the zone shown in *Figure 04.24*.

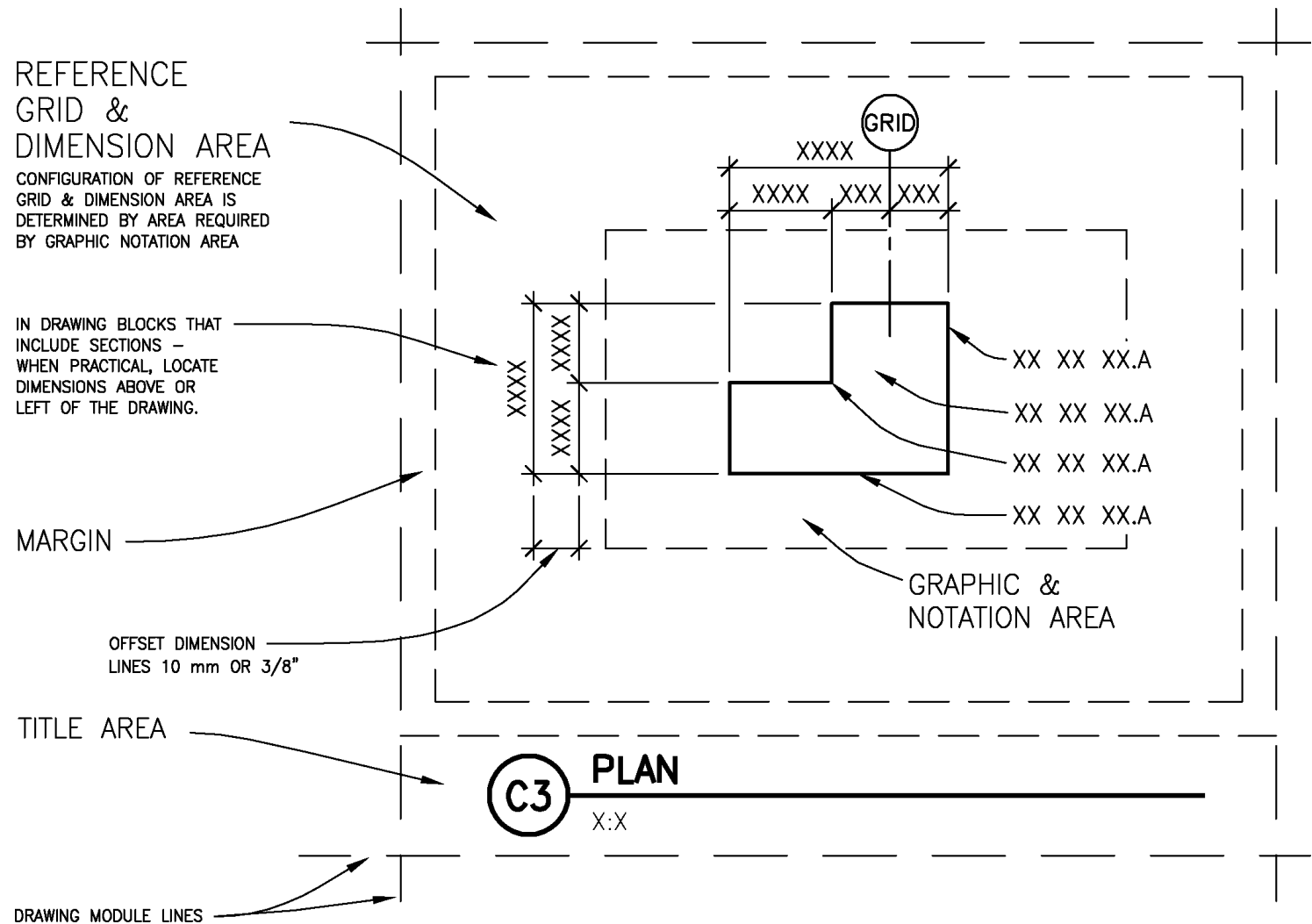


Figure 04.24 Typical drawing block format.

- For wall sections, two main strings of dimensions exist. The one placed closest to the building defines the rough openings and the top of the slab or subfloor. The second string indicates the floor-to-floor heights. Avoid dimensioning the overall height of the building already shown on the building section. Avoid dimensioning the ceiling height already included in the Room Finish Schedule.
- Variances in ceiling height within a room may be indicated on the Reflected Ceiling Plan and also noted in the remarks column on the Room Finish Schedule. Dimensions for this group of drawings must include masonry coursing or panel joint locations, relieving angles, and masonry ledges locations as well as other wall features.
- For section details provide all the detailed dimensioning not indicated in the drawings described above. This group of drawings should have the same orientation as the wall sections. Refer to *Figure 04.37* on page UDS-04.66 for an example of the hierarchy of dimensions associated with these drawings.

Guidelines

- Dimension fractions should not be less than 1.5 mm (1/16") because accuracy in the field is usually not required to be more precise than that. In cases where an opening width is divided into two equal parts and the original width is 1.58 m (5'-2-1/16"), write the total width on one string and create another string stating **EQ** (equal) on both sides rather than label each side as 790 mm (2'-7-1/32").
- Where perimeter roof beams are sloped to accommodate drainage, do not tie the dimensions to the top of steel. Tie them instead to the top of the wall.
- Check for superimposed information caused by layering.
- Where the length of dimension lines is too short to accommodate the dimension number, show the number to the side.
- If the drawing is not to scale, note **NTS** in the drawing title.

Rules for Conversion and Rounding

The rules for conversion and rounding are based on using either exact or approximate values. Correspondence between the accuracy of data and the resulting number of significant digits

should be carefully considered with regard to the implied conversion of quantities. Accuracy should never be sacrificed or exaggerated.

A scale having a division of 1/16-inch for making the original measurements is obviously suitable for measuring in SI units with a metric scale having divisions of 1 mm.

It is necessary to determine the intended precision of a measurement before converting. The converted dimension should be rounded to a minimum number of significant digits such that a unit of the last place is equal to or less than the converted precision.

Example: $1\text{-}7/8" = 47.625$ mm exactly
 $1\text{-}7/8" = 47.6$ mm normal rounding
 $1\text{-}7/8" = 47.5$ mm +/-
 $1\text{-}7/8" = 48$ mm +/-

The exact conversion $1" = 25.4$ mm generally produces values containing more decimal places than are required for accuracy. It is usually necessary to round these values to maintain accuracy compatible with those of the original values.

An “approximate” number will be followed with a +/- (plus/minus) symbol after it.

Converted dimension values used in the *Drafting Conventions Module* have been rounded to the minimum number of digits to maintain desired accuracy.

Refer to *ASTM E 380 - Standard Practice for the Use of the International System of Units (SI): The Modernized Metric System* for more information. See Bibliography on page UDS-INTRO.18.

Material Indications

Some material indications are used in drawings to help the viewer understand the use and extent of materials. Symbols should provide identification of material. Refer to the *Symbols Module* for more information. Detailed information about the indicated graphic material should be placed in the specifications.

Material indications may define general use if the material covers the entire surface, or a specific pattern such as the coursing and placement of bricks. For clarity, notes calling out the material

may be used in addition to the graphic symbol. Material patterns and accents indications should be used sparingly on drawings to identify but not to overly describe.

Unless a specific pattern is being illustrated, it is not necessary to fill the drawing area with the material indication. Show the material around the perimeter of the area or at either end to increase the readability of the drawing. The following is a description of material indications for plans, elevations, and sections:

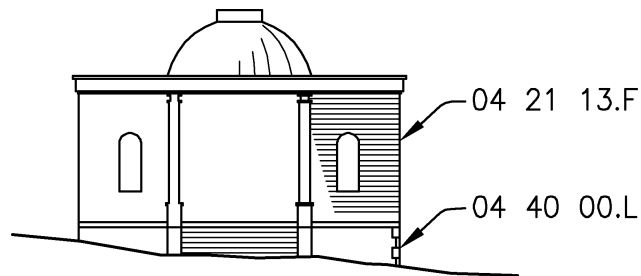


Figure 04.25 Elevation material indication.

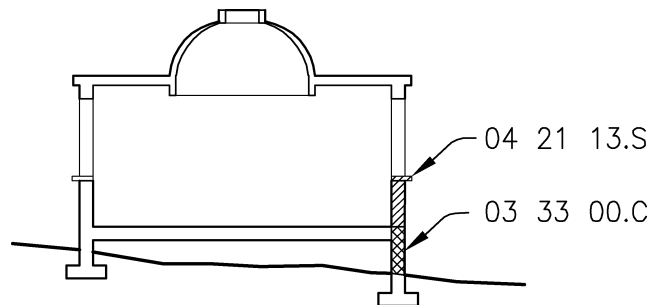


Figure 04.26 Section material indication.

- Plans:** While floor plans drawn at 1:100 (1/8" = 1'-0") or 1:50 (1/4" = 1'-0") may not require any material indications for exterior walls, plan details drawn at a larger scale should include a hatch or fill showing the exterior cladding material(s). Surface materials for flooring, countertops, landscape material, and other items may not be indicated if the whole area is constructed of the same material and does not include any patterns. The room finishes schedule and the specifications will provide that information. Where certain areas such as main access halls or other major spaces are paved with stone, tile, terrazzo, or other materials arranged in geometric patterns, an enlarged plan providing detailed information identifying materials and dimensions should be drawn.
- Elevations and Sections:** Interior and exterior elevation drawings commonly use material indications to identify the surface materials intended. Refer to *Figure 04.25*. Section drawings use material indication symbols to define the location of specific materials. Refer to *Figure 04.26*.

Scale in Material Indications

Small-scale plans and sections should use simplified versions of the material indication symbol to keep from cluttering the drawing. Large-scale details should use material indication symbols that have enough detail to describe clearly the material and its size.

Hatching

Hatching refers to the patterns of repetitive lines, dots, or figures used to indicate specific types of materials or designate specific areas. Hatching is very useful in making drawings readable. Use it only to indicate specific materials such as a brick wall or specific areas where work is to be done. For example, drawings shown at 1:100 (1/8" = 1'-0") or smaller rarely require any hatching to

indicate materials. Use a hatch pattern to indicate a specific area of flooring to be removed within a larger area of flooring to remain.

Limit the area to be hatched. In large areas requiring hatching to make the drawings readable, it is not necessary to hatch the entire area. Select small areas to be hatched that will clearly identify the entire area. Indicate hatching where materials change or terminate.

Notations

The *Notations Module* includes standards for different types of notes on different types of drawings. The purpose of notations associated with construction drawings is to perform the following functions:

Notes:

Roofing – Use membrane roofing, not PVC roofing or EPDM single-ply roofing.

Flashing – Use metal flashing, not hot-dipped galvanized flashing or copper flashing.

- Provide information relevant to the entire set of documents, or individual disciplines, or individual sheets.
- Identify products, materials, components, or assemblies using the same terminology used in the specifications.
- Inform drawing users as to the execution requirements of the design.

Brevity should be a guideline for writing notations. The following are other guidelines for notations:

- Select notes to identify, but not overly describe, the materials, components, and assemblies.
- Use generic terms for products, materials, and components. Refer to *MasterFormat*™. Refer to *Figure 04.27*.
- Minimize use of abbreviations. Refer to the *Terms and Abbreviations Module*.
- Use consistent terminology between drawings and specifications.
- Compose notations without defining a specific contractor to do the work, unless laws require the division of work according to a filed sub-bid. An exception may be multiple prime contracts that may require a defined division of the work.
- Avoid being specific about the sequence of construction.

- Eliminate repetition of notations on a sheet.
- Eliminate broad references to the specifications such as notes that state “per specs” or “refer to specifications.”

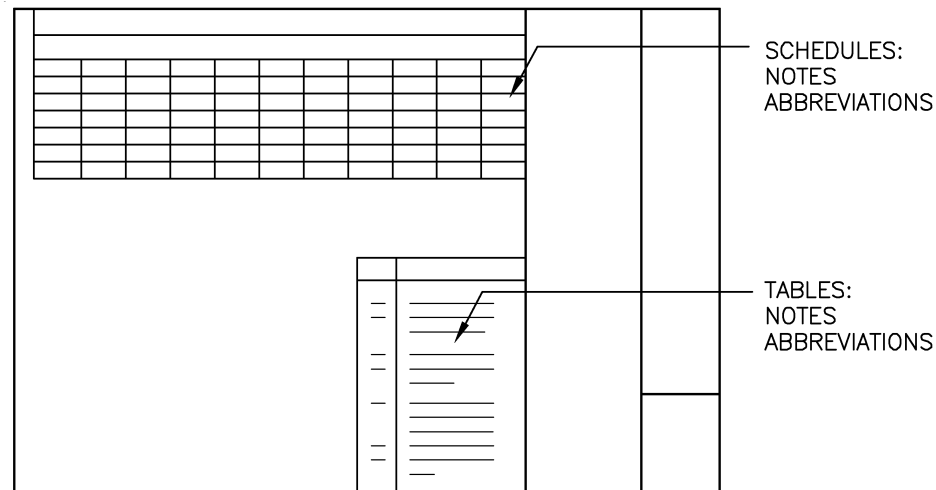


Figure 04.27 Notes for tables, schedules, and diagrams.

Tables, Schedules, and Diagrams

Notes used in tables, schedules, and diagrams should be brief. Refer to *Figure 04.27*. Single terms provide a simple, clear, and efficient means of communication.

Identifying Spaces and Objects

Spaces and objects in a building are identified to easily locate and to simplify the preparation of schedules. The identifier is used in drawings, schedules, and specifications to fully describe the space or object in question.

Spaces

Rooms: The first part of a room identifier should match the floor number. Room numbering should start at the most prominent means of access to the floor. For instance, the first room to the right of the major elevator or stair on the third floor would be **301**. Number rooms sequentially moving clockwise around the building.

Stairs: The most prominent stair with the largest egress capacity is identified as **Stair 1**. On the first floor, number the stairs sequentially moving clockwise from the first stair. The stair number remains the same for its entire height. Stairs above or below the first floor that do not connect with the first floor are numbered following those that do. If several prominent stairs with large egress capacity exist, the stairs may be numbered in order of their importance to the main egress point in the building. Additional stairs may be numbered as described above.

Exterior Spaces: Exterior spaces such as balconies, porches, lanais, terraces, and porte-cocheres, if more than one, are numbered.

Elevators: The elevator nearest to the building entrance with the largest access and egress capacity is identified as **Elevator 1**. Number additional elevators moving clockwise within elevator banks. Use the same sequence and arrangement of numbers on additional banks of elevators if present.

Shafts: The shaft nearest to the building entrance with the largest access and egress capacity is identified as **Shaft 1**. Number shafts moving clockwise as required.

Objects

Doors: Each door opening in a building must have a unique identifier. If a room has one door opening, the door opening number is the same as the secure side room number. If more than one door opening in a room exists, door openings within that room are identified by the room number followed by an alpha character starting clockwise from the corridor access door opening. For example, in room numbered **105** the corridor access door opening number is **105A**, the second door opening would be numbered **105B**, and a third door opening **105C**. Glass within doors is considered part of the door and not a window. Sidelights are part of the door frame and should be represented in the door frame type. Each door is further described in the door schedule as being a type of door and receiving a hardware set. Refer to the *Schedules Module* and the *Symbols Module*.

Windows: Each type of window must have a unique identifier. Refer to the *Schedules Module* and the *Symbols Module*.

Louver Types: Each type of louver is to have a unique identifier. Louvers are distinguished from windows by the identifying symbol. Refer to the *Symbols Module*.

Furniture, Fixtures, and Equipment: Lab casework, store fixtures, fume hoods, and cranes fall under this category. Industrial projects may require other types of equipment such as lathes, planers, and shearing machines. To identify and reference equipment, alphanumeric designations are placed on the piece of equipment shown in the plan and a legend identifying it.

Graphic Conventions for Text and Notes

The minimum text size is 3.2 mm (1/8") for hand drafting and 2.4 mm (3/32") for CAD. Smaller text size is generally not legible on reduced or one-half size sets. The use of bold, italic, and underline should not be used for notes.

Cross-Referencing

Cross-referencing provides a system for tracking information from the general to the specific within a drawing set. The master drawing for a cross-referencing system is the floor plan. The floor plan should contain references to the building sections, elevations, interior elevations, plan details, and other information necessary to fully describe the project. A properly cross-referenced drawing set does not duplicate information but provides it one time in the expected location.

A poorly referenced project is subject to misinterpretation by contractors, owners, architects, engineers, and building officials. It can increase the cost of the drawings and construction due to required addenda, clarifications, and possibly change orders.

Proper cross-referencing does not require any extra effort. The most efficient way to do this while maintaining control over the process is to create a comprehensive and detailed mock-up of the project. Refer to Mock-Up Drawing Set on page UDS-04.85.

Drawing Identification

Each drawing should be provided with a unique drawing identification and corresponding sheet identification. Items on a drawing that require additional clarification are provided with a cross-reference to another drawing or view on another sheet.

For example, a section cut shown on a plan refers to a specific drawing on a specific sheet at another place in the drawing set. This drawing may require additional cross-references on other sheets. Refer to *Figure 04.28*.

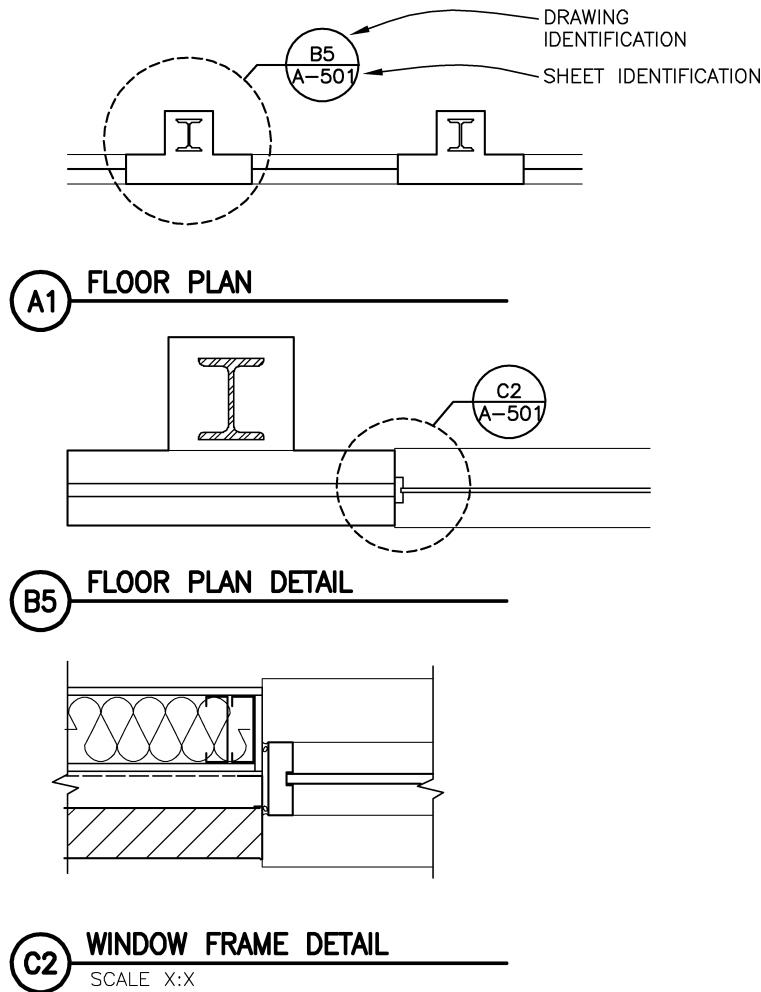


Figure 04.28 Drawing identification.

Symbols

Symbols are graphic representations of an item or materials by association, resemblance, or convention. A symbol often represents a material or object not fully illustrated on the drawings.

Symbol Categories

Symbols used in drawings are classified in terms of type, in six categories:

- **Identity Symbols** are abstract representations of an item. An electrical outlet is an example. These symbols are scale dependent.
- **Line Symbols** indicate continuous objects and are either single or double lines. Walls are usually drawn with two lines and ducts with one or two lines based on the scale of the drawing.
- **Material Symbols** portray a material graphically in plan, elevation, or section. A graphic representation of concrete is an example. These symbols are drawn to scale.
- **Object Symbols** represent items such as furniture and toilet fixtures. These symbols are drawn to scale.
- **Reference Symbols** refer the reader to another part of the documentation. Partition type symbol, section cuts, and elevation references are examples.
- **Text Symbols** graphically indicate a word or words and may be used in notations on drawings. For letter symbols, dimensionless numbers, mathematical symbols, and subscript symbols, refer to *ASHRAE Handbook - Fundamentals*.

Sheet Types

Sheet types consist of scaled views and non-scaled views. Scaled views are plans, elevations, sections, large-scale plans, and details. Nonscaled views are diagrams, 3D representations, and schedules. Project sheets are grouped into categories identified by alphanumeric numbers listed and explained in detail in the *Drawing Set Organization Module*. The following discussion on sheet types includes general guidelines for information necessary for each sheet type. These guidelines are not intended to be comprehensive, but may be used as a basis for establishing a check list for coordination and completeness of the sheets.

Sheet Type 0 - General

General sheets provide information of a general nature that applies to the whole project as well as to each discipline. The first sheet in the set following the title sheet provides information that includes the drawing index, code summary, materials and the graphic symbols legend, abbreviations, a small orientation or vicinity map indicating the location of the project, and other relevant information of a general nature. A general information sheet is placed at the beginning of the set of drawings for each discipline to show information of a general nature unique to that discipline.

Many buildings are documented with screened backgrounds of floor plans on which mechanical, plumbing, and electrical layouts are drawn.

Sheet Type 1 - Plans

Typical components of plans include the following information:

- **Drawing Scales:** Indicate scale on plans. Refer to Scale on page UDS-04.11 for information on scales.

- **Column Grid Lines:** If used (may be omitted on Civil, Landscape, and Site plans).
- **True North Arrow and Plan North Arrow:** If used.
- **Key Plans:** Show clearly the relationship among the elements of complex projects or where the size of one element requires two or more drawings to delineate a level. Include column grids adjacent to match lines and corners; do not label rooms or departments.

The following is a description of requirements for plans generated by each discipline placed in the order of the *Drawing Set Organization Module*.

Civil Plans

Civil plans include site demolition, site improvement, dimension control, grading, paving, and site utilities plans. Dimension control plans show benchmarks and survey control point locations as well as interrelationships among buildings, streets, parking areas, fences, and utilities. Grading plans define limits of all grading work, provide critical spot elevations, and set controlling grades to assure proper site drainage. Paving plans establish base lines for large paved areas, locate roads, and indicate types of paving. Site utilities plans show the size and location of all new and existing utilities.

Include the north arrow, key plan, match lines (if used), scale, and column grid described at the start of Type 1 Sheets. The following list of items should be included in all Civil plans:

Site Demolition Plans

- Limits of items to be removed from the site including planting, exterior lighting, and paved areas.
- Curbs to be cut as well as trees and plantings to be protected.
- Locations of existing structures and utilities to remain.
- Items to be demolished and removed from site.
- Items to be salvaged and turned over to owner.
- Items to remain undisturbed and be protected.

Dimension Control or Layout Plans

- Base plans showing information from field survey including benchmark and survey control point locations.
- Interrelationships of buildings, streets, parking areas, fences, and utilities.
- Locations for access and egress to facilities.
- Horizontal layout for fencing.
- Location and limits of site improvements.

Guidelines for Dimension Control or Layout Plans

- Structures should be located by horizontal coordinates where possible. Reinforced concrete structures should be located relative to face or centerline of wall. Steel structures should be located by grid line.
- Do not show dimensions or elevations of structures already shown on Architectural or Structural drawings. Adequate dimensions should be provided so that nothing has to be scaled from the drawings. Include inverts for graded (sloped) site utility lines at point of connection to building utilities.

Grading Plans

- Site grading with controlling grades to assure proper drainage. Critical spot elevations must be positioned relative to a survey control point, structure, or road baseline.
- Limits of grading work.
- Sizes of new drainage facilities with controlling grades.
- Modified contours for the new design. Relate them to the building outline to ensure positive drainage to catch basins and other discharge points.
- Spot elevations at corners and points adjacent to building entrances.

Paving Plans

- Large paved areas. Locate by establishing a baseline.
- Roads. Locate based on a centerline horizontal alignment.
- Paving. Indicate types.
- Core lines and expansion, contraction, and control joints. Dimension each item to the nearest fixed point.

Site Utilities Plans

- New or existing utilities to service new facilities. Show sizes, inverts, and location of connection to existing lines.
- Existing site utility structures. Adjust to meet new grading requirements.
- Site utilities. Show extent to within 1.5 m (5'-0") from building. Reference Mechanical and Electrical site utilities plans, if used.

Guidelines for Site Utilities Plans

- Ensure that the interface between site and building utilities are at the same location.
- Check ground-floor elevation against spot elevations adjacent to entrances.
- Check the location of curb cuts against new driveways.
- Check elevation of ledges supporting masonry shown on the elevations against grade elevations shown on Civil or Landscape plan.

Landscape Plans

These plans may include site preparation (indicating structures to be demolished and plants to be removed), irrigation, and plant materials plans. Site preparation plans show existing site features to be modified including planting to be removed, curbs to be cut, exterior lighting, paving areas to be removed, and trees to be protected. Irrigation plans dimension layout of the irrigation piping and sprinkler heads and the locations of controllers as well as their power supply. Plant

material plans show dimension layout of landscape material, and designate plant types and their quantity.

In addition to the items listed at the start of Type 1 Sheet, the following list of items should be included on all Landscape plans:

Site Preparation Plans

- Outline (at grade) and names of buildings and/or structures.
- Walks, streets, curbs, parking areas, signs, planters, light poles, and other site structures.

Irrigation Plans

- Layout of irrigation items. Dimension to the nearest fixed point.
- Coordinate location of irrigation controllers with architectural, mechanical, and power requirements with Electrical plans.

Plant Materials Plans

- Names of buildings and/or structures. Show outline (at grade).
- Walks, streets, curbs, parking areas, signs, planters, light poles, and other site structures.
- Layout of landscape materials. Dimension to nearest fixed point.
- Show designations, location, spacing, and quantity of materials for planting.
- Schedule of plant materials for each planting plan.

Structural Plans

Structural plans include demolition, foundation, and framing plans. These plans define support and bracing elements (columns and shear walls) of the building. Horizontal support members such as beams, girders, and trusses must be coordinated with other discipline elements passing through or beneath them to eliminate conflict among these disciplines.

In addition to the items listed at the start of Type 1 Sheets, the following list of items should be included in Structural plans:

Foundation Plans and Slab-on-Grade Framing Plans

- Column piers and footings.
- Footings. Indicate top of footing elevations on all spread footings. Also show top of pier elevations.
- Grade beams or walls required under masonry walls.
- Expansion, control, and seismic joints. Label, dimension, and detail each. Indicate thickened edges that will occur on each side of the joint for slabs on grade.
- Top of slab elevation on all plans.
- Slab block-outs. Dimension vertically and horizontally. Dimension boundaries of areas with different slab thickness and/or reinforcing requirements.
- Footings for stairways and shear walls. Dimension in plan and indicate top of footing elevation.
- Stairs and ramps. Dimension in plan and assign a number to each stair. Only overall plan dimensions should be shown. Treads and risers will be dimensioned on large-scale plans and sections.
- Dowels to masonry walls. Identify and show location.
- Floor slopes to drains and spot elevations. Show relative floor elevations.
- Pits, trenches, floor recesses, and tunnels. Show, locate, dimension, and detail each.
- Curbs. Show notes, dimensions, and details.
- Concrete equipment pads.
- Bonding or grounding of structural and/or reinforcing steel for lightning protection.
- Water stops, where required.
- Membrane waterproofing or vapor retarder under soil bearing slabs, pits, and trenches.

Guidelines for Foundation Plans and Slab-on-Grade Framing Plans

- Dimension plans fully for all offsets and provide overall dimensions as required. Dimension to edges of slabs where they occur. Coordinate with Architectural plans and dimensions.
- Footings need not be dimensioned if they are symmetrical about the column grid; otherwise, plan dimensions will be required to show location with respect to column grid. Coordinate with Architectural plans.
- Footings that step in elevation are indicated and dimensioned.

Floor and Roof Framing Plans

- Girders, miscellaneous cast-in-place concrete beams, steel beams, slabs, and channels. Locate dimensionally.
- Edges of slabs. Dimension to nearest gridline or reference point.
- Label all slab block-outs as “open” and dimension, both vertically and horizontally. Indicate method of additional reinforcement around the opening.
- Top of slab elevation on all plans.
- Brackets. Assign a mark number to each but do not dimension.
- Expansion, control, and seismic joints. Label, dimension, and detail each.
- Stairs and ramps. Dimension fully in plan. Stairs should be indicated by stair number. Only overall plan dimensions should be required. Treads and risers will be dimensioned on sections.
- Bracing elements such as shear walls and braced walls. Indicate location and identify.
- Concrete handrails. Indicate location and dimension.
- Dowels to masonry walls, if required. Indicate location and identify.
- All masonry and lintel locations on the plans and in a lintel schedule.

Guidelines for Floor and Roof Framing Plans

- Assign a member identification mark to all framing members.
- Dimension centerlines of all beams. Dimension to edge of spandrels or beams at openings.
- Show spacing of all joists on framing plans and locate all bridging.
- Show floor and roof slopes to drains and spot elevations. Show relative floor and roof elevations.
- Refer to the structural floor plan above the floor being considered when checking for overhead clearances.
- Do not indicate the size of structural members on Architectural drawings.
- Dimension slab openings for skylights, roof hatches, major duct penetrations, depressed slabs, and concrete curbs.

Architectural Plans

Architectural plans include demolition, floor, reflected ceiling, and roof plans.

Floor Plans

All architectural drawings are generated from the plans. Plans provide information about dimensions, partition types, room, and door numbers as well as references to elevations, building sections, wall sections, enlarged plans, details, window types, and schedules. Exterior window types may be shown on the plans or elevations but not on both.

Number the ground floor as the first floor. All occupied floors above the first floor are to be numbered sequentially upward. The floor below the first floor is **B1**. Identify identical floor plans in multistory buildings as “Typical Floor Plan” and identify which floors the typical plan applies. Number mezzanines sequentially (**M1**, **M2**) for mezzanines with limited size and egress capacity. Number larger mezzanines as part of the floor numbering system.

Reflected Ceiling Plans

Reflected ceiling plans are reflections (as if one is looking at mirrored floors) of the ceilings on the floor plans. All areaways and lower roofs should be deleted from the plans while overhead items, sometimes shown dashed on the floor plan, should be shown with solid lines. Delete door swings and show room numbers.

Plumbing, mechanical, and electrical elements should be shown only in architecturally significant spaces to bring order to the design of these ceilings. Utilitarian spaces such as mechanical, electrical, storage, and other spaces may be covered by a note similar to: "This plan shows the locations of items in architecturally significant spaces only. Refer to Plumbing, Mechanical, and Electrical plans for all items not shown herein."

It is recommended that the ceiling grid background plans be developed at the same time as the floor plan backgrounds so that both may be made available to other disciplines. This enables them to position lighting, registers, diffusers, and other elements of the design in locations conforming to the grid and reduces the amount of changes required by the architectural designer.

Roof Plans

Roof plans should be grouped with the floor plans and drawn at the same scale. Do not show site or building information located below the roofline. Structural grid should be shown only if necessary to locate roof structures or equipment. A partial roof structural plan should be named "Penthouse Plan."

In addition to the information shared by all plan sheets that are listed at the start of Type 1 Sheets, the following list of items should be included on all Architectural floor plans:

Floor Plans

- Room names and numbers.
- Floor plan dimensions. Locate walls and partitions, level changes, and close strings of dimensions from column grid to column grid. Refer to Dimensions on page UDS-04.19.
- Partition types. Refer to Sheet Type 6 - Schedules and Diagrams on page UDS-04.74.
- Borrowed light and louver types. Show exterior window types in small projects.

- Exterior and interior wall elevation references.
- Building section references.
- Wall section references.
- Floor plan horizontal detail references.
- Termination of floor materials within a room.
- Floor drain and slope lines of drainage to floor drain. Show extent and direction of slope.
- Plumbing fixtures, fire hose, and extinguisher cabinets.
- Built-in casework, shelving, lockers, benches, kitchen casework, and equipment. See Classifications of Furniture, Fixtures, and Equipment definition in Interior plans on page UDS-04-49.
- Openings in the floor such as elevator and dumbwaiter shafts, mechanical/plumbing/electrical shafts, atria, stairs, and escalators. Do not show an “X” through a chase unless entire chase is a floor penetration.
- Trenches and other recessed areas needing depressions in the floor, such as recessed floor mats, thickset ceramic tile, and other items. Dimension and detail each.
- References to details and sheet notes.
- Significant overhead features such as balconies, skylights, beams, and roof overhangs. Indicate with a dashed line and add a note describing what that line represents.
- Edge of slabs, ledges, equipment pads, and curbs. Do not show walls and bridges at the next level below, or items that appear on another floor or roof plan. Make sure that the structural drawing set contains the details required to illustrate these items.

Reflected Ceiling Plans

- References to details for ceiling edge conditions, building expansion, control joints, seismic joints, and lighting coves. Do not reference building or wall section cuts.
- Description of exterior soffit materials. Include light fixtures, control joints, and access panels.

- Ceiling material indications. If more than one material is scheduled, show extent of materials. Place the ceiling component legend on the reflected ceiling plans rather than in the general information sheet.
- Light fixtures, exit lights, sprinkler heads, supply and return grilles, smoke detectors, speakers, emergency shower, and other items. Dimension if necessary.
- Ceiling access panels including panels that are furnished by mechanical or electrical trades. Indicate size.
- Rated partitions and other partitions extending through the ceiling plane to the structural deck. Identify rated partitions by a symbol.
- Skylights and roof hatches. Dimension if necessary.
- Plenum barriers where required by code.
- Elements located above ceilings requiring specific locations or construction such as fire-rated horizontal enclosures, catwalks, disappearing stairs, air handling equipment, and other elements.
- Delete door swings and door openings unless opening extends to the ceiling.

Roof Plans

- Extent and direction of slope to roof drains. Show emergency roof overflow drains or scuppers. Include elevations of high points, ridges, low points, drains, and overflows for accurate determination/confirmation of roof slope.
- Penthouse roof plan. Show on the same drawing if possible.
- Roof pavers, walking surfaces, changes in materials, building expansion, and roofing control and seismic joints.
- Antennas and supports, lightning arresters, major roof penetrations, window cleaning equipment, roof-mounted equipment, and screen walls. Coordinate lightning protection locations with Electrical.
- Skylights.
- Size and locate downspouts and gutter expansion joints for buildings with hipped roofs.

- Splash blocks at downspouts that discharge water onto a lower roof level.
- Roof access and ladders to different levels.
- Roof crickets.
- References to details for the items listed above. Do not detail parapets if shown on the wall sections.
- Eliminate conflict between roof penetrations (i.e., vents, exhausts) and roof crickets, flashing, and valleys. Consider relocating penetrations to less visible areas.

Interior Plans

Interior plans include demolition, furniture, furnishings, fixtures, and equipment plans. These plans are usually drawn on the architectural backgrounds without the symbols or dimensions layers. These plans are used by the electrical engineer to locate outlets, power requirements, and lighting.

In addition to the information listed at the beginning of Type 1 Sheets, and usually provided on the screened Architectural background plans, the following list of items should be included on all Interior floor plans:

- Borrowed light and louver openings.
- Interior room elevation references.
- Pertinent tables, schedules, key, and sheet notes.
- Building expansion and seismic joints if they intersect and affect furniture and equipment installations.
- Trenches and other recessed areas with depressions.
- Fire-hose cabinets that contain fire extinguishers, extinguisher cabinets, and wall-mounted extinguishers. Coordinate locations with Architectural and Fire Protection plans.
- Drinking fountains, water coolers, and all other plumbing fixtures.
- Toilet partitions, toilet casework, and toilet accessories.

Guidelines for Interior Plans

- Indicate rooms with equipment or custom furniture or other areas to be enlarged by a dashed line around the area. Reference to enlarged plan. Show furniture and equipment on enlarged plan only. Do not duplicate information shown on smaller scale plans. Show interior elevation references on the enlarged plan.
- Coordinate location of furniture and equipment with lockers, cabinets, chalkboards, tackboards, electrical outlets, thermostats, clock outlets, and other items contained in the Architectural/Engineering documents.
- Identify each item of furniture and equipment by a mark number.

Classifications of Furniture, Fixtures, and Equipment

- **Class 1:** Permanently fixed items with permanent utility connections, such as stoves, dishwashers, steam tables, light fixtures, wall switches, water chillers, air handling units, bridge cranes, pumps, electrical generators, transformers, and switch gear; and large fixed shop equipment such as automatic cutting machines, air compressors, jib cranes, large cleaning and plating tanks, and milling machines.
- **Class 2:** Portable items with flexible or quick-disconnect utility connections, including office and household items such as computers, calculators, electric coffee pots, vacuum cleaners, table lamps, floor lamps, window air conditioning units, household refrigerators, and television sets; and shop equipment such as powered hand drills (electric and pneumatic), powered hand-held saws, air compressors, welding machines, oxyacetylene cutting and welding outfits, and paint sprayers.
- **Class 3:** Movable items without utility connections, including office and household furnishings such as chairs, sofas, stands, desks, tables, rugs, beds, and shop equipment such as tool cabinets, work benches, storage racks, storage bins, storage shelves, bench-mounted vises, hand-powered trucks for handling compressed gas tanks, and A-frame cranes.

- **Class 4:** Expendable and consumable items, including expendables such as window curtains, shower curtains, bed linens, uniforms, clothing, brooms, wall mirrors, wall pictures, tableware, crystal ware, kitchen cutlery, cooking utensils, hand tools (pliers, screwdrivers, wrenches), mechanics' tool kits, test equipment (small battery-powered, hand-held voltmeters and multi-meters), and storage aids (plastic storage bins and shelf separators); and consumables such as products with limited shelf life (medicines, chemicals, paints, and food), household supplies (soaps, cleansers, and ammonia solutions), office supplies, shop supplies (nuts, bolts, welding rods, fluxes, electrical tape), janitorial supplies (wiping cloths, paper towels, toilet paper, and oil-absorbent sweeping materials).

Fire Protection and Plumbing Plans

These plans include floor and demolition plans. They define the piping required to connect fixtures, floor and roof drains, fire pumps, fire hose cabinets, sprinkler heads, and other elements of the plumbing system. For some industrial projects such as lab and medical facilities, plans include gas, air, vacuum, and special waste piping.

Plumbing Plans

- Ensure that furring for pipes located in proximity to columns does not conflict with beams and column base plates.
- Size partitions and pipe chases to accommodate the pipes they enclose.
- Group vent pipes at a limited number of locations to minimize penetrations. Design pipes crossing from one side of an expansion joint to the other to accommodate the movement between the two sides.

Mechanical Plans

Mechanical plans showing demolition of existing components of the mechanical system or the duct, pipe, and heating media layout for new construction are overlaid on the architectural background. For better readability of mechanical plans, screen the architectural background to a lighter shade. Mechanical plans must identify same unit designations that appear in schedules, indicate all sections, reference all details, and size louvers and openings.

In addition to the items listed at the beginning of Type 1 Sheets, and usually shown on the backgrounds, the following list of items should be included in all Mechanical plans:

- Exterior and interior louver openings.
- Piping sized in U.S. standard.
- Ductwork sized with clear inside dimensions. Air quantities should be indicated in L/s (CFM).
- Mechanical rooms and other areas to be enlarged. Indicate by a dashed line around the area. Reference to the enlarged plan. Do not duplicate information.
- Turning vanes, splitters, and extractors.
- Fire dampers and control dampers. Coordinate locations with Architectural and Electrical plans.
- Duct connections to kitchen hoods, lab hoods, and other equipment requiring supply or exhaust air.
- Duct-mounted coils.
- Pipe sleeves.
- Thermostat locations and reference unit or zone controls. Coordinate locations with architectural and Interiors.
- Sound attenuators.
- Valves.
- Vibration isolation elements.

Mechanical Room Plans

Confine area of enlargement to that portion referenced on smaller scale plans. Reference all applicable details and diagrams. Make and indicate sufficient section cuts to adequately convey layout to the contractor. Indicate future equipment with dashed lines and note as future. Express all air quantities in L/s (CFM). Also, show the following:

- Equipment by unit designations as contained on the schedules.

- Ductwork with double lines.
- Piping 50 mm (2") and larger with double lines. Piping smaller than 50 mm (2") should be indicated with single lines.
- Other equipment located in mechanical room should be shown with light dashed lines.
- Air handling units complete with motor locations, filter sections, flexible connections, and mixing box sections.
- Air handling unit drain connection and routing to floor drain.
- Equipment pads or applicable support method; coordinate with Architectural and Structural plans.
- Dampers.
- Sound traps and internally lined ductwork.
- Valves.
- Roof plan.
- Roof-mounted equipment and indicate the maximum allowable height for each.

Guidelines for Mechanical Room Plans

- Coordinate locations of all plenum barriers with Architectural plans.
- Coordinate location of motorized dampers with Electrical plans.
- Coordinate location and size of door undercuts and grilles with Architectural plans. Eliminate undercuts or grilles if the door is located in a fire-rated partition.
- Coordinate location and size of outside and combustion air intakes with Architectural plans.
- Coordinate size and location of screen walls and related ventilation requirements for condensing units and cooling towers with Architectural plans.
- Coordinate ductwork routing and diffuser location with other disciplines.
- Coordinate power and control components (i.e., starter and relays) with Electrical plans.

- Indicate coil and fan shaft pull spaces.
- Indicate clear space for pulling boiler tubes.
- Identify major duct intersections and check against the available ceiling to bottom of slab depth. Add the space required for beams, light fixtures, and piping.
- Check mechanical shaft dimensions against the dimensions of ducts and pipes located within them.
- Check fin tube locations against furniture layout, especially if casework is located at the window wall. Verify who is specifying the fin tube enclosure, location, and design.
- Coordinate louver locations and sizes with elevations. Also coordinate supply and return air registers with those shown on the reflected ceiling plans.
- Verify that fire dampers protect ducts passing through rated walls and floors unless the duct is part of a smoke evacuation system.
- Review locations of registers for conflicts on the final reflected ceiling plans.

Electrical Plans

Demolition, lighting, power, and in some cases, communication plans constitute the electrical plans. Lighting plans define the type and location of light fixtures, switches, smoke detectors, exit lights, speakers, and elements of the fire detection and security systems.

Power plans locate all outlets, electrical panels, junction boxes, motors, switch gear, transformers, emergency generators, and other components of the electrical power system. Items associated with communications may be shown on these sheets or on an independent group of sheets depending on the complexity of the project.

In addition to the items listed at the beginning of Type 1 Sheets, the following list of items should be included on all Electrical plans superimposed on Architectural backgrounds:

- Clocks. Coordinate with Architectural and Interiors.
- Telephone locations should be shown on electrical communication plans. For simple projects, they may be included with the Electrical power plans.

- Lighting fixtures, fixture types, and number and size of lamps per fixture. Provide information relative to physical size, material, and finish of lighting fixtures to Architectural and Mechanical for coordination.
- Switches for control of lighting.
- Lighting circuits and associated wiring.
- Receptacles and associated wiring. Receptacles should be identified by appropriate National Electrical Manufacturers Association (NEMA) type.
- Cable trays. Indicate size and location.
- Panel boards. Drawings should clearly indicate location, designation, and the type of mounting required (flush or surface).
- Service entrance (weatherhead, conduit, and main disconnect).
- Exit lights and main exit light switch. Indicate location and designation.
- Fire alarm equipment, and associated wiring including alarm bells, manual stations, control panels, power supply switch, and empty service entrance conduit for connection to fire alarm loop, if applicable. Indicate locations.
- Transformers, motor generator units, rectifiers, primary equipment, primary and secondary bus, and supports. Show the necessary space requirements for each, and location and proper designation including associated wiring.
- Fresh air intake and exhaust, and engine exhaust system for power generators. Indicate locations.
- Switchgear, switchboards, and similar equipment. Indicate size, location, designation, and space requirements.
- Other signal, communication, or alarm system equipment. Indicate location and designation.
- Transformer vaults, transformer pads and enclosing fences, DC generators and rectifiers, and all AC generating equipment. Indicate all unusual grounding requirements, and all grounding.

- Motors or equipment that require electrical service. Indicate location, designation, and rating. Show method of termination and/or connection to motors and/or equipment; show all necessary junction boxes, disconnects, controllers (approximate only), conduit stubs and receptacles required to serve the motor and/or equipment.

Guidelines for Electrical Plans

- Indicate electrical rooms and other areas to be enlarged to a larger scale by a dashed line around the area. Reference to the enlarged drawing. Do not duplicate information.
- Indicate all sections and reference all details.
- Provide separate lighting plan layout from power plan layout. In small projects drawn at 1:50 (1/4" = 1'-0"), lighting and power may be combined in one plan.
- Identify and designate all electrical fixtures of the same unit designations as contained on the schedules.
- Coordinate the schedule designations for lay-in and surface-mounted fixtures with the reflected ceiling plans.
- Coordinate exterior light fixtures, and weatherproof exterior outlets.
- Show location of undercounter lighting and circuitry.
- Show the number of conductors in each conduit or cable run when the number of conductors required exceeds two. Circuit designations shall be shown for all home runs and feeders. Conduit and wire sizes shall be shown on the floor plans when not shown on panel board schedules and/or riser diagrams.

Sheet Type 2 - Elevations

Exterior Elevations

Architectural exterior elevations and partial exterior elevations are developed from the plans from which they are projected. For small projects, window types, building section, and wall section symbols may be shown on the plans. For medium and large projects, wall section and window type symbols may be shown on the elevations. Refer to *Figure 04.29*. Building sections

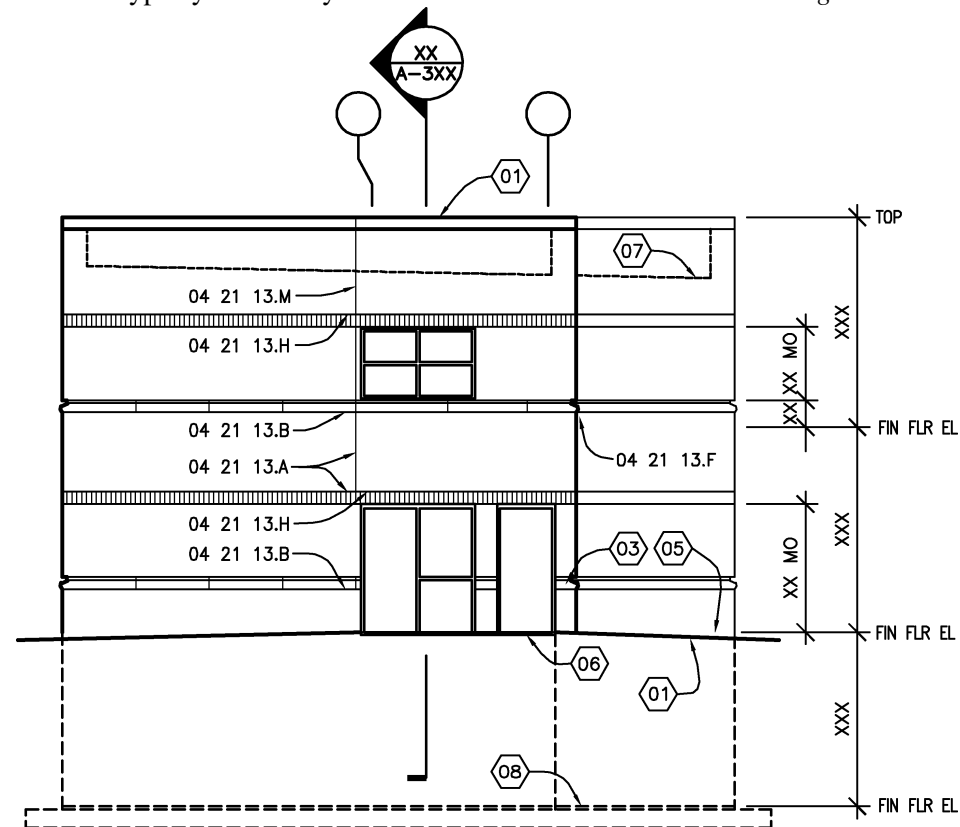


Figure 04.29 Example of an elevation showing all symbols.

relate more readily to the plans and their section cut symbol should be placed there. All section reference symbols should be shown on either the plans or the elevations—not on both.

If a Key plan is used on the plan sheets, it should also be placed on the elevation sheets with elevation symbols indicating the location of each elevation shown on the sheet. Refer to *Figure 04.30*. Match lines should be set at the same locations as the plans. Grid lines should be placed only at corners and where changes in planes occur.

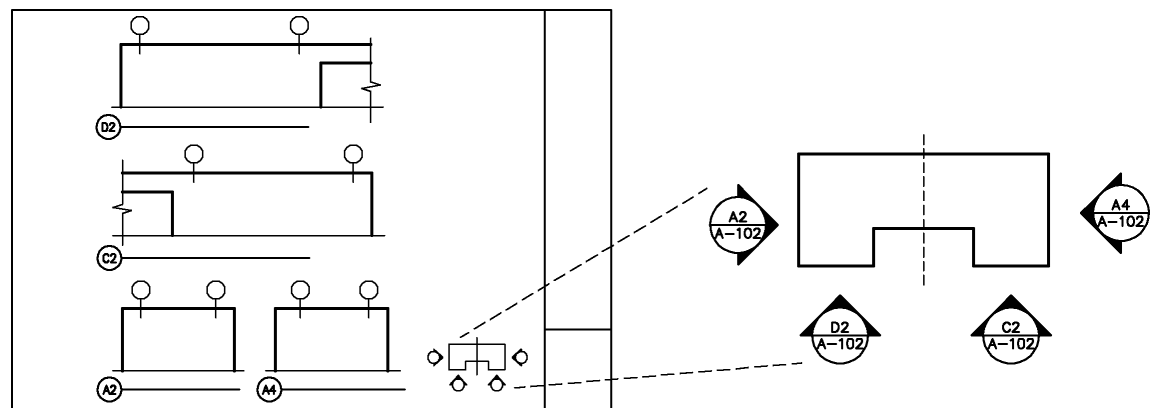


Figure 04.30 Key plan used to identify the location of each elevation.

All partial elevations must be shown, however small they may be. Special features such as medallions, unusual masonry patterns, rustication, or decorative lintels must be referenced, detailed, and dimensioned. Hidden items such as steel lintels, shelf angles, and other elements should be indicated with a partial dashed line to show extent. Movement joints in masonry and joints in panelized systems must be drawn to provide a uniform basis for pricing as well as clarify the designer's intent. Determining these locations must be based on the standards set by each industry.

Show materials graphically using hatching at the edges of the area to clarify limits. Refer to *Figure 04.25* on page UDS-04.29. All hatching or fill must be dark enough to reproduce well even when the sheet is reproduced at half size.

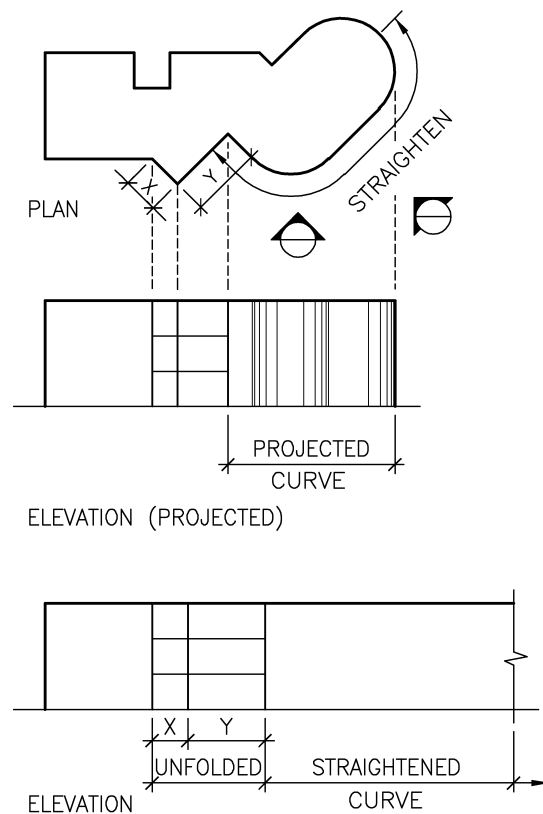


Figure 04.31 How to represent an elevation for the different phases.

Show all elevations as projected. Provide additional elevations to which the viewer is oriented 90 degrees for material takeoffs. Curves are simply noted as such on the elevations. The same approach applies to partial elevations forming an angle to the main elevation. These should be identified as “unfolded.” Refer to *Figure 04.31*.

Show the relationship between elevations and the surrounding grade taken from the site plan spot elevations around the building footprint. Where a masonry ledge exists below grade, dimension its elevation and show it dashed and stepped to match the grade. Refer to *Figure 04.32*.

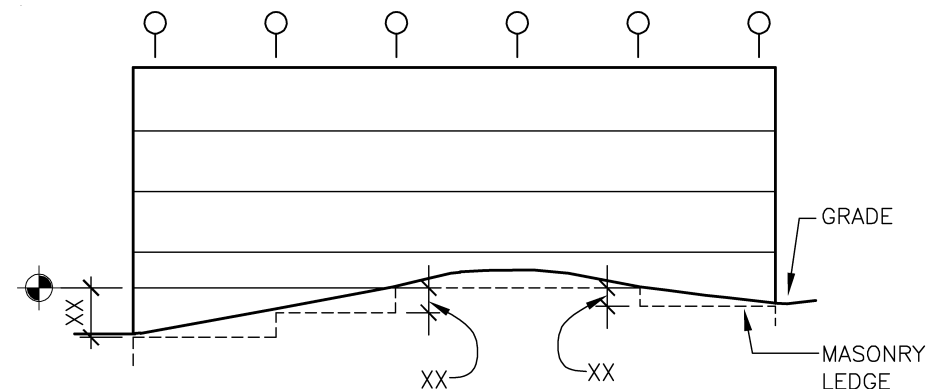


Figure 04.32 Elevation at grade.

Reference elevations on the floor plans by using the appropriate symbol for exterior and interior elevations. Refer to the *Symbols Module*. Once the building north is determined, name the elevations accordingly. Refer to *Figure 04.33*.

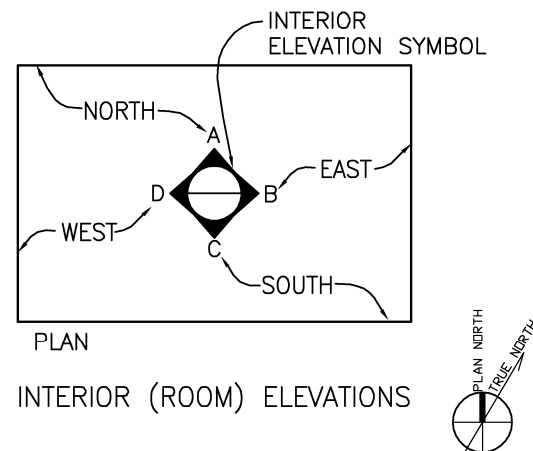
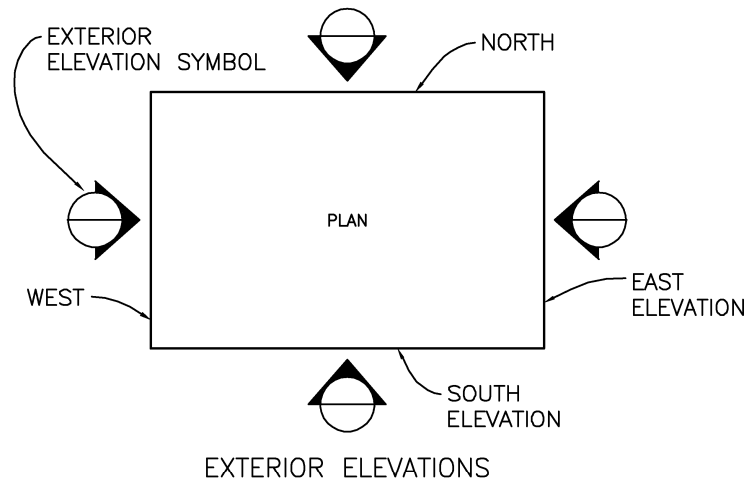


Figure 04.33 Naming exterior and interior elevations.

If design development elevations are upgraded directly from the schematic design drawings, delete all graphics depicting people and cars as well as any shadows and shading that may be shown on the original drawings.

The following list of items should be included on all exterior elevation drawings:

- Key plan. Indicate locations of exterior elevations.
- Column grid lines, and match lines, if used.
- Scale. Indicate scale on all architectural exterior elevations (and partial exterior elevations.) Refer to Scale on page UDS-04.11 for information on scales.
- Building section references, if not shown on plans.
- Wall section references, if required by project complexity.
- Typical type and extent of materials, tie holes, and rustication joint patterns, and fenestration.
- Floor-to-floor dimensions.
- Extent of building elements below grade. Represent with dashed lines.
- Gutters, rain leaders or downspouts, and roof scuppers labeled as to function.
- All penthouses, skylights, roof-mounted equipment extending above the parapet, mechanical louvers, or equipment screens. Do not indicate size of equipment.
- Ladders to roofs.
- Building identification graphics.
- Handrails and guardrails.
- Dock bumpers.
- Site adjacency elements such as retaining walls.
- Typical and non-typical detail references.
- Hidden and partial elevations.
- Lintels and shelf angles. Show dashed.

- Expansion and control joints for cement plaster and concrete masonry. Show extent of different cement plaster textures.
- Extent of different unit masonry bond patterns, colors, and textures.
- Movement joints, rustication joints, building expansion joints, and seismic joints. Coordinate with Structural plans.
- Form and tie patterns for architectural concrete.
- Light fixtures and signage.

Interior Elevations

Interior elevations are required for kitchens and classrooms (chalkboard and tackboard walls) to show millwork and casework and to indicate the extent of materials where more than one material is scheduled. They are also required for important spaces such as auditoriums, main lobbies, and atria.

If typical mounting height diagrams of wall-mounted equipment are provided and no material changes occur on the wall, an interior elevation of the wall is not required. Refer to Graphic Conventions and Indications on page UDS-04.19 for mounting heights of wall-mounted equipment. Indicate heights, signage, and changes in wall materials.

The following list of items should be included in all interior elevations:

- Access panels, including those furnished by Mechanical and Electrical plans. Indicate size.
- Louvers and grilles. Coordinate sizes with Mechanical plans.
- Electrical switchgear and panels.
- Large pipe and duct penetrations.
- Changes in wall materials, including acoustical applications.
- Door and borrowed light heights. Coordinate with coursing of masonry walls.
- Vertical dimensions and, in some cases, horizontal dimensions if not shown on the plans. Refer to *Figure 04.34*.

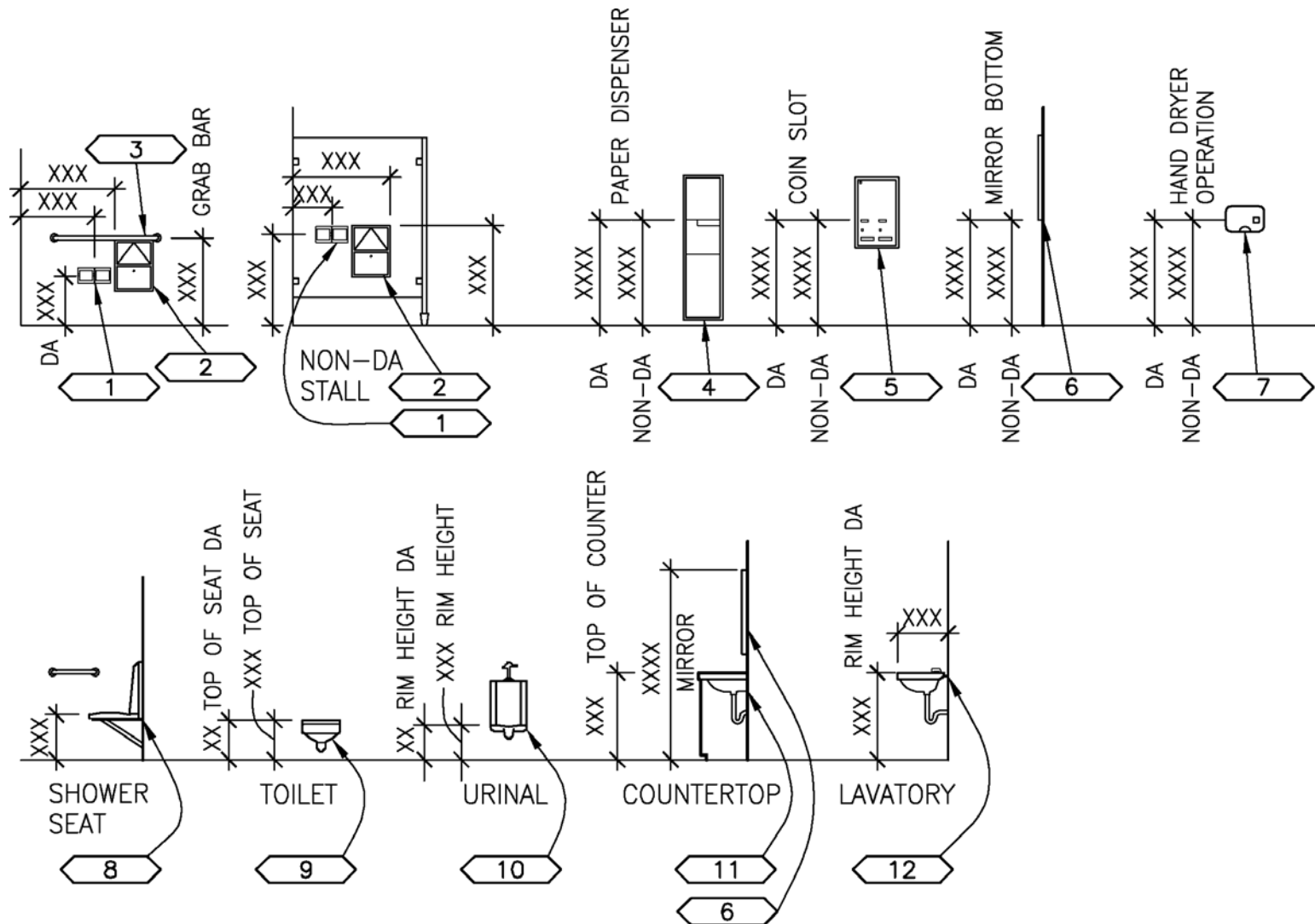


Figure 04.34 Vertical dimensions.

- Power, telephone, data, and other outlets around casework, equipment, furnishings, and other places where the location is critical.

Guidelines for Interior Elevations

- Coordinate extent of cabinets with Interiors and Equipment drawings.
- Indicate and locate by dimension expansion, seismic, masonry, and plaster control joints.
- If more than one material is scheduled for a room's wall, its extent should be graphically shown and dimensioned. Refer to *Figure 04.35*.
- Indicate and dimension location of wall sconces.

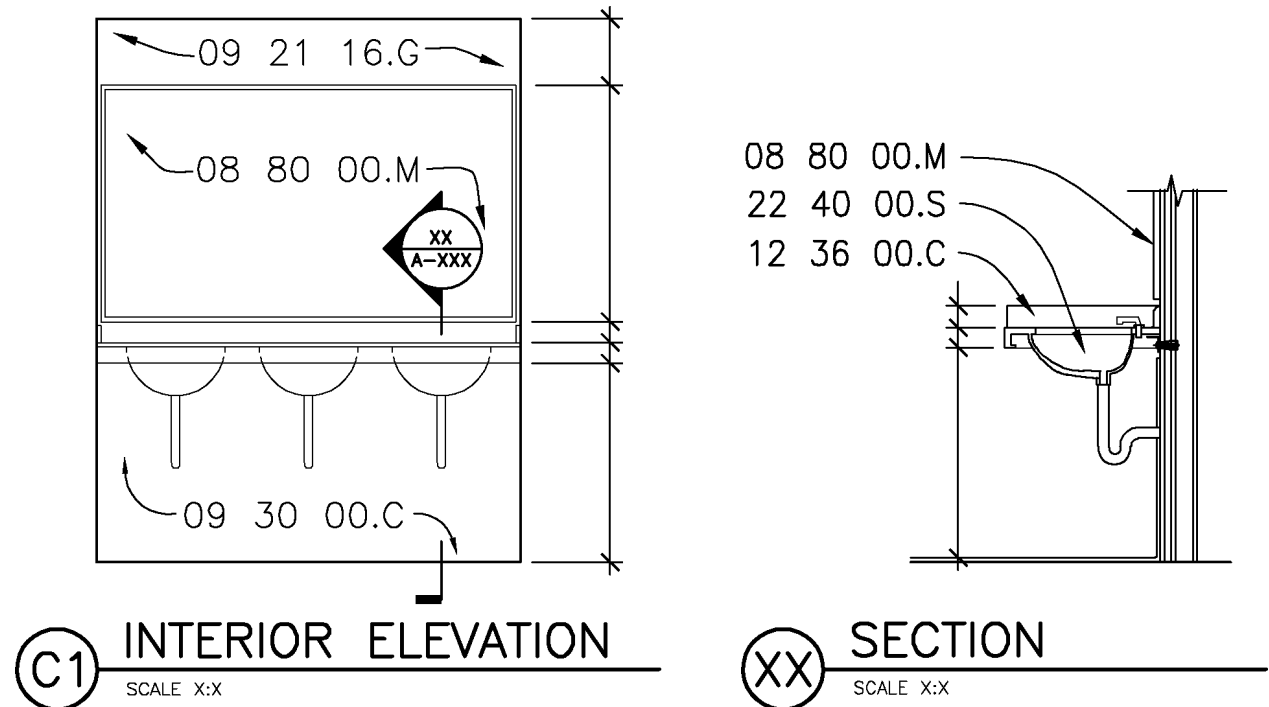


Figure 04.35 Material indications.

Sheet Type 3 - Sections

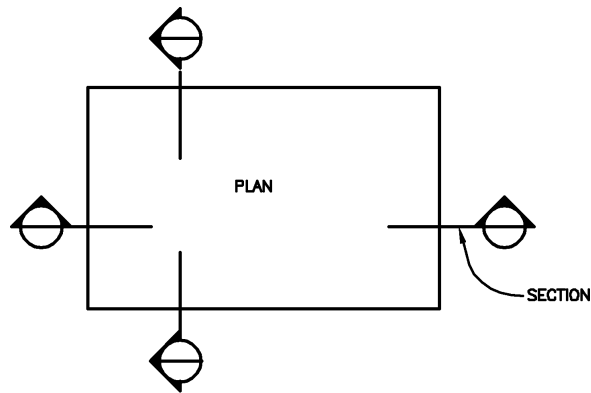
Building Sections

Building sections are usually drawn at the same scale as the floor plans and because of the small scale are used to indicate relationships of major spaces, vertical information, and major detail references.

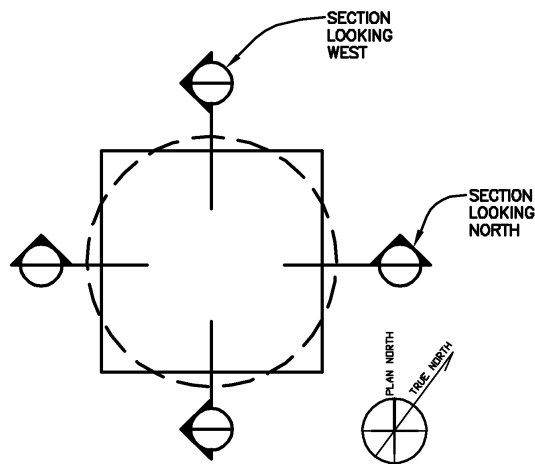
Show as many sections as are necessary to describe the complexities of the project. Eliminate section details if they are located at exterior walls because these belong in wall sections, which are usually drawn at a larger scale. Also, eliminate duplication of reference to larger details normally referenced from the roof plan. Do not show interior elevations on building sections. Refer to *Figure 04.36*.

The following list of items should be included in all building section drawings:

- Key plan showing building section cut lines.
- Scale. Indicate scale on all building sections. See Scale on page UDS-04.11 for information on scale.
- Column grid lines, if used, should be shown at top of each section.
- Match lines, if used.
- Other building section references that intersect the building section. The tail of the intersecting building section reference should point in the direction that the section is cut.
- Room numbers within the section.
- Floor-to-floor dimensions. Do not show floor elevations.
- Finish grade.
- Ceilings and partitions that are cut in section.
- Major materials, symbols, and abbreviations lists. Show only a minimum amount of material indications where changes or termination of materials occurs.



ELONGATED BUILDINGS



SQUARE OR ROUND BUILDINGS

Figure 04.36 Indicating building sections.

Wall Sections

Provide wall sections to clearly indicate different wall conditions. Reference larger-scale details of areas such as window head and sill details, soffit and eave edges, parapets, shelf angles, and areas requiring flashing or fire-safing insulation. Do not duplicate information shown on large-scale details on wall sections. When more than one wall section is drawn on a sheet, align floors horizontally. Eliminate repetition of dimensions by observing the hierarchies shown in *Figure 04.37*.

Draw sections of all exterior wall types at a scale that allows the section to be drawn without break lines whenever possible. The following list of items should be included in wall section drawings:

- Interior and exterior materials and finishes.
- Detail references.
- Finish grade.
- Floor levels, floor-to-floor dimensions. Do not show ceiling heights documented in Finish Schedule or on the reflected ceiling plan, unless it is necessary for clarification.
- Profile of built-in equipment against wall.
- Louvers. Coordinate with Mechanical.
- Masonry coursing relative to the dimensions shown on the section.

To eliminate unnecessary repetition of information between the building sections, wall sections, and section details, a hierarchy of notations and dimensions should be established.

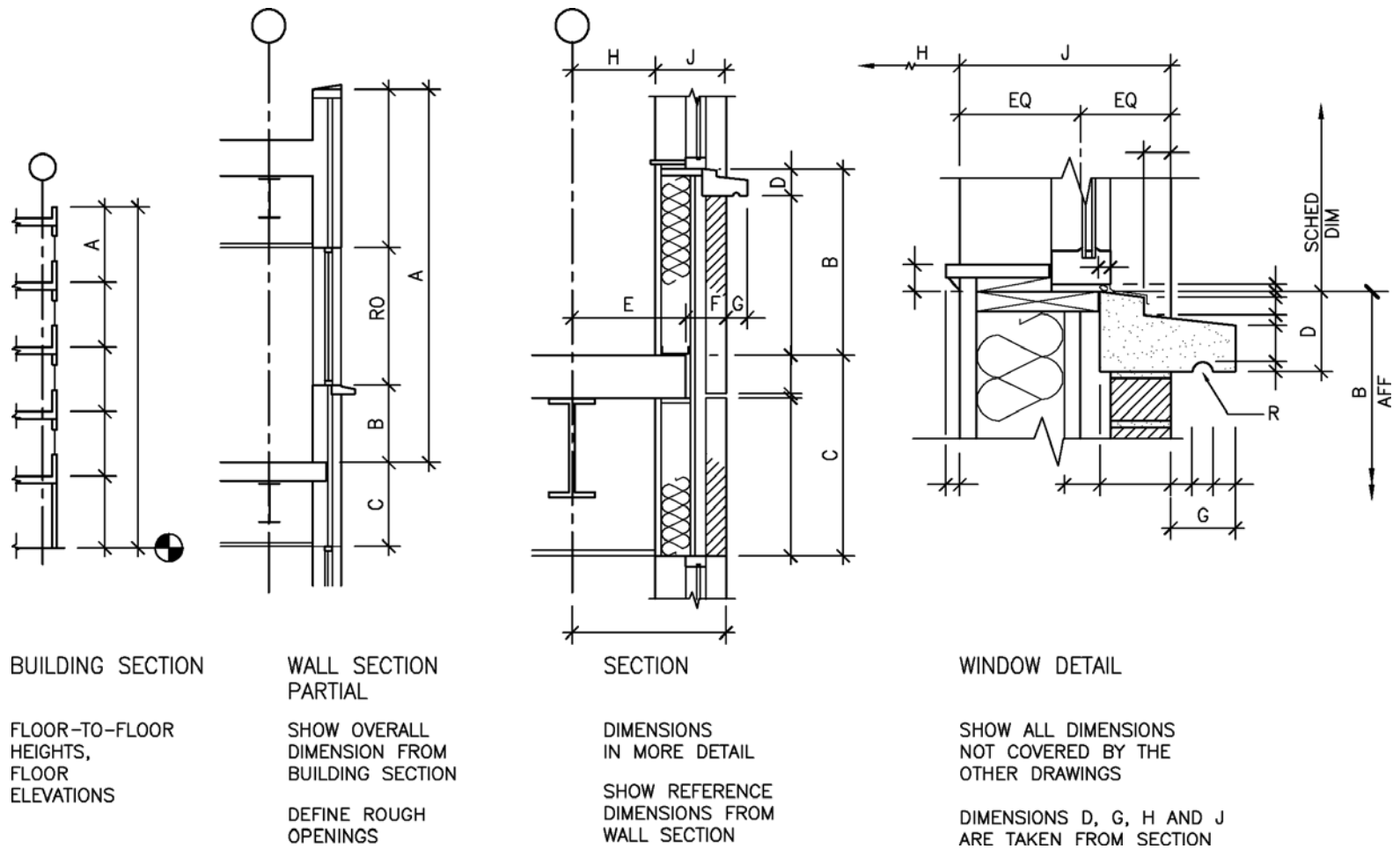


Figure 04.37 Hierarchy of dimensions.

Sheet Type 4 – Large-Scale Views

Large-scale views are drawings reproduced at a larger scale to provide more detailed information that cannot be accommodated at the smaller-scaled drawing.

Enlarged Floor Plans

Place a dashed line around areas or rooms to be enlarged to provide more extensive detailing and dimensions. Stairwells, toilet rooms, elevator shafts, kitchens, laboratories, and mechanical and electrical rooms are examples of plans referenced to the enlarged plan. Do not duplicate information on smaller-scale plans, with the exception of room names and numbers, partition types, and column grids used for location references. Indicate overall dimensions of the area to be enlarged to establish the dimension string to be used in the enlarged plan.

Enlarged plans for elevator shafts should include a pit access ladder and the size and location of a sump pit, if one is used.

Auditoriums, kitchens, and laboratories are examples of rooms that usually require large-scale views and, in some cases, interior elevations.

Enlarged plans are required for auditoriums with fixed seats to show the size and number of seats, aisle width, and floor elevations if the floors are stepped or sloped as well as other features such as projection and presentation equipment.

Enlarged kitchen or laboratory plans should indicate wall or overhead cabinets with a dashed line. Add elevation symbols and identify each cabinet with a reference shown on the elevation rather than the plan. Where cabinets change direction or abut walls, include filler panels to facilitate installation.

Toilet Rooms

Identify toilet accessories and key to a diagram or schedule. Show dimensions to determine the width and length of toilet compartments and the dimensions of the surrounding walls.

Dimension the centerline of each plumbing fixture and tie all dimensions to a fixed point. Refer to *Figure 04.38*.

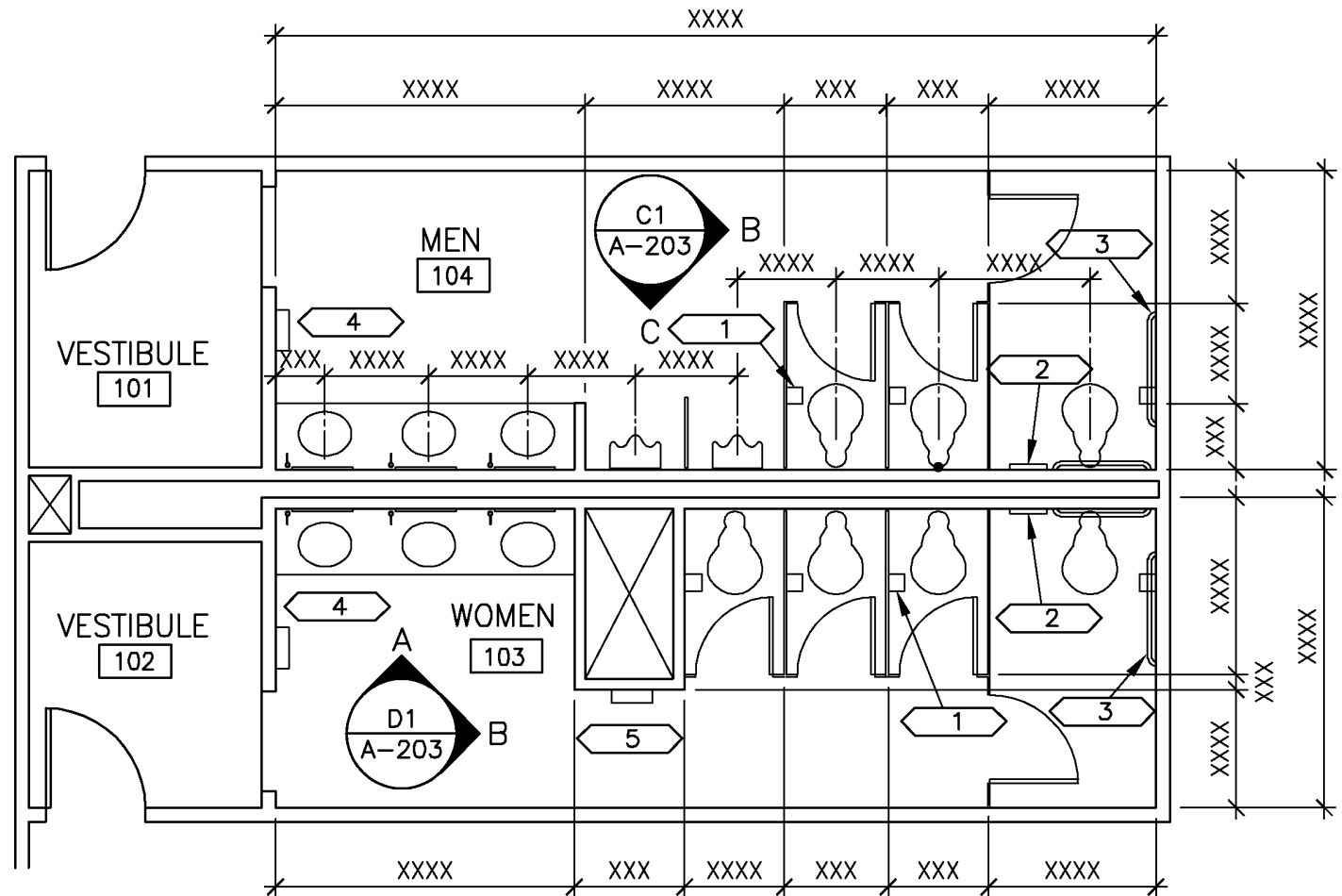


Figure 04.38 Example of a toilet plan showing dimensioning, accessory identification, and reference to elevation.

Group stair plans for all levels and place them next to the stairwell section. Show overall dimensions, number of treads, width, and length of flights. Refer to *Figure 04.39*. Show location of supports in consultation with the structural engineer.

Stair Sections

Stair sections should be tied to a reference grid such as a column number. Floor-to-floor heights, number of risers, and reference to enlarged details are also required. If possible, draw these sections adjacent to the plans associated with them. The first-level plan should be placed at the bottom of the sheet with subsequent levels arranged vertically above in an orderly succession. Clearly identify handrails, guardrails, and metal safety nosings.

Stair sections should show the number of risers, headroom dimension, and details for handrails and guardrails. Refer to *Figure 04.40*. Caution should be paid to avoid overdrafting. Refer to *Figure 04.41*.

The following list of items should be included in stair section drawings:

- Concrete stairs are detailed by Structural. Unless applied finishes are provided (i.e., terrazzo, granite, and special handrails), eliminate drawing these sections. Reference tread nosings, handrails, and other architectural features from floor plans or building sections.
- If fire hose or fire valve cabinets occur in stairs, show these in section and dimension heights and location.
- Tie dimensions to the number of risers and observe minimum clearances.
- Draw handrails and guardrails in detail.
- Draw a detail at slab edge and indicate whether the space below the first landing is enclosed by a furring partition.
- Indicate a ladder and roof hatch to access the roof. If roof access is through a stair penthouse, show a curb to raise the doorsill above the adjacent roof to facilitate flashing.

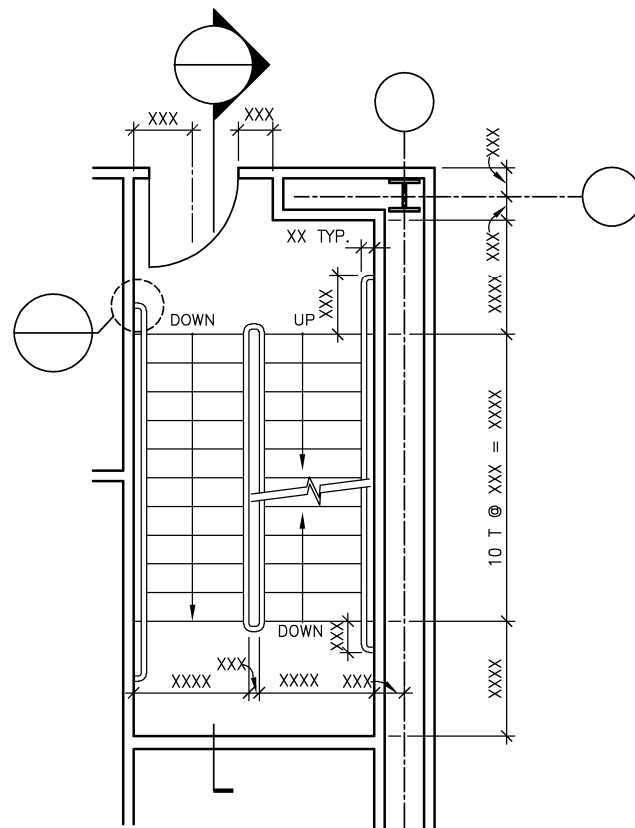
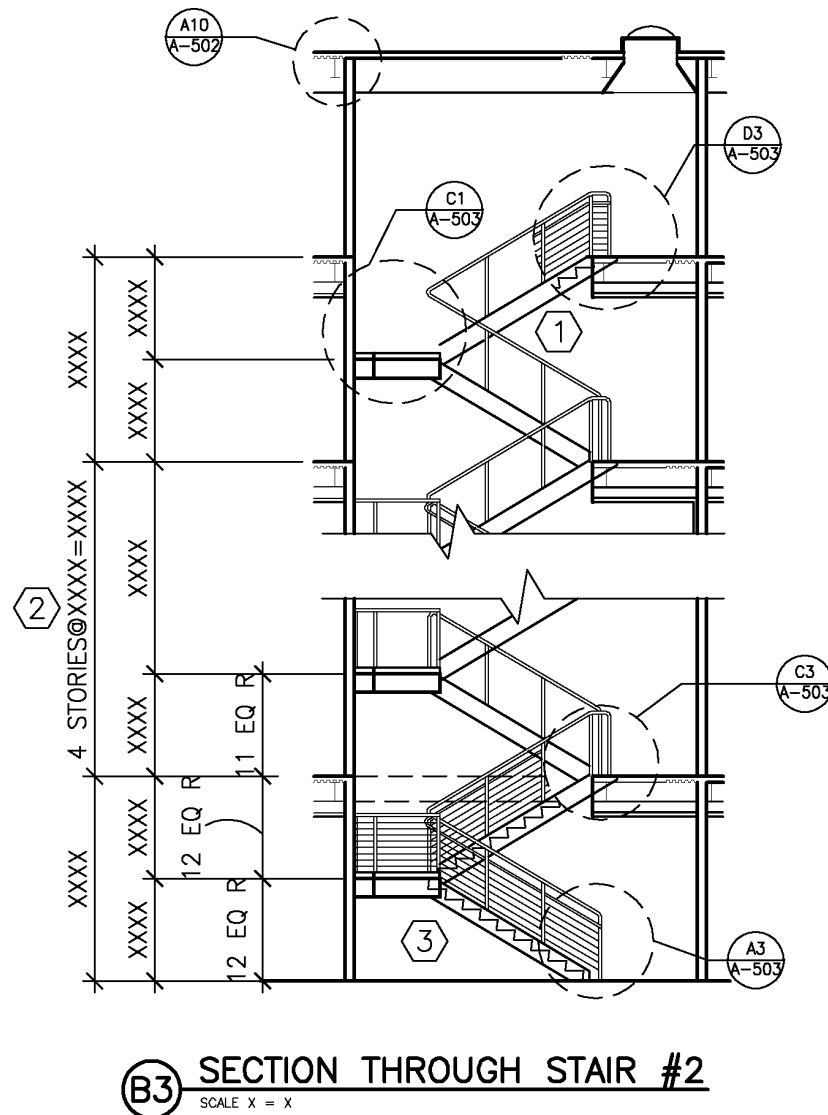
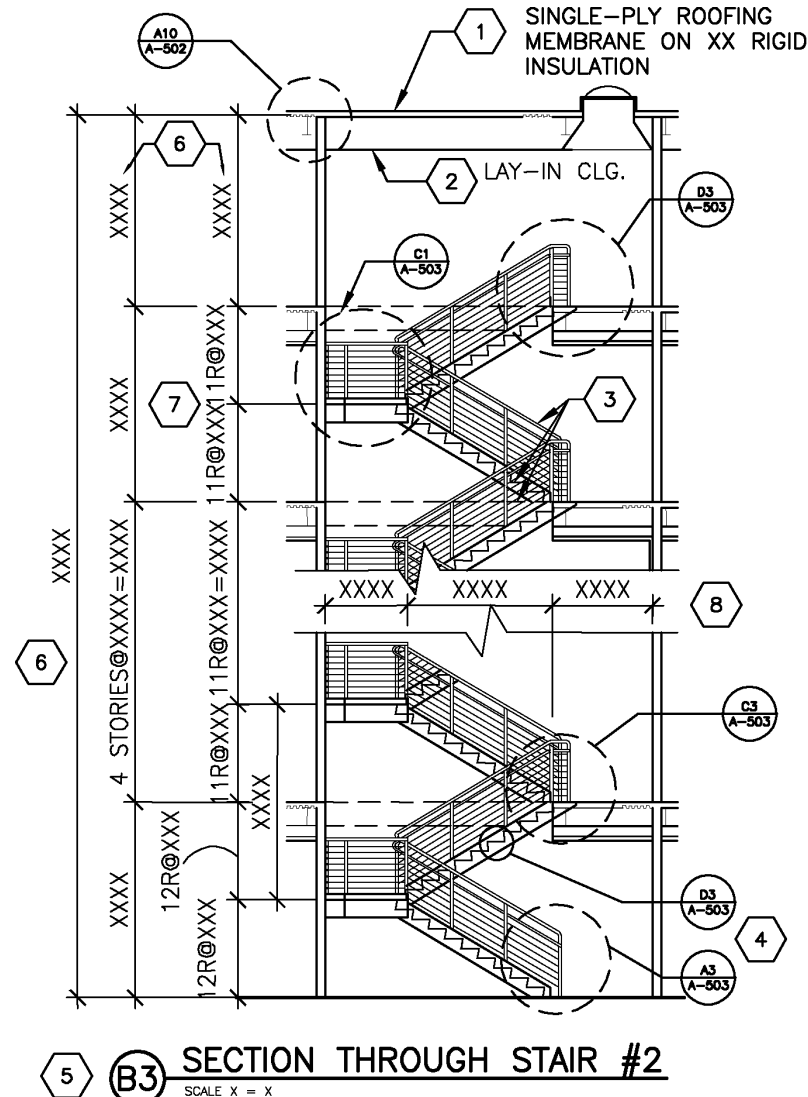


Figure 04.39 Stair plan.



- ① SHOW THE LEAST NUMBER OF STEPS (MANUAL DRAFTING).
- ② DO NOT SHOW REPETITIOUS IDENTICAL FLOORS ON MULTISTORY PROJECTS, EVEN IF THERE IS SPACE TO INCLUDE THEM.
- ③ SHOW INTERMEDIATE RAILINGS AT THE TOP AND BOTTOM OF STAIR AND ANY ATYPICAL CONDITIONS ONLY (MANUAL DRAFTING).

Figure 04.40 Stair section.



- 1 INFORMATION OF INTEREST TO THE ROOFING SUBCONTRACTOR ONLY. ROOF PLAN AND DETAILS SUCH AS DETAIL A10/A502 ALSO PROVIDE THIS INFORMATION.
- 2 ROOM FINISH SCHEDULE AND REFLECTED CEILING PLAN DUPLICATE THIS INFORMATION.
- 3 REPETITIOUS AND TIME-CONSUMING DRAFTING THAT DOES NOT CONTRIBUTE ANY INFORMATION BEYOND THAT WHICH IS PROVIDED BY THE OVERALL DIMENSION.
- 4 THIS DETAIL SHOULD BE REFERENCED ON DETAIL C3/A-503.
- 5 REFERENCE SECTION TITLE TO FLOOR PLAN.
- 6 DIMENSION BELONGS ON BUILDING SECTION. STAIR FABRICATOR DOES NOT REFERENCE THIS INFORMATION.
- 7 REPETITIOUS INFORMATION AND DIFFICULT TO READ. USE THE ABBREVIATION "TYP" FOR REPETITIOUS DIMENSIONS.
- 8 THIS DIMENSION STRING IS DUPLICATED ON THE PLANS.

Figure 04.41 Example of overdrafting.

The architect, in collaboration with the structural engineer, must indicate how the stair is supported. If hanger rods are used, their locations must be indicated in plan as well as on the section. If the enclosure is constructed of concrete masonry units, the locations of points of support must be coordinated with the locations of concrete-filled reinforced masonry cells.

Elevator Shaft Sections

Elevator manufacturers provide information for elevators. If elevator cabs are custom-designed, a set of interior elevations should be included in the elevator detail sheet. The elevator shaft section should show door height, pit ladder, dry sump (if required), and shaft vent. The section should refer to details for door head and sill (typical floor and slab on grade); slab edge at the wall tying the location of the edge to the grid; pit, ladder, and vent detail.

The following list of items should be included in elevator shaft section drawings:

- Show the elevator pit, ladder, and sills. Refer the latter two to enlarged details.
- Show the top of the shaft vent and pump room vent for hydraulic elevators.
- Indicate how the guide rails are supported where the floor-to-floor height exceeds the maximum allowable distance between rail supports. This will be based on information from the structural engineer.
- Detail door head and sill as well as slab edge for typical floor and sill at the pit.
- For traction elevators, show the machine room penthouse, indicate how the shaft is vented, and position the walls with enough clearances around the machine as required by the manufacturer(s).
- Where the elevator cab is customized, show interior elevations, finish materials, and dimensions.

Sheet Type 6 - Schedules and Diagrams

Schedules take a tabular form while diagrams are graphic representations. Both provide a large amount of information in a limited space. Schedules may be placed either in the specifications or on the drawings. The following is a description of each:

Schedules

Schedules provide a consistent format for representing a related group of items. They are keyed to the drawings and, in addition to the headings, are divided into at least three main columns.

The format, types, and composition of schedules are addressed in detail in the *Schedules Module*.

Diagrams

Diagrams are graphic representations that are usually not drawn to scale but can be noted with dimensions. They may represent a plan of a partition as shown in *Figure 04.44*, or an elevation such as a casework, louver, window, or door type. Refer to *Figure 04.45*. They may be schematic in nature such as mechanical, plumbing, and electrical riser diagrams. Refer to *Figure 04.46*.

Door and Frame Types

Door types (refer to *Figure 04.45*), like diagrams, may not be drawn to scale because a door elevation may represent doors that look the same but have different dimensions. Types may also represent doors constructed from different materials. The same type may represent a wood or hollow metal door. The door schedule differentiates among these doors by describing the door type, the material, and the dimensions of each. Refer to the *Schedules Module*.

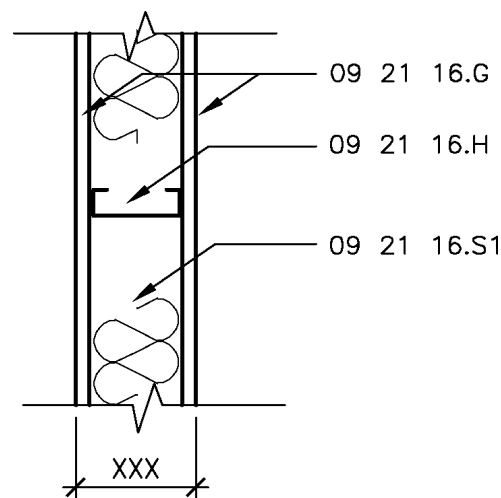
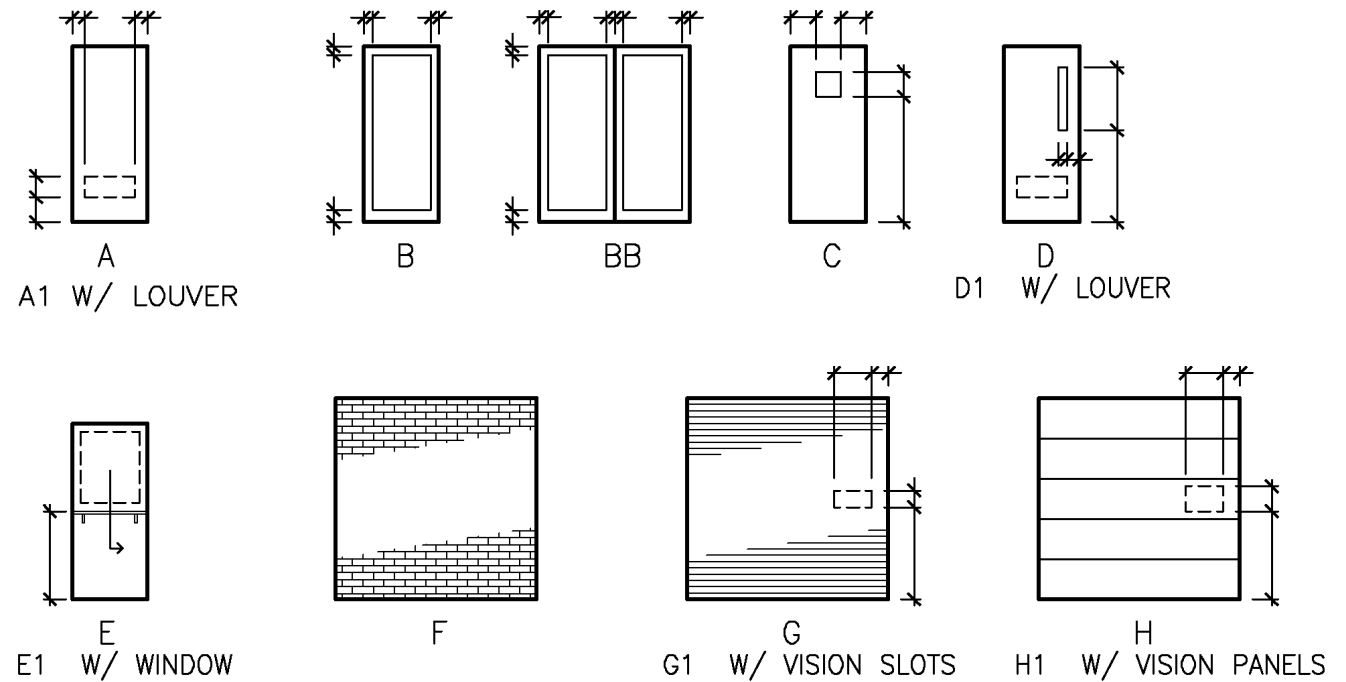


Figure 04.44 Partition type.



GUIDELINES:

1. ADD TYPES AS REQUIRED TO THIS GENERIC DIAGRAM.
2. DESIGNATE GLASS TYPES.
3. DIMENSION STYLES ONLY.

Figure 04.45 Door types.

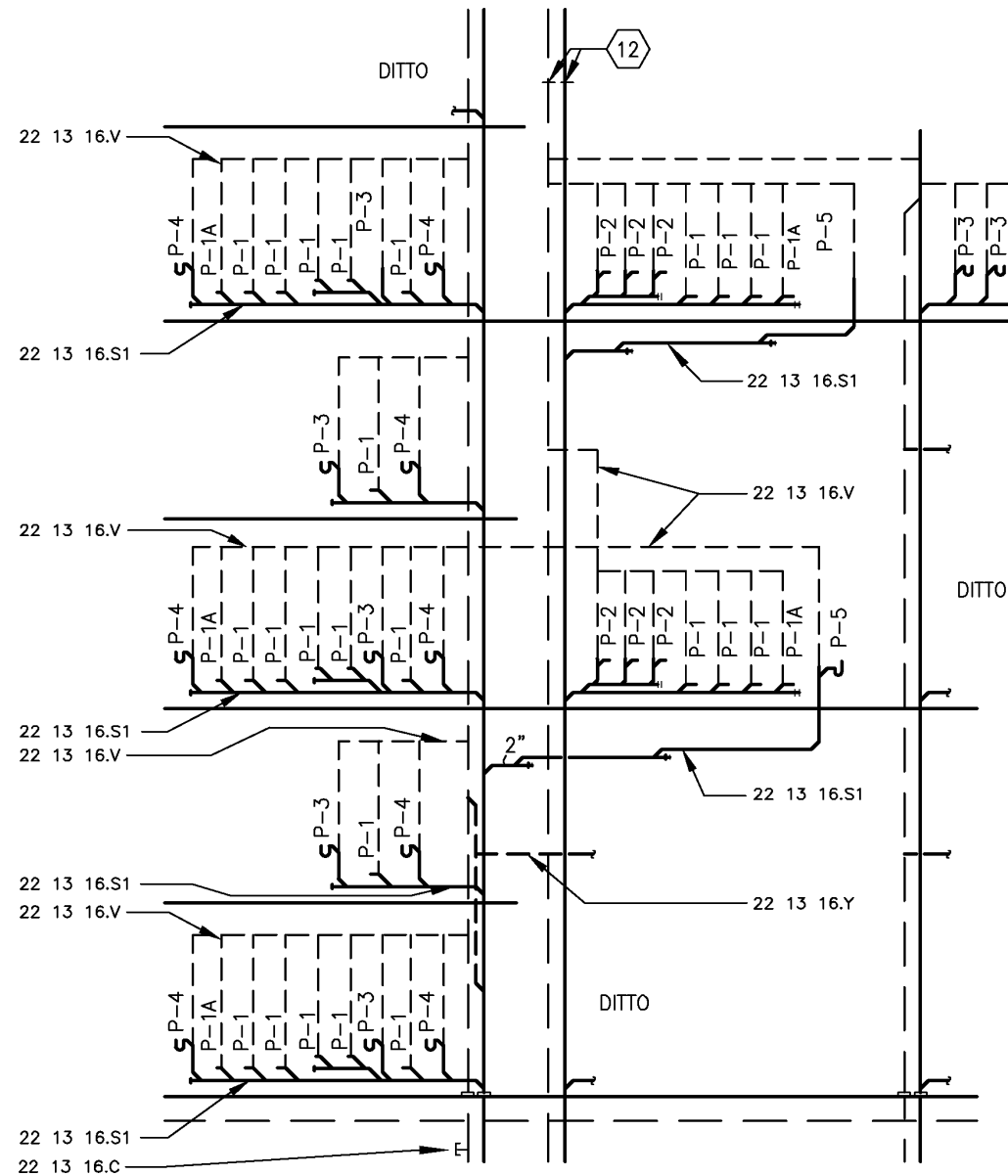


Figure 04.46 Riser diagram.

In a similar manner, door frame types represent the frame shape. Refer to *Figure 04.47*. If all the frames are similar, the frame type column in the schedule may not be needed. A frame surrounding

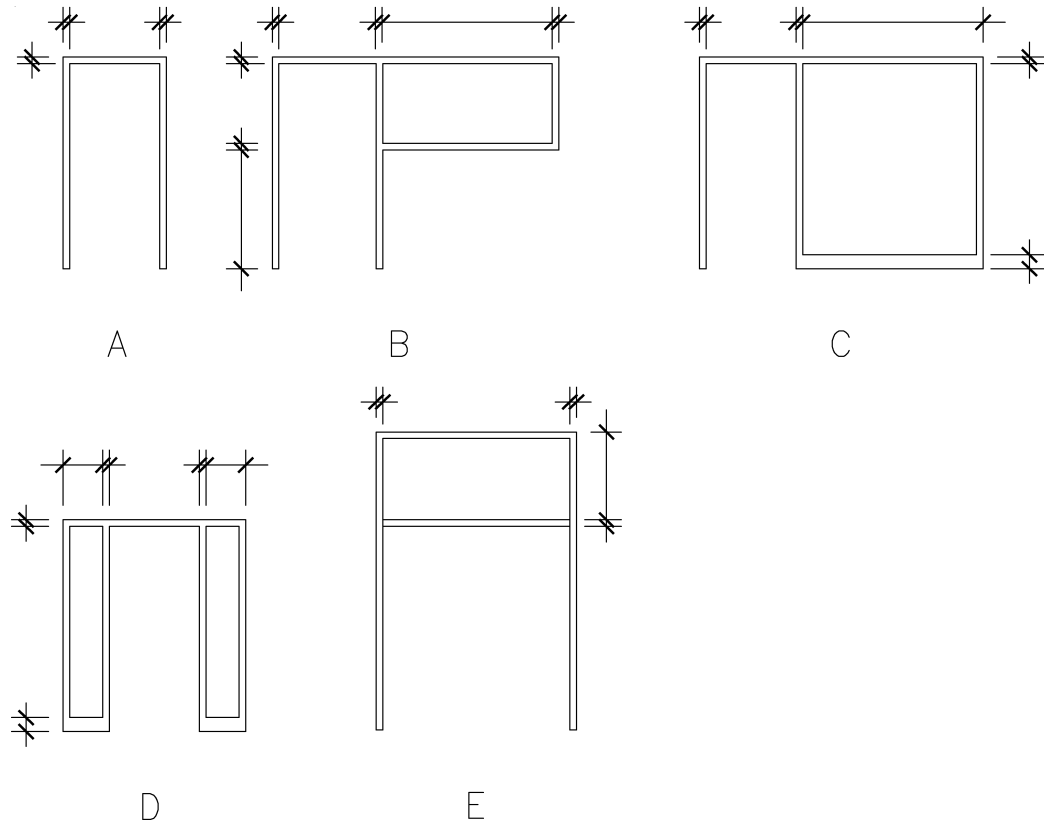


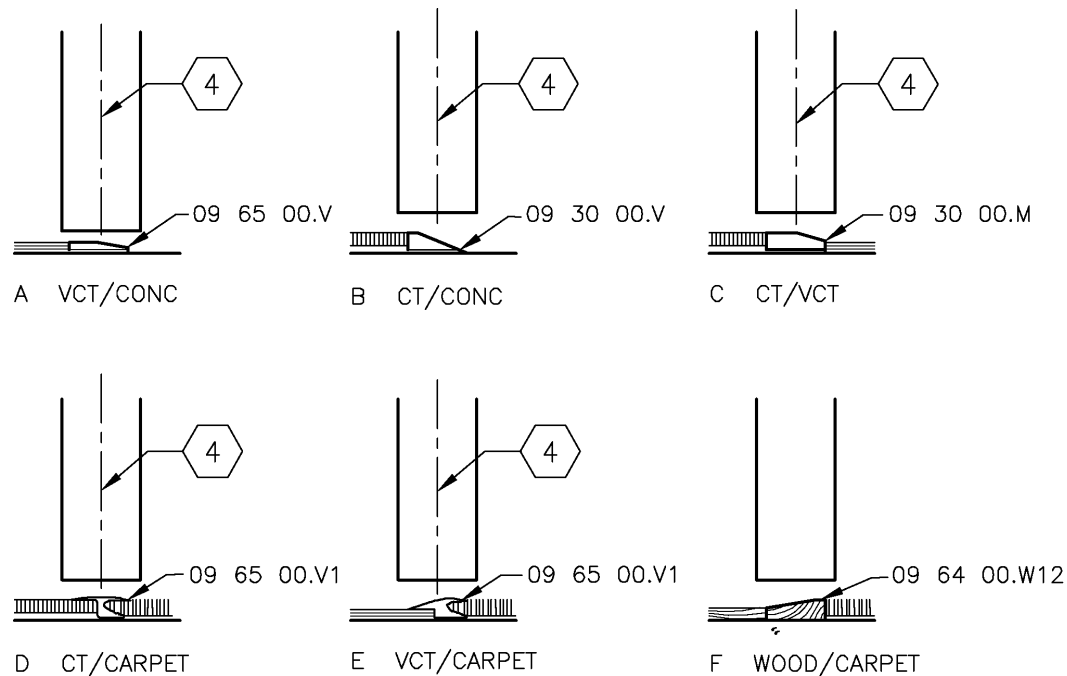
Figure 04.47 Door frame types with sidelights and transoms.

a single or double door should be the same type because it has the same shape and the door schedule will list the different widths. Other frame types include frames with a sidelight, frames with a sidelight on both sides, smoke barrier door frames, frames containing a door with a transom. Door types may be drawn on a sheet that also includes door frame details, details for

exterior thresholds, and interior demarcation between floor materials under the doors (refer to *Figure 04.48*) as well as the door schedule.

Alternatively, the schedule may be included in the specifications. Borrowed lights may also be included on this sheet.

Window Types



GUIDELINES:

1. ADD DETAILS AS REQUIRED TO THIS GENERIC GROUP OF DETAILS. WRITE "NOT USED" ON DETAILS NOT OCCURRING IN THE PROJECT AT HAND.
2. IN THE DOOR SCHEDULE UNDER THE "THRESHOLD" COLUMN, WRITE THE APPLICABLE DETAIL NUMBER. FOR EXAMPLE, "A2C/A____" WHERE "A2" IS THE GENERIC DETAIL FOR ALL THRESHOLDS AND "C" IS CT/VCT.

Figure 04.48 Threshold details.

The actual window frame size dimension should be shown and a general note determining the joint width should be added to the sheet.

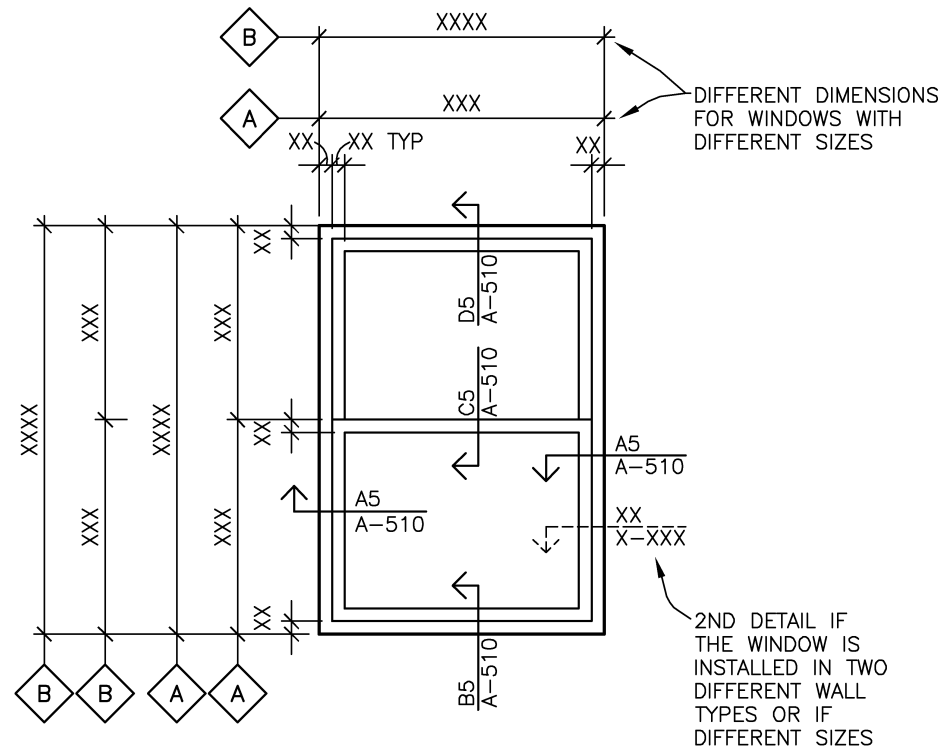


Figure 04.49 Double-hung window type with dimensions representing two window sizes.

It is important to group the windows according to the type of system selected for each opening if the specifications contain descriptions for more than one system. For instance, some projects contain a curtain wall system, a storefront system, and a punched window system. Refer to *Figure 04.50*. Following is a brief description of each type.

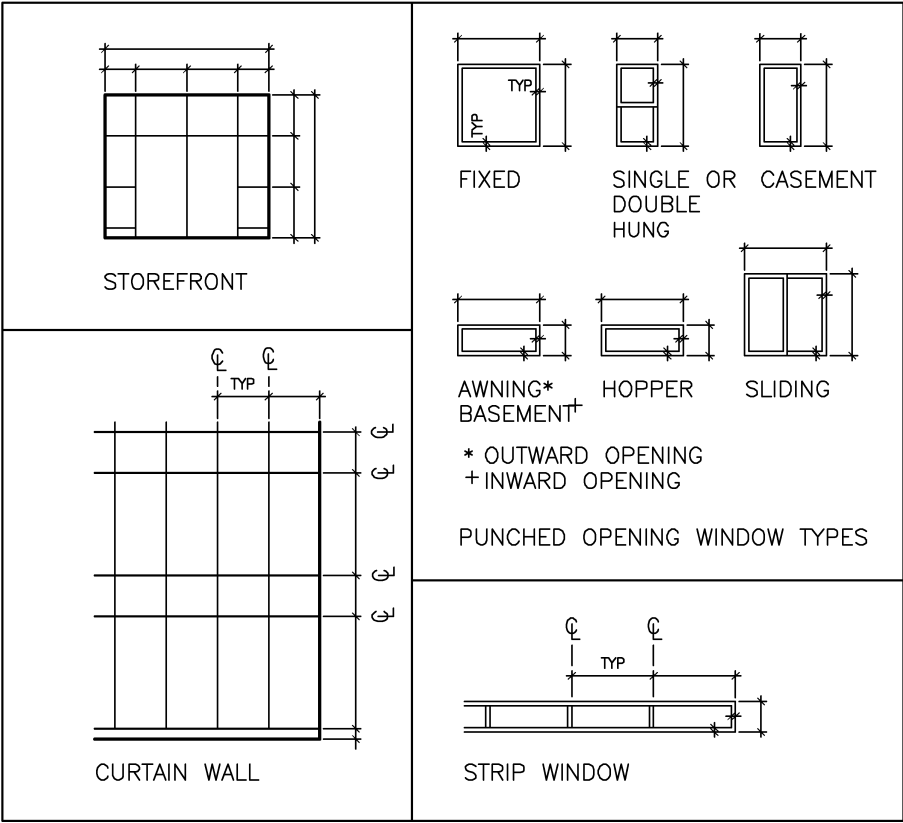


Figure 04.50 Window types.

Window frame details should be keyed to details placed in the same sheet as the types and schedule (if used). If the same window type is installed in more than one type of exterior wall

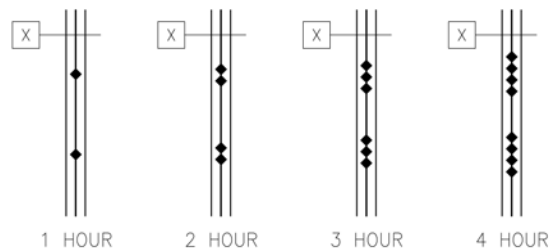


Figure 04.51 Representation of fire-rated partitions on the floor plan.

(e.g., brick veneer and metal-clad walls), place keys for each type to show the different details at each location.

Partitions

Partitions may be represented on the floor plans by a wall-type identifier (refer to the *Symbols Module*) containing a sequential alphanumeric designation. Refer to *Figure 04.52*. Do not add types to indicate finishes. A legend similar to *Figure 04.51* should be included on all floor plans.

Sheet Types 7 & 8 - User Defined

These series of sheets allow the user to accommodate sheet types that do not fall under any of the types described in this article.

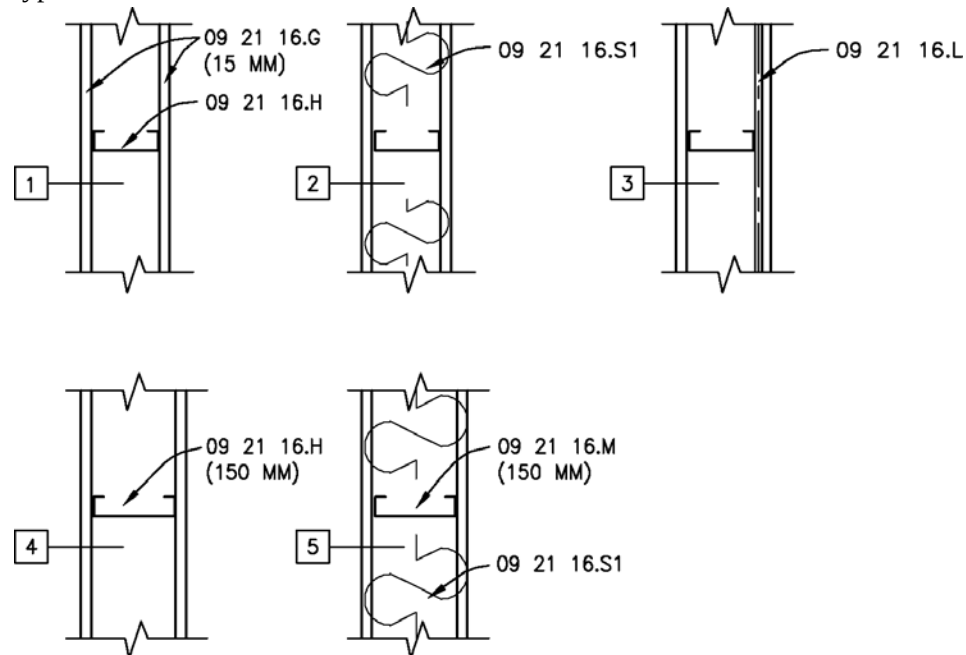


Figure 04.52 Examples of modifications to a general purpose partition.

Sheet Type 9 - 3D Representations

3D views consist of axonometric drawings, oblique drawings, perspectives, and photographs. They are used to assist the viewer in comprehending complex 3D relationships of shapes.

Axonometric Drawings

Axonometric is a general term used to describe one of three methods of 3D projection: isometric, dimetric, and trimetric. All three methods represent two vertical and one horizontal plane parallel to corresponding established axes at true dimensions. The difference among the three methods is the angles and scales used to execute the drawing. The most commonly used are isometric and dimetric representations. Isometric drawings are drawn with all three axes at 120 degrees relative to each other. Refer to *Figure 04.53*.

Dimetric drawings project the three planes at different angles and scales to simulate a true perspective. One of the most commonly used diagrams for producing a dimetric drawing is illustrated in *Figure 04.54*.

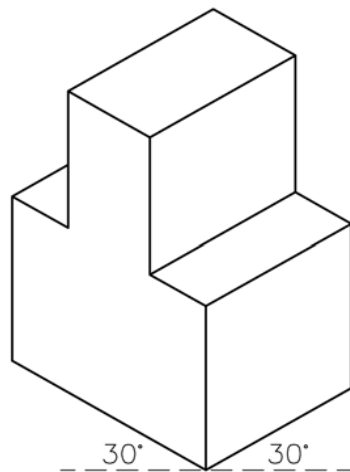


Figure 04.53 Axonometric isometric drawing.

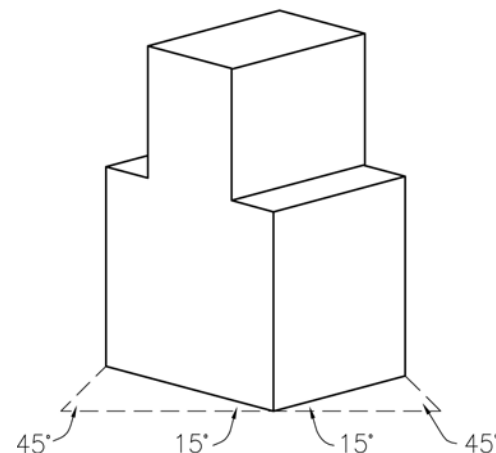


Figure 04.54 Axonometric dimetric drawing.

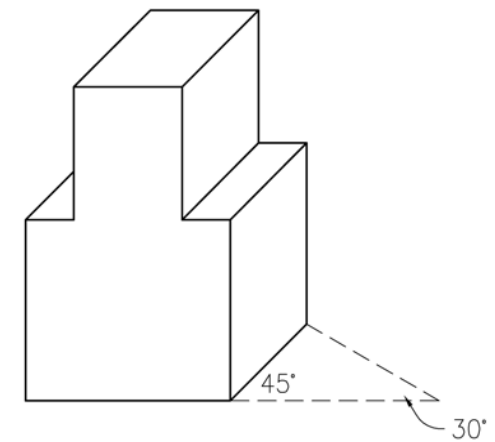


Figure 04.55 Oblique drawing.

Oblique Drawings

Oblique drawings are similar to diametric drawings except that one plane is parallel to the drawing plane. Refer to *Figure 04.55*.

Perspectives

Perspectives, unlike axonometric or oblique drawings, are represented by parallel lines that meet at a vanishing point located at the horizon. This gives the structure a true image similar to a photograph.

Photographs

Generally, photographs are used as a means of delineating new work to be performed on existing conditions. In historic remodeling, it is quite acceptable to use a regular camera to photograph ornate trim work and note on the picture what repair work must be done to restore the original trim. Refer to *Figure 04.56*.

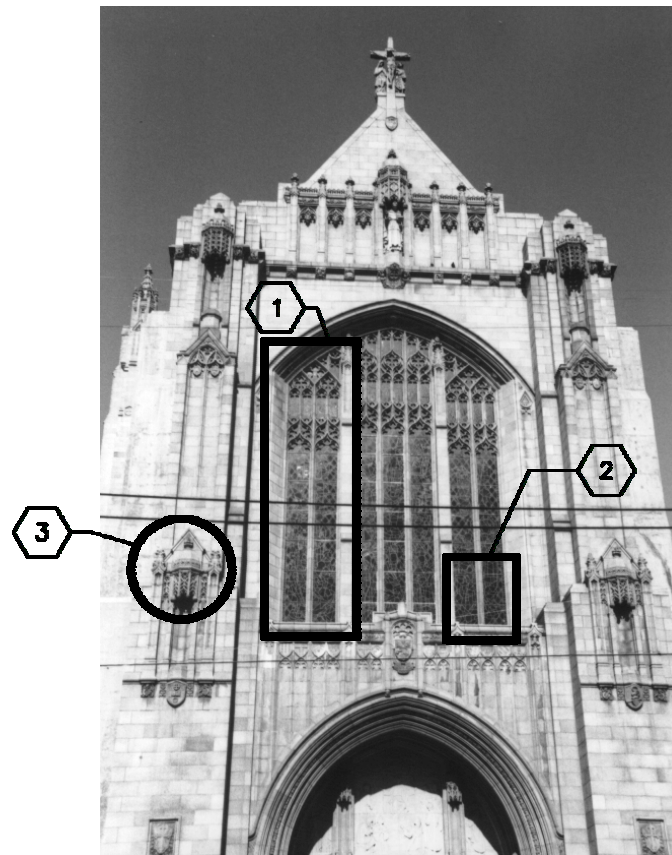
Photography may also be used to generate drawings of an existing building using special calibrated camera equipment that superimposes a grid of points on the image. The resulting image is compensated for film and perspective distortion by digitizing the points using special computer software.

Photographs are often used in presentations to show an existing site with a proposed building superimposed within the picture. Digitizing the photograph and entering it into a computer program as a background or environment and then overlaying a digitally modeled building in matching perspective is the method used to achieve this representation.

A symbol should be indicated on plans and elevations denoting where and at what angle the photographs were taken. Refer to the *Symbols Module* for symbols types.

NOTES:

- ① REPAIR LANCET MULLIONS
PER DETAIL C6/A-502.
- ② REPAIR MULLIONS AS
DIRECTED BY ARCHITECT Ⓢ
TIME OF INSPECTION AFTER
GLAZING REMOVAL.
- ③ REPAIR CRACKS AS
INDICATED IN SPECIFICATION
SECTION 04900.



SOUTH ELEVATION
NO SCALE

Figure 04.56 Using a photograph as a construction drawing sheet.

Mock-Up Drawing Set

Mock-Up Set, Cartoon Set, Story Book Set, and Mini-Set are names referring to drawings (or sketches) usually reproduced at 1/4-size representing all the project sheets required for a phase of the construction drawings. The mock-up is either manually sketched or CAD generated.

The mock-up set assists in the planning of the entire drawing set by assigning graphic and textual information to specific sheets in the construction document set. It uses standards provided by *Drawing Set Organization*, *Sheet Organization*, and other UDS modules.

It is preferable that this reduced set of drawings be started at the onset of the design development phase or before. The step-by-step procedures for producing a mock-up follow.

Mock-Up Set Procedures

Step 1: Compile a sheet list based on the Sheet Type Designators described in the *Drawing Set Organization Module*. Identify each sheet using the designators described under Sheet Identification in that module. Format the sheets as prescribed in the *Sheet Organization Module*.

Step 2: Create in CAD a blank project sheet at 1/4-size and make a number of copies on which to draw the mock-up.

Step 3: Reduce the drawings from the preceding phase of the project and paste on the sheets either by using CAD or manually. Augment with added drawings from the sheet list.

Step 4: Circle items that require detailing. Eliminate repetition by identifying typical details. Enlarge these circled areas to the appropriate scale (refer to Scale on page UDS-04.11) and place in the subdivided sheets. Add bubbles containing the number of each detail to the sheets from which the details were enlarged.

Step 5: Identify rooms that require interior elevations using the symbols shown in Symbols. Sketch each elevation on the appointed sheet(s).

Step 6: If the schedules are to be included in the drawings rather than in the specifications, estimate the size of schedules by counting the number of items to be included in them.

Step 7: Sketch diagrams representing partition, door, window, etc. Refer to Sheet Types. The sketching should show only the space requirement at this early stage in the project.

Step 8: Allocate space for 3D representations if required for the project. Also assign one sheet for miscellaneous details.

The mock-up must convey as much relevant information to the project team as necessary to show organization, numbering, and outline content. If CAD is used, enlarge or reduce the drawing from the preceding phase to generate details. After the drawing is generated, paste on the detail sheet. Refer to the *Drawing Set Organization Module* for sheet groupings, format, subdivisions, and numbering. Also, identify standard details to be retrieved from the firm's standard details library, reduce to 1/4-size, and paste on their respective sheets. Refer to *Figures 04.57* and *04.58*.

Mock-Up Guidelines

The following items should be considered in preparing a mock-up drawing set:

- Establish minimum standard sheet size from largest unbroken plan footprint, elevation, or section. Use standard sheet sizes as provided in the *Sheet Organization Module*.
- Choose a scale factor for the mock-up set as directed by the *Sheet Organization Module*.
- Develop a comprehensive list of scaled and non-scaled views to be added to drawing sheets. The mock-up worksheet is provided on page UDS-04.90 to assist in this tabulation.
- Determine the extent of the participation of each of the various disciplines. Use discipline designators as shown in the *Drawing Set Organization Module* level one or level two designators as required.
- Assign scaled and nonscaled views to appropriate sheets based on the *Sheet Organization Module* and the *Drawing Set Organization Module*.
- Review drawing categories to check for completeness.

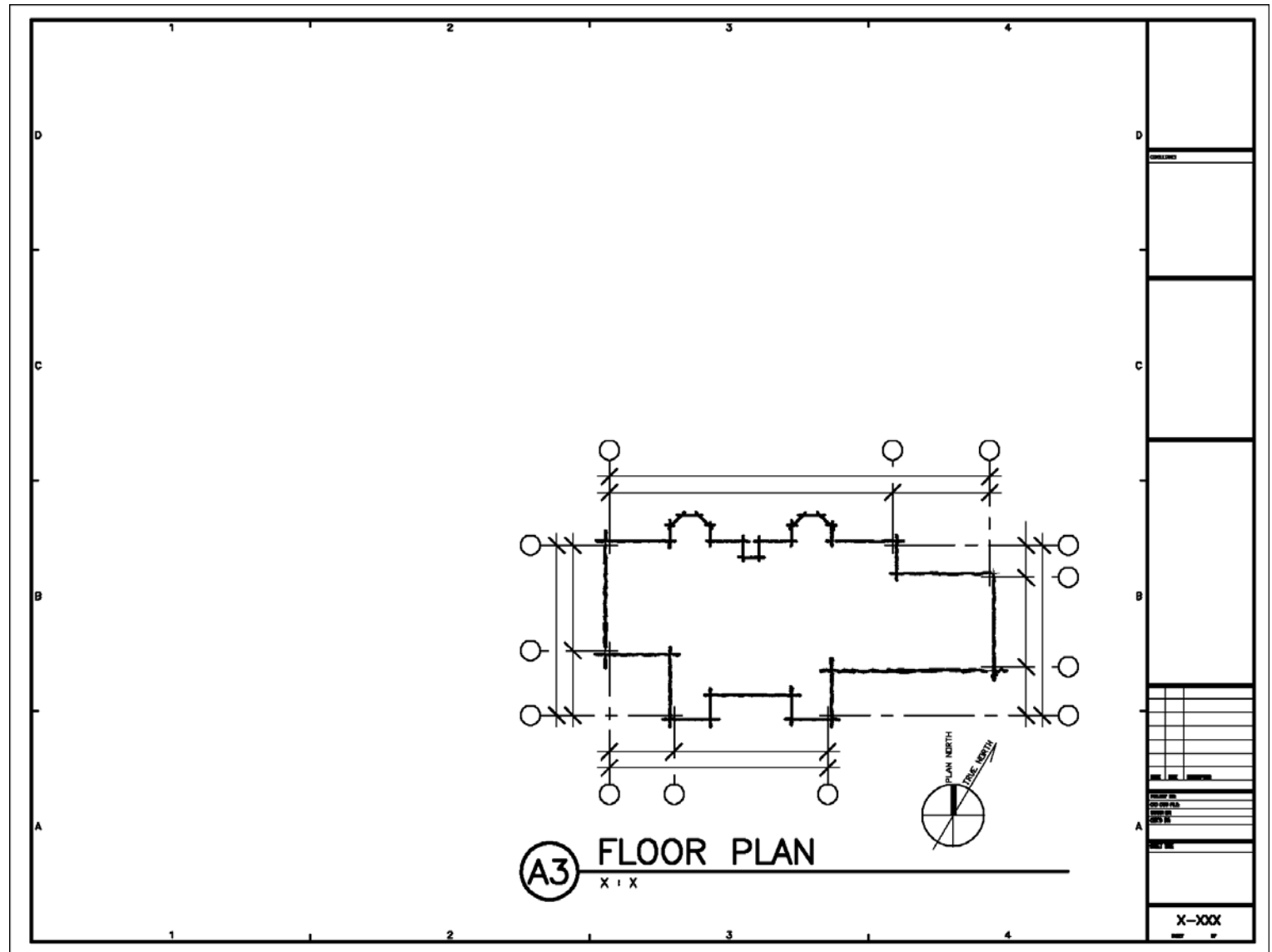
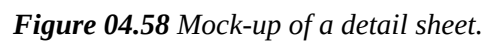


Figure 04.57 Mock-up of a plan sheet.



Mock-Up Worksheet

A mock-up worksheet is a tool intended to help the drawing organizer estimate the total number of drawings and the total amount of production time required to develop a comprehensive drawing set. Additional space on the back or another sheet may be needed to list the total number of small-scale details and/or schedules the project requires. Refer to the Mock-Up Worksheet on page UDS-04.90.

MOCK-UP WORKSHEET							
SHEET NUMBER	SHEET NAME	NUMBER OF VIEWS	LIST OF VIEWS (Include All Disciplines)	SCALED SIZE	NUMBER OF HOURS PER SHEET	ASSIGNED TO:	COST PER SHEET
						TOTAL COST	

Terms and Abbreviations

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
99 Canal Center Plaza
Alexandria, VA 22314-1588**

(800) 689-2900

www.csinet.org

www.nationalcadstandard.org

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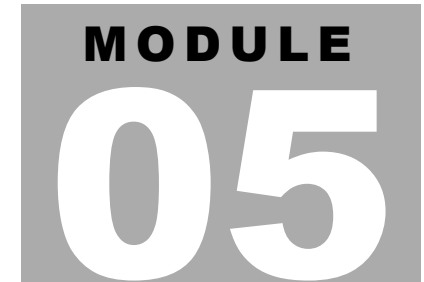
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Introduction

The *Terms and Abbreviations Module* establishes guidelines for consistent terminology used in the construction industry. Consistent terms ensure clear and concise communication among the architect, owner, contractor, and consultants. The purpose of this Module is to provide a standard for construction document terms and abbreviations.

The *Terms and Abbreviations Module* provides the following

- A consistent standard of communication in construction documents
- A searchable list of common terms and abbreviations used in the construction industry
- Consistent spelling of terms and abbreviations
- Notes on common use and non-preferred terminology

Uses

The Module provides a standard for the use of terms and abbreviations. A standard gives the professional office an efficient way to quickly determine the proper term and its abbreviation. It also helps intern architects and designers become familiar with the industry standards.

Objectives

The objective of the Module is to provide a standardized resource for construction terms and their abbreviations. It is not the objective of the Module to encourage the use of abbreviations. *The Project Resource Manual – CSI Manual of Practice* states that, whenever possible, terms should be spelled out and abbreviations should be used only to reduce time and space or where appropriate to improve clarity. The increased use of computer-aided drafting (CAD) has reduced the time required for writing text and notes on drawings, and the need for abbreviations. The use of obscure or undefined abbreviations results in a flawed project. When the meaning of an abbreviation is in doubt, spell it out!

Methodology

The terms included in this Module were selected using the following criteria:

- The term has six or more letters. Terms with five letters or fewer should not be abbreviated. However, certain commonly used terms (such as “build” and “center”) have been included.
- Trade association acronyms, such as UL, ASTM, and NFPA, have been included if the organization publishes standards likely to be referenced on drawings.
- Common English language terms have not been included. Some examples are “afternoon” (PM) and “Central Standard Time” (CST).
- Abbreviations representing professional licenses, certifications, or memberships associated with a person’s name are not included. It is assumed that the professional, whose name is on the documents, will define and control the proper format of his name. American Institute of Architects (AIA), Professional Engineer (PE), and Certified Construction Specifier (CCS) are examples.
- Terms in conflict with industry-accepted terminology do not have abbreviations. The proper term is shown in the “Notes” column and its abbreviation is in the Module.
- Symbols that contain letters are not abbreviations

Guidelines

- Do not abbreviate words of five letters or fewer, except in schedules. A schedule column heading may need an abbreviation to reduce the size of the column and the overall size of the schedule.
- Avoid the use of abbreviations with more than one meaning. Generally the shared abbreviations in the Module are from different disciplines. Therefore, the context or the location within the drawing set should make the intended term obvious. However, if it does not, spell out the term.
- Show the source or a list of abbreviations on the General sheets. Two ways to accomplish this are:
 - Reference the UDS *Terms and Abbreviations* Module.
 - Include a selected list derived from the Module CD-ROM or copied from the hardcopy. The organization and location of the General sheets are included in the UDS *Drawing Set Organization* Module.
- If any doubt or confusion exists about the meaning of the abbreviation, do not use the abbreviation. Clarity is paramount and must not be sacrificed.

Organization of Terms and Abbreviations

Terms and abbreviations are presented in two easily accessible formats. The first format is in alphabetical order by term and the second in order by abbreviation. Terms, and their abbreviations, are listed with any other term that shares the same abbreviation. Terms that should be avoided are also included with a listing of the preferred term in the “Notes” column. These terms do not have an abbreviation because they should not be used.

Terms

Term	Abbreviation	Shared Abbreviation	Notes
A			
abandon	ABAN		
abbreviation	ABBRV		
abnormal	ABNL		
above finished counter	AFC	automatic frequency control	
above finished floor	AFF		
above finished grade	AFG		
above finished slab	AFS		
above suspended ceiling	ASC	amps short circuit; asphalt surface course	
abrasive	ABRSV		
abrasive hardness	Ha		
abrasive resistant	ABRSV RES		
absolute	ABS	acrylonitrile butadiene styrene	
absorption	ABSORB		
access door	ACS DR		
access floor	ACS FLR		
access panel	ACS PNL		
accessible	ACC		
acid/alkaline scale	pH		
acid resistant	ACID RES		
acid resistant cast iron	ACID RES CI		
acid resistant pipe	ACID RES P		
acid resistant vent	ACID RES V		
acid resistant waste	ACID RES W		
acid vent	AV	air vent; audio visual	
acid waste	AW	actual weight; architectural woodwork	
acid waste line	AWL		

Term	Abbreviation	Shared Abbreviation	Notes
acoustic	ACST		
acoustic calking	----		acoustic sealant
acoustical ceiling tile	ACT		
acoustical insulation	ACOUS INSUL		
acoustical panel	ACOUS PNL		
acoustical panel ceiling	APC		
acoustical plaster	----		acoustical finish
acoustical tile ceiling	ATC		
acoustical wall treatment	AWT		
across	ACR		
acrylonitrile butadiene styrene	ABS	absolute	
actual weight	AW	acid waste; architectural woodwork	
addendum	ADDM		
additional	ADDL		
adhesive	ADH		
adjacent	ADJ	adjoining; adjustable	
adjoining	ADJ	adjacent; adjustable	
adjustable	ADJ	adjacent; adjoining	
administration	ADMIN		
aggregate	AGGR		
aggregate base course	ABC	Associated Builders and Contractors	
air condition	A/C		
air conditioning unit	A/C UNIT		
air cooled condensing unit	ACCU		
air handling unit	AHU		
air pressure drop	APD		
air pressure return line	APR		
air separator	AS	ammeter switch	
air supply unit	ASU		
air vent	AV	acid vent; audio visual	
air water pump	AWP		
alarm	ALM		

Term	Abbreviation	Shared Abbreviation	Notes
alarm annunciator panel	AAP		
alignment	ALNMT		
allowance	ALLOW		
alteration	ALTRN		
alternate	ALT	altitude	
alternate number	ALT NO		
alternating current	AC	armored cable; asbestos cement; asphaltic concrete	
alternative	---		alternate
altitude	ALT	alternate	
aluminum	ALUM		
aluminum cable steel reinforced	ACSR		
ambient	AMB		
American Architectural Manufacturers Association	AAMA		
American Association of Cost Engineers	AACE		
American Concrete Institute	ACI		
American Gas Association	AGA		
American Institute of Architects	AIA		
American Institute of Steel Construction	AISC		
American National Standards Institute	ANSI		
American Plywood Association	APA		
American Society for Testing and Materials	ASTM		
American Society of Civil Engineers	ASCE		
American Society of Heating, Refrigerating, and Air Conditioning Engineers	ASHRAE		

Term	Abbreviation	Shared Abbreviation	Notes
American Society of Mechanical Engineers	ASME		
American Standard Elevator Codes	ASEC		
American steel wire gauge	ASWG		
American Water Works Association	AWWA		
American Welding Society	AWS		
American wire gauge	AWG		
American Wood Preservers' Association	AWPA		
Americans with Disabilities Act	ADA		
ammeter switch	AS	air separator	
amount	AMT		
ampere	AMP		
ampere hour	AH		
ampere interrupting capacity	AIC		
amplifier	AMPL		
amplitude modulation	AM		
amps short circuit	ASC	above suspended ceiling; asphalt surface course	
anchor	AHR		
anchor bolt	AB		
and so forth	ETC	et cetera	
angle	L	liter	
angle beam	ANG BM		
angle stop valve	ASV		
annunciator	ANN		
anodize	ANOD		
antenna	ANT		
apartment	APT	Association for Preservation Technology	
appearance	APP	atactic propylene	
appendix	APPX		

Term	Abbreviation	Shared Abbreviation	Notes
apply	----		install
approved	APPD		
approximate	APPROX		
Architect	ARCH		
architect/engineer	A/E		
Architect's Supplemental Instruction	ASI		
architectural finish	ARF		
architectural woodwork	AW	acid waste; actual weight	
Architectural Woodworking Institute	AWI		
area drain	AD		
armored cable	AC	alternating current; asbestos cement; asphaltic concrete	
article	ART		
as-built	----		record drawings
as required	AR		
asbestos	ASB		
asbestos cement	AC	alternating current; armored cable; asphaltic concrete	
asphalt	ASPH		
Asphalt Institute	AI		
asphalt roofing	----		built-up roofing
asphalt surface course	ASC	above suspended ceiling; amps short circuit	
asphaltic concrete	AC	alternating current; armored cable; asbestos cement	
asphaltic concrete paving	ACP	automatic control panel	
assembled cooling unit	ACU		
assembly	ASSY		
Associated Builders and Contractors	ABC	aggregate base course	

Term	Abbreviation	Shared Abbreviation	Notes
Associated General Contractors of America	AGC		
Association for Preservation Technology	APT	apartment	
asymmetrical	ASYM		
atactic propylene	APP	appearance	
atmosphere	ATM	automatic teller machine	
attachment	ATCH		
attention	ATTN		
audio frequency	AF		
audio visual	AV	acid vent; air vent	
authority having jurisdiction	AHJ		
auto transformer	AUTO XFMR		
automatic	AUTO		
automatic air damper	AAD		
automatic air vent	AAV		
automatic check valve	ACHKV		
automatic control panel	ACP	asphaltic concrete paving	
automatic control system	ACS		
automatic control valve	ACV		
automatic door closer	ADC		
automatic door seal	ADS		
automatic frequency control	AFC	above finished counter	
automatic sprinkler	ASKLR		
automatic sprinkler drain	ASD		
automatic sprinkler riser	ASR		
automatic teller machine	ATM	atmosphere	
automatic transfer switch	ATS		
auxiliary	AUX		
auxiliary power unit	APU		
avenue	AVE		
average	AVG		

Term	Abbreviation	Shared Abbreviation	Notes
awning window	AWN WDW		
axial flow	AX FL		
azimuth	AZ		
B			
back of curb	BC	between centers; bolt circle; bookcase; bottom chord; brick color; building code	
back to back	B/B		
backboard	BKBD		
backdraft damper	BDD		
backflow preventer	BFP		
background	BKGD		
backing	BKG		
backing rope	----		joint backer
baffle	BAF		
baggage	BAG		
balance	BAL		
balcony	BALC		
balestrades	----		railing
ball valve	BV		
ballast	BLST		
balled and burlapped	B&B	bell and bell; grade B or better (lumber)	
bar joists	----		steel joists
base board radiator	BBR		
base line	BL	building line	
base plate	B PL		
baseboard	BB	bulletin board	
basement	BSMT		
basic insulation level	BIL		
bathtub	BT		
batt insulation	----		blanket insulation
batten	BAT	battery	

Term	Abbreviation	Shared Abbreviation	Notes
battery	BAT	batten	
bay window double hung	BAY WDW DH		
beam	BM	benchmark; bending moment	
beam, standard	S BM		
beam, wide flange	WF BM		
bearing	BRG		
bearing plate	BRG PL		
bed joint	BJT		
bedding	BDNG		
bedroom	BR		
bell and bell	B&B	balled and burlapped; grade B or better (lumber)	
bell and flange	B&F		
bell and spigot	B&S		
bell mouth	BL MTH		
below	BLW		
below ceiling	BLW CLG		
below finish floor	BFF		
benchmark	BM	beam; bending moment	
bending moment	BM	beam; benchmark	
better	BTR		
between	BTWN		
between centers	BC	back of curb; bolt circle; bookcase; bottom chord; brick color; building code	
bevel	BEV		
bifolding doors	BI FLD DR		
Birmingham wire gauge	BWG		
bituminous	BITUM		
black steel pipe	BSP		
blackboard	----		chalkboard
blanket	BLKT		
block	----		concrete masonry unit
blowdown	BLWDN		

Term	Abbreviation	Shared Abbreviation	Notes
blower	BLO		
blowoff	BO		
board	BD	butterfly damper	
board feet (foot)	BD FT		
board measure	B/M		
boiler	BLR		
boiler feed booster pump	BFBP		
boiler feedwater	BFW		
boiler feedwater pump	BFWP		
boiler horsepower	BLR HP		
bolt circle	BC	back of curb; between centers; bookcase; bottom chord; brick color; building code	
bonding	BNDG		
bookcase	BC	back of curb; between centers; bolt circle; bottom chord; brick color; building code	
booster	BSTR		
borrowed light	BLT	built	
both faces	BF		
both sides	BS		
both ways	BW		
bottom	BOT		
bottom chord	BC	back of curb; between centers; bolt circle; bookcase; brick color; building code	
bottom face	BOT F		
bottom of steel	BOS		
boulevard	BLVD		
boundary	BDRY		
bracing	BRCG		
bracket	BRKT		
brake horsepower	BHP		
breaker	BRKR		

Term	Abbreviation	Shared Abbreviation	Notes
brick color	BC	back of curb; between centers; bolt circle; bookcase; bottom chord; building code	
Brick Institute of America	BIA		
bridging	BRDG		
bridging joist	BRDG JST		
bright annealed	BA		
British thermal unit	Btu		
British thermal unit (1000)	MBtu		
British thermal unit per hour	BtuH		
bronze	BRZ		
broom closet	B CL		
buck-boast transformer	BB XFMR		
build	BLD		
Builder's Hardware Manufacturer's Association	BHMA		
building	BLDG		
building automation system	BAS		
building code	BC	back of curb; between centers; bolt circle; bookcase; bottom chord; brick color	
building line	BL		
Building Officials and Code Administrators Association International	BOCA		
building paper	BP		
built	BLT	borrowed light	
built-in	BLT IN		
built-up	BU	bushel	
built-up roofing	BUR		
bulb tee beam	BLB T BM		
bulkhead	BLKHD		
bulletin board	BB	baseboard	
bulletproof (bullet-resistant)	BPRF		

Term	Abbreviation	Shared Abbreviation	Notes
bullnose	BN		
burlap	BRLP		
bushel	BU	built-up	
butt weld	BT WLD		
butterfly check valve	BCV		
butterfly damper	BD	board	
butterfly valve	BFV		
by pass	BYP		
C			
cabinet	CAB		
cabinet unit heater	CUH		
cable television	CTV		
calculate	CALC		
calked joint	CLKJ		
calking	----		sealant
calorie	CAL		
camber	CAM		
candela	cd	construction documents; contract documents	
candlepower	CP	concrete pipe; control panel	
canopy	CAN		
cantilever	CANTIL		
canvas	CANV		
capacitor	CAP	capacity	
capacity	CAP	capacitor	
carbon dioxide	CO ²		
carbon monoxide	CO	cased opening; Certificate of Occupancy; cleanout; company; cutout	
carpet	CPT	control power transformer	
carpet and pad	C&P		
carriage bolt	CB	catch basin; cement base; ceramic base; corner bead	

Term	Abbreviation	Shared Abbreviation	Notes
cased opening	CO	carbon monoxide; Certificate of Occupancy; cleanout; company; cutout	
casement	CSMT		
casement window	CW	chemical waste line; clockwise; cold water piping; cool white	
casework	CSWK		
casing	CSG		
casing bead	----		metal trim
cast concrete	C CONC		
cast-in-place	CIP	cast iron pipe	
cast iron	CI	curb inlet	
cast iron pipe	CIP	cast in place	
cast iron soil pipe	CISP		
cast steel	CSTL		
cast stone	CS	commercial standard; control switch	
catalog	CAT		
catch basin	CB	carriage bolt; cement base; ceramic base; corner bead	
catwalk	CATW		
cavity	CAV		
ceiling	CLG		
ceiling attenuation class	CAC		
ceiling diffuser	CLG DIFF		
ceiling duct outlet	CLG DCT OUT		
ceiling grille	CLG GRL		
ceiling height	CLG HT		
ceiling panel	----		acoustical panel
ceiling register	CLG REG		
ceiling tile	----		acoustical tile
Celsius	C	channel	
cement	CEM	cemetery	

Term	Abbreviation	Shared Abbreviation	Notes
cement base	CB	carriage bolt; catch basin; ceramic base; corner bead	
cement finish	CEM FIN		
cement floor	CF	contractor furnished	
cement plaster	CEM PLAS		
cement plaster ceiling	CEM PLAS CLG		
cementitious (backer) board	CBB		
cemetery	CEM	cement	
center	CTR	contour; cooling tower return	
center line	CL	class; close	
center matched	CM	construction management	
center of gravity	CG	common ground; corner guard	
center to center	C TO C		
centigrade	----		Celsius
centimeter	cm		
centimeter per second	cm/s		
ceramic	CER		
ceramic base	CB	carriage bolt; catch basin; cement base; corner bead	
ceramic glazed structural facing units	CGSFU		
ceramic tile	CT	count; current transformer	
ceramic tile base	CTB		
ceramic tile floor	CTF		
Ceramic Tile Institute of America	CTI		
Certificate of Occupancy	CO	carbon monoxide; cased opening; cleanout; company; cutout	
certify	CERT		
Chain Link Fence Manufacturers Institute	CLFMI		
chalkboard	CH BD		
chamber	CHMBR		
chamfer	CHFR		

Term	Abbreviation	Shared Abbreviation	Notes
change order request	COR		
channel	C	Celsius	
charge	CHG		
check	CHK		
check valve	CHKV		
chemical	CHEM		
chemical waste line	CW	casement window; clockwise; cold water piping; cool white	
chilled drinking water	CDW		
chilled drinking water return	CDWR		
chilled drinking water supply	CDWS		
chilled water	CHW	circulating hot water	
chilled water primary pump	CHWPP		
chilled water pump	CHWP		
chilled water recirculating pump	CHWRP		
chilled water return	CHWR		
chilled water secondary pump	CHWSP		
chilled water supply	CHWS		
chiller	CH	coat hook	
chlorinated polyvinyl chloride	CPVC		
chlorofluorocarbons	CFC		
chrome plated	CHR PL		
circle	CIR		
circuit	CKT		
circuit breaker	CKT BRKR		
circular	CIRC		
circulating hot water	CHW	chilled water	
circulating water pump	CWP	condenser water pump	
circumference	CRCMF		
cladding	CLDG		
class	CL	center line; close	
Class A door	A LABEL		

Term	Abbreviation	Shared Abbreviation	Notes
Class B door	B LABEL		
Class C door	C LABEL		
Class D door	D LABEL		
Class E door	E LABEL		
classification	CLASS		
classroom	CLRM		
cleanout	CO	carbon monoxide; cased opening; Certificate of Occupancy; company; cutout	
cleanout to grade	COTG		
clear	CLR	color; cooler	
clear wired glass	CLWG		
cleat	CLT		
clockwise	CW	casement window; chemical waste line; cold water piping; cool white	
close	CL	centerline; class	
closed circuit television	CCTV		
closet	CLO		
closet rod	CR	control relay; control room	
closure	CLOS		
clothes dryer	CL D		
coat hook	CH	chiller	
coated	CTD		
coating	CTG		
coaxial cable	COAX		
coefficient	COEFF		
coefficient of performance (heating)	COP	coping	
coefficient of utilization	CU	cubic; copper	
cold-formed metal framing	CFMF		
cold rolled steel	CRS		

Term	Abbreviation	Shared Abbreviation	Notes
cold water piping	CW	casement window; chemical waste line; clockwise; cool white	
color	CLR	clear; cooler	
color rendering index	CRI		
column	COL		
column line	CLL	contract limit line	
combination, combined	COMB		
commercial standard	CS	cast stone; control switch	
common	COM		
common ground	CG	center of gravity; corner guard	
common mode rejection	CMR		
communication	COMM		
community antenna television	CATV		
company	CO	carbon monoxide; cased opening; Certificate of Occupancy; cleanout; cutout	
compartment	COMPT		
complete	COMPL		
component	COMP		
composite	CMPST		
compressible	CPRS		
compressor	COMPR		
computer	CMPTR		
computer floor	----		access flooring
concealed	CNCL		
concentric	CONC	concrete	
concrete	CONC	concentric	
concrete block	----		concrete masonry unit
concrete floor	CONC FLR		
concrete masonry unit	CMU		
concrete opening	CONC OPNG		
concrete pavement	PCCP		
concrete pipe	CP	candlepower; control panel	

Term	Abbreviation	Shared Abbreviation	Notes
Concrete Reinforcing Steel Institute	CRSI		
concrete sewer pipe	CSP		
concrete splash block	CSB	casing bead	
condensate	CNDS		
condensate return pump	CRP		
condensation	CONDN		
condenser	COND	condition	
condenser water pump	CWP	circulating water pump	
condenser water return	CWR		
condenser water supply	CWS		
condition	COND	condenser	
conduit	CND		
conference	CONF		
connect	CONN		
construction	CONSTR		
construction documents	CD	candela; contract documents	
construction joint	CJ	control joint	
construction management	CM	center matched	
Construction Specifications Institute	CSI		
consultant	CONSULT		
contactor	CNTOR		
continue	CONT	controller	
contour	CTR	center; cooling tower return	
contract	CONTR	contractor	
contract change directive	CCD		
contract documents	CD	candela; construction documents	
contract limit line	CLL	column line	
contractor	CONTR	contract	
contractor furnished	CF	cement floor	
contractor furnished equipment	CFE		

Term	Abbreviation	Shared Abbreviation	Notes
contractor furnished/contractor installed	CF/CI		<i>also, provide</i>
contractor furnished/owner installed	CF/OI		
control	CTRL		
control contactor	CCR		
control joint	CJ	construction joint	
control panel	CP	candlepower; concrete pipe	
control power transformer	CPT	carpet	
control relay	CR	closet rod; control room	
control room	CR	closet rod; control relay	
control switch	CS	cast stone; commercial standard	
control valve	CV		
controller	CONT	continue	
convert	CONV		
conveyor	CNVR		
cook top	CK TP		
cool white	CW	casement window; chemical waste line; clockwise; cold water piping	
cool white deluxe	CWX		
cooler	CLR	color; clear	
cooling coil	C/C		
cooling tower return	CTR	contour; center	
cooling tower supply	CTS		
coordinate	COORD		
coping	COP	coefficient of performance (heating)	
copper	CU	coefficient of utilization; cubic	
cork tackboard	----		tackboard
corkboard	----		tackboard
corner	CNR		

Term	Abbreviation	Shared Abbreviation	Notes
corner bead	CB	carriage bolt; catch basin; cement base; ceramic base	
corner guard	CG	center of gravity; common ground	
cornice	CORN		
correct	CORR	corridor	
correspond	CORRES		
corridor	CORR	correct	
corrugated deck	----		steel roof deck
corrugated metal pipe	CMP		
count	CT	ceramic tile; current transformer	
counter	CNTR		
counter sunk	CSK		
counterclockwise	CCW		
counterflashing	CFLG		
coupling	CPLG		
courtyard	CRT YD		
cover	COV	cut off valve	
cover plate	COV PL		
critical path method	CPM		
cross brace	X BRACE		
cross section	X SECT		
crossbracing	XBRA		
crown	CRN		
crushed stone	----		porous fill
cubic	CU	coefficient of utilization; copper	
cubic centimeter	cm ³		
cubic feet	CU FT		
cubic feet per minute	CFM		
cubic feet per second	CFS		
cubic inch	CU IN		
cubic meter	m ³		
cubic meter per second	m ³ /s		

Term	Abbreviation	Shared Abbreviation	Notes
cubic millimeter	mm ³		
cubic yard	CU YD		
cubicle	CUB		
curb and gutter	C&G		
curb inlet	CI	cast iron	
current	CUR		
current limiting fuse	CLF		
current transformer	CT	ceramic tile; count	
curtain	CURT		
custodian	CUST		
cut off valve	COV	cover	
cut stone	CT STN		
cutout	CO	carbon monoxide; cased opening; Certificate of Occupancy; cleanout; company	
cylinder	CYL		
cylinder lock	CYL L		
cylinder locks keyed alike	KA		
cypress	CYP		
D			
damage free	DF	diesel fuel; drinking fountain	
damper	DMPR		
dampproof course	DPC		
dampproofing	DMPF		
database	DB	dry bulb	
datum	DAT		
dead load	DL		
decibel	dB		
decigram	dg		
deciliter	dL		
decimeter	dm		
deep	D	depth; penny (nail)	
definition	DEF		

Term	Abbreviation	Shared Abbreviation	Notes
deflection	DFLCT		
defrost	DFR		
degrease	DGR		
degree	DEG		
degrees Celsius	DEG C		
degrees Fahrenheit	DEG F		
deionized water	DIW		
delete	DEL	deliver	
deliver	DEL	delete	
delta	----		Use symbol (see Symbols Module)
demolition	DEMO	demonstration	
demonstration	DEMO	demolition	
demountable partition	DPTN		
density	DENS		
department	DEPT		
depth	D	deep; penny (nail)	
describe	DESCR	description	
description	DESCR	describe	
design	DSGN		
design-build	D-B		
designation	DES		
detach	DTCH		
detail	DET		
detention	DETN		
development	DEV		
dew point	DP		
dew point temperature	DPT	differential pressure transmitter	
diagonal	DIAG	diagram	
diagram	DIAG	diagonal	
diameter	DIA		
diesel fuel	DF	damage free; drinking fountain	

Term	Abbreviation	Shared Abbreviation	Notes
difference	DIFF	differential; diffuser	
differential	DIFF	difference; diffuser	
differential pressure sensor	DPS		
differential pressure transmitter	DPT	dew point temperature	
diffuser	DIFF	difference; differential	
digital	DGTL		
dimension	DIM		
dimmer	DMR		
dimmer control panel	DCP		
dimmer switch	DMR SW		
dining room	DR	door; drain; dressing room; drive	
direct current	DC		
direct digital control	DDC		
direction	DIR		
dirt	----		earth
disable	DSBL		
disabled	DA	drainage area	
discharge	DISCH		
disconnect	DISC		
disconnect switch	DS	double strength (glass); downspout	
dishwasher	DW	distilled water; domestic water	
dispenser	DISP		
display and storage	D&S		
disposal	DSPL		
distance	DIST	district	
distilled water	DW	dishwasher; domestic water	
distribution panel	DISTR PNL		
district	DIST	distance	
divide	DIV	division	
division	DIV	divide	
document	DOC		
domelite	----		plastic skylight

Term	Abbreviation	Shared Abbreviation	Notes
domestic	DOM		
domestic hot water	DHW	double hung windows	
domestic water	DW	dishwasher; distilled water	
domestic water heater	DWH		
domestic water return	DWR	drawer	
domestic water supply	DWS		
door	DR	dining room; drain; dressing room; drive	
door closer	DR CL		
door frame	DR FR		
Door Hardware Institute	DHI		
door holder	DRH		
door louver	DRLV		
door opening	DR OPNG		
door stop	DRST		
door switch	DRSW		
double	DBL		
double acting door	DBL ACT DR		
double extra heavy	XXH		
double glaze	DBL GLZ		
double hung (door, window)	DH		
double hung windows	DHW	domestic hot water	
double joist	DJ		
double pole, double throw	DPDT		
double pole, single throw	DPST		
double strength (glass)	DS	disconnect switch; downspout	
Douglas fir	DOUG FIR		
dovetail	DVTL		
downspout	DS	disconnect switch; double strength (glass)	
dozen	DOZ		
drafting	DFTG		
drain	DR	dining room; door; dressing room; drive	
drain tile	DT		

Term	Abbreviation	Shared Abbreviation	Notes
drain, waste, and vent	DWV		
drainage area	DA	disable	
drawer	DWR	domestic water return	
drawing	DWG		
dressed four sides	D4S		
dressed one side	D1S		
dressed two sides	D2S		
dressing area	DR AREA		
dressing room	DR	dining room; door; drain; drive	
drinking fountain	DF	damage free; diesel fuel	
drinking fountain, wall mounted	DF WL MTD		
drive	DR	dining room; door; drain; dressing room	
drop inlet	DI		
dry bulb	DB	database	
dry bulb temperature	DBT		
dry chemical	D CHEM		
dry film thickness	DFT		
dry standpipe	DSP		
drywall	----		gypsum board
duct access panel	DAP		
duct covering insulation	DCI		
duct liner insulation	DLI		
duct return	DCT/RT		
duct rising, duct riser	DCT/RS		
duct supply	DCT SUP		
ductile iron pipe	DIP		
dumbwaiter	DWTR		
duplex	DX		
duplex outlet	DX OUT		
duplicate	DUPL		
dutch door	DT DR		

Term	Abbreviation	Shared Abbreviation	Notes
E			
each	EA		
each end	EE		
each face	EF	exterior finish	
each layer	EL	easement line; elevation	
each way	EW		
easement	ESMT		
easement line	EL	each layer; elevation	
east	E	modulus of elasticity	
eccentric	ECC		
eccentric reducer	ECC RDCR		
economizer	ECON		
edge grain	EG		
edge of curb	EC		
edge of pavement (paving)	EP	electrical panel (panelboard)	
edge of shoulder	ES	electrostatic	
edge of slab	EOS		
effect	EFT		
effective	EFF	efficiency	
effective horsepower	EHP	electric heating panel	
effective temperature	ET		
efficiency	EFF	effective	
elastomeric	ELAST		
electric	ELEC		
electric door opener	ELEC DR OP		
electric hand dryer	EHD		
electric heater	EH		
electric heating panel	EHP	effective horsepower	
electric panel board	EPB		
electric water cooler	EWC		
electric water heater	EWH		

Term	Abbreviation	Shared Abbreviation	Notes
electrical metallic tubing	EMT		
electrical nonmetallic tubing	ENT		
electrical outlet	EO		
electrical panel (panelboard)	EP	edge of pavement (paving)	
electrical resistance welding	ERW		
electrically operated valve	EOV		
electro-pneumatic	----		pneumatic electric
electromagnetic	EM	expanded metal	
electromagnetic interference	EMI		
electronic data processing	EDP		
electrostatic	ES	edge of shoulder	
element	ELEM	elementary	
elementary	ELEM	element	
elevation	EL	each layer; easement line	
elevator	ELEV		
elevator cab	----		elevator car
emergency	EMER		
emergency monitoring control panel	EMCP		
emergency power off	EPO		
emergency shower	EMER SHR		
enamel	ENAM		
enclosure	ENCL		
energy	ENGY		
energy efficiency ratio	EER		
energy management system	EMS		
engine	ENG		
engineer	ENGR		
Engineered Wood Association	EWA		
Engineers Joint Contract Documents Committee	EJCDC		
entering air temperature	EAT		

Term	Abbreviation	Shared Abbreviation	Notes
entering dry bulb temperature	EDBT		
entering water temperature	EWT		
entering wet bulb temperature	EWBT		
entrance	ENTR		
environment	ENVIR		
Environmental Protection Agency	EPA		
equal	EQ		
equally spaced	EQL SP		
equipment	EQUIP		
equivalent	EQUIV		
escalator	ESCAL		
escape	ESC	escutcheon	
escutcheon	ESC	escape	
especially	ESP		
establish	ESTB		
estimate	EST		
et cetera	ETC	and so forth	
ethylene propylene diene monomer	EPDM		
evacuate	EVAC		
evaporate	EVAP		
evaporative cooling unit	ECU		
example	EX		
excavate	EXC		
exchanger	EXCH		
exclude	EXCL		
execute	EXEC		
exhaust	EXH	exhibit	
exhaust air	EXH A		
exhaust air grille	EXH GR		
exhaust air register	EAR		

Term	Abbreviation	Shared Abbreviation	Notes
exhaust duct	EXH DT		
exhaust fan	EXH FN		
exhaust hood	EXH HD		
exhaust vent	EXHV		
exhibit	EXH	exhaust	
existing	EXIST		
existing grade	EXST GR		
existing roof drain	ERD		
exit light	EXT LT		
expand	EXP	expansion; exposed	
expanded metal	EM	electromagnetic	
expanded polystyrene board (insulation)	EPS		
expansion	EXP	expand; exposed	
expansion bolt	EXP BT		
expansion joint	EJ		
explosion proof	EPRF		
exposed	EXP	expand; expansion	
extension	EXTN		
exterior	EXT	external; extinguisher	
exterior finish	EF	each face	
exterior finish system	EFS		
exterior grade	EXT GR		
exterior gypsum board	EGB		
exterior gypsum sheathing board	EGSB		
exterior insulation and finish system	EIFS		
external	EXT	exterior; extinguisher	
external pipe thread	EPT		
external static pressure	ESP		
extinguisher	EXT	exterior; external	
extra large	XL		

Term	Abbreviation	Shared Abbreviation	Notes
extruded polystyrene board (insulation)	XPS		
extrusion	EXTRU		
eye guard	EGRD		
eye wash station	EWS		
F			
fabric	FAB		
fabric wallcovering	FWC		
face area	FA	final assembly; fire alarm; fresh air	
face brick	FC BRK		
face of concrete	FOC	face of curb	
face of curb	FOC	face of concrete	
face of finish	FOF	fuel oil return line	
face of masonry	FOM		
face of slab	FOS	face of stud; fuel oil supply	
face of stud	FOS	face of slab; fuel oil supply	
face of wall	FOW		
face to face	F/F		
face velocity	FV	flush valve; foot valve	
facial tissue dispenser	FTD		
facility	FACIL		
facsimile	FAX		
factor	FAC		
factory	FCTY		
factory mutual	FM		
Fahrenheit	F	female; fire line	
fan coil unit	FCU		
fan powered terminal	FPT		
far face	FF	finish face	
far side	FS	Federal Specification; fire station; full scale; full size	

Term	Abbreviation	Shared Abbreviation	Notes
fascia	FAS	fire alarm station	
fascia board	FAS BD		
fastener	FSTNR		
federal	FED		
Federal Energy Administration	FEA		
Federal Highway Administration	FHWA		
Federal Housing Administration	FHA		
Federal Specification	FS	far side; fire station; full scale; full size	
federal stock number	FSN		
federal supply classification	FSC		
federal test methods	FTM		
feedback	FDBK		
feeder	FDR	fire door	
feedout	FDO		
feedwater	FDW		
feet	FT	fire treated; foot; fully tempered (glass)	
feet per minute	FPM		
feet per second	FPS		
female	F	Fahrenheit; fire line	
feminine napkin disposal	----		sanitary napkin disposal
feminine napkin vendor	----		sanitary napkin vendor
fence	FN		
fiber insulation	----		rigid insulation
fiber reinforced gypsum	FRG		
fiber reinforced polyester	FRP	fiberglass reinforced plastic	
fiberboard	----		rigid insulation
fiberglass	FGL		
fiberglass reinforced plastic	FRP	fiber reinforced polyester	
field order	FO	finished opening; fuel oil	
figure	FIG		
file cabinet	FC	footcandle	
filler	FLR	floor	

Term	Abbreviation	Shared Abbreviation	Notes
fillet	FIL		
filter	FLTR		
filter water return	FWR		
filter water supply	FWS		
final assembly	FA	face area; fire alarm; fresh air	
finger joint	FNGR JT		
finish	FIN		
finish both sides	FIN BS		
finish face	FF	far face	
finish floor	FIN FLR		
finish floor elevation	FF EL		
finish four sides	F4S		
finish grade	FIN GR		
finish two sides	F2S		
finish wood	FIN WD		
finished one side	F1S		
finished opening	FO	field order, fuel oil	
finned tube radiation	FTR		
fire alarm	FA	face area; final assembly; fresh air	
fire alarm annunciator panel	FAAP		
fire alarm bell	FABL		
fire alarm box	FABX		
fire alarm control panel	FACP		
fire alarm station	FAS	fascia	
fire blanket	FB	flat bar	
fire brick	F BRK		
fire damper	FDMPR		
fire department connection	FDC		
fire department connection cabinet	FDCC		
fire department valve	FDV		
fire door	FDR	feeder	

Term	Abbreviation	Shared Abbreviation	Notes
fire extinguisher	FE		
fire extinguisher cabinet	FEC		
fire hose	FH	fire hydrant; flat head; flat head screws	
fire hose cabinet	FHC		
fire hose rack	FHR		
fire hydrant	FH	fire hose; flat head; flat head screws	
fire line	F	Fahrenheit; female	
fire protection	FP	fireproof; flag pole; freezing point	
fire protection water supply	FPW		
fire rated assembly	FRA		
fire rating	FR	fire resistant; frame	
fire resistant	FR	fire rating; frame	
fire retardant treated wood	FRTW		
fire sprinkler head	FSH		
fire standpipe	FSP		
fire station	FS	far side; Federal Specification; full scale; full size	
fire treated	FT	feet; foot; fully tempered (glass)	
fire wall	FW	flood wall	
fireplace	FPL		
fireproof	FP	fire protection; flagpole; freezing point	
fixture	FIXT		
flagpole	FP	fire protection; fireproof; freezing point	
flammable	FLMB		
flange	FLG	flooring	
flared	FLRD		
flashing	FLASH		
flat bar	FB	fire blanket	
flat head	FH	fire hose; fire hydrant; flat head screws	
flat head machine screw	FHMS		
flat head screws	FH	fire hose; fire hydrant; flat head	
flat head wood screw	FHWS		
flexible	FLEX		

Term	Abbreviation	Shared Abbreviation	Notes
float finish concrete	FL FIN CONC		
float glass	FLT GL		
flood wall	FW	fire wall	
floodlight	FLT		
floor	FLR	filler	
floor area ratio	FAR		
floor cleanout	FCO		
floor drain	FD		
floor finish	FLR FIN		
floor outlet	FL OUT		
floor plate	FLR PL		
floor register	FLR REG		
floor sink	FLR SK		
flooring	FLG	flange	
floorline	FL	foot-lambert	
flow line	FLL		
flow sensing switch	FSS		
flow switch	FL SW		
flowmeter	F METER		
fluid ounce	FL OZ		
fluorescent	FLUOR		
fluorescent fixture	FLUOR FIX		
fluorescent lighting	LT FLUOR		
flush mount	FLMT		
flush valve	FV	face velocity; foot valve	
flushing rim sink	FR SNK		
fluted concrete masonry unit	FLUT CMU		
fluting	FLUT		
foam backer	----		backer rod
foil backed batt insulation	FF BATT		
foil backed insulation	FF INSUL		
foil faced drywall	----		foil faced gypsum board

Term	Abbreviation	Shared Abbreviation	Notes
foil faced gypsum wallboard	----		foil faced gypsum board
folding	FLDG		
foot	FT	feet; fire treated; fully tempered (glass)	
foot board measure	FBM		
foot valve	FV	face velocity; flush valve	
foot/pound	FT/LB		
foot/pound force	FT/LBF		
footcandle	FC	file cabinet	
footing	FTG		
foot-lambert	FL	floorline	
form board	FMBD		
formica	----		plastic laminate
formwork	FWRK		
foundation	FDTN		
fountain	FOUNT		
four-conductor	4/C		
four-pole double throw	4PDT		
four-pole single throw	4PST		
four-way	4WAY		
four-wire	4W		
frame	FR	fire rating; fire resistant	
framed mirror	FR MIR		
framed mirror and shelf	FR MIR/SHF		
framing	FRMG		
freeway	FRWY		
freezer	FRZ		
freezestat	FSTAT		
freezing point	FP	fire protection; fireproof; flagpole	
freight	FRT		
frequency	FREQ		
fresh air	FA	face area; final assembly; fire alarm	
fresh air inlet (intake)	FAI		

Term	Abbreviation	Shared Abbreviation	Notes
fritted glass	FR GL		
from floor above	FFA		
from floor below	FFB		
frosted glass	FRST GL		
fuel oil	FO	field order; finished opening	
fuel oil pump	FOP		
fuel oil return	FOR		
fuel oil return line	FOF	face of finish	
fuel oil storage tank	FOTK		
fuel oil supply	FOS	face of slab; face of stud	
fuel oil vent	FOV		
full height partition	FHP		
full load amps	FLA		
full scale	FS	far side; Federal Specification; fire station; full size	
full size	FS	far side; Federal Specification; fire station; full scale	
full voltage non-reversing	FVNR		
full voltage reversing	FVR		
fully tempered (glass)	FT	feet; fire treated; foot	
furnace	FURN	furnish; furniture	
furnish	FURN	furnace; furniture	
furnished by owner	----		OF/CI or OF/OI
furniture	FURN	furnace; furnish	
furniture, fixture, and equipment	FF&E		
furring	FURG		
fuse box	----		panelboard
fused switch	FU SW		
fusible link	FUS LINK		
future	FUT		
G			
gage	GA	Gypsum Association	
gallon	GAL		

Term	Abbreviation	Shared Abbreviation	Notes
gallons per day	GPD		
gallons per hour	GPH		
Gallons Per Hour, Standard	SGPH		
gallons per minute	GPM		
gallons per second	GPS		
galvanic	GALV	galvanized	
galvanized	GALV	galvanic	
galvanized iron	GI		
galvanized iron pipe	GIP		
galvanized sheet metal	GSM		
galvanized steel	GALV STL		
garbage disposal	G DISP		
garden	GRDN		
gas bibb	GB	grab bar	
gas fired water heater	GWH		
gas line	G LN		
gas pressure regulator	GPR		
gas vent through roof	GVTR		
gasoline vent	GV	gravity vent	
gate valve	GTV		
gauge	----		gage
general	GEN	generator	
general conditions	GEN COND		
general contractor	GC		
general purpose	GEN PURP		
generator	GEN	general	
girder	G	ground; natural gas	
glass	GL	ground level	
glass block	GL BLK		
glass-fiber-reinforced concrete	GFRC		
glass-fiber-reinforced gypsum	GFRG		
glass-fiber-reinforced plaster	GFRP	glass-fiber-reinforced plastic	

Term	Abbreviation	Shared Abbreviation	Notes
glass-fiber-reinforced plastic	GFRP	glass-fiber-reinforced plaster	
glazed concrete masonry unit	GLZ CMU		
glazed structural unit	GSU		
glazed wall tile	GWT		
glazing	GLZ		
globe valve	GLV		
glue	----		adhesive
glued laminated wood	GLU LAM		
government	GOVT		
grab bar	GB	gas bibb	
grade B or better (lumber)	B&B	balled and burlapped; bell and bell	
grade beam	GR BM		
grade C and better	C&BTR		
grade cleanout	GCO		
grade line	GR LN		
gradient	GRAD		
grand master key	GMK		
grand master keyed	GMKD		
granite	GRAN		
grating	GRTG		
gravel	----		porous fill
gravity roof ventilator	GRV	groove	
gravity vent	GV	gasoline vent	
graylite	----		gray sheet glass
grease trap	GT	gross ton; grout	
grille	GRL		
grommet	GROM		
groove	GRV	gravity roof ventilator	
gross	GR		
gross ton	GT	grease trap; grout	
gross weight	GR WT		
ground	G	girder; natural gas	

Term	Abbreviation	Shared Abbreviation	Notes
ground fault circuit interrupter	GFCI		
ground fault interrupter	----		ground fault circuit interrupter
ground floor	GR FL		
ground level	GL	glass	
grounded outlet	GRD OUT		
group	GP		
grout	GT	grease trap; gross ton	
guarantee	GUAR		
guaranteed maximum price	GMP		
guard	GD		
guard rail	GDR		
gutter	GUT		
gymnasium	GYM		
gyplath	----		gypsum lath or metal lath
gypsum	GYP		
Gypsum Association	GA	gage	
gypsum board	GYP BD		
gypsum panel	----		gypsum board
gypsum plaster	GYP PLAS		
gypsum plaster ceiling	GPC		
gypsum sheathing board	GSB		
gypsum wallboard	----		gypsum board
H			
hammer	HMR		
hand-off-automatic	HOA		
hand dryer	HD	heavy duty	
hand hole	HH		
hand sink	HS	heat-strengthened (glass); high strength	
handicap	HC	heating coil; heavy commercial; hollow core; hose cabinet	
handicapped	HCP		

Term	Abbreviation	Shared Abbreviation	Notes
handrail	HNDRL		
hanger	HGR		
hardboard	HDBD		
hardener	HDNR		
hardware	HDW		
hardwood	HDWD		
hatch (roof)	H	high	
hazard	HAZ		
hazardous materials	HAZ MAT		
head joint	HD JT		
header	HDR		
headquarters	HQ		
headwall	HDWL		
heat-strengthened (glass)	HS	hand sink; high strength	
heat absorbing glass	HAGL		
heat exchanger	HEX	hexagon	
heat gain	HG		
heat pump	HP	high pressure; horsepower	
heat transfer	Q	rate of flow	
heat transfer coefficient	U		
heat treated (glass)	HT TRD		
heating coil	HC	handicap; heavy commercial; hollow core; hose cabinet	
heating water return	HTWR		
heating water supply	HTWS		
heating, ventilating, and air conditioning	HVAC		
heavy	HVY		
heavy commercial	HC	handicap; heating coil; hollow core; hose cabinet	
heavy duty	HD	hand dryer	
hectare	ha		
hectoliter	hL		

Term	Abbreviation	Shared Abbreviation	Notes
hectometer	hm		
height	HT		
hemlock	HEM		
herculite	----		tempered glass
hertz	Hz		
hexagon	HEX	heat exchanger	
high	H	hatch (roof)	
high density overlay	HDO		
high density polyethylene	HDPE		
high efficiency particulate air (filter)	HEPA		
high frequency	HF		
high intensity discharge	HID		
high power factor	HPF		
high pressure	HP	heat pump; horsepower	
high pressure boiler	HPB		
high pressure drip trap	HPDT		
high pressure gas	HPG		
high pressure plastic laminate	H PLAM		
high pressure return	HPR		
high pressure sodium	HPS	high pressure steam	
high pressure steam	HPS	high pressure sodium	
high pressure trap	HPT		
high strength	HS	hand sink; heat-strengthened (glass)	
high temperature hot water	HTHW		
high velocity diffuser	HVD		
high velocity terminal	HVT		
high voltage	HV	hose valve	
highway	HWY		
hoist	HST		
hold open	HO		
holddown	HLDN		

Term	Abbreviation	Shared Abbreviation	Notes
hollow concrete masonry unit	HCMU		
hollow core	HC	handicap; heating coil; heavy commercial; hose cabinet	
hollow core wood door	HCWD		
hollow metal	HM		
hollow metal door	HMD	humidity	
hollow metal door and frame	HMDF		
hollow metal frame	HMF		
Hollow Metal Manufacturers Association	HMMA		
horizontal	HORIZ		
horizontal sliding window	SLD WDW		
horsepower	HP	heat pump; high pressure	
hose bibb	HB		
hose cabinet	HC	handicap; heating coil; heavy commercial; hollow core	
hose connector	HCONN		
hose gate valve	HGV		
hose valve	HV	high voltage	
hospital	HOSP		
hot and cold water	H&CW		
hot water	HW		
hot water boiler	HWB		
hot water circulating pump	HWCP		
hot water coil	HWC		
hot water heater	----		water heater
hot water line	HWL		
hot water pump	HWP		
hot water return	HWR		
hot water supply	HWS		
hot water tank	HWT		
house	HSE		

Term	Abbreviation	Shared Abbreviation	Notes
housekeeping	HSKPG		
humidistat	HSTAT		
humidity	HMD	hollow metal door	
hundred cubic feet	CCF		
hundred weight	CWT		
hydrant	HYD		
hydraulic	HYDR		
hydrochlorofluorocarbons	HCFC		
I beam	IB		
identification	ID	inside diameter; inside dimension; interior design	
identification number	ID NO		
ignition	IGN		
illumination	ILLUM		
Illumination Engineering Society of North America	IESNA		
illustrate	ILLUS		
immediate	IMED		
impact isolation class	IIC		
impact noise rating	INR		
impulses per minute	IPM		
impulses per second	IPS	international pipe standard; iron pipe size	
incandescent	INCAND		
inch-pound	IN-LB		
inch-pound force	IN-LBF		
inches per second	IN/S		
inches, water column	IN WC		
incinerator	INCIN		
included	INCL		
increase	INC		
increment	INCR		

Term	Abbreviation	Shared Abbreviation	Notes
independent	IND	industrial	
indoor air quality	IAQ		
industrial	IND	independent	
infinite	INF		
information	INFO		
infrared	IR	inside radius	
inlet manhole	IMH		
input/output	I/O		
insect screen	IS	island	
inside diameter	ID	identification; inside dimension; interior design	
inside dimension	ID	identification; inside diameter; interior design	
inside face	IF	intake fan	
inside face of stud	IFS		
inside radius	IR	infrared	
inspect	INSP		
install	INSTL		
instantaneous water heater	IWH		
instrument	INSTR		
insufficient	INSUF		
insulated metal panel	INSUL PNL		
insulation	INSUL		
insurance	INS		
intake fan	IF	inside face	
intercommunication	INTERCOM		
interior	INT		
interior design	ID	identification; inside diameter; inside dimension	
interlocked armored cable	BX		
intermediate metal conduit	IMC		
international	INTL		
International Building Code	IBC		
international pipe standard	IPS	impulses per second; iron pipe size	

Term	Abbreviation	Shared Abbreviation	Notes
International Standards Organization	ISO	isometric	
International System of Units	SI		
interrupting capacity	IC	ironing cabinet	
interstate (highway)	I	moment of inertia	
Intertek Testing Services	ITS		
invert	INV		
invert elevation	INV EL		
inverted roof membrane assembly	IRMA		
iron pipe	IP		
iron pipe size	IPS	impulses per second; inches per second; international pipe standard	
iron pipe threaded	IPT		
ironing cabinet	IC	interrupting capacity	
irregular	IRREG		
irrigation water	IW		
island	IS	insect screen	
isolation transformer	IT		
isometric	ISO	International Standards Organization	
J			
jalousie	JAL		
janitor	JAN		
janitor closet	JAN CLO		
janitor sink	----		service sink
janitor's sink	JS		
joint filler	----		joint backer
joint stuffer	----		joint backer
junction box	J-BOX		
junior	JR		
K			
kalamein door	----		metal clad door

Term	Abbreviation	Shared Abbreviation	Notes
kelvin	K	thousand	
keyway	KWY		
kickplate	KPL		
kiln dried	KD	knocked down	
kilo	k		
kilocalorie	kCAL		
kilogram	kg		
kilohertz	kHz		
kiloliter	kL		
kilometer	km		
kilometers per hour	km/h		
kilometers per second	km/s		
kilopascal	kPa		
kilovolt	kV		
kilovolt ampere	kVA		
kilovolt ampere per hour	kVAh		
kilovolt ampere reactive	kVAR		
kilowatt	kW		
kilowatt hour	kWh		
kilowatt hour meter	kWhm		
kips per lineal foot	KLF		
kips per square foot	KSF		
kips per square inch	KSI		
kitchen	KIT		
kitchen cabinet	KC		
knee brace	KB		
knock out panel	KOP		
knocked down	KD	kiln dried	
knockout	KO		
L			
laboratory	LAB		

Term	Abbreviation	Shared Abbreviation	Notes
lacquer	LAQ		
ladder	LAD		
lagging	LAG		
lally column	L COL		
laminate	LAM		
laminated glass	LAM GL		
lamp lumen depreciation	LLD		
landing	LDG		
landmark	LDMK		
landscape	LNDSCP		
lane	LN		
large	LRG		
large scale	LS	lawn sprinkling; lump sum	
latch and lock	L&L		
latent heat	LH	left hand	
latent heat gain	LHG		
latent heat ratio	LHR	left hand reverse	
lateral	LATL		
lath	----		gypsum lath or metal lath
lath and plaster	L&P		
latitude	LAT	lattice; leaving air temperature	
lattice	LAT	lattitude; leaving air temperature	
launch	LANH		
laundry	LAU		
laundry chute	LC		
lavatory	LAV		
lawn sprinkling	LS	large scale; lump sum	
layer	LYR		
layout	LYT		
lead lined	LL	live load; low level; lower left	
lead lined gypsum board	LL GB		
leader	LDR		

Term	Abbreviation	Shared Abbreviation	Notes
leaving air	LA	lightning arrester	
leaving air temperature	LAT	latitude; lattice	
leaving dry bulb temperature	LDBT		
leaving water temperature	LWT		
leaving wet bulb temperature	LWBT		
left hand	LH	latent heat	
left hand reverse	LHR	latent heat ratio	
left hand side	LHS		
lexan	----		plastic glazing
library	LIB		
light	LT		
light emitting diode	LED		
light gage	LT GA		
light pole	LP	lightproof; liquid petroleum; low pressure (mechanical)	
light switch	LT SW		
lighting	LTG		
lighting panel	LTG PNL		
lightning	LTNG		
lightning arrester	LA	leaving air	
lightproof	LP	light pole; liquid petroleum; low pressure (mechanical)	
lightproof louver	LPL		
lightproof vent	LPV		
lightweight	LT WT		
lightweight concrete	LWC		
lightweight concrete masonry unit	LCMU		
lightweight insulating concrete	LWIC		
lightweight plaster	LW PLAS		
limestone	LMST		
limit switch	LIM SW		
limited	LTD		

Term	Abbreviation	Shared Abbreviation	Notes
line ground	LG	liquid gas	
line of sight	LOS		
linear	LIN		
linear ceiling diffuser	LCD		
linear diffuser	LD		
linear feet (foot)	LF		
linen closet	L CL		
linoleum	LINO		
liquid	LIQ	liquor	
liquid gas	LG	line ground	
liquid natural gas	LNG	longitude	
liquid oxygen	LOX		
liquid petroleum	LP	light pole; lightproof; low pressure (mechanical)	
liquid petroleum gas	LPG	low pressure gas	
liquor	LIQ	liquid	
liter	L	angle	
liter per second	L/s		
live load	LL	lead lined; lower left; low level	
living room	LR		
load-bearing	LD BRG		
location	LOC		
lock on	LO	lubricating oil	
locked rotor amps	LRA		
locker	LKR		
locker room	LKR RM		
locknut	LKNT		
lockwasher	LKWASH		
logarithm	LOG		
long leg horizontal	LLH		
long leg vertical	LLV		
longitude	LNG	liquid natural gas	
longitudinal	LONG		

Term	Abbreviation	Shared Abbreviation	Notes
loose cubic meter	LCM		
loose cubic yard	LCY		
loose fill insulation	LF INS		
loudspeaker	----		speaker
louver	LVR		
louver door	LVDR		
louvered	LVD		
louvered roof vent	LRV		
low density polyethylene	LDPE		
low level	LL	lead lined; live load; lower left	
low point	LPT		
low power factor	LPF		
low pressure (mechanical)	LP	light pole; lightproof; liquid petroleum	
low pressure alarm switch	LPAS		
low pressure boiler	LPB		
low pressure condensate return	LPCR		
low pressure drip trap set	LPDT		
low pressure gas	LPG	liquid petroleum gas	
low pressure return	LPR		
low pressure sodium	LPS	low pressure steam	
low pressure steam	LPS	low pressure sodium	
low temperature hot water	LTHW		
low voltage	LV		
low water	LW		
low water cut off	LWCO		
low water mark	LWM		
lower left	LL	lead lined; live load; low level	
lubricate	LUB		
lubricating oil	LO	lock on	
lubricating oil pump	LOP		
lubricating oil vent	LOV		
lucite	----		acrylic sheet

Term	Abbreviation	Shared Abbreviation	Notes
lumber	LBR		
lumen	LM		
lumen dirt depreciation	LDD		
lumens per watt	LPW		
lump sum	LS	large scale; lawn sprinkling	
M			
machine	MACH		
machine bolt	MB	mail box; mixing box	
machine room	MACH RM		
machine screw	MS	mop sink; motor starter	
magnet	MAG		
magnetic north	MN		
mahogany	MAHOG		
mail box	MB	machine bolt; mixing box	
mail chute	MCH		
main circuit breaker	MCB	metal corner bead	
maintenance	MAINT		
make up air unit	MAU		
male pipe thread	MPT		
management	MGT		
manhole	MH		
manhole cover	MC	mechanical contractor; medicine cabinet; metal-clad; moisture content; moment connection	
manual	MAN		
manual air vent	MAV		
manual damper	MD	metal deck	
manual transfer switch	MTS		
manual volume damper	MVD		
manufactured	MFD		
manufacturer	MFR	mass flow rate	
manufacturer's recommendation	MFR REC		

Term	Abbreviation	Shared Abbreviation	Notes
manufacturing	MFG		
Maple Flooring Manufacturers Association	MFMA	Metal Framing Manufacturers Association	
marble base	MRB		
marble floor	MRF		
Marble Institute of America	MIA		
marble threshold	MRT		
marker	MKR		
masonite	----		hardboard
masonry opening	MO	motor operated	
mass flow rate	MFR	manufacturer	
master antenna television system	MATV		
master bedroom	MBR	member	
master switch	MSW		
masterkeyed	MKD		
masthead	MHD		
mastic	----		adhesive
mastic floor	MF	mill finish	
material	MATL		
materials list	ML	metal lath; monolithic	
matrix	MTX		
maximum	MAX		
maximum overcurrent protection	MOCP		
mean sea level	MSL		
mean temperature difference	MTD	mounted	
measure	MEAS		
mechanical	MECH		
mechanical contractor	MC	manhole cover; medicine cabinet; metal-clad; moisture content; moment connection	
mechanical engineer	ME		
mechanical room	MECH RM		
medical	MED	medium	

Term	Abbreviation	Shared Abbreviation	Notes
medicine cabinet	MC	manhole cover; mechanical contractor; metal-clad; moisture content; moment connection	
medium	MED	medical	
medium density overlay	MDO		
medium pressure	MP		
medium pressure gas	MPG	miles per gallon	
medium pressure return	MPR		
medium pressure steam	MPS		
medium temperature hot water	MTHW		
meeting	MTG	mounting	
megahertz	MHz		
megavolt-ampere	MVA		
megawatt	MW	microwave	
megawatt hour	MWh		
melamine	MEL		
member	MBR	master bedroom	
membrane	MEMB		
membrane waterproofing	MWP		
memorandum	MEMO		
mercury	Hg		
meridian	MER		
metal	MTL		
metal-clad	MC	manhole cover; mechanical contractor; medicine cabinet; moisture content; moment connection	
metal base	MTLB		
metal corner bead	MCB	main circuit breaker	
metal deck	MD	manual damper	
metal door	MTLD		
metal flashing	MTLF		
Metal Framing Manufacturers Association	MFMA	Maple Flooring Manufacturers Association	
metal lath	ML	materials list; monolithic	

Term	Abbreviation	Shared Abbreviation	Notes
metal lath and plaster	ML&P		
metal nosing	----		abrasive nosing
metal oxide semiconductor	MOS		
metal partition	MTLP		
metal roof	MTLR		
metal threshold	MT	mount	
meter	m		
meters per second	m/s		
methyl ethyl ketone	MEK		
mezzanine	MEZZ		
microphone	MIC		
microwave	MW	megawatt	
middle	MID		
miles per gallon	MPG	medium pressure gas	
miles per hour	MPH		
military standard	MIL STD		
mill finish	MF	mastic floor	
milliampere	mA		
millimeter	mm		
million gallons per day	MGD		
millisecond	ms		
millivolt	mV		
milliwatt	mW		
millwork	MLWK		
minimum	MIN	minute	
minimum circuit amps	MCA		
minute	MIN	minimum	
mirror	MIRR		
mirror glass	----		reflective glass
miscellaneous	MISC		
miscellaneous metal	----		metal fabrications
miter	MIT		

Term	Abbreviation	Shared Abbreviation	Notes
mixed air	MA		
mixed air temperature	MAT		
mixing box	MB	machine bolt; mail box	
model	MOD	modify; module; motor operated damper	
modified bitumen	MOD BIT		
modify	MOD	model; module; motor operated damper	
modulator-demodulator	MODEM		
module	MOD	model; modify; motor operated damper	
modulus of elasticity	E	east	
modulus of section	Z		
moisture	MSTRE		
moisture content	MC	manhole cover; mechanical contractor; medicine cabinet; metal-clad; moment connection	
moisture resistant	MR		
molding (moulding)	MLDG		
moment	M		
moment connection	MC	manhole cover; mechanical contractor; medicine cabinet; metal-clad; moisture content	
moment of inertia	I	interstate (highway)	
monitor	MON	monument	
monolithic	ML	materials list; metal lath	
monument	MON	monitor	
mop rack	MOPR		
mop service basin	MSB		
mop sink	MS	machine screw; motor starter	
mop/broom holder	MBH		
motor	MOT		
motor control center	MCC		
motor direct connect	MDC		
motor generator	MG		
motor operated	MO	masonry opening	
motor operated damper	MOD	model; modify; module	

Term	Abbreviation	Shared Abbreviation	Notes
motor operated valve	MOV		
motor starter	MS	machine screw; mop sink	
mount	MT	metal threshold	
mounted	MTD	mean temperature difference	
mounting	MTG	meeting	
movable	MVBL		
mullion	MULL		
multiple	MULT		
multizone	MZ		
municipal	MUNIC		
N			
nameplate	NPL	nickel plated	
narrow	NAR		
narrow stile	NS	near side; no scale	
national	NATL		
National Association of Architectural Metal	NAAMM		
National Building Code	NBC		
National Bureau of Standards	NBS		
National Electrical Code	NEC		
National Electrical Manufacturers Association	NEMA		
National Fenestration Rating Council	NFRC		
National Fire Code	NFC		
National Fire Protection Association	NFPA		
National Institute of Building Sciences	NIBS		

Term	Abbreviation	Shared Abbreviation	Notes
National Institute of Standards and Technology	NIST		
National Paint and Coatings Association	NPCA		
National Roofing Contractors Association	NRCA		
natural	NAT		
natural gas	G	girder; ground	
near face	NF		
near side	NS	narrow stile; no scale	
negative	NEG		
negotiated	NEGTD		
net weight	NT WT		
neutral	NEUT		
newton	N	north	
nickel	NKL		
nickel copper	NICOP		
nickel copper alloy	NCA		
nickel plated	NPL	nameplate	
nickel silver	NI SIL		
night light	NL		
no paint	NP		
no scale	NS	narrow stile; near side	
noise criteria	NC	normally closed	
noise isolation class	NIC	not in contract	
noise reduction	NR		
noise reduction coefficient	NRC		
nominal	NOM		
non-metallic	NM		
non-reinforced concrete pipe	NRCP		
non-slip stair nosing	----		abrasive nosing
noncombustible	NCOMBL		

Term	Abbreviation	Shared Abbreviation	Notes
nonflammable	NONFLMB		
nonfused	NFSD		
nonloadbearing	NLB		
nonmagnetic	NMAG		
nonremovable	NRP		
nonstandard	NON STD		
normal	NORM		
normally closed	NC	noise criteria	
normally open	NO	number	
north	N	newton	
not applicable	NA		
not exceeding	NE		
not in contract	NIC	noise isolation class	
not to scale	NTS		
notice of clarification	NOC		
notice to proceed	NTP		
number	NO	normally open	
numeral	NUM		

Term	Abbreviation	Shared Abbreviation	Notes
O			
obscure glass	OGL		
obscure wired glass	OWGL		
observation window	OBW		
Occupational Safety and Health Adminstration	OSHA		
occupy	OCC		
octagon	OCT		
office	OFF		
oil circuit breaker	OCB		
oil circuit recloser	OCR		
oil gage	OGA		
oil level	OLVL		
oil pressure	OPRS		
oil proof	OP		
oil seal	OSL		
oil switch	OS		
oil temperature gauge	OTG		
on center	OC		
one thousand gallons per hour	MGPH		
one thousand square feet	MSF		
one-way	1WAY		
opaque	OPQ		
open web steel joists	----		steel joists
opening	OPNG		
operable	OPR		
operating room	OR	outside radius	
operating steam pressure	OSP		
opposite	OPP		
opposite hand	OPH		
optimum	OPT	optional	

Term	Abbreviation	Shared Abbreviation	Notes
optional	OPT	optimum	
ordnance	ORD	overflow roof drain	
organic	ORG		
original	ORIG		
ornamental	ORN		
ounce	OZ		
out to out	O/O		
outlet	OUT		
outside air	OA	overall	
outside air damper	OAD		
outside air grille	OAG		
outside air intake	OAI		
outside diameter	OD	outside dimension	
outside dimension	OD	outside diameter	
outside face	OF		
outside face of studs	OFS		
outside radius	OR	operating room	
over	O/		
overall	OA	outside air	
overcurrent	OVC		
overflow	OVFL		
overflow drain	OFD		
overflow roof drain	ORD	ordnance	
overhang	OH		
overhead (coiling) door	OH DR		
overload	OL		
override	OVRD		
owner furnished/contractor installed	OF/CI		
owner furnished/owner installed	OF/OI		
oxygen	O		

Term	Abbreviation	Shared Abbreviation	Notes
P			
package	PKG		
packaged terminal air conditioner	PTAC		
paint	PT	pipe thread; pneumatic tube; post-tensioned; pressure treated	
painted base	PB	panelboard; panic bar; pull box; pushbutton	
painted metal	PMTL		
Painting and Decorating Contractors of America	PDCA		
pair	PR	pipe rail; pumped return	
panel	PNL		
panel point	PP	polypropylene (plastic); push/pull	
panelboard	PB	painted base; panic bar; pull box; pushbutton	
panic bar	PB	painted base; panelboard; pull box; pushbutton	
panic bolt	PANB		
paper cup dispenser	PCD		
paper towel dispenser	PTD	printed	
paper towel dispenser and receptacle	PTDR		
paper towel receptacle	PTR		
paragraph	PARA		
parallel	PAR	parapet	
parapet	PAR	parallel	
parenthesis	PAREN		
parging	PARG		
parking	PRKG		
parking garage	PK GAR		
parking lot	PK LOT		
parkway	PKWY		
part number	PN		
partial	PART		

Term	Abbreviation	Shared Abbreviation	Notes
particleboard	PBD		
partition	PTN		
parts per million	PPM		
pascal	Pa		
pass-through window	----		counter shutter <i>or</i> sliding window
pass window	PW		
passenger	PASS		
paste	----		adhesive
pattern	PAT		
paved	PV		
paved road	PV RD		
pavement	----		paving
paving	PVG		
pedestal	PED		
pegboard	PGBD		
pendant	PEND		
penetrate	PEN		
penny (nail)	D	deep; depth	
penthouse	PH	phase	
percent	PCT		
perforated	PERF	perform	
perform	PERF	perforated	
perimeter	PERIM		
period	PER		
permanent	PERM		
perpendicular	PERP		
petroleum	PETRO		
pharmacy	PHAR		
phase	PH	penthouse	
phase meter	PM		
phillips head screw	PHS		

Term	Abbreviation	Shared Abbreviation	Notes
photoelectric	PE	pneumatic electric	
photoelectric cell	PEC		
photograph	PHOTO		
piece	PC	point of curve; polycarbonate; portland cement	
pilaster	PIL		
piling	PLG		
pipe anchor	PA	power amplifier; public address	
pipe rail	PR	pair; pumped return	
pipe sleeve	PSL		
pipe thread	PT	paint; pneumatic tube; post-tensioned; pressure treated	
pitch pocket	----		sealant pocket
pivoted	PIV	post indicator valve	
place	PLC		
plant mix bituminous concrete	PMBC		
plaster	PLAS	plastic	
plaster wall	PLST WL		
plastic	PLAS	plaster	
plastic laminate	PLAM		
plate glass	PL GL		
platform	PLAT		
plexiglass	----		acrylic sheet
plumb	PLB		
plumbing	PLBG		
plywood	PLYWD		
pneumatic	PNEU		
pneumatic electric	PE	photoelectric	
pneumatic tube	PT	paint; pipe thread; post tensioned; pressure treated	
point of curve	PC	piece; polycarbonate; portland cement	
point of intersection	PI		
pole	P	pump	
polished	POL		

Term	Abbreviation	Shared Abbreviation	Notes
polished plate glass	PPGL		
polycarbonate	PC	piece; point of curve; portland cement	
polychlorinated biphenyl	PCB		
polyethylene (plastic)	POLY		
polyisobutylene (plastic)	PIB		
polypropylene (plastic)	PP	panel point; push/pull	
polystyrene (plastic)	PS	pull station	
polyvinyl acetate	PVA		
polyvinyl chloride (plastic)	PVC		
polyvinyl fluoride (plastic)	PVF		
porcelain	PORC		
portable	PORT		
portland cement	PC	piece; point of curve; polycarbonate	
Portland Cement Association	PCA		
portland cement plaster	PCP		
position	POS	positive	
positive	POS	position	
post indicator valve	PIV	pivoted	
post office	PO	purchase order	
post-tensioned	PT	paint; pipe thread; pneumatic tube; pressure treated	
post-tensioned concrete	PT CONC		
potable water	POTW		
pound	LB		
pound-force	LBF		
pound-force per cubic foot	LBF/CF		
pound-force per foot	LBF/FT		
pound-force per horsepower	LBF/HP		
pound-force per hour	LBF/H		
pound-force per inch	LBF/IN		
pound-force per minute	LBF/MIN		
pound-force per square foot	LBF/SF		
pound-force per square inch	LBF/SI		

Term	Abbreviation	Shared Abbreviation	Notes
pounds per cubic foot	PCF		
pounds per linear foot	PLF		
pounds per square foot	PSF		
pounds per square inch	PSI		
pounds per square inch absolute	PSIA		
pounds per square inch, gage	PSIG		
pour	----		place
poured in place	----		cast in place
power	PWR		
power amplifier	PA	pipe anchor; public address	
power factor	PF		
power line	POW LN		
power panel	----		panelboard
power pole	----		utility pole
power roof exhaust	PRE		
power roof ventilator	PRV	pressure reducing valve; pressure regulator valve; pressure relief valve	
pre-fit	----		factory fit
pre-trimmed	----		factory fit
precast	PRCST		
precast concrete	PCC	precool coil	
Precast/Prestressed Concrete Institute	PCI		
precool coil	PCC	precast concrete	
precut	----		factory fit
prefabricate	PREFAB		
preference	PREF		
prefinish	PREFIN		
preformed	PREFMD		
preheat coil	PHC		
preliminary	PRELIM		
premolded	PRMLD		

Term	Abbreviation	Shared Abbreviation	Notes
premolded expansion joint	PEJ		
preparation	PREP		
pressure	PRESS		
pressure drop or difference	PD		
pressure gage	PG	profile grade	
pressure reducing station	PRS		
pressure reducing valve	PRV	power roof ventilator; pressure regulator valve; pressure relief valve	
pressure regulator valve	PRV	power roof ventilator; pressure reducing valve; pressure relief valve	
pressure relief valve	PRV	power roof ventilator; pressure reducing valve; pressure regulator valve	
pressure switch	PRESS SW		
pressure temperature relief valve	PTRV		
pressure treated	PT	paint; pipe thread; pneumatic tube; post tensioned	
prestressed concrete	PS CONC		
previous	PREV		
primary	PRI		
primary hot water return	PHWR		
primary hot water supply	PHWS		
prime coat	----		shop coat
primer	----		shop coat
principal	PRIN		
printed	PTD	paper towel dispenser	
probable maximum flood	PMF		
probable maximum precipitation	PMP		
production	PROD		
profile grade	PG	pressure gage	
project	PROJ		
property	PROP		
property line	PL		
provisional	PROV		

Term	Abbreviation	Shared Abbreviation	Notes
PSF absolute	PSFA		
PSF gage	PSFG		
public address	PA	pipe anchor; power amplifier	
pull box	PB	painted base; panelboard; panic bar; pushbutton	
pull station	PS	polystyrene (plastic)	
pump	P	pole	
pump discharge	PDISCH		
pump suction	PMP SCT		
pumped return	PR	pair; pipe rail	
purchase order	PO	post office	
purlins	PUR		
purse shelf	PSH		
push rod	PRD		
push/pull	PP	panel point; polypropylene (plastic)	
push/pull plate	PP PL		
pushbutton	PB	painted base; panelboard; panic bar; pull box	
Q			
quadrangle	QUAD	quadrant	
quadrant	QUAD	quadrangle	
quadruple receptacle outlet	4OUT		
quality	QUAL		
quality assurance	QA		
quality control	QC		
quality control review	QCR		
quality management	QM		
quantity	QTY		
quarry	QRY		
quarry tile	QT		
quarry tile base	QTB		
quarry tile floor	QTF		
quarter	QTR		

Term	Abbreviation	Shared Abbreviation	Notes
quotation	QUOT		
R			
rabbeted	RAB		
radian	RAD	radiator; return air duct	
radiation	RADN		
radiation hazard	RAD HAZ		
radiator	RAD	radian; return air duct	
radio frequency	RF	resilient flooring	
radius	R	range; riser; thermal resistance	
railing	RLG		
railroad	RR	roll roofing	
rain water leader	RWL		
range	R	radius; riser; thermal resistance	
rapid start	RS	rough sawn	
rate of flow	Q	heat transfer	
rating	RTG		
reactive kilovolt amperes	RKVA		
received	RECD		
receiver	RCVR		
receptacle	RECPT		
reception	RCPTN		
recessed	REC		
recessed waste receptacle	RWR		
reciprocal	RECIP		
recirculate	RECIRC		
recreation room	REC ROOM		
rectangle	RECT		
reducer	RDC		
redwood	RWD		
reference	REF	refrigerator	
reflect	REFL		

Term	Abbreviation	Shared Abbreviation	Notes
reflected ceiling plan	RCP	reinforced concrete pipe	
refractory	REFR	refrigeration	
refrigerant	RFGT		
refrigerant discharge	RD	road; roof drain	
refrigerant hot gas	RHG		
refrigerant liquid line	RLL		
refrigerant suction line	RSL		
refrigeration	REFR	refractory	
refrigerator	REF	reference	
register	REG	regulation	
regulation	REG	register	
reheat coil	RHC		
reheat valve	RHV		
reinforce	REINF		
reinforced brick masonry	RBM		
reinforced concrete	RC	remote control	
reinforced concrete box	RCB		
reinforced concrete culvert pipe	RCCP		
reinforced concrete pipe	RCP	reflected ceiling plan	
reinforcement	----		reinforcing
reinforcing bar	----		reinforcing
reinforcing steel	RST		
reinforcing steel bars	REBAR		
relative humidity	RH	right hand; roof hatch	
relief valve	RV	roof vent; roof ventilator	
remodel	----		alter or finish
remote control	RC	reinforced concrete	
removable	REM		
repair	REP		
replace	REPL		
reproduce	REPRO		
request for information	RFI		

Term	Abbreviation	Shared Abbreviation	Notes
request for proposal	RFP		
require	REQ		
required	REQD		
research and development	R&D		
resilient	RESIL		
resilient base	RB	rubber base	
resilient flooring	RF	radio frequency	
restroom	REST		
return	RET		
return air	RA		
return air duct	RAD	radian; radiator	
return air fan	RA FAN		
return air grille	RA GR		
return air temperature	RAT		
reveal	RVL		
reverse	RVS		
revision	REV	revolutions	
revolutions	REV	revision	
revolutions per minute	RPM		
revolutions per second	RPS		
rheostat	RHEO		
right	RT		
right hand	RH	relative humidity; roof hatch	
right hand reverse	RHR		
right of way	ROW		
rigid insulation, solid	RDG INS		
riser	R	radius; range; thermal resistance	
road	RD	refrigerant discharge; roof drain	
roadway	RW		
robe hook	RB HK		
rocklath	----		gypsum lath <i>or</i> metal lath
roll roofing	RR	railroad	

Term	Abbreviation	Shared Abbreviation	Notes
rolling steel door	RSD		
roof drain	RD	refrigerant discharge; road	
roof hatch	RH	relative humidity; right hand	
roof leader	RL		
roof top unit	RTU		
roof vent	RV	relief valve; roof ventilator	
roof ventilator	RV	relief valve; roof vent	
roofing	RFG		
room	RM		
room air conditioner	RAC		
room monitor system	RMS	root mean square	
root mean square	RMS	room monitor system	
rough opening	RO		
rough sawn	RS	rapid start	
round	RND		
round head machine screw	RHMS		
round head wood screw	RHWS		
rubber	RBR		
rubber base	RB	resilient base	
rubber tile floor	RTF		
runway	RWY		
rusting steel	----		weathering steel
S			
saddle	SDL		
safety factor	SF	square foot (feet); supply fan	
safety nosing	----		abrasive nosing
safety valve	SV	sheet vinyl	
salvage	SALV		
sample	SAMP		
sand	----		porous fill
sandblast	SDBL		

Term	Abbreviation	Shared Abbreviation	Notes
sanitary	SAN		
sanitary napkin dispenser	SND		
sanitary napkin disposal unit	SNDU		
sanitary sewer	SS	service sink; standing seam (roof); steam supply; storm sewer	
saturate	SAT	suspended acoustical tile	
schedule	SCHED		
schedule of values	SOV	shut off valve	
schematic	SCHEM		
school	SCH		
scored joint	SJ	slip joint	
screen	SCRN		
scupper	SCP		
scuttle	----		roof hatch
sea level	SL	spot light	
sealant	SLNT		
seamless	SMLS		
seat cover dispenser	SCD		
secondary hot water return	SHWR		
secondary hot water supply	SHWS		
section	SECT		
segment	SEG		
select	SEL		
semiconductor controlled rectifier	SCR	shower curtain rod	
sensible heat	SH	shingles; single hung (window)	
sensible heat gain	SHG		
sensible heat ratio	SHR	shower	
sensor	SNSR		
separate	SEP		
septic tank	SEP TNK		
service	SVCE		

Term	Abbreviation	Shared Abbreviation	Notes
service sink	SS	sanitary sewer; standing seam (roof); steam supply; storm sewer	
sewage	SWG		
sewer	SWR		
shading coefficient	SC	solid core	
shaft	SHT	sheet	
shaft (elevator)	SHFT		
shaft horsepower	SFT HP		
sheathing	SHTHG		
sheet	SHT	shaft	
sheet metal	SM	silty sand; small; smooth	
sheet metal (flashing)	SHT MTL FLASH		
sheet vinyl	SV	safety valve	
sheeting	----		sheathing
shelving	SHV		
shingles	SH	sensible heat; single hung (window)	
shop drawings	SD	smoke detector; soap dispenser; storm drain; supply duct	
short circuit capacity	SCC		
shoulder	SHLDR		
shower	SHR	sensible heat ratio	
shower curtain rod	SCR	semiconductor controlled rectifier	
shower drain	SHRD		
shower head	SHR HD		
shut off valve	SOV	schedule of values	
shutter	SHTR		
sidewalk	SW	switch	
siding	SDG		
signal	SIG		
silty gravel	GM		
silty sand	SM	sheet metal; small; smooth	
similar	SIM		

Term	Abbreviation	Shared Abbreviation	Notes
single	SGL		
single hung (window)	SH	sensible heat; shingles	
single acting (door)	SA	supply air	
single-phase	1PH		
single pole	1P		
single pole, double throw	SPDT		
single pole, single throw	SPST		
single receptacle floor outlet	FLOUTS		
single receptacle outlet	SOUT		
single throw	ST	stairs; street	
sink	----		lavatory
sketch	SK		
skydome	----		skylight
skylight	SKLT		
skylite	----		skylight
sleeve	SLV		
sliding	SLDG		
sliding glass door	SGD		
slip joint	SJ	scored joint	
slop sink	----		service sink
small	SM	sheet metal; silty sand; smooth	
smoke	SMK		
smoke damper	SDMPR		
smoke detector	SD	shop drawings; soap dispenser; storm drain; supply duct	
smooth	SM	sheet metal; silty sand; small	
soap dispenser	SD	shop drawings; smoke detector; storm drain; supply duct	
Society of American Registered Architects	SARA		
softwood	SFTWD		
solder	SLDR		

Term	Abbreviation	Shared Abbreviation	Notes
solenoid valve	SOLV		
solid concrete masonry unit	SCMU		
solid core	SC	shading coefficient	
solid core wood door	SCWD		
solid plastic	SP	standpipe; sump pit	
solution	SOLN		
solvent	SLVT		
sound insulation	SND INS		
sound transmission class	STC		
south	S		
Southern Building Code Congress International	SBCCI		
space heater	SPH		
speaker	SPKR		
special	SPCL		
special finish	SP FIN		
specific gravity	SP GR		
specification	SPEC		
splash block	SB		
spline	SPL		
spot elevation	SP EL		
spot light	SL	sea level	
sprinkler	SPKLR		
sprinkler line	SPR		
spruce-pine-fir	SPF		
square	SQ		
square bar	SQ BR		
square centimeter; centimeter squared	cm ²		
square foot (feet)	SF	safety factor; supply fan	
square inch	SQ IN		
square kilometer	km ²		

Term	Abbreviation	Shared Abbreviation	Notes
square meter	m ²		
square millimeter	mm ²		
square yard	SQ YD		
staggered	STAG		
stained glass	ST GL		
stainless	STNLS		
stainless steel	SST		
stainless steel pipe	SSP		
stairs	ST	single throw; street	
standard	STD		
standard cubic feet per minute	SCFM		
standard cubic feet per second	SCFS		
standard temperature and pressure	STP		
standing seam (roof)	SS	sanitary sewer; service sink; steam supply; storm sewer	
standpipe	SP	solid plastic; sump pit	
start/stop	S/S		
static pressure	ST PR		
station	STA		
steam	STM		
steam gage	SG		
steam generator	ST GEN		
steam manhole	SMH		
steam return	SR		
steam supply	SS	sanitary sewer; service sink; standing seam (roof); storm sewer	
steam working pressure	STWP		
Steel Deck Institute	SDI	Steel Door Institute	
Steel Door Institute	SDI	Steel Deck Institute	
steel joist	STL JST		
Steel Joist Institute	SJI		

Term	Abbreviation	Shared Abbreviation	Notes
steel lintel	STL LNTL		
steel plate	STL PL		
steel roof deck	STL RF DK		
steel truss	STL TR		
steel tube	STL TB		
Steel Window Institute	SWI		
stepping	STPG		
stiffener	STIF		
stirrup	STIR		
storage	STOR		
storeroom	STRM		
storm drain	SD	shop drawings; smoke detector; soap dispenser; supply duct	
storm drain manhole	SDMH		
storm sewer	SS	sanitary sewer; service sink; standing seam (roof); steam supply	
storm water	ST W		
straight	STR	strike; stringers	
strainer	STN		
street	ST	single throw; stairs	
strike	STR	straight; stringers	
stringers	STR	straight; strike	
strobe	STRB		
strobe/horn	STRB/HRN		
structural	STRUCT		
structural clay tile	SCT		
structural engineer	SE		
structural steel	STRUCT STL		
stucco	----		cement plaster
styrene butadien styrene	SBS		
subfloor	SUB FL		
subparagraph	SUBPAR		

Term	Abbreviation	Shared Abbreviation	Notes
subsoil drain	SSD		
substitute	SUB		
substrate	SBSTR		
suction	SUCT		
sufficient	SUF		
summary	SUM		
sump pit	SP	solid plastic; standpipe	
sump pump	SMP		
sump tank	SUTK		
supervisor	SUPVR		
supplement	SUPPL		
supplementary	SUP		
supply	SPLY		
supply air	SA	single acting (door)	
supply air grille	SAG		
supply duct	SD	shop drawings; smoke detector; soap dispenser; storm drain	
supply fan	SF	safety factor; square foot (feet)	
support	SPRT		
suppression	SUPN		
surface	SURF		
surfaced four sides	S4S		
surfaced one side	S1S		
surfaced two sides	S2S		
surround	SURR		
surveillance camera	SURV CAM		
surveillance equipment	SURV EQUIP		
surveillance monitor	SURV MON		
survey	SURV		
suspend	SUSP		
suspended acoustical plaster ceiling	SAPC		

Term	Abbreviation	Shared Abbreviation	Notes
suspended acoustical tile	SAT	saturate	
suspended acoustical tile ceiling	SATC		
suspended ceiling	SUSP CLG		
suspended plaster ceiling	SPC		
suspended unit heater	SUH		
swing door	SWDR		
switch	SW	sidewalk	
switchboard	SWBD		
switchgear	SWGR		
symbol	SYM		
symmetrical	SYMM		
synthetic	SYNTH		
system	SYS		
T			
table of content	TOC	top of concrete; top of curb	
tabulate	TAB		
tackboard	TK BD		
tangent	TAN		
tar	----		pitch
technical	TECH		
telephone	TEL		
telephone control panel	TCP	temperature control panel; traffic control plan	
telephone equipment room	TER	terrazzo	
telephone floor outlet	FOUTT		
telephone jack	TEL JK		
telephone outlet	TEL OUT		
telephone pole	TP	total pressure; twisted pair	
telephone terminal board	TTB		
television	TV		
television outlet	TVOUT		
temperature	TEMP	temporary	

Term	Abbreviation	Shared Abbreviation	Notes
temperature and pressure valve	T&P VALVE		
temperature control panel	TCP	telephone control panel; traffic control plan	
temperature control valve	TCV		
temperature difference	TD	towel dispenser; trench drain	
tempered	TMPD		
tempered glass	TMPD GL		
tempered hardboard	TEMP HDBD		
temporary	TEMP	temperature	
temporary benchmark	TBM		
tensile strength	TS	tube steel	
terminal	TERM		
terminal unit controller	TUC		
terra cotta	TC		
terrazzo	TER	telephone equipment room	
test boring-xx (e.g., TB-01)	TB-xx		
thermal	THERM		
thermal conductance	C VALUE		
thermal conductivity	K VALUE		
thermal resistance	R	radius; range; riser	
thermopane	----		insulating glass
thermostat	TSTAT		
thickness	THK		
thousand	K	kelvin	
thousand board feet	MBF		
thousand Btu per hour	MBtuH		
thousand cubic feet	MCF		
thousand feet board measure	MBM		
thousand foot/pounds	KIP FT		
thousand pounds	KIP		
thread	THD		
three-conductor	3/C		
three-phase	3PH		

Term	Abbreviation	Shared Abbreviation	Notes
three-ply	3PLY		
three-way	3WAY		
threshold	THRES		
through	THRU		
through bolt	TB	towel bar	
throughout	THRUOUT		
Tile Council of America	TCA		
time and materials	T&M		
to floor above	TFA		
to floor below	TFB		
toilet (plumbing fixture)	----		water closet
toilet paper dispenser	TPD		
toilet paper holder	TPH		
tolerance	TOL		
tongue and groove	T&G		
top and bottom	T&B		
top elevation	TE		
top of ____	TO		
top of beam	TOB		
top of concrete	TOC	table of content; top of curb	
top of concrete footing	TOC FTG		
top of concrete wall	TOC WALL		
top of curb	TOC	table of content; top of concrete	
top of finish floor	TFF		
top of floor	TOF	top of footing; top of frame	
top of footing	TOF	top of floor; top of frame	
top of foundation	TO FDN		
top of frame	TOF	top of floor; top of footing	
top of joist	TOJ		
top of manhole	TMH		
top of masonry	TOM		
top of parapet	TOP	top of pavement	

Term	Abbreviation	Shared Abbreviation	Notes
top of pavement	TOP	top of parapet	
top of rim	TR	towel rack	
top of slab	TOS	top of steel	
top of steel	TOS	top of slab	
top of truss	TOT		
top of wall	TOW		
topography	TOPO		
total dynamic head	TDH		
total pressure	TP	telephone pole; twisted pair	
total quality management	TQM		
towel bar	TB	through bolt	
towel dispenser	TD	temperature difference; trench drain	
towel dispenser/receptacle	TDR		
towel rack	TR	top of rim	
towel shelf	TSH		
tower water return	----		condenser water
tower water supply	----		condenser water
traffic control plan	TCP	telephone control panel; temperature control panel	
transfer	XFER		
transfer grille	TG		
transformer	XFMR		
transom	TRANS	transparent	
transparent	TRANS	transom	
transparent wood finish	TRANS WD FIN		
transverse expansion joint	TEJ		
tread	T		
treated	TRTD		
treated water return	TWR		
treated water supply	TWS		
trench drain	TD	temperature difference; towel dispenser	
true north	TN		
tub/shower	T/S		

Term	Abbreviation	Shared Abbreviation	Notes
tube steel	TS	tensile strength	
tunnel	TNL		
turnbuckle	TRNBKL		
turnpike	TNPK		
twindow	----		insulating glass
twist lock	TL		
twisted pair	TP	telephone pole; total pressure	
twisted pair shielded	TPS		
two-conductor	2/C		
two-way	2WAY		
typical	TYP		
U			
ultimate	ULT		
ultraviolet	UV		
undercut	UC		
undercut door	UCD		
underfloor duct	UFD		
underground	UGND		
Underwriters Laboratories	UL		
unexcavated	UNEX		
unfinish	UNFIN		
uniform	UNIF		
Uniform Building Code	UBC		
Uniform Fire Code	UFC		
Uniform Mechanical Code	UMC		
Uniform Plumbing Code	UPC		
uninterruptible power supply	UPS		
unit heater	UH		
unit of sound level	dBA		
unit weight	UWT		
universal	UNIV		

Term	Abbreviation	Shared Abbreviation	Notes
unless noted	UN		
unless noted otherwise	UNO		
unless otherwise noted	UON		
unpaved road	UNPV RD		
untwisted pair	UTP		
urinal	UR		
utility	UTIL		
utility pole	UP		
V			
V joint	VJ		
vacuum	VAC	vacuum line	
vacuum breaker	VB	valve box; vinyl base	
vacuum cleaner outlet	VCO		
vacuum line	VAC	vacuum	
vacuum pump	VP	vanishing point; vapor pressure; velocity pressure; veneer plaster	
vacuum return pump	VRP		
valve box	VB	vacuum breaker; vinyl base	
vanishing point	VP	vacuum pump; vapor pressure; velocity pressure; veneer plaster	
vanity	VAN		
vapor barrier	----		vapor retarder
vapor pressure	VP	vacuum pump; vanishing point; velocity pressure; veneer plaster	
vapor proof	VAP PRF		
vapor retarder	VR	voltage regulator	
variable air volume	VAV		
variable frequency	VF		
variable frequency drive	VFD		
variation	VAR	varies; volt ampere reactive	
varies	VAR	variation; volt ampere reactive	

Term	Abbreviation	Shared Abbreviation	Notes
vehicle	VEH		
velocity	VEL		
velocity pressure	VP	vacuum pump; vanishing point; vapor pressure; veneer plaster	
veneer	VNR		
veneer plaster	VP	vacuum pump; vanishing point; vapor pressure; velocity pressure	
vent stack	VS	voltmeter switch	
vent through roof	VTR		
ventilation	VENT	ventilator	
ventilator	VENT	ventilation	
veranda	VRNDA		
verify	VERFY		
verify in field	VIF		
vertical	VERT		
vertical curve	VC		
vertical grain	VG		
vertical unit heater	VUH		
very high frequency	VHF		
very high output	VHO		
vestibule	VEST		
vibration	VIB		
vicinity	VIC		
video	VID		
video amplifier	VIDAMP		
video integration	VINT		
village	VIL		
vinyl base	VB	vacuum breaker; valve box	
vinyl composition tile	VCT	vitrified clay tile	
vinyl faced acoustical tile	VFAT		
vinyl tile	----		resilient tile
vinyl wall covering	VWC		

Term	Abbreviation	Shared Abbreviation	Notes
vinyl wall fabric	VWF		
viscosity	VISC		
visqueen	----		vapor retarder
visual	VIS		
vitreous	VIT		
vitrefied clay tile	VCT	vinyl composition tile	
volatile organic compound	VOC		
volt	V		
volt-ammeter	VAM		
volt ampere	VA		
volt ampere reactive	VAR	variation; varies	
voltage	VOLT		
voltage drop	VD	volume damper	
voltage regulator	VR	vapor retarder	
voltage relay	VRLY		
voltmeter switch	VS	vent stack	
volume	VOL		
volume damper	VD	voltage drop	
volumetric flow rate	VFR		
W			
wainscot	WSCT		
wall ash urn	WAU		
wall board	----		gypsum board
wall cabinets	W CAB		
wall cleanout	WCO		
wall covering	WC	water closet; water column	
wall fabric	WFAB		
wall hung	WH	wall hydrant; water heater; weep hole	
wall hydrant	WH	wall hung; water heater; weep hole	
wall to wall	W/W		
warehouse	WHSE		

Term	Abbreviation	Shared Abbreviation	Notes
warm white	WW	wastewater; wireway	
warm white deluxe	WWX		
Warnock Hershey International	----		Intertek Testing Services
warranty	WARR		
wash fountain	WF	wide flange	
waste	W	watt; west; wide	
waste disposer	WDSP		
waste water	WW	warm white; wireway	
water	WTR		
water chiller	WCHR		
water closet	WC	wall covering; water column	
water closet, wall hung	WC WL HNG		
water column	WC	wall covering; water closet	
water cooled	WCLD		
water cooler	WCLR		
water cooler, wall hung	WCL WL MTD		
water cooling tower	----		cooling tower
water elevation	WT EL		
water gage	WG		
water hammer arrestor	WHA		
water heater	WH	wall hung; wall hydrant; weep hole	
water jacket	WJ		
water line	WL	wind load	
water meter	WM	wire mesh	
water pressure drop	WPD		
water pump	WP	waterproofing; weatherproof; working point	
water repellent	WR	weather resistant; wire rope	
water table	WT	watertight; weight	
waterproof membrane	WPM		
waterproofing	WP	water pump; weatherproof; working point	
watertight	WT	water table; weight	
watt	W	waste; west; wide	

Term	Abbreviation	Shared Abbreviation	Notes
watthour meter	WHM		
weather	WEA		
weather resistant	WR	water repellent; wire rope	
weather seal	WSL		
weatherproof	WP	water pump; waterproofing; working point	
weatherstrip	WS		
weep hole	WH	wall hung; wall hydrant; water heater	
weight	WT	water table; watertight	
welded	WLD		
welded wire fabric	WWF		
welded wire mesh	WWM		
west	W	waste; watt; wide	
wet bulb	WB	wood base	
wet bulb temperature	WBT		
where occurs	WO	work order	
wide	W	waste; watt; west	
wide flange	WF	wash fountain	
wind load	WL	water line	
window	WDW		
Window and Door Manufacturers Association	WDMA		
window unit	WU		
wire glass	----		wired glass
wire mesh	WM	water meter	
wire rope	WR	water repellant; weather resistant	
wired glass	WGL		
wireway	WW	warm white; waste water	
with	W/		
without	W/O		
wood	WD	wood door	
wood base	WB	wet bulb	
wood blocking	WBL		

Term	Abbreviation	Shared Abbreviation	Notes
wood door	WD	wood	
wood door and frame	WDF		
wood frame	WFR		
wood furring strips	WFS		
wood louvers	WD LOUV		
wood panelling	WDP		
work order	WO	where occurs	
working point	WP	water pump; waterproofing; weatherproof	
working pressure	WPR		
working steam pressure	WSP		
wrought brass	WBS		
wrought iron	WI		
Y			
yard	YD	yard drain; yard drainage pipe	
yard cleanout	YCO		
yard drain	YD	yard; yard drainage pipe	
yard drainage pipe	YD	yard; yard drain	
yard hydrant	YH		
yard inlet	YI		
year	YR		

Abbreviations

Abbreviation	Term	Shared Abbreviation
1PH	single-phase	
1P	single pole	
1WAY	one-way	
2/C	two-conductor	
2WAY	two-way	
3/C	three-conductor	
3PH	three-phase	
3PLY	three-ply	
3WAY	three-way	
4/C	four-conductor	
4OUT	quadruple receptacle outlet	
4PDT	four-pole double throw	
4PST	four-pole single throw	
4W	four-wire	
4WAY	four-way	
A		
A LABEL	Class A door	
A/C	air condition	
A/C UNIT	air conditioning unit	
A/E	architect/engineer	
AACE	American Association of Cost Engineers	
AAD	automatic air damper	
AAMA	American Architectural Manufacturers Association	
AAP	alarm annunciator panel	
AAV	automatic air vent	
AB	anchor bolt	
ABAN	abandon	

Abbreviation	Term	Shared Abbreviation
ABBRV	abbreviation	
ABC	aggregate base course	Associated Builders and Contractors
ABC	Associated Builders and Contractors	aggregate base course
ABNL	abnormal	
ABRSV	abrasive	
ABRSV RES	abrasive resistant	
ABS	absolute	acrylonitrile butadiene styrene
ABS	acrylonitrile butadiene styrene	absolute
ABSORB	absorption	
AC	alternating current	armored cable; asbestos cement; asphaltic concrete
AC	armored cable	alternating current; asbestos cement; asphaltic concrete
AC	asbestos cement	alternating current; armored cable; asphaltic concrete
AC	asphaltic concrete	alternating current; armored cable; asbestos cement
ACC	accessible	
ACCU	air cooled condensing unit	
ACHKV	automatic check valve	
ACI	American Concrete Institute	
ACID RES	acid resistant	
ACID RES CI	acid resistant cast iron	
ACID RES P	acid resistant pipe	
ACID RES V	acid resistant vent	
ACID RES W	acid resistant waste	
ACOUS INSUL	acoustical insulation	
ACOUS PNL	acoustical panel	
ACP	asphaltic concrete paving	automatic control panel
ACP	automatic control panel	asphaltic concrete paving
ACR	across	
ACS	automatic control system	
ACS DR	access door	
ACS FLR	access floor	
ACS PNL	access panel	
ACSR	aluminum cable steel reinforced	

Abbreviation	Term	Shared Abbreviation
ACST	acoustic	
ACT	acoustical ceiling tile	
ACU	assembled cooling unit	
ACV	automatic control valve	
AD	area drain	
ADA	Americans with Disabilities Act	
ADC	automatic door closer	
ADDL	additional	
ADDM	addendum	
ADH	adhesive	
ADJ	adjacent	adjoining; adjustable
ADJ	adjoining	adjacent; adjustable
ADJ	adjustable	adjacent; adjoining
ADMIN	administration	
ADS	automatic door seal	
AF	audio frequency	
AFC	above finished counter	automatic frequency control
AFC	automatic frequency control	above finished counter
AFF	above finished floor	
AFG	above finished grade	
AFS	above finished slab	
AGA	American Gas Association	
AGC	Associated General Contractors	
AGGR	aggregate	
AH	ampere hour	
AHJ	authority having jurisdiction	
AHR	anchor	
AHU	air handling unit	
AI	Asphalt Institute	
AIA	American Institute of Architects	
AIC	ampere interrupting capacity	
AISC	American Institute of Steel Construction	

Abbreviation	Term	Shared Abbreviation
ALLOW	allowance	
ALM	alarm	
ALNMT	alignment	
ALT	alternate	altitude
ALT	altitude	alternate
ALT NO	alternate number	
ALTRN	alteration	
ALUM	aluminum	
AM	amplitude modulation	
AMB	ambient	
AMP	ampere	
AMPL	amplifier	
AMT	amount	
ANG BM	angle beam	
ANN	annunciator	
ANOD	anodize	
ANSI	American National Standards Institute	
ANT	antenna	
APA	American Plywood Association	
APC	acoustical panel ceiling	
APD	air pressure drop	
APP	appearance	atactic propylene
APP	atactic propylene	appearance
APPD	approved	
APPROX	approximate	
APPX	appendix	
APR	air pressure return line	
APT	apartment	Association for Preservation Technology
APT	Association for Preservation Technology	apartment
APU	auxiliary power unit	
AR	as required	
ARCH	Architect	

Abbreviation	Term	Shared Abbreviation
ARF	architectural finish	
ART	article	
AS	air separator	ammeter switch
AS	ammeter switch	air separator
ASB	asbestos	
ASC	above suspended ceiling	amps short circuit; asphalt surface course
ASC	amps short circuit	above suspended ceiling; asphalt surface course
ASC	asphalt surface course	above suspended ceiling; amps short circuit
ASCE	American Society of Civil Engineers	
ASD	automatic sprinkler drain	
ASEC	American Standard Elevator Codes	
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers	
ASI	Architect's Supplemental Instruction	
ASKLR	automatic sprinkler	
ASME	American Society of Mechanical Engineers	
ASPH	asphalt	
ASR	automatic sprinkler riser	
ASSN	association	
ASSY	assembly	
ASTM	American Society for Testing and Materials	
ASU	air supply unit	
ASV	angle stop valve	
ASWG	American steel wire gauge	
ASYM	asymmetrical	
ATC	acoustical tile ceiling	
ATCH	attachment	
ATM	atmosphere	automatic teller machine
ATM	automatic teller machine	atmosphere
ATS	automatic transfer switch	
ATTN	attention	
AUTO	automatic	

Abbreviation	Term	Shared Abbreviation
AUTO XFMR	auto transformer	
AUX	auxiliary	
AV	acid vent	air vent; audio visual
AV	air vent	acid vent; audio visual
AV	audio visual	acid vent; air vent
AVE	avenue	
AVG	average	
AW	acid waste	actual weight; architectural woodwork
AW	actual weight	acid waste; architectural woodwork
AW	architectural woodwork	acid waste; actual weight
AWG	American wire gauge	
AWI	Architectural Woodworking Institute	
AWL	acid waste line	
AWN WDW	awning window	
AWP	air water pump	
AWPA	American Wood Preservers' Association	
AWS	American Welding Society	
AWT	acoustical wall treatment	
AWWA	American Water Works Association	
AX FL	axial flow	
AZ	azimuth	
B		
B CL	broom closet	
B LABEL	Class B door	
B PL	base plate	
B&B	balled and burlapped	bell and bell; grade B or better (lumber)
B&B	bell and bell	balled and burlapped; grade B or better (lumber)
B&B	grade B or better (lumber)	balled and burlapped; bell and bell
B&F	bell and flange	
B&S	bell and spigot	
B/B	back to back	
B/M	board measure	

Abbreviation	Term	Shared Abbreviation
BA	bright annealed	
BAF	baffle	
BAG	baggage	
BAL	balance	
BALC	balcony	
BAS	building automation system	
BAT	batten	battery
BAT	battery	batten
BAY WDW DH	bay window double hung	
BB	baseboard	bulletin board
BB	bulletin board	baseboard
BB XFMR	buck-boast transformer	
BBR	base board radiator	
BC	back of curb	between centers; bolt circle; bookcase; bottom chord; brick color; building code
BC	between centers	back of curb; bolt circle; bookcase; bottom chord; brick color; building code
BC	bolt circle	back of curb; between centers; bookcase; bottom chord; brick color; building code
BC	bookcase	back of curb; between centers; bolt circle; bottom chord; brick color; building code;
BC	bottom chord	back of curb; between centers; bolt circle; bookcase; brick color; building code
BC	brick color	back of curb; between centers; bolt circle; bookcase; bottom chord; building code
BC	building code	back of curb; between centers; bolt circle; bookcase; bottom chord; brick color
BCV	butterfly check valve	
BD	board	butterfly damper
BD	butterfly damper	board
BD FT	board feet (foot)	

Abbreviation	Term	Shared Abbreviation
BDD	backdraft damper	
BDNG	bedding	
BDRY	boundary	
BEV	bevel	
BF	both faces	
BFBP	boiler feed booster pump	
BFF	below finish floor	
BFP	backflow preventer	
BFV	butterfly valve	
BFW	boiler feedwater	
BFWP	boiler feedwater pump	
BHMA	Builder's Hardware Manufacturer's Association	
BHP	brake horsepower	
BI FLD DR	bifolding doors	
BIA	Brick Institute of America	
BIL	basic insulation level	
BITUM	bituminous	
BJT	bed joint	
BKBD	backboard	
BKG	backing	
BKGD	background	
BL	base line	building line
BL	building line	base line
BL MTH	bell mouth	
BLB T BM	bulb tee beam	
BLD	build	
BLDG	building	
BLKHD	bulkhead	
BLKT	blanket	
BLO	blower	
BLR	boiler	
BLR HP	boiler horsepower	

Abbreviation	Term	Shared Abbreviation
BLST	ballast	
BLT	borrowed light	built
BLT	built	borrowed light
BLT IN	built-in	
BLVD	boulevard	
BLW	below	
BLW CLG	below ceiling	
BLWDN	blowdown	
BM	beam	benchmark; bending moment
BM	benchmark	beam; bending moment
BM	bending moment	beam; benchmark
BN	bullnose	
BNDG	bonding	
BO	blowoff	
BOCA	Building Officials and Code Administrators Association International	
BOS	bottom of steel	
BOT	bottom	
BOT F	bottom face	
BP	building paper	
BPRF	bulletproof (bullet-resistant)	
BR	bedroom	
BRCG	bracing	
BRDG	bridging	
BRDG JST	bridging joist	
BRG	bearing	
BRG PL	bearing plate	
BRKR	breaker	
BRKT	bracket	
BRLP	burlap	
BRZ	bronze	
BS	both sides	

Abbreviation	Term	Shared Abbreviation
BSMT	basement	
BSP	black steel pipe	
BSTR	booster	
BT	bathtub	
BT WLD	butt weld	
BTR	better	
Btu	British thermal unit	
BtuH	British thermal unit per hour	
BTWN	between	
BU	built-up	bushel
BU	bushel	built-up
BUR	built-up roofing	
BV	ball valve	
BW	both ways	
BWG	Birmingham wire gauge	
BX	interlocked armored cable	
BYP	by pass	
C		
C	Celsius	channel
C	channel	Celsius
C CONC	cast concrete	
C LABEL	Class C door	
C TO C	center to center	
C VALUE	thermal conductance	
C&BTR	grade C and better	
C&G	curb and gutter	
C&P	carpet and pad	
C/C	cooling coil	
CAB	cabinet	
CAC	ceiling attenuation class	
CAL	calorie	
CALC	calculate	

Abbreviation	Term	Shared Abbreviation
CAM	camber	
CAN	canopy	
CANTIL	cantilever	
CANV	canvas	
CAP	capacitor	capacity
CAP	capacity	capacitor
CAT	catalog	
CATV	community antenna television	
CATW	catwalk	
CAV	cavity	
CB	carriage bolt	catch basin; cement base; ceramic base; corner bead
CB	catch basin	carriage bolt; cement base; ceramic base; corner bead
CB	cement base	carriage bolt; catch basin; ceramic base; corner bead
CB	ceramic base	carriage bolt; catch basin; cement base; corner bead
CB	corner bead	carriage bolt; catch basin; cement base; ceramic base
CBB	cementitious (backer) board	
CC	cubic centimeter	
CCD	contract change directive	
CCF	hundred cubic feet	
CCR	control contactor	
CCTV	closed circuit television	
CCW	counterclockwise	
cd	candela	construction documents; contract documents
CD	construction documents	candela; contract documents
CD	contract documents	candela; construction documents
CDW	chilled drinking water	
CDWR	chilled drinking water return	
CDWS	chilled drinking water supply	
CEM	cement	cemetery
CEM	cemetery	cement
CEM FIN	cement finish	
CEM PLAS	cement plaster	

Abbreviation	Term	Shared Abbreviation
CEM PLAS CLG	cement plaster ceiling	
CER	ceramic	
CERT	certify	
CF	cement floor	contractor furnished
CF	contractor furnished	cement floor
CF/CI	contractor furnished/contractor installed	
CF/OI	contractor furnished/owner installed	
CFC	chlorofluorocarbons	
CFE	contractor furnished equipment	
CFLG	counterflashing	
CFM	cubic feet per minute	
CFMF	cold-formed metal framing	
CFS	cubic feet per second	
CG	center of gravity	common ground; corner guard
CG	common ground	center of gravity; corner guard
CG	corner guard	center of gravity; common ground
CGSFU	ceramic glazed structural facing units	
CH	chiller	coat hook
CH	coat hook	chiller
CH BD	chalkboard	
CHEM	chemical	
CHFR	chamfer	
CHG	charge	
CHK	check	
CHKV	check valve	
CHMBR	chamber	
CHR PL	chrome plated	
CHW	chilled water	circulating hot water
CHW	circulating hot water	chilled water
CHWP	chilled water pump	
CHWPP	chilled water primary pump	
CHWR	chilled water return	

Abbreviation	Term	Shared Abbreviation
CHWRP	chilled water recirculating pump	
CHWS	chilled water supply	
CHWSP	chilled water secondary pump	
CI	cast iron	curb inlet
CI	curb inlet	cast iron
CIP	cast-in-place	cast iron pipe
CIP	cast iron pipe	cast in place
CIR	circle	
CIRC	circular	
CISP	cast iron soil pipe	
CJ	construction joint	control joint
CJ	control joint	construction joint
CK TP	cook top	
CKT	circuit	
CKT BRKR	circuit breaker	
CL	center line	class; close
CL	class	center line; close
CL	close	center line; class
CL D	clothes dryer	
CLASS	classification	
CLDG	cladding	
CLF	current limiting fuse	
CLFMI	Chain Link Fence Manufacturers Institute	
CLG	ceiling	
CLG DCT OUT	ceiling duct outlet	
CLG DIFF	ceiling diffuser	
CLG GRL	ceiling grille	
CLG HT	ceiling height	
CLG REG	ceiling register	
CLKJ	calked joint	
CLL	column line	contract limit line
CLL	contract limit line	column line

Abbreviation	Term	Shared Abbreviation
CLO	closet	
CLOS	closure	
CLR	clear	color; cooler
CLR	color	clear; cooler
CLR	cooler	clear; color
CLRM	classroom	
CLT	cleat	
CLWG	clear wired glass	
cm	centimeter	
cm ²	square centimeter; centimeter squared	
cm ³	cubic centimeter	
CM	construction management	center matched
cm/s	centimeter per second	
CMP	corrugated metal pipe	
CMPST	composite	
CMPTR	computer	
CMR	common mode rejection	
CMU	concrete masonry unit	
CNCL	concealed	
CND	conduit	
CNDS	condensate	
CNR	corner	
CNTOR	contactor	
CNTR	counter	
CNVR	conveyor	
CO	carbon monoxide	cased opening; Certificate of Occupancy; cleanout; company; cutout
CO	cased opening	carbon monoxide; Certificate of Occupancy; cleanout; company; cutout
CO	Certificate of Occupancy	carbon monoxide; cased opening; cleanout; company; cutout

Abbreviation	Term	Shared Abbreviation
CO	cleanout	carbon monoxide; cased opening; Certificate of Occupancy; company; cutout
CO	company	carbon monoxide; cased opening; Certificate of Occupancy; cleanout; cutout
CO	cutout	carbon monoxide; cased opening; Certificate of Occupancy; cleanout; company
CO ₂	carbon dioxide	
COAX	coaxial cable	
COEFF	coefficient	
COL	column	
COM	common	
COMB	combination, combined	
COMM	communication	
COMP	component	
COMPL	complete	
COMPR	compressor	
COMPT	compartment	
CONC	concentric	concrete
CONC	concrete	concentric
CONC FLR	concrete floor	
CONC OPNG	concrete opening	
COND	condenser	condition
COND	condition	condenser
CONDN	condensation	
CONF	conference	
CONN	connect	
CONSTR	construction	
CONSULT	consultant	
CONT	continue	controller
CONT	controller	continue
CONTR	contract	contractor
CONTR	contractor	contract

Abbreviation	Term	Shared Abbreviation
CONV	convert	
COORD	coordinate	
COP	coefficient of performance (heating)	coping
COP	coping	coefficient of performance (heating)
COR	change order request	
CORN	cornice	
CORR	correct	corridor
CORR	corridor	correct
CORRES	correspond	
COTG	cleanout to grade	
COV	cover	cut off valve
COV	cut off valve	cover
COV PL	cover plate	
CP	candlepower	concrete pipe; control panel
CP	concrete pipe	candlepower; control panel
CP	control panel	candlepower; concrete pipe
CPLG	coupling	
CPM	critical path method	
CPRS	compressible	
CPT	carpet	control power transformer
CPT	control power transformer	carpet
CPVC	chlorinated polyvinyl chloride	
CR	closet rod	control relay; control room
CR	control relay	closet rod; control room
CR	control room	closet rod; control relay
CRCMF	circumference	
CRI	color rendering index	
CRN	crown	
CRP	condensate return pump	
CRS	cold rolled steel	
CRSI	Concrete Reinforcing Steel Institute	
CRT YD	courtyard	

Abbreviation	Term	Shared Abbreviation
CS	cast stone	commercial standard; control switch
CS	commercial standard	cast stone; control switch
CS	control switch	cast stone; commercial standard
CSB	concrete splash block	
CSG	casing	
CSI	Construction Specifications Institute	
CSK	counter sunk	
CSMT	casement	
CSP	concrete sewer pipe	
CSTL	cast steel	
CSWK	casework	
CT	ceramic tile	count; current transformer
CT	count	ceramic tile; current transformer
CT	current transformer	ceramic tile; count
CT STN	cut stone	
CTB	ceramic tile base	
CTD	coated	
CTF	ceramic tile floor	
CTG	coating	
CTI	Ceramic Tile Institute of America	
CTR	center	contour; cooling tower return
CTR	contour	center; cooling tower return
CTR	cooling tower return	center; contour
CTRL	control	
CTS	cooling tower supply	
CTV	cable television	
CU	coefficient of utilization	copper; cubic
CU	copper	coefficient of utilization; cubic
CU	cubic	coefficient of utilization; copper
CU FT	cubic feet	
CU IN	cubic inch	
CU YD	cubic yard	

Abbreviation	Term	Shared Abbreviation
CUB	cubicle	
CUH	cabinet unit heater	
CUR	current	
CURT	curtain	
CUST	custodian	
CV	control valve	
CW	casement window	chemical waste line; clockwise; cold water piping; cool white
CW	chemical waste line	casement window; clockwise; cold water piping; cool white
CW	clockwise	casement window; chemical waste line; cold water piping; cool white
CW	cold water piping	casement window; chemical waste line; clockwise; cool white
CW	cool white	casement window; chemical waste line; clockwise; cold water piping
CWP	circulating water pump	condenser water pump
CWP	condenser water pump	circulating water pump
CWR	condenser water return	
CWS	condenser water supply	
CWT	hundred weight	
CWX	cool white deluxe	
CYL	cylinder	
CYL L	cylinder lock	
CYP	cypress	
D		
D	deep	depth; penny (nail)
D	depth	deep; penny (nail)
D	penny (nail)	deep; depth
D CHEM	dry chemical	
D LABEL	Class D door	
D&S	display and storage	
D1S	dressed one side	
D2S	dressed two sides	

Abbreviation	Term	Shared Abbreviation
D4S	dressed four sides	
DA	disabled	drainage area
DA	drainage area	disable
DAP	duct access panel	
DAT	datum	
dB	decibel	
DB	database	dry bulb
DB	dry bulb	database
D-B	design-build	
dBA	unit of sound level	
DBL	double	
DBL ACT DR	double acting door	
DBL GLZ	double glaze	
DBT	dry bulb temperature	
DC	direct current	
DCI	duct covering insulation	
DCP	dimmer control panel	
DCT SUP	duct supply	
DCT/RS	duct rising, duct riser	
DCT/RT	duct return	
DDC	direct digital control	
DEF	definition	
DEG	degree	
DEG C	degrees Celsius	
DEG F	degrees Fahrenheit	
DEL	delete	deliver
DEL	deliver	delete
DEMO	demolition	demonstration
DEMO	demonstration	demolition
DENS	density	
DEPT	department	
DES	designation	

Abbreviation	Term	Shared Abbreviation
DESCR	describe	description
DESCR	description	describe
DET	detail	
DETN	detention	
DEV	development	
DF	damage free	diesel fuel; drinking fountain
DF	diesel fuel	damage free; drinking fountain
DF	drinking fountain	damage free; diesel fuel
DF WL MTD	drinking fountain, wall mounted	
DFLCT	deflection	
DFR	defrost	
DFT	dry film thickness	
DFTG	drafting	
dg	decigram	
DGR	degrease	
DGTL	digital	
DH	double hung (door, window)	
DHI	Door Hardware Institute	
DHW	domestic hot water	double hung windows
DHW	double hung windows	domestic hot water
DI	drop inlet	
DIA	diameter	
DIAG	diagonal	diagram
DIAG	diagram	diagonal
DIFF	difference	differential; diffuser
DIFF	differential	difference; diffuser
DIFF	diffuser	difference; differential
DIM	dimension	
DIP	ductile iron pipe	
DIR	direction	
DISC	disconnect	
DISCH	discharge	

Abbreviation	Term	Shared Abbreviation
DISP	dispenser	
DIST	distance	district
DIST	district	distance
DISTR PNL	distribution panel	
DIV	divide	division
DIV	division	divide
DIW	deionized water	
DJ	double joist	
dL	deciliter	
DL	dead load	
DLI	duct liner insulation	
dm	decimeter	
DMPF	dampproofing	
DMPR	damper	
DMR	dimmer	
DMR SW	dimmer switch	
DOC	document	
DOM	domestic	
DOUG FIR	Douglas fir	
DOZ	dozen	
DP	dew point	
DPC	dampproof course	
DPDT	double pole, double throw	
DPS	differential pressure sensor	
DPST	double pole, single throw	
DPT	dew point temperature	differential pressure transmitter
DPT	differential pressure transmitter	dew point temperature
DPTN	demountable partition	
DR	dining room	door; drain; dressing room; drive
DR	door	dining room; drain; dressing room; drive
DR	drain	dining room; door; dressing room; drive
DR	dressing room	dining room; door; drain; drive

Abbreviation	Term	Shared Abbreviation
DR	drive	dining room; door; drain; dressing room
DR AREA	dressing area	
DR CL	door closer	
DR FR	door frame	
DR OPNG	door opening	
DRH	door holder	
DRLV	door louver	
DRST	door stop	
DRSW	door switch	
DS	disconnect switch	double strength (glass); downspout
DS	double strength (glass)	disconnect switch; downspout
DS	downspout	disconnect switch; double strength (glass)
DSBL	disable	
DSGN	design	
DSP	dry standpipe	
DSPL	disposal	
DT	drain tile	
DT DR	dutch door	
DTCH	detach	
DUPL	duplicate	
DVTL	dovetail	
DW	dishwasher	distilled water; domestic water
DW	distilled water	dishwasher; domestic water
DW	domestic water	dishwasher; distilled water
DWG	drawing	
DWH	domestic water heater	
DWR	domestic water return	drawer
DWR	drawer	domestic water return
DWS	domestic water supply	
DWTR	dumbwaiter	
DWV	drain, waste, and vent	
DX	duplex	

Abbreviation	Term	Shared Abbreviation
DX OUT	duplex outlet	
E		
E	east	modulus of elasticity
E	modulus of elasticity	east
E LABEL	Class E door	
EA	each	
EAR	exhaust air register	
EAT	entering air temperature	
EC	edge of curb	
ECC	eccentric	
ECC RDCR	eccentric reducer	
ECON	economizer	
ECU	evaporative cooling unit	
EDBT	entering dry bulb temperature	
EDP	electronic data processing	
EE	each end	
EER	energy efficiency ratio	
EF	each face	exterior finish
EF	exterior finish	each face
EFF	effective	efficiency
EFF	efficiency	effective
EFS	exterior finish system	
EFT	effect	
EG	edge grain	
EGB	exterior gypsum board	
EGRD	eye guard	
EGSB	exterior gypsum sheathing board	
EH	electric heater	
EHD	electric hand dryer	
EHP	effective horsepower	electric heating panel
EHP	electric heating panel	effective horsepower
EIFS	exterior insulation and finish system	

Abbreviation	Term	Shared Abbreviation
EJ	expansion joint	
EJCDC	Engineers Joint Contract Documents Committee	
EL	each layer	easement line; elevation
EL	easement line	each layer; elevation
EL	elevation	each layer; easement line
ELAST	elastomeric	
ELEC	electric	
ELEC DR OP	electric door opener	
ELEM	element	elementary
ELEM	elementary	element
ELEV	elevator	
EM	electromagnetic	expanded metal
EM	expanded metal	electromagnetic
EMCP	emergency monitoring control panel	
EMER	emergency	
EMER SHR	emergency shower	
EMI	electromagnetic interference	
EMS	energy management system	
EMT	electrical metallic tubing	
ENAM	enamel	
ENCL	enclosure	
ENG	engine	
ENGR	engineer	
ENGY	energy	
ENT	electrical nonmetallic tubing	
ENTR	entrance	
ENVIR	environment	
EO	electrical outlet	
EOS	edge of slab	
EOV	electrically operated valve	
EP	edge of pavement (paving)	electrical panel (panelboard)
EP	electrical panel (panelboard)	edge of pavement (paving)

Abbreviation	Term	Shared Abbreviation
EPA	Environmental Protection Agency	
EPB	electric panel board	
EPDM	ethylene propylene diene monomer	
EPO	emergency power off	
EPRF	explosion proof	
EPS	expanded polystyrene board (insulation)	
EPT	external pipe thread	
EQ	equal	
EQL SP	equally spaced	
EQUIP	equipment	
EQUIV	equivalent	
ERD	existing roof drain	
ERW	electrical resistance welding	
ES	edge of shoulder	electrostatic
ES	electrostatic	edge of shoulder
ESC	escape	escutcheon
ESC	escutcheon	escape
ESCAL	escalator	
ESMT	easement	
ESP	especially	
ESP	external static pressure	
EST	estimate	
ESTB	establish	
ET	effective temperature	
ETC	and so forth	et cetera
ETC	et cetera	and so forth
EVAC	evacuate	
EVAP	evaporate	
EW	each way	
EWA	Engineered Wood Association	
EWBT	entering wet bulb temperature	
EWC	electric water cooler	

Abbreviation	Term	Shared Abbreviation
EWB	electric water heater	
EWS	eye wash station	
EWT	entering water temperature	
EX	example	
EXC	excavate	
EXCH	exchanger	
EXCL	exclude	
EXEC	execute	
EXH	exhaust	exhibit
EXH	exhibit	exhaust
EXH A	exhaust air	
EXH DT	exhaust duct	
EXH FN	exhaust fan	
EXH GR	exhaust air grille	
EXH HD	exhaust hood	
EXHV	exhaust vent	
EXIST	existing	
EXP	expand	expansion; exposed
EXP	expansion	expand; exposed
EXP	exposed	expand; expansion
EXP BT	expansion bolt	
EXST GR	existing grade	
EXT	exterior	external; extinguisher
EXT	external	exterior; extinguisher
EXT	extinguisher	exterior; external
EXT GR	exterior grade	
EXT LT	exit light	
EXTN	extension	
EXTRU	extrusion	
F		
F	Fahrenheit	female; fire line
F	female	Fahrenheit; fire line

Abbreviation	Term	Shared Abbreviation
F	fire line	Fahrenheit; female
F BRK	fire brick	
F METER	flowmeter	
F/F	face to face	
F1S	finished one side	
F2S	finish two sides	
F4S	finish four sides	
FA	face area	final assembly; fire alarm; fresh air
FA	final assembly	face area; fire alarm; fresh air
FA	fire alarm	face area; final assembly; fresh air
FA	fresh air	face area; final assembly; fire alarm
FAAP	fire alarm annunciator panel	
FAB	fabric	
FABL	fire alarm bell	
FABX	fire alarm box	
FAC	factor	
FACIL	facility	
FACP	fire alarm control panel	
FAI	fresh air inlet (intake)	
FAR	floor area ratio	
FAS	fascia	fire alarm station
FAS	fire alarm station	fascia
FAS BD	fascia board	
FAX	facsimile	
FB	fire blanket	flat bar
FB	flat bar	fire blanket
FBM	foot board measure	
FC	file cabinet	footcandle
FC	footcandle	file cabinet
FC BRK	face brick	
FCO	floor cleanout	
FCTY	factory	

Abbreviation	Term	Shared Abbreviation
FCU	fan coil unit	
FD	floor drain	
FDBK	feedback	
FDC	fire department connection	
FDCC	fire department connection cabinet	
FDMPR	fire damper	
FDO	feedout	
FDR	feeder	fire door
FDR	fire door	feeder
FDTN	foundation	
FDV	fire department valve	
FDW	feedwater	
FE	fire extinguisher	
FEA	Federal Energy Administration	
FEC	fire extinguisher cabinet	
FED	federal	
FF	far face	finish face
FF	finish face	far face
FF BATT	foil backed batt insulation	
FF EL	finish floor elevation	
FF INSUL	foil backed insulation	
FF&E	furniture, fixture, and equipment	
FFA	from floor above	
FFB	from floor below	
FGL	fiberglass	
FH	fire hose	fire hydrant; flat head; flat head screws
FH	fire hydrant	fire hose; flat head; flat head screws
FH	flat head	fire hose; fire hydrant; flat head screws
FH	flat head screws	fire hose; fire hydrant; flat head
FHA	Federal Housing Administration	
FHC	fire hose cabinet	
FHMS	flat head machine screw	

Abbreviation	Term	Shared Abbreviation
FHP	full height partition	
FHR	fire hose rack	
FHWA	Federal Highway Administration	
FHWS	flat head wood screw	
FIG	figure	
FIL	fillet	
FIN	finish	
FIN BS	finish both sides	
FIN FLR	finish floor	
FIN GR	finish grade	
FIN WD	finish wood	
FIXT	fixture	
FL	floorline	foot-lambert
FL	foot-lambert	floorline
FL FIN CONC	float finish concrete	
FL OUT	floor outlet	
FL OZ	fluid ounce	
FL SW	flow switch	
FLA	full load amps	
FLASH	flashing	
FLDG	folding	
FLEX	flexible	
FLG	flange	flooring
FLG	flooring	flange
FLL	flow line	
FLMB	flammable	
FLMT	flush mount	
FLOUTS	single receptacle floor outlet	
FLR	filler	floor
FLR	floor	filler
FLR FIN	floor finish	
FLR PL	floor plate	

Abbreviation	Term	Shared Abbreviation
FLR REG	floor register	
FLR SK	floor sink	
FLRD	flared	
FLT	floodlight	
FLT GL	float glass	
FLTR	filter	
FLUOR	fluorescent	
FLUOR FIX	fluorescent fixture	
FLUT	fluting	
FLUT CMU	fluted concrete masonry unit	
FM	factory mutual	
FMBD	form board	
FN	fence	
FNGR JT	finger joint	
FO	field order	finished opening; fuel oil
FO	finished opening	field order; fuel oil
FO	fuel oil	field order; finished opening
FOC	face of concrete	face of curb
FOC	face of curb	face of concrete
FOF	face of finish	fuel oil return line
FOF	fuel oil return line	face of finish
FOM	face of masonry	
FOP	fuel oil pump	
FOR	fuel oil return	
FOS	face of slab	face of stud; fuel oil supply
FOS	face of stud	face of slab; fuel oil supply
FOS	fuel oil supply	face of slab; face of stud
FOTK	fuel oil storage tank	
FOUNT	fountain	
FOUTT	telephone floor outlet	
FOV	fuel oil vent	
FOW	face of wall	

Abbreviation	Term	Shared Abbreviation
FP	fire protection	fireproof; flagpole; freezing point
FP	fireproof	fire protection; flagpole; freezing point
FP	flagpole	fire protection; fireproof; freezing point
FP	freezing point	fire protection; fireproof; flagpole
FPL	fireplace	
FPM	feet per minute	
FPS	feet per second	
FPT	fan powered terminal	
FPW	fire protection water supply	
FR	fire rating	fire resistant; frame
FR	fire resistant	fire rating; frame
FR	frame	fire rating; fire resistant
FR GL	fritted glass	
FR MIR	framed mirror	
FR MIR/SHF	framed mirror and shelf	
FR SNK	flushing rim sink	
FRA	fire rated assembly	
FREQ	frequency	
FRG	fiber reinforced gypsum	
FRMG	framing	
FRP	fiber reinforced polyester	fiberglass reinforced plastic
FRP	fiberglass reinforced plastic	fiber reinforced polyester
FRST GL	frosted glass	
FRT	freight	
FRTW	fire retardant treated wood	
FRWY	freeway	
FRZ	freezer	
FS	far side	Federal Specification; fire station; full scale; full size
FS	Federal Specification	far side; fire station; full scale; full size
FS	fire station	far side; Federal Specification; full scale; full size
FS	full scale	far side; Federal Specification; fire station; full size
FS	full size	far side; Federal Specification; fire station; full scale

Abbreviation	Term	Shared Abbreviation
FSC	federal supply classification	
FSH	fire sprinkler head	
FSN	federal stock number	
FSP	fire standpipe	
FSS	flow sensing switch	
FSTAT	freezestat	
FSTNR	fastener	
FT	feet	fire treated; foot; fully tempered (glass)
FT	fire treated	feet; foot; fully tempered (glass)
FT	foot	feet; fire treated; fully tempered (glass)
FT	fully tempered (glass)	feet; fire treated; foot
FT/LB	foot/pound	
FT/LBF	foot/pound force	
FTD	facial tissue dispenser	
FTG	footing	
FTM	federal test methods	
FTR	finned tube radiation	
FU SW	fused switch	
FURG	furring	
FURN	furnace	furnish; furniture
FURN	furnish	furnace; furniture
FURN	furniture	furnace; furnish
FUS LINK	fusible link	
FUT	future	
FV	face velocity	flush valve; foot valve
FV	flush valve	face velocity; foot valve
FV	foot valve	face velocity; flush valve
FVNR	full voltage non-reversing	
FVR	full voltage reversing	
FW	fire wall	flood wall
FW	flood wall	fire wall
FWC	fabric wallcovering	

Abbreviation	Term	Shared Abbreviation
FWR	filter water return	
FWRK	formwork	
FWS	filter water supply	
G		
G	girder	ground; natural gas
G	ground	girder; natural gas
G	natural gas	girder; ground
G DISP	garbage disposal	
G LN	gas line	
GA	gage	Gypsum Association
GA	Gypsum Association	gage
GAL	gallon	
GALV	galvanic	galvanized
GALV	galvanized	galvanic
GALV STL	galvanized steel	
GB	gas bibb	grab bar
GB	grab bar	gas bibb
GC	general contractor	
GCO	grade cleanout	
GD	guard	
GDR	guard rail	
GEN	general	generator
GEN	generator	general
GEN COND	general conditions	
GEN PURP	general purpose	
GFCI	ground fault circuit interrupter	
GFRC	glass-fiber-reinforced concrete	
GFRG	glass-fiber-reinforced gypsum	
GFRP	glass-fiber-reinforced plaster	glass-fiber-reinforced plastic
GFRP	glass-fiber-reinforced plastic	glass-fiber-reinforced plaster
GI	galvanized iron	
GIP	galvanized iron pipe	

Abbreviation	Term	Shared Abbreviation
GL	glass	ground level
GL	ground level	glass
GL BLK	glass block	
GLU LAM	glued laminated wood	
GLV	globe valve	
GLZ	glazing	
GLZ CMU	glazed concrete masonry unit	
GM	silty gravel	
GMK	grand master key	
GMKD	grand master keyed	
GMP	guaranteed maximum price	
GOVT	government	
GP	group	
GPC	gypsum plaster ceiling	
GPD	gallons per day	
GPH	gallons per hour	
GPM	gallons per minute	
GPR	gas pressure regulator	
GPS	gallons per second	
GR	gross	
GR BM	grade beam	
GR FL	ground floor	
GR LN	grade line	
GR WT	gross weight	
GRAD	gradient	
GRAN	granite	
GRD OUT	grounded outlet	
GRDN	garden	
GRL	grille	
GROM	grommet	
GRTG	grating	
GRV	gravity roof ventilator	groove

Abbreviation	Term	Shared Abbreviation
GRV	groove	gravity roof ventilator
GSB	gypsum sheathing board	
GSM	galvanized sheet metal	
GSU	glazed structural unit	
GT	grease trap	gross ton; grout
GT	gross ton	grease trap; grout
GT	grout	grease trap; gross ton
GTV	gate valve	
GUAR	guarantee	
GUT	gutter	
GV	gasoline vent	gravity vent
GV	gravity vent	gasoline vent
GVTR	gas vent through roof	
GWH	gas fired water heater	
GWT	glazed wall tile	
GYM	gymnasium	
GYP	gypsum	
GYP BD	gypsum board	
GYP PLAS	gypsum plaster	
H		
H	hatch (roof)	high
H	high	hatch (roof)
H PLAM	high pressure plastic laminate	
H&CW	hot and cold water	
Ha	abrasive hardness	
ha	hectare	
HAGL	heat absorbing glass	
HAZ	hazard	
HAZ MAT	hazardous materials	
HB	hose bibb	
HC	handicap	heating coil; heavy commercial; hollow core; hose cabinet
HC	heating coil	handicap; heavy commercial; hollow core; hose cabinet

Abbreviation	Term	Shared Abbreviation
HC	heavy commercial	handicap; heating coil; hollow core; hose cabinet
HC	hollow core	handicap; heating coil; heavy commercial; hose cabinet
HC	hose cabinet	handicap; heating coil; heavy commercial; hollow core
HCFC	hydrochlorofluorocarbons	
HCMU	hollow concrete masonry unit	
HCONN	hose connector	
HCP	handicapped	
HCWD	hollow core wood door	
HD	hand dryer	heavy duty
HD	heavy duty	hand dryer
HD JT	head joint	
HDBD	hardboard	
HDNR	hardener	
HDO	high density overlay	
HDPE	high density polyethylene	
HDR	header	
HDW	hardware	
HDWD	hardwood	
HDWL	headwall	
HEM	hemlock	
HEPA	high efficiency particulate air (filter)	
HEX	heat exchanger	hexagon
HEX	hexagon	heat exchanger
HF	high frequency	
HG	heat gain	
Hg	mercury	
HGR	hanger	
HGV	hose gate valve	
HH	hand hole	
HID	high intensity discharge	
hL	hectoliter	
HLDN	holddown	

Abbreviation	Term	Shared Abbreviation
hm	hectometer	
HM	hollow metal	
HMD	hollow metal door	humidity
HMD	humidity	hollow metal door
HMDF	hollow metal door and frame	
HMF	hollow metal frame	
HMMA	Hollow Metal Manufacturers Association	
HMR	hammer	
HNDRL	handrail	
HO	hold open	
HOA	hand-off-automatic	
HORIZ	horizontal	
HOSP	hospital	
HP	heat pump	high pressure; horsepower
HP	high pressure	heat pump; horsepower
HP	horsepower	heat pump; high pressure
HPB	high pressure boiler	
HPDT	high pressure drip trap	
HPF	high power factor	
HPG	high pressure gas	
HPR	high pressure return	
HPS	high pressure sodium	high pressure steam
HPS	high pressure steam	high pressure sodium
HPT	high pressure trap	
HQ	headquarters	
HS	hand sink	heat-strengthened (glass); high strength
HS	heat-strengthened (glass)	hand sink; high strength
HS	high strength	hand sink; heat-strengthened (glass)
HSE	house	
HSKPG	housekeeping	
HST	hoist	
HSTAT	humidistat	

Abbreviation	Term	Shared Abbreviation
HT	height	
HT TRD	heat treated (glass)	
HTHW	high temperature hot water	
HTWR	heating water return	
HTWS	heating water supply	
HV	high voltage	hose valve
HV	hose valve	high voltage
HVAC	heating, ventilating, and air conditioning	
HVD	high velocity diffuser	
HVT	high velocity terminal	
HVY	heavy	
HW	hot water	
HWB	hot water boiler	
HWC	hot water coil	
HWCP	hot water circulating pump	
HWL	hot water line	
HWP	hot water pump	
HWR	hot water return	
HWS	hot water supply	
HWT	hot water tank	
HWY	highway	
HYD	hydrant	
HYDR	hydraulic	
Hz	hertz	
I		
I	interstate (highway)	moment of inertia
I	moment of inertia	interstate (highway)
I/O	input/output	
IAQ	indoor air quality	
IB	I beam	
IBC	International Building Code	
IC	interrupting capacity	ironing cabinet

Abbreviation	Term	Shared Abbreviation
IC	ironing cabinet	interrupting capacity
ID	identification	inside diameter; inside dimension; interior design
ID	inside diameter	identification; inside dimension; interior design
ID	inside dimension	identification; inside diameter; interior design
ID	interior design	identification; inside diameter; inside dimension
ID NO	identification number	
IESNA	Illumination Engineering Society of North America	
IF	inside face	intake fan
IF	intake fan	inside face
IFS	inside face of stud	
IGN	ignition	
IIC	impact isolation class	
ILLUM	illumination	
ILLUS	illustrate	
IMC	intermediate metal conduit	
IMED	immediate	
IMH	inlet manhole	
IN WC	inches, water column	
INC	increase	
INCAND	incandescent	
INCIN	incinerator	
INCL	included	
INCR	increment	
IND	independent	industrial
IND	industrial	independent
INF	infinite	
INFO	information	
IN-LB	inch-pound	
IN-LBF	inch-pound force	
INR	impact noise rating	
INS	insurance	
IN/S	inches per second	

Abbreviation	Term	Shared Abbreviation
INSTL	install	
INSTR	instrument	
INSUF	insufficient	
INSUL	insulation	
INSUL PNL	insulated metal panel	
INT	interior	
INTERCOM	intercommunication	
INTL	international	
INV	invert	
INV EL	invert elevation	
IP	iron pipe	
IPM	impulses per minute	
IPS	impulses per second	international pipe standard; iron pipe size
IPS	international pipe standard	impulses per second; iron pipe size
IPS	iron pipe size	impulses per second; international pipe standard
IPT	iron pipe threaded	
IR	infrared	inside radius
IR	inside radius	infrared
IRMA	inverted roof membrane assembly	
IRREG	irregular	
IS	insect screen	island
IS	island	insect screen
ISO	International Standards Organization	isometric
ISO	isometric	International Standards Organization
IT	isolation transformer	
ITS	Intertek Testing Services	
IW	irrigation water	
IWH	instantaneous water heater	
J		
JAL	jalousie	
JAN	janitor	
JAN CLO	janitor closet	

Abbreviation	Term	Shared Abbreviation
J-BOX	junction box	
JR	junior	
JS	janitor's sink	
K		
k	kilo	
K	kelvin	thousand
K	thousand	kelvin
K VALUE	thermal conductivity	
KA	cylinder locks keyed alike	
KB	knee brace	
KC	kitchen cabinet	
kCAL	kilocalorie	
KD	kiln dried	knocked down
KD	knocked down	kiln dried
kg	kilogram	
kHz	kilohertz	
KIP	thousand pounds	
KIP FT	thousand foot/pounds	
KIT	kitchen	
kL	kiloliter	
KLF	kips per lineal foot	
km	kilometer	
km ²	square kilometer	
km/h	kilometer per hour	
km/s	kilometer per second	
KO	knockout	
KOP	knock out panel	
kPa	kilopascal	
KPL	kickplate	
KSF	kips per square foot	
KSI	kips per square inch	
kV	kilovolt	

Abbreviation	Term	Shared Abbreviation
kVA	kilovolt ampere	
kVAh	kilovolt ampere per hour	
kVAR	kilovolt ampere reactive	
kW	kilowatt	
kWh	kilowatt hour	
kWhm	kilowatt hour meter	
KWY	keyway	
L		
L	angle	liter
L	liter	angle
L CL	linen closet	
L COL	lally column	
L&L	latch and lock	
L&P	lath and plaster	
L/s	liter per second	
LA	leaving air	lightning arrester
LA	lightning arrester	leaving air
LAB	laboratory	
LAD	ladder	
LAG	lagging	
LAM	laminare	
LAM GL	laminated glass	
LANH	launch	
LAQ	lacquer	
LAT	latitude	lattice; leaving air temperature
LAT	lattice	latitude; leaving air temperature
LAT	leaving air temperature	latitude; lattice
LATL	lateral	
LAU	laundry	
LAV	lavatory	
LBF	pound-force	
LBF/FT	pound-force per foot	

Abbreviation	Term	Shared Abbreviation
LBF/SF	pound-force per square foot	
LBF/CF	pound-force per cubic foot	
LBF/HP	pound-force per horsepower	
LBF/H	pound-force per hour	
LBF/IN	pound-force per inch	
LBF/SI	pound-force per square inch	
LBF/MIN	pound-force per minute	
LBR	lumber	
LBS	pound	
LC	laundry chute	
LCD	linear ceiling diffuser	
LCM	loose cubic meter	
LCMU	lightweight concrete masonry unit	
LCY	loose cubic yard	
LD	linear diffuser	
LD BRG	load-bearing	
LDBT	leaving dry bulb temperature	
LDD	lumen dirt depreciation	
LDG	landing	
LDMK	landmark	
LDPE	low density polyethylene	
LDR	leader	
LED	light emitting diode	
LF	linear feet (foot)	
LF INS	loose fill insulation	
LG	line ground	liquid gas
LG	liquid gas	line ground
LH	latent heat	left hand
LH	left hand	latent heat
LHG	latent heat gain	
LHR	latent heat ratio	left hand reverse
LHR	left hand reverse	latent heat ratio

Abbreviation	Term	Shared Abbreviation
LHS	left hand side	
LIB	library	
LIM SW	limit switch	
LIN	linear	
LINO	linoleum	
LIQ	liquid	liquor
LIQ	liquor	liquid
LKNT	locknut	
LKR	locker	
LKR RM	locker room	
LKWASH	lockwasher	
LL	lead lined	live load; low level; lower left
LL	live load	lead lined; low level; lower left
LL	low level	lead lined; live load; lower left
LL	lower left	lead lined; live load; low level
LL GB	lead lined gypsum board	
LLD	lamp lumen depreciation	
LLH	long leg horizontal	
LLV	long leg vertical	
LM	lumen	
LMST	limestone	
LN	lane	
LNDSCP	landscape	
LNG	liquid natural gas	longitude
LNG	longitude	liquid natural gas
LO	lock on	lubricating oil
LO	lubricating oil	lock on
LOC	location	
LOG	logarithm	
LONG	longitudinal	
LOP	lubricating oil pump	
LOS	line of sight	

Abbreviation	Term	Shared Abbreviation
LOV	lubricating oil vent	
LOX	liquid oxygen	
LP	light pole	lightproof; liquid petroleum; low pressure (mechanical)
LP	lightproof	light pole; liquid petroleum; low pressure (mechanical)
LP	liquid petroleum	light pole; lightproof; low pressure (mechanical)
LP	low pressure (mechanical)	light pole; lightproof; liquid petroleum
LPAS	low pressure alarm switch	
LPB	low pressure boiler	
LPCR	low pressure condensate return	
LPDT	low pressure drip trap set	
LPF	low power factor	
LPG	liquid petroleum gas	low pressure gas
LPG	low pressure gas	liquid petroleum gas
LPL	lightproof louver	
LPR	low pressure return	
LPS	low pressure sodium	low pressure steam
LPS	low pressure steam	low pressure sodium
LPT	low point	
LPV	lightproof vent	
LPW	lumens per watt	
LR	living room	
LRA	locked rotor amps	
LRG	large	
LRV	louvered roof vent	
LS	large scale	lawn sprinkling; lump sum
LS	lawn sprinkling	large scale; lump sum
LS	lump sum	large scale; lawn sprinkling
LT	light	
LT FLUOR	fluorescent lighting	
LT GA	light gage	
LT SW	light switch	
LT WT	lightweight	

Abbreviation	Term	Shared Abbreviation
LTD	limited	
LTG	lighting	
LTG PNL	lighting panel	
LTHW	low temperature hot water	
LTNG	lightning	
LUB	lubricate	
LV	low voltage	
LVD	louvered	
LVDR	louver door	
LVR	louver	
LW	low water	
LW PLAS	lightweight plaster	
LWBT	leaving wet bulb temperature	
LWC	lightweight concrete	
LWCO	low water cut off	
LWIC	lightweight insulating concrete	
LWM	low water mark	
LWT	leaving water temperature	
LYR	layer	
LYT	layout	
M		
m	meter	
m ²	square meter	
m ³	cubic meter	
m ³ /s	cubic meter per second	
m/s	meter per second	
M	moment	
mA	milliampere	
MA	mixed air	
MACH	machine	
MACH RM	machine room	
MAG	magnet	

Abbreviation	Term	Shared Abbreviation
MAHOG	mahogany	
MAINT	maintenance	
MAN	manual	
MAT	mixed air temperature	
MATL	material	
MATV	master antenna television system	
MAU	make up air unit	
MAV	manual air vent	
MAX	maximum	
MB	machine bolt	mail box; mixing box
MB	mail box	machine bolt; mixing box
MB	mixing box	machine bolt; mail box
MBF	thousand board feet	
MBH	mop/broom holder	
MBM	thousand feet board measure	
MBR	master bedroom	member
MBR	member	master bedroom
MBtu	British thermal unit (1000)	
MBtuH	thousand Btu per hour	
MC	manhole cover	mechanical contractor; medicine cabinet; metal-clad; moisture content; moment connection
MC	mechanical contractor	manhole cover; medicine cabinet; metal-clad; moisture content; moment connection
MC	medicine cabinet	manhole cover; mechanical contractor; metal-clad; moisture content; moment connection
MC	metal-clad	manhole cover; mechanical contractor; medicine cabinet; moisture content; moment connection
MC	moisture content	manhole cover; mechanical contractor; medicine cabinet; metal-clad; moment connection
MC	moment connection	manhole cover; mechanical contractor; medicine cabinet; metal-clad; moisture content

Abbreviation	Term	Shared Abbreviation
MCA	minimum circuit amps	
MCB	main circuit breaker	metal corner bead
MCB	metal corner bead	main circuit breaker
MCC	motor control center	
MCF	thousand cubic feet	
MCH	mail chute	
MD	manual damper	metal deck
MD	metal deck	manual damper
MDC	motor direct connect	
MDO	medium density overlay	
ME	mechanical engineer	
MEAS	measure	
MECH	mechanical	
MECH RM	mechanical room	
MED	medical	medium
MED	medium	medical
MEK	methyl ethyl ketone	
MEL	melamine	
MEMB	membrane	
MEMO	memorandum	
MER	meridian	
MEZZ	mezzanine	
MF	mastic floor	mill finish
MF	mill finish	mastic floor
MFD	manufactured	
MFG	manufacturing	
MFMA	Maple Flooring Manufacturers Association	Metal Framing Manufacturers Association
MFMA	Metal Framing Manufacturers Association	Maple Flooring Manufacturers Association
MFR	manufacturer	mass flow rate
MFR	mass flow rate	manufacturer
MFR REC	manufacturer's recommendation	
MG	motor generator	

Abbreviation	Term	Shared Abbreviation
MGD	million gallons per day	
MGPH	one thousand gallons per hour	
MGT	management	
MH	manhole	
MHD	masthead	
MHz	megahertz	
MIA	Marble Institute of America	
MIC	microphone	
MID	middle	
MIL STD	military standard	
MIN	minimum	minute
MIN	minute	minimum
MIRR	mirror	
MISC	miscellaneous	
MIT	miter	
MKD	masterkeyed	
MKR	marker	
ML	materials list	metal lath; monolithic
ML	metal lath	materials list; monolithic
ML	monolithic	materials list; metal lath
ML&P	metal lath and plaster	
MLDG	molding (moulding)	
MLWK	millwork	
mm	millimeter	
mm ²	square millimeter	
mm ³	cubic millimeter	
MN	magnetic north	
MO	masonry opening	motor operated
MO	motor operated	masonry opening
MOCP	maximum overcurrent protection	
MOD	model	modify; module; motor operated damper
MOD	modify	model; module; motor operated damper

Abbreviation	Term	Shared Abbreviation
MOD	module	model; modify; motor operated damper
MOD	motor operated damper	model; modify; module
MOD BIT	modified bitumen	
MODEM	modulator-demodulator	
MON	monitor	monument
MON	monument	monitor
MOPR	mop rack	
MOS	metal oxide semiconductor	
MOT	motor	
MOV	motor operated valve	
MP	medium pressure	
MPG	medium pressure gas	miles per gallon
MPG	miles per gallon	medium pressure gas
MPH	miles per hour	
MPR	medium pressure return	
MPS	medium pressure steam	
MPT	male pipe thread	
MR	moisture resistant	
MRB	marble base	
MRF	marble floor	
MRT	marble threshold	
MS	machine screw	mop sink; motor starter
MS	mop sink	machine screw; motor starter
MS	motor starter	machine screw; mop sink
ms	millisecond	
MSB	mop service basin	
MSF	one thousand square feet	
MSL	mean sea level	
MSTRE	moisture	
MSW	master switch	
MT	metal threshold	mount
MT	mount	metal threshold

Abbreviation	Term	Shared Abbreviation
MTD	mean temperature difference	mounted
MTD	mounted	mean temperature difference
MTG	meeting	mounting
MTG	mounting	meeting
MTHW	medium temperature hot water	
MTL	metal	
MTLB	metal base	
MTLD	metal door	
MTLF	metal flashing	
MTLP	metal partition	
MTLR	metal roof	
MTS	manual transfer switch	
MTX	matrix	
MULL	mullion	
MULT	multiple	
MUNIC	municipal	
mV	millivolt	
MVA	megavolt-ampere	
MVBL	movable	
MVD	manual volume damper	
mW	milliwatt	
MW	megawatt	microwave
MW	microwave	megawatt
MWh	megawatt hour	
MWP	membrane waterproofing	
MZ	multizone	
N		
N	newton	north
N	north	newton
NA	not applicable	

Abbreviation	Term	Shared Abbreviation
NAAMM	National Association of Architectural Metal Manufacturers	
NAR	narrow	
NAT	natural	
NATL	national	
NBC	National Building Code	
NBS	National Bureau of Standards	
NC	noise criteria	normally closed
NC	normally closed	noise criteria
NCA	nickel copper alloy	
NCOMBL	noncombustible	
NE	not exceeding	
NEC	National Electrical Code	
NEG	negative	
NEGTD	negotiated	
NEMA	National Electrical Manufacturers Association	
NEUT	neutral	
NF	near face	
NFC	National Fire Code	
NFPA	National Fire Protection Association	
NFRC	National Fenestration Rating Council	
NFSD	nonfused	
NI SIL	nickel silver	
NIBS	National Institute of Building Sciences	
NIC	noise isolation class	not in contract
NIC	not in contract	noise isolation class
NICOP	nickel copper	
NIST	National Institute of Standards and Technology	
NKL	nickel	
NL	night light	
NLB	nonloadbearing	
NM	non-metallic	

Abbreviation	Term	Shared Abbreviation
NMAG	nonmagnetic	
NO	normally open	number
NO	number	normally open
NOC	notice of clarification	
NOM	nominal	
NON STD	nonstandard	
NONFLMB	nonflammable	
NORM	normal	
NP	no paint	
NPCA	National Paint and Coatings Association	
NPL	nameplate	nickel plated
NPL	nickel plated	nameplate
NR	noise reduction	
NRC	noise reduction coefficient	
NRCA	National Roofing Contractors Association	
NRCP	non-reinforced concrete pipe	
NRP	nonremovable	
NS	narrow stile	near side; no scale
NS	near side	narrow stile; no scale
NS	no scale	narrow stile; near side
NT WT	net weight	
NTP	notice to proceed	
NTS	not to scale	
NUM	numeral	
O		
O/	over	
O/O	out to out	
O	oxygen	
OA	outside air	overall
OA	overall	outside air
OAD	outside air damper	
OAG	outside air grille	

Abbreviation	Term	Shared Abbreviation
OAI	outside air intake	
OBW	observation window	
OC	on center	
OCB	oil circuit breaker	
OCC	occupy	
OCR	oil circuit recloser	
OCT	octagon	
OD	outside diameter	outside dimension
OD	outside dimension	outside diameter
OF	outside face	
OF/CI	owner furnished/contractor installed	
OFD	overflow drain	
OFF	office	
OF/OI	owner furnished/owner installed	
OFS	outside face of studs	
OGA	oil gage	
OGL	obscure glass	
OH	overhang	
OH DR	overhead (coiling) door	
OL	overload	
OLVL	oil level	
OP	oil proof	
OPH	opposite hand	
OPNG	opening	
OPP	opposite	
OPQ	opaque	
OPR	operable	
OPRS	oil pressure	
OPT	optimum	optional
OPT	optional	optimum
OR	operating room	outside radius
OR	outside radius	operating room

Abbreviation	Term	Shared Abbreviation
ORD	ordnance	overflow roof drain
ORD	overflow roof drain	ordnance
ORG	organic	
ORIG	original	
ORN	ornamental	
OS	oil switch	
OSHA	Occupational Safety and Health Administration	
OSL	oil seal	
OSP	operating steam pressure	
OTG	oil temperature gauge	
OUT	outlet	
OVC	overcurrent	
OVFL	overflow	
OVRD	override	
OWGL	obscure wired glass	
OZ	ounce	
P		
P	pole	pump
P	pump	pole
Pa	pascal	
PA	pipe anchor	power amplifier; public address
PA	power amplifier	pipe anchor; public address
PA	public address	pipe anchor; power amplifier
PANB	panic bolt	
PAR	parallel	parapet
PAR	parapet	parallel
PARA	paragraph	
PAREN	parenthesis	
PARG	parging	
PART	partial	
PASS	passenger	
PAT	pattern	

Abbreviation	Term	Shared Abbreviation
PB	painted base	panelboard; panic bar; pull box; pushbutton
PB	panelboard	painted base; panic bar; pull box; pushbutton
PB	panic bar	painted base; panelboard; pull box; pushbutton
PB	pull box	painted base; panelboard; panic bar; pushbutton
PB	pushbutton	painted base; panelboard; panic bar; pull box
PBD	particleboard	
PC	piece	point of curve; polycarbonate; portland cement
PC	point of curve	piece; polycarbonate; portland cement
PC	polycarbonate	piece; point of curve; portland cement
PC	portland cement	piece; point of curve; polycarbonate
PCA	Portland Cement Association	
PCB	polychlorinated biphenyl	
PCC	precast concrete	precool coil
PCC	precool coil	precast concrete
PCCP	concrete pavement	
PCD	paper cup dispenser	
PCF	pounds per cubic foot	
PCI	Precast/Prestressed Concrete Institute	
PCP	portland cement plaster	
PCT	percent	
PD	pressure drop or difference	
PDCA	Painting and Decorating Contractors of America	
PDISCH	pump discharge	
PE	photoelectric	pneumatic electric
PE	pneumatic electric	photoelectric
PEC	photoelectric cell	
PED	pedestal	
PEJ	premolded expansion joint	
PEN	penetrate	
PEND	pendant	
PER	period	
PERF	perforated	perform

Abbreviation	Term	Shared Abbreviation
PERF	perform	perforated
PERIM	perimeter	
PERM	permanent	
PERP	perpendicular	
PETRO	petroleum	
PF	power factor	
PG	pressure gage	profile grade
PG	profile grade	pressure gage
PGBD	pegboard	
pH	acid/alkaline scale	
PH	penthouse	phase
PH	phase	penthouse
PHAR	pharmacy	
PHC	preheat coil	
PHOTO	photograph	
PHS	phillips head screw	
PHWR	primary hot water return	
PHWS	primary hot water supply	
PI	point of intersection	
PIB	polyisobutylene (plastic)	
PIL	pilaster	
PIV	pivoted	post indicator valve
PIV	post indicator valve	pivoted
PK GAR	parking garage	
PK LOT	parking lot	
PKG	package	
PKWY	parkway	
PL	property line	
PL GL	plate glass	
PLAM	plastic laminate	
PLAS	plaster	plastic
PLAS	plastic	plaster

Abbreviation	Term	Shared Abbreviation
PLAT	platform	
PLB	plumb	
PLBG	plumbing	
PLC	place	
PLF	pounds per linear foot	
PLG	piling	
PLST WL	plaster wall	
PLYWD	plywood	
PM	phase meter	
PMBC	plant mix bituminous concrete	
PMTL	painted metal	
PMF	probable maximum flood	
PMP	probable maximum precipitation	
PMP SCT	pump suction	
PN	part number	
PNEU	pneumatic	
PNL	panel	
PO	post office	purchase order
PO	purchase order	post office
POL	polished	
POLY	polyethylene (plastic)	
PORC	porcelain	
PORT	portable	
POS	positive	position
POS	position	positive
POTW	potable water	
POW LN	power line	
PP	panel point	polypropylene (plastic); push/pull
PP	polypropylene (plastic)	panel point; push/pull
PP	push/pull	panel point; polypropylene (plastic)
PP PL	push/pull plate	
PPGL	polished plate glass	

Abbreviation	Term	Shared Abbreviation
PPM	parts per million	
PR	pair	pipe rail; pumped return
PR	pipe rail	pair; pumped return
PR	pumped return	pair; pipe rail
PRCST	precast	
PRD	push rod	
PRE	power roof exhaust	
PREF	preference	
PREFAB	prefabricate	
PREFIN	prefinish	
PREFMD	preformed	
PRELIM	preliminary	
PREP	preparation	
PRESS	pressure	
PRESS SW	pressure switch	
PREV	previous	
PRI	primary	
PRIN	principal	
PRKG	parking	
PRMLD	premolded	
PROD	production	
PROJ	project	
PROP	property	
PROV	provisional	
PRS	pressure reducing station	
PRV	power roof ventilator	pressure reducing valve; pressure regulator valve; pressure relief valve
PRV	pressure reducing valve	power roof ventilator; pressure regulator valve; pressure relief valve
PRV	pressure regulator valve	power roof ventilator; pressure reducing valve; pressure relief valve

Abbreviation	Term	Shared Abbreviation
PRV	pressure relief valve	power roof ventilator; pressure reducing valve; pressure regulator valve
PS	polystyrene (plastic)	pull station
PS	pull station	polystyrene (plastic)
PS CONC	prestressed concrete	
PSF	pounds per square foot	
PSFA	PSF absolute	
PSFG	PSF gage	
PSH	purse shelf	
PSI	pounds per square inch	
PSIA	pounds per square inch absolute	
PSIG	pounds per square inch, gage	
PSL	pipe sleeve	
PT	paint	pipe thread; pneumatic tube; post tensioned; pressure treated
PT	pipe thread	paint; pneumatic tube; post tensioned; pressure treated
PT	pneumatic tube	paint; pipe thread; post tensioned; pressure treated
PT	post tensioned	paint; pipe thread; pneumatic tube; pressure treated
PT	pressure treated	paint; pipe thread; pneumatic tube; post tensioned
PT CONC	post-tensioned concrete	
PTAC	packaged terminal air conditioner	
PTD	paper towel dispenser	printed
PTD	printed	paper towel dispenser
PTDR	paper towel dispenser and receptacle	
PTN	partition	
PTR	paper towel receptacle	
PTRV	pressure temperature relief valve	
PUR	purlins	
PV	paved	
PV RD	paved road	
PVA	polyvinyl acetate	
PVC	polyvinyl chloride (plastic)	
PVF	polyvinyl fluoride (plastic)	

Abbreviation	Term	Shared Abbreviation
PVG	paving	
PW	pass window	
PWR	power	
Q		
Q	heat transfer	rate of flow
Q	rate of flow	heat transfer
QA	quality assurance	
QC	quality control	
QCR	quality control review	
QM	quality management	
QRY	quarry	
QT	quarry tile	
QTB	quarry tile base	
QTF	quarry tile floor	
QTR	quarter	
QTY	quantity	
QUAD	quadrangle	quadrant
QUAD	quadrant	quadrangle
QUAL	quality	
QUOT	quotation	
R		
R	radius	range; riser; thermal resistance
R	range	radius; riser; thermal resistance
R	riser	radius; range; thermal resistance
R	thermal resistance	radius; range; riser
R&D	research and development	
RA	return air	
RA FAN	return air fan	
RA GR	return air grille	
RAB	rabbeted	
RAC	room air conditioner	

Abbreviation	Term	Shared Abbreviation
RAD	radian	radiator; return air duct
RAD	radiator	radian; return air duct
RAD	return air duct	radian; radiator
RAD HAZ	radiation hazard	
RADN	radiation	
RAT	return air temperature	
RB	resilient base	rubber base
RB	rubber base	resilient base
RB HK	robe hook	
RBM	reinforced brick masonry	
RBR	rubber	
RC	reinforced concrete	remote control
RC	remote control	reinforced concrete
RCB	reinforced concrete box	
RCCP	reinforced concrete culvert pipe	
RCP	reflected ceiling plan	reinforced concrete pipe
RCP	reinforced concrete pipe	reflected ceiling plan
RCPTN	reception	
RCVR	receiver	
RD	refrigerant discharge	road; roof drain
RD	road	refrigerant discharge; roof drain
RD	roof drain	refrigerant discharge; road
RDC	reducer	
RDG INS	rigid insulation, solid	
REBAR	reinforcing steel bars	
REC	recessed	
REC ROOM	recreation room	
RECD	received	
RECIP	reciprocal	
RECIRC	recirculate	
RECPT	receptacle	
RECT	rectangle	

Abbreviation	Term	Shared Abbreviation
REF	reference	refrigerator
REF	refrigerator	reference
REFL	reflect	
REFR	refractory	refrigeration
REFR	refrigeration	refractory
REG	register	regulation
REG	regulation	register
REINF	reinforce	
REM	removable	
REP	repair	
REPL	replace	
REPRO	reproduce	
REQ	require	
REQD	required	
RESIL	resilient	
REST	restroom	
RET	return	
REV	revision	revolutions
REV	revolutions	revision
RF	radio frequency	resilient flooring
RF	resilient flooring	radio frequency
RFG	roofing	
RFGT	refrigerant	
RFI	request for information	
RFP	request for proposal	
RH	relative humidity	right hand; roof hatch
RH	right hand	relative humidity; roof hatch
RH	roof hatch	relative ahumidity; right hand
RHC	reheat coil	
RHEO	rheostat	
RHG	refrigerant hot gas	
RHMS	round head machine screw	

Abbreviation	Term	Shared Abbreviation
RHR	right hand reverse	
RHV	reheat valve	
RHWS	round head wood screw	
RKVA	reactive kilovolt amperes	
RL	roof leader	
RLG	railing	
RLL	refrigerant liquid line	
RM	room	
RMS	room monitor system	root mean square
RMS	root mean square	room monitor system
RND	round	
RO	rough opening	
ROW	right of way	
RPM	revolutions per minute	
RPS	revolutions per second	
RR	railroad	roll roofing
RR	roll roofing	railroad
RS	rapid start	rough sawn
RS	rough sawn	rapid start
RSD	rolling steel door	
RSL	refrigerant suction line	
RST	reinforcing steel	
RT	right	
RTF	rubber tile floor	
RTG	rating	
RTU	roof top unit	
RV	relief valve	roof vent; roof ventilator
RV	roof vent	relief valve; roof ventilator
RV	roof ventilator	relief valve; roof vent
RVL	reveal	
RVS	reverse	
RW	roadway	

Abbreviation	Term	Shared Abbreviation
RWD	redwood	
RWL	rain water leader	
RWR	recessed waste receptacle	
RWY	runway	
S		
S	south	
S BM	beam, standard	
S/S	start/stop	
S1S	surfaced one side	
S2S	surfaced two sides	
S4S	surfaced four sides	
SA	single acting (door)	supply air
SA	supply air	single acting (door)
SAG	supply air grille	
SALV	salvage	
SAMP	sample	
SAN	sanitary	
SAPC	suspended acoustical plaster ceiling	
SARA	Society of American Registered Architects	
SAT	saturate	suspended acoustical tile
SAT	suspended acoustical tile	saturate
SATC	suspended acoustical tile ceiling	
SB	splash block	
SBCCI	Southern Building Code Congress International	
SBS	styrene butadiene styrene	
SBSTR	substrate	
SC	shading coefficient	solid core
SC	solid core	shading coefficient
SCC	short circuit capacity	
SCD	seat cover dispenser	
SCFM	standard cubic feet per minute	
SCFS	standard cubic feet per second	

Abbreviation	Term	Shared Abbreviation
SCH	school	
SCHED	schedule	
SCHEM	schematic	
SCMU	solid concrete masonry unit	
SCP	scupper	
SCR	semiconductor controlled rectifier	shower curtain rod
SCR	shower curtain rod	semiconductor controlled rectifier
SCRN	screen	
SCT	structural clay tile	
SCWD	solid core wood door	
SD	shop drawings	smoke detector; soap dispenser; storm drain; supply duct
SD	smoke detector	shop drawings; soap dispenser; storm drain; supply duct
SD	soap dispenser	shop drawings; smoke detector; storm drain; supply duct
SD	storm drain	shop drawings; smoke detector; soap dispenser; supply duct
SD	supply duct	shop drawings; smoke detector; soap dispenser; storm drain
SDBL	sandblast	
SDG	siding	
SDI	Steel Deck Institute	Steel Door Institute
SDI	Steel Door Institute	Steel Deck Institute
SDL	saddle	
SDMH	storm drain manhole	
SDMPR	smoke damper	
SE	structural engineer	
SECT	section	
SEG	segment	
SEL	select	
SEP	separate	
SEP TNK	septic tank	
SF	safety factor	square foot (feet); supply fan
SF	square foot (feet)	safety factor; supply fan
SF	supply fan	safety factor; square foot (feet)
SFT HP	shaft horsepower	

Abbreviation	Term	Shared Abbreviation
SFTWD	softwood	
SG	steam gage	
SGD	sliding glass door	
SGL	single	
SGPH	Gallons Per Hour, Standard	
SH	sensible heat	shingles; single hung (window)
SH	shingles	sensible heat; single hung (window)
SH	single hung (window)	sensible heat; shingles
SHFT	shaft (elevator)	
SHG	sensible heat gain	
SHLDR	shoulder	
SHR	sensible heat ratio	shower
SHR	shower	sensible heat ratio
SHR HD	shower head	
SHRD	shower drain	
SHT	shaft	sheet
SHT	sheet	shaft
SHT MTL FLASH sheet metal (flashing)		
SHTHG	sheathing	
SHTR	shutter	
SHV	shelving	
SHWR	secondary hot water return	
SHWS	secondary hot water supply	
SI	International System of Units	
SIG	signal	
SIM	similar	
SJ	scored joint	slip joint
SJ	slip joint	scored joint
SJI	Steel Joist Institute	
SK	sketch	
SKLT	skylight	

Abbreviation	Term	Shared Abbreviation
SL	sea level	spot light
SL	spot light	sea level
SLD WDW	horizontal sliding window	
SLDG	sliding	
SLDR	solder	
SLNT	sealant	
SLV	sleeve	
SLVT	solvent	
SM	sheet metal	silty sand; small; smooth
SM	silty sand	sheet metal; small; smooth
SM	small	sheet metal; silty sand; smooth
SM	smooth	sheet metal; silty sand; small
SMH	steam manhole	
SMK	smoke	
SMLS	seamless	
SMP	sump pump	
SND	sanitary napkin dispenser	
SND INS	sound insulation	
SNDU	sanitary napkin disposal unit	
SNSR	sensor	
SOLN	solution	
SOLV	solenoid valve	
SOUT	single receptacle outlet	
SOV	schedule of values	shut off valve
SOV	shut off valve	schedule of values
SP	solid plastic	standpipe; sump pit
SP	standpipe	solid plastic; sump pit
SP	sump pit	solid plastic; standpipe
SP EL	spot elevation	
SP FIN	special finish	
SP GR	specific gravity	
SPC	suspended plaster ceiling	

Abbreviation	Term	Shared Abbreviation
SPCL	special	
SPDT	single pole, double throw	
SPEC	specification	
SPF	spruce-pine-fir	
SPH	space heater	
SPKLR	sprinkler	
SPKR	speaker	
SPL	spline	
SPLY	supply	
SPR	sprinkler line	
SPRT	support	
SPST	single pole, single throw	
SQ	square	
SQ BR	square bar	
SQ IN	square inch	
SQ YD	square yard	
SR	steam return	
SS	sanitary sewer	service sink; standing seam (roof); steam supply; storm sewer
SS	service sink	sanitary sewer; standing seam (roof); steam supply; storm sewer
SS	standing seam (roof)	sanitary sewer; service sink; steam supply; storm sewer
SS	steam supply	sanitary sewer; service sink; standing seam (roof); storm sewer
SS	storm sewer	sanitary sewer; service sink; standing seam (roof); steam supply
SSD	subsoil drain	
SSP	stainless steel pipe	
SST	stainless steel	
ST	single throw	stairs; street
ST	stairs	single throw; street
ST	street	singlethrow; stairs
ST GEN	steam generator	
ST GL	stained glass	
ST PR	static pressure	
ST W	storm water	

Abbreviation	Term	Shared Abbreviation
STA	station	
STAG	staggered	
STC	sound transmission class	
STD	standard	
STIF	stiffener	
STIR	stirrup	
STL JST	steel joist	
STL LNTL	steel lintel	
STL PL	steel plate	
STL RF DK	steel roof deck	
STL TB	steel tube	
STL TR	steel truss	
STM	steam	
STN	strainer	
STNLS	stainless	
STOR	storage	
STP	standard temperature and pressure	
STPG	stepping	
STR	straight	strike; stringers
STR	strike	straight; stringers
STR	stringers	straight; strike
STRB	strobe	
STRB/HRN	strobe/horn	
STRM	storeroom	
STRUCT	structural	
STRUCT STL	structural steel	
STWP	steam working pressure	
SUB	substitute	
SUB FL	subfloor	
SUBPAR	subparagraph	
SUCT	suction	
SUF	sufficient	

Abbreviation	Term	Shared Abbreviation
SUH	suspended unit heater	
SUM	summary	
SUP	supplementary	
SUPN	suppression	
SUPPL	supplement	
SUPVR	supervisor	
SURF	surface	
SURR	surround	
SURV	survey	
SURV CAM	surveillance camera	
SURV EQUIP	surveillance equipment	
SURV MON	surveillance monitor	
SUSP	suspend	
SUSP CLG	suspended ceiling	
SUTK	sump tank	
SV	safety valve	sheet vinyl
SV	sheet vinyl	safety valve
SVCE	service	
SW	sidewalk	switch
SW	switch	sidewalk
SWBD	switchboard	
SWDR	swing door	
SWG	sewage	
SWGR	switchgear	
SWI	Steel Window Institute	
SWR	sewer	
SYM	symbol	
SYMM	symmetrical	
SYNTH	synthetic	
SYS	system	
T		
T	tread	

Abbreviation	Term	Shared Abbreviation
T&B	top and bottom	
T&G	tongue and groove	
T&M	time and materials	
T&P VALVE	temperature and pressure valve	
T/S	tub/shower	
TAB	tabulate	
TAN	tangent	
TB	through bolt	towel bar
TB	towel bar	through bolt
TBM	temporary benchmark	
TB-xx	test boring-xx (e.g., TB-01)	
TC	terra cotta	
TCA	Tile Council of America	
TCP	telephone control panel	temperature control panel; traffic control plan
TCP	temperature control panel	telephone control panel; traffic control plan
TCP	traffic control plan	telephone control panel; temperature control panel
TCV	temperature control valve	
TD	temperature difference	towel dispenser; trench drain
TD	towel dispenser	temperature difference; trench drain
TD	trench drain	temperature difference; towel dispenser
TDH	total dynamic head	
TDR	towel dispenser/receptacle	
TE	top elevation	
TECH	technical	
TEJ	transverse expansion joint	
TEL	telephone	
TEL JK	telephone jack	
TEL OUT	telephone outlet	
TEMP	temperature	temporary
TEMP	temporary	temperature
TEMP HDBD	tempered hardboard	
TER	telephone equipment room	terrazzo

Abbreviation	Term	Shared Abbreviation
TER	terrazzo	telephone equipment room
TERM	terminal	
TFA	to floor above	
TFB	to floor below	
TFF	top of finish floor	
TG	transfer grille	
THD	thread	
THERM	thermal	
THK	thickness	
THRES	threshold	
THRU	through	
THRUOUT	throughout	
TK BD	tackboard	
TL	twist lock	
TMH	top of manhole	
TMPD	tempered	
TMPD GL	tempered glass	
TN	true north	
TNL	tunnel	
TNPK	turnpike	
TO	top of ____	
TO FDN	top of foundation	
TOB	top of beam	
TOC	table of content	top of concrete; top of curb
TOC	top of concrete	table of content; top of curb
TOC	top of curb	table of content; top of concrete
TOC FTG	top of concrete footing	
TOC WALL	top of concrete wall	
TOF	top of floor	top of footing; top of frame
TOF	top of footing	top of floor; top of frame
TOF	top of frame	top of floor; top of footing
TOJ	top of joist	

Abbreviation	Term	Shared Abbreviation
TOL	tolerance	
TOM	top of masonry	
TOP	top of parapet	top of pavement
TOP	top of pavement	top of parapet
TOPO	topography	
TOS	top of slab	top of steel
TOS	top of steel	top of slab
TOT	top of truss	
TOW	top of wall	
TP	telephone pole	total pressure; twisted pair
TP	total pressure	telephone pole; twisted pair
TP	twisted pair	telephone pole; total pressure
TPD	toilet paper dispenser	
TPH	toilet paper holder	
TPS	twisted pair shielded	
TQM	total quality management	
TR	top of rim	towel rack
TR	towel rack	top of rim
TRANS	transom	transparent
TRANS	transparent	transom
TRANS WD FIN	transparent wood finish	
TRNBKL	turnbuckle	
TRTD	treated	
TS	tensile strength	tube steel
TS	tube steel	tensile strength
TSH	towel shelf	
TSTAT	thermostat	
TTB	telephone terminal board	
TUC	terminal unit controller	
TV	television	
TVOUT	television outlet	
TWR	treated water return	

Abbreviation	Term	Shared Abbreviation
TWS	treated water supply	
TYP	typical	
U		
U	heat transfer coefficient	
UBC	Uniform Building Code	
UC	undercut	
UCD	undercut door	
UFC	Uniform Fire Code	
UFD	underfloor duct	
UGND	underground	
UH	unit heater	
UL	Underwriters Laboratories	
ULT	ultimate	
UMC	Uniform Mechanical Code	
UN	unless noted	
UNEX	unexcavated	
UNFIN	unfinish	
UNIF	uniform	
UNIV	universal	
UNO	unless noted otherwise	
UNPV RD	unpaved road	
UON	unless otherwise noted	
UP	utility pole	
UPC	Uniform Plumbing Code	
UPS	uninterruptible power supply	
UR	urinal	
UTIL	utility	
UTP	untwisted pair	
UV	ultraviolet	
UWT	unit weight	

Abbreviation	Term	Shared Abbreviation
V		
V	volt	
VA	volt ampere	
VAC	vacuum	vacuum line
VAC	vacuum line	vacuum
VAM	volt-ammeter	
VAN	vanity	
VAP PRF	vapor proof	
VAR	variation	varies; volt ampere reactive
VAR	varies	variation; volt ampere reactive
VAR	volt ampere reactive	variation; varies
VAV	variable air volume	
VB	vacuum breaker	valve box; vinyl base
VB	valve box	vacuum breaker; vinyl base
VB	vinyl base	vacuum breaker; valve box
VC	vertical curve	
VCO	vacuum cleaner outlet	
VCT	vinyl composition tile	vittrified clay tile
VCT	vittrified clay tile	vinyl composition tile
VD	voltage drop	volume damper
VD	volume damper	voltage drop
VEH	vehicle	
VEL	velocity	
VENT	ventilation	ventilator
VENT	ventilator	ventilation
VERT	vertical	
VEST	vestibule	
VF	variable frequency	
VFAT	vinyl faced acoustical tile	
VFD	variable frequency drive	
VFR	volumetric flow rate	
VG	vertical grain	

Abbreviation	Term	Shared Abbreviation
VHF	very high frequency	
VHO	very high output	
VIB	vibration	
VIC	vicinity	
VID	video	
VIDAMP	video amplifier	
VIF	verify in field	
VIL	village	
VINT	video integration	
VIS	visual	
VISC	viscosity	
VIT	vitreous	
VJ	V joint	
VNR	veneer	
VOC	volatile organic compound	
VOL	volume	
VOLT	voltage	
VP	vacuum pump	vanishing point; vapor pressure; velocity pressure; veneer plaster
VP	vanishing point	vacuum pump; vapor pressure; velocity pressure; veneer plaster
VP	vapor pressure	vacuum pump; vanishing point; velocity pressure; veneer plaster
VP	velocity pressure	vacuum pump; vanishing point; vapor pressure; veneer plaster
VP	veneer plaster	vacuum pump; vanishing point; vapor pressure; velocity pressure
VR	vapor retarder	voltage regulator
VR	voltage regulator	vapor retarder
VRFY	verify	
VRLY	voltage relay	
VRNDA	veranda	
VRP	vacuum return pump	
VS	vent stack	voltmeter switch
VS	voltmeter switch	vent stack
VTR	vent through roof	
VUH	vertical unit heater	

Abbreviation	Term	Shared Abbreviation
VWC	vinyl wall covering	
VWF	vinyl wall fabric	
W		
W	waste	watt; west; wide
W	watt	waste; west; wide
W	west	waste; watt; wide
W	wide	waste; watt; west
W CAB	wall cabinets	
W/	with	
W/O	without	
W/W	wall to wall	
WARR	warranty	
WAU	wall ash urn	
WB	wet bulb	wood base
WB	wood base	wet bulb
WBL	wood blocking	
WBS	wrought brass	
WBT	wet bulb temperature	
WC	wall covering	water closet; water column
WC	water closet	wall covering; water column
WC	water column	wall covering; water closet
WC WL HNG	water closet, wall hung	
WCHR	water chiller	
WCL WL MTD	water cooler, wall hung	
WCLD	water cooled	
WCLR	water cooler	
WCO	wall cleanout	
WD	wood	wood door
WD	wood door	wood
WD LOUV	wood louvers	
WDF	wood door and frame	
WDMA	Window and Door Manufacturers Association	

Abbreviation	Term	Shared Abbreviation
WDP	wood panelling	
WDSP	waste disposer	
WDW	window	
WEA	weather	
WF	wash fountain	wide flange
WF	wide flange	wash fountain
WF BM	beam, wide flange	
WFAB	wall fabric	
WFR	wood frame	
WFS	wood furring strips	
WG	water gage	
WGL	wired glass	
WH	wall hung	wall hydrant; water heater; weep hole
WH	wall hydrant	wall hung; water heater; weep hole
WH	water heater	wall hung; wall hydrant; weep hole
WH	weep hole	wall hung; wall hydrant; water heater
WHA	water hammer arrestor	
WHM	watthour meter	
WHSE	warehouse	
WI	wrought iron	
WJ	water jacket	
WL	water line	wind load
WL	wind load	water line
WLD	welded	
WM	water meter	wire mesh
WM	wire mesh	water meter
WO	where occurs	work order
WO	work order	where occurs
WP	water pump	waterproofing; weatherproof; working point
WP	waterproofing	water pump; weatherproof; working point
WP	weatherproof	water pump; waterproofing; working point
WP	working point	water pump; waterproofing; weatherproof

Abbreviation	Term	Shared Abbreviation
WPD	water pressure drop	
WPM	waterproof membrane	
WPR	working pressure	
WR	water repellent	weather resistant; wire rope
WR	weather resistant	water repellent; wire rope
WR	wire rope	water repellent; weather resistant
WS	weatherstrip	
WSCT	wainscot	
WSL	weather seal	
WSP	working steam pressure	
WT	water table	watertight; weight
WT	watertight	water table; weight
WT	weight	water table; watertight
WT EL	water elevation	
WTR	water	
WU	window unit	
WW	warm white	waste water; wireway
WW	waste water	warm white; wireway
WW	wireway	warm white; waste water
WWF	welded wire fabric	
WWM	welded wire mesh	
WWX	warm white deluxe	

X

X BRACE	cross brace
X SECT	cross section
XBRA	crossbracing
XFER	transfer
XFMR	transformer
XL	extra large
XPS	extruded polystyrene board (insulation)
XXH	double extra heavy

Abbreviation	Term	Shared Abbreviation
Y		
YCO	yard cleanout	
YD	yard	yard drain; yard drainage pipe
YD	yard drain	yard; yard drainage pipe
YD	yard drainage pipe	yard; yard drain
YH	yard hydrant	
YI	yard inlet	
YR	year	
Z		
Z	modulus of section	

Preferred Terms

Non-Preferred Terms	Preferred Terms
acoustic calking	acoustic sealant
acoustical plaster	acoustical finish
alternative	alternate
apply	install
as-built	record drawings
asphalt roofing	built-up roofing
backing rope	joint backer
balestrades	railing
bar joists	steel joists
batt insulation	blanket insulation
blackboard	chalkboard
block	concrete masonry unit
calking	sealant
casing bead	metal trim
ceiling panel	acoustical panel
ceiling tile	acoustical tile
centigrade	Celsius
computer floor	access flooring
concrete block	concrete masonry unit
cork tackboard	tackboard
corkboard	tackboard
corrugated deck	steel roof deck
crushed stone	porous fill
delta	<i>Use symbol (see Symbols Module)</i>
dirt	earth
domelite	plastic skylight
drywall	gypsum board
electro-pneumatic	pneumatic electric

Non-Preferred Terms	Preferred Terms
elevator cab	elevator car
feminine napkin disposal	sanitary napkin disposal
feminine napkin vendor	sanitary napkin vendor
fiber insulation	rigid insulation
fiberboard	rigid insulation
foam backer	backer rod
foil faced drywall	foil faced gypsum board
foil faced gypsum wallboard	foil faced gypsum board
formica	plastic laminate
furnished by owner	OF/CI or OF/OI
fuse box	panelboard
gauge	gage
glue	adhesive
gravel	porous fill
graylite	gray sheet glass
ground fault interrupter	ground fault circuit interrupter
gyplath	gypsum lath or metal lath
gypsum panel	gypsum board
gypsum wallboard	gypsum board
herculite	tempered glass
hot water heater	water heater
janitor sink	service sink
joint filler	joint backer
joint stuffer	<i>joint backer</i>
kalamein door	metal clad door
lath	gypsum lath or metal lath
lexan	plastic glazing
loudspeaker	speaker

Non-Preferred Terms	Preferred Terms
lucite	acrylic sheet
masonite	hardboard
mastic	adhesive
metal nosing	abrasive nosing
safety nosing	abrasive nosing
sand	porous fill
non-slip stair nosing	abrasive nosing
open web steel joists	steel joists
pass-through window	counter shutter or sliding window
paste	adhesive
pavement	paving
pitch pocket	sealant pocket
plexiglass	acrylic sheet
pour	place
poured in place	cast-in-place
power panel	panelboard
power pole	utility pole
pre-fit	factory fit
pre-trimmed	factory fit
precut	factory fit
prime coat	shop coat
primer	shop coat
reinforcement	reinforcing
reinforcing bar	reinforcing

Non-Preferred Terms	Preferred Terms
remodel	alter or refinish
rocklath	gypsum lath or metal lath
rusting steel	weathering steel
scuttle	roof hatch
sheeting	sheathing
sink	lavatory
skydome	skylight
skylite	skylight
slop sink	service sink
stucco	cement plaster
tar	pitch
thermopane	insulating glass
toilet (plumbing fixture)	water closet
tower water return	condenser water
tower water supply	condenser water
twindow	insulating glass
vapor barrier	vapor retarder
vinyl tile	resilient tile
visqueen	vapor retarder
wall board	gypsum board
Warnock Hershey International	Intertek Testing Services
water cooling tower	cooling tower
wire glass	wired glass

Symbols

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
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www.csinet.org

www.nationalcadstandard.org

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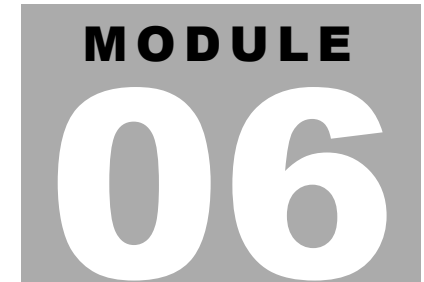
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Introduction

The *Symbols Module* compiles a full range of standard symbols used throughout the construction industry. Covered in this Module are standard symbols, their graphic representation, and their role in creating, understanding, and fulfilling the intent of construction documents. Standard symbols ensure clear and concise communication among the architect, owner, contractor, and consultants. This Module is a joint effort of CSI and the CADD/GIS Technology Center.

The *Symbols Module* provides:

- Symbols for use in drawings.
- Graphic representations of symbols.
- Organization of symbols for drawings by *MasterFormat*™ and further classification by symbol type.
- Standardization of symbols.

The benefits of the *Symbols Module* are as follows:

- Defines symbols used on drawings.
- Presents symbols in a consistent graphic representation.

Objective

The objective of the Module is to provide a standardized resource for construction symbols, with emphasis on the benefits of consistent graphic representation. The increased use of computer-aided drafting (CAD) has assisted in reducing the time required for managing and creating construction documents and the symbols used. The *Symbols Module* is suitable for manual drafting and CAD creators and those that use construction documents.

Organization of Symbols

Symbols are a graphic representation of an object or of a material that represents something else by:

- Association
- Resemblance
- Convention

Symbols used in drawings are scale dependent, independent, or both.

- **Scale Dependent:** Actual printed size of the symbol depends on the scale of the drawing or view of the model.
- **Scale Independent:** Actual printed size of the symbol is consistent no matter what the drawing scale. Its size is related only to clarity and interpretation.

Symbols used in drawings are constructed of various line widths. The following list is an example of standardized line weights of symbols:

- Existing objects and material symbols are drawn with a thin line.
- New objects are drawn with a medium line.
- Objects to be demolished or removed are drawn with a medium dashed line.

Refer to the Common Line Types in the *Drafting Conventions Module* on page UDS-04.14.

Symbols Classification

Symbols used in drawings are classified in terms of type:

- **Identity.** These symbols indicate individual objects and are generally used in mechanical and electrical drawings. Such symbols are valves, fire alarms, light fixtures, and electrical outlets. These symbols are scale independent.
- **Line.** These symbols indicate continuous objects and are either single or double lines. Walls are usually drawn with two lines and ducts may be drawn with one or two lines based on the scale of the drawing. Site and building utilities are drawn with one line with breaks in the line for a letter(s) to identify the utility line. Some lines are solid, some are dashed, and some are a combination of both. These symbols are scale independent.
- **Material.** These symbols graphically indicate certain materials and are used to help the reader differentiate one material from another. These symbols may be in elevation, vertical, or horizontal section. They should be used as necessary but not overdone and used where a material begins and ends or changes direction. Such symbols are used to designate earth, concrete, stone, steel, wood, and insulation. They are drawn in an appropriate size and scale of the drawn object. A material symbol may change based on the scale used or the view presented of the object. These symbols can be either scale dependent or independent.
- **Object.** These symbols resemble the actual objects being symbolized. Such symbols are doors, some with the direction of swing indicated, windows, toilet fixtures, and furniture. These symbols are scale dependent.

- **Reference.** These symbols refer the reader to information in another area of the set of drawings, or give basic information regarding the drawing or data on the drawing. Such symbols are exterior and interior elevation indicators, building section indicators, partial building section indicators, and detail indicators. Included with these symbols are drawing block titles, graphic scales, north arrow, room identifiers, door/borrowed lite identifiers, window type identifiers, louver type identifiers, wall type identifiers, furniture, fixture and equipment identifiers, identification device (sign) identifiers, key note identifiers, leaders, dimension lines with terminators, match lines, and revision clouds with identifiers. These symbols are scale independent.
- **Text.** These symbols graphically indicate a word or words and may be used in notations on drawings. The text symbols provided are commonly used. For letter symbols, dimensionless numbers, mathematical symbols, and subscript symbols see the *ASHRAE Handbook - Fundamentals*.

Symbol Organization

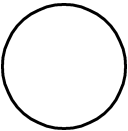
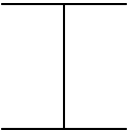
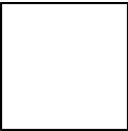
Symbols are organized by the following hierarchy:

- *MasterFormat* Division and Number
 - Symbol Type
 - Alphabetical order of the symbol description

For example, a bathtub is listed in *MasterFormat* Division 22, Plumbing, Section 22 40 00, Plumbing Fixtures. Although the bathtub may be shown on Architectural floor plans, the bathtub is listed in Division 22, Plumbing.

Symbols

by MasterFormat 2004 Numbers (MF NO) & Symbol Type (Type)

MF NO	DESCRIPTION	TYPE	SYMBOL
DIV 01 GENERAL REQUIREMENTS			
01 00 00	column, circular symbol	O	
01 00 00	column, I beam symbol	O	
01 00 00	column, square symbol	O	
01 00 00	and	T	&

MF NO	DESCRIPTION	TYPE	SYMBOL
01 00 00	at	T	@
01 00 00	center line	T	Ⓢ
01 00 00	degree(s)	T	°
01 00 00	divide by, per	T	/

MF NO	DESCRIPTION	TYPE	SYMBOL
01 00 00	dollar (USD)	T	\$
01 00 00	equals, equal to	T	=
01 00 00	foot, feet	T	×
01 00 00	greater than	T	>
01 00 00	greater than or equal to	T	≥

MF NO	DESCRIPTION	TYPE	SYMBOL
01 00 00	inch(es)	T	×
01 00 00	less than	T	<
01 00 00	less than or equal to	T	≤
01 00 00	minus	T	—
01 00 00	multiply by, by	T	×

UNIFORM DRAWING SYSTEM

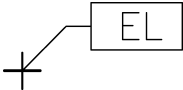
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MF NO	DESCRIPTION	TYPE	SYMBOL
01 00 00	number, pound	T	#
01 00 00	percent	T	%
01 00 00	plus	T	+
01 00 00	plus or minus	T	+/- or ±
01 00 00	property line	T	ℙ

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	DESCRIPTION	TYPE	SYMBOL
01 40 00	quality requirements, boring indicator	I	 EL
01 40 00	quality requirements, elevation indicator, finish	I	
01 40 00	quality requirements, monument indicator	I	 EL
01 40 00	quality requirements, property corner indicator, existing, 5 mm (3/16") diameter, typical	I	
01 40 00	quality requirements, property corner indicator, new	I	

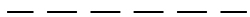
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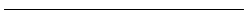
UNIFORM DRAWING SYSTEM

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U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	DESCRIPTION	TYPE	SYMBOL
01 40 00	quality requirements, temporary ground point indicator, existing, 4 mm (5/32") square, typical	I	
01 40 00	quality requirements, temporary ground point indicator, new	I	
01 42 00	center line indicator; thin line, 2 mm (5/64") dash, 2 mm (5/64") space	L	
01 42 00	contract limit line; wide line with dot, 1 mm (1/16") diameter dot, 3 mm (1/8") space	L	
01 42 00	demolition line; medium line, 4 mm (5/32") dash, 2 mm (5/64") space	L	

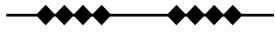
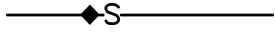
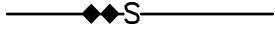
MF NO	DESCRIPTION	TYPE	SYMBOL
01 42 00	existing to remain line; thin line	L	
01 42 00	features above line indicator; thin dashed line	L	
01 42 00	fire resistive rated line, 1 hour; fine line, 2.5 mm (3/32") diamond, 14 mm (9/16") repeat	L	
01 42 00	fire resistive rated line, 2 hour; fine line, 2.5 mm (3/32") diamond, 12 mm (29/64") repeat	L	
01 42 00	fire resistive rated line, 3 hour; fine line, 2.5 mm (3/32") diamond, 8 mm (21/64") repeat	L	

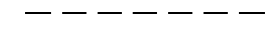
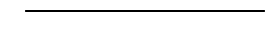
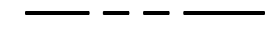
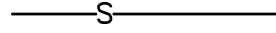
UNIFORM DRAWING SYSTEM

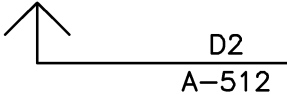
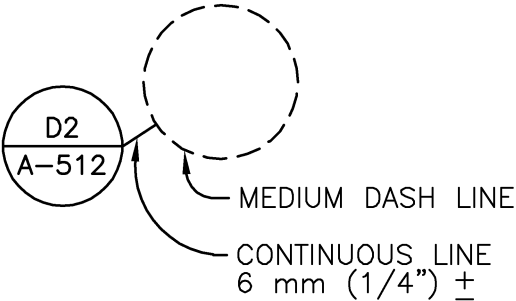
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SYMBOLS

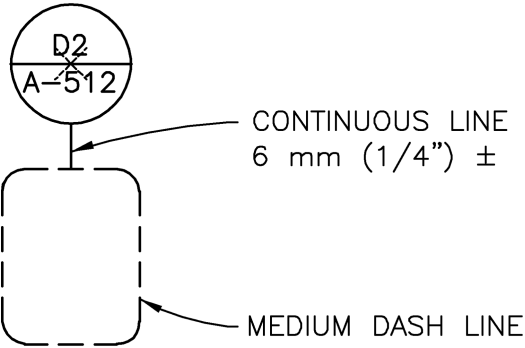
MF NO	DESCRIPTION	TYPE	SYMBOL
01 42 00	fire resistive rated line, 4 hour; fine line, 2.5 mm (3/32") diamond, 7 mm (9/32") repeat	L	
01 42 00	fire-rated, smoke barrier line, 1 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text, 3.2 mm (1/8") space, 14 mm (9/16") repeat	L	
01 42 00	fire-rated, smoke barrier line, 2 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text, 3.2 mm (1/8") space, 12 mm (29/64") repeat	L	
01 42 00	fire-rated, smoke barrier line, 3 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text, 3.2 mm (1/8") space, 8 mm (21/64") repeat	L	

MF NO	DESCRIPTION	TYPE	SYMBOL
01 42 00	fire-rated, smoke barrier line, 4 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text, 3.2 mm (1/8") space, 7 mm (9/32") repeat	L	
01 42 00	hidden features line; thin line	L	
01 42 00	new line; medium line	L	
01 42 00	property line; wide line, 5 mm (3/16") dash, 3 mm (1/8") space	L	
01 42 00	smoke barrier line, fine line, 2.5 mm (3/32") text, 14 mm (9/16") repeat	L	

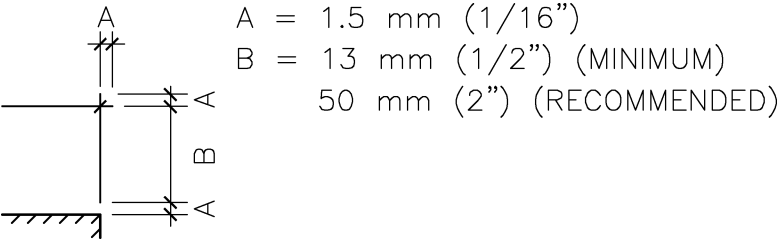
MF NO	Description	Type	Symbol
01 42 00	break, round (user defines size)	R	
01 42 00	break, straight (see section indicators, building, with break standards)	R	
01 42 00	detail indicator for small conditions, 45 degree arrow, 2.5 mm (3/32") text, medium line	R	
01 42 00	detail indicator, dashed circle, 2.5 mm (3/32") text, typical	R	

MF NO	Description	Type	Symbol

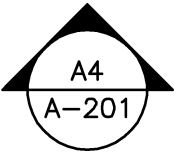
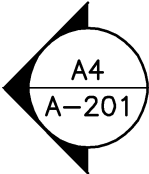
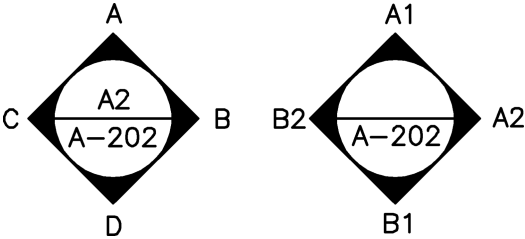
01 42 00 detail indicator,
dashed rectangle,
2.5 mm (3/32") text, typical R

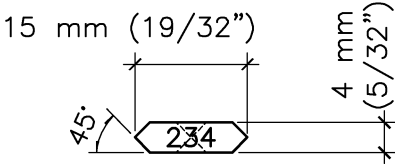
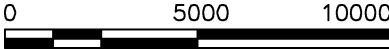
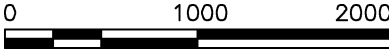


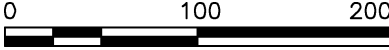
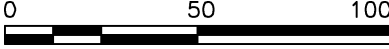
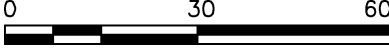
01 42 00 dimension line: continuous, thin
line with medium line for
terminator, typical R

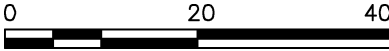
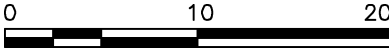
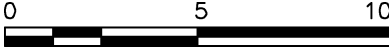
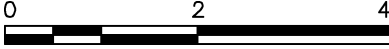
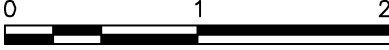


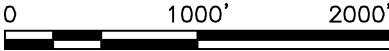
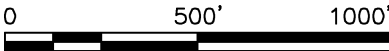
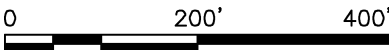
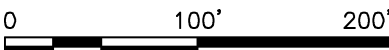
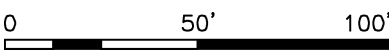
UDS-06.12

MF NO	Description	Type	Symbol
01 42 00	elevation indicator, interior, single view, 16 mm (5/8") diameter	R	
01 42 00	elevation indicator, exterior, 16 mm (5/8") diameter	R	
01 42 00	elevation indicator, exterior, 16 mm (5/8") diameter	R	
01 42 00	elevation indicator, interior, multiple view, 16 mm (5/8") diameter	R	

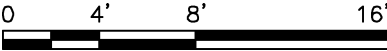
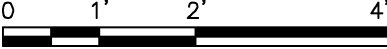
MF NO	Description	Type	Symbol
01 42 00	furniture, fixture, & equipment indicator, medium line, typical	R	
01 42 00	graphic scale, 1:5000	R	
01 42 00	graphic scale, 1:2000	R	
01 42 00	graphic scale, 1:1000	R	

MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1:500	R	
01 42 00	graphic scale, 1:200	R	
01 42 00	graphic scale, 1:100	R	
01 42 00	graphic scale, 1:50	R	
01 42 00	graphic scale, 1:30	R	

MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1:20	R	
01 42 00	graphic scale, 1:10	R	
01 42 00	graphic scale, 1:5	R	
01 42 00	graphic scale, 1:2	R	
01 42 00	graphic scale, 1:1	R	

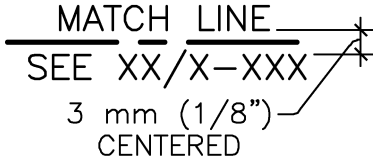
MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1" = 1000'-0"	R	
01 42 00	graphic scale, 1" = 500'-0"	R	
01 42 00	graphic scale, 1' = 200'-0"	R	
01 42 00	graphic scale, 1' = 100'-0"	R	
01 42 00	graphic scale, 1' = 50'-0"	R	

MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1' = 40'-0"	R	
01 42 00	graphic scale, 1' = 30'-0"	R	
01 42 00	graphic scale, 1' = 20'-0"	R	
01 42 00	graphic scale, 1' = 10'-0"	R	
01 42 00	graphic scale, 1/16" = 1'-0"	R	

MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1/8" = 1'-0"	R	
01 42 00	graphic scale, 1/4" = 1'-0"	R	
01 42 00	graphic scale, 3/8" = 1'-0"	R	
01 42 00	graphic scale, 1/2" = 1'-0"	R	
01 42 00	graphic scale, 3/4" = 1'-0"	R	

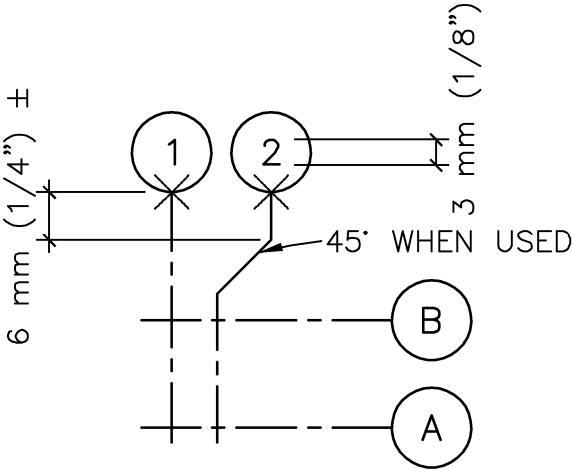
MF NO	Description	Type	Symbol
01 42 00	graphic scale, 1" = 1'-0"	R	
01 42 00	graphic scale, 1 1/2" = 1'-0"	R	
01 42 00	graphic scale, 3" = 1'-0"	R	
01 42 00	graphic scale, 6" = 1'-0"	R	
01 42 00	graphic scale, 1" = 1"	R	

MF NO	Description	Type	Symbol
01 42 00	identification device indicator, 2 mm (5/64") text, 3 mm (1/8") sides	R	
01 42 00	insertion point, 4 mm (5/32") wide/high hidden line	R	
01 42 00	keynote indicator, 2.5 mm (3/32") text, 60 degree angles, 6 mm (1/4") high, medium line	R	
01 42 00	leader, curved, 3:1 filled arrow, 3 mm (1/8") text, medium line	R	NOTE 
01 42 00	leader, straight, 3:1 filled arrow, 3 mm (1/8") text, medium line	R	NOTE 

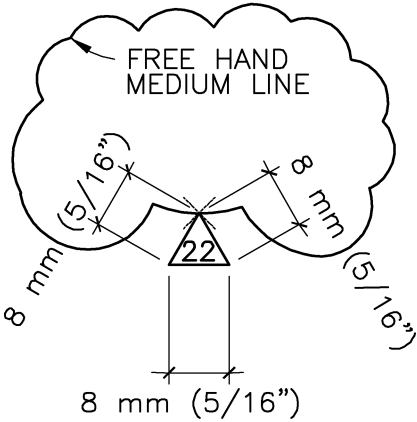
MF NO	Description	Type	Symbol
01 42 00	louver type identifier, L = louver, 3 = type, similiar to window type identifier, medium line	R	
01 42 00	match line indicator, extra wide center line, 3 mm (1/8") text, medium line, typical	R	
01 42 00	north indicator (user defines circle size)	R	

MF NO	Description	Type	Symbol

01 42 00 reference grid indicator with
reference grid lines, medium line,
typical R

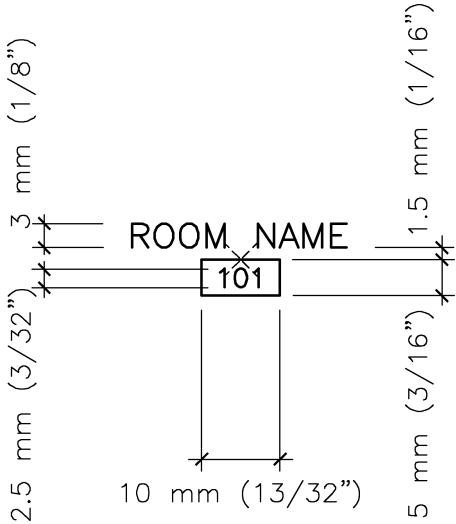


01 42 00 revision indicator (shown with
revision cloud), typical R

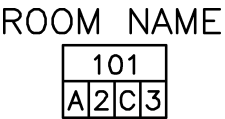


MF NO	Description	Type	Symbol

01 42 00 room identifier with room name and number, medium line, typical R



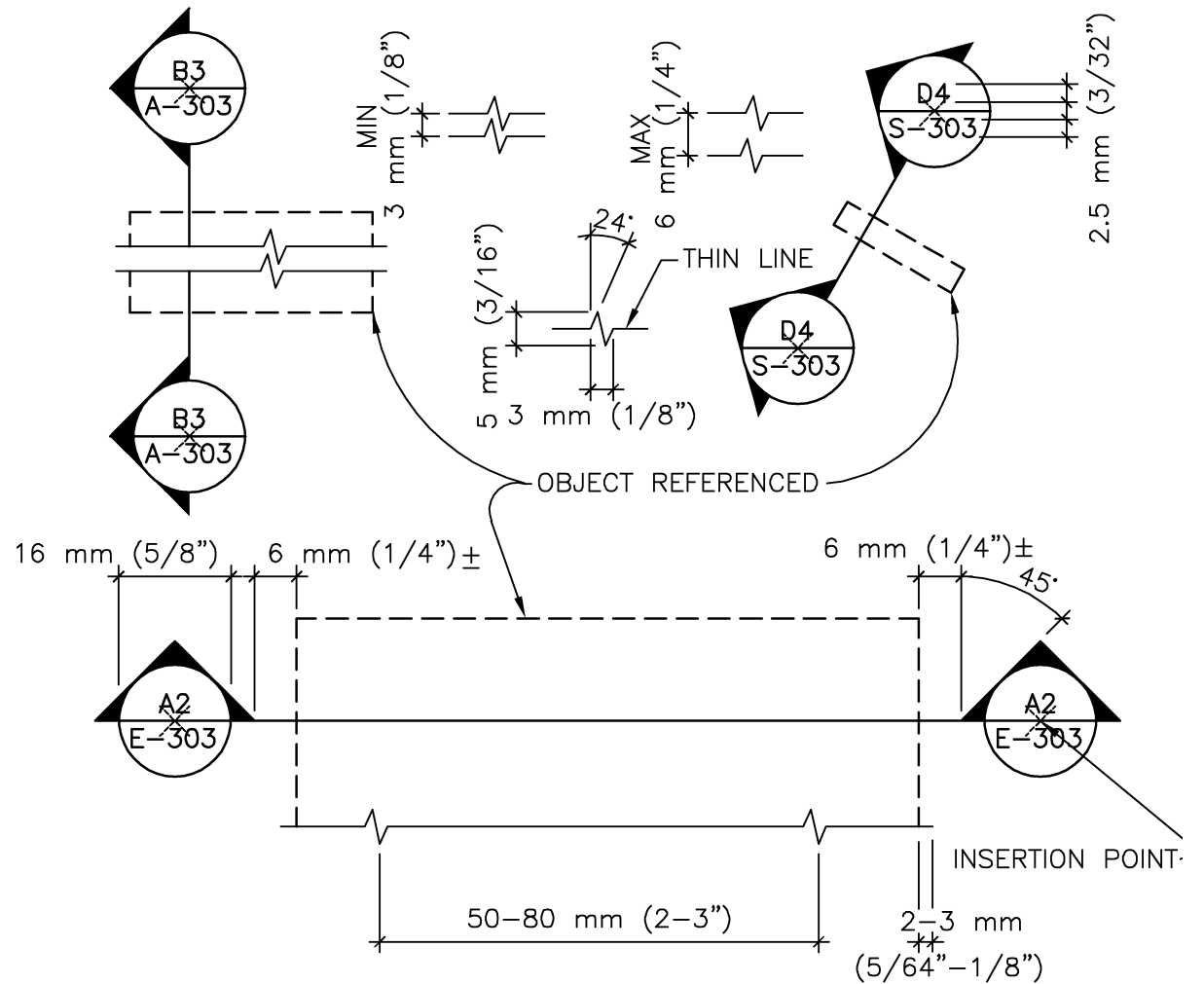
01 42 00 room identifier, optional finishes
A = floor finish type
2 = base finish type
C = wall finish type
3 = ceiling finish type R

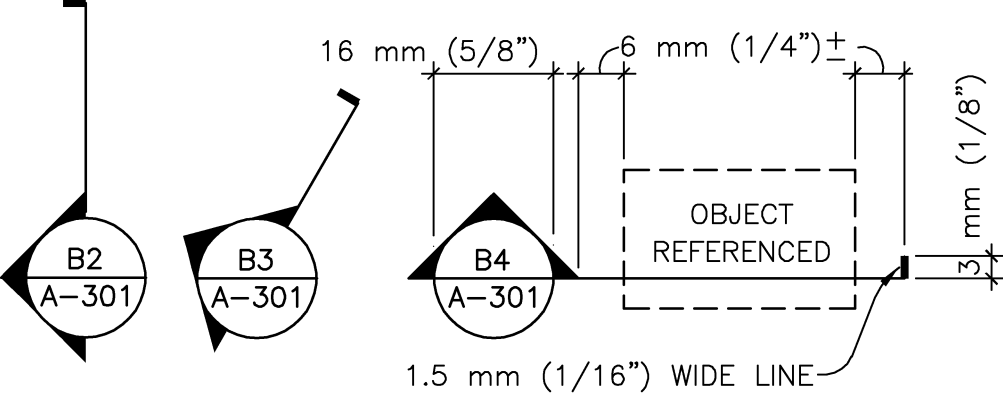
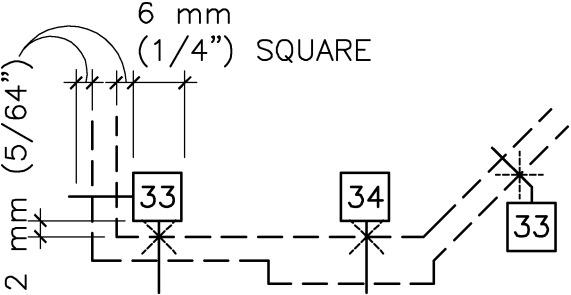
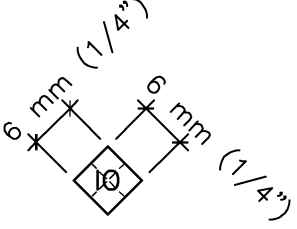


MF NO	Description	Type	Symbol

01 42 00 section indicators for building
with break standards, typical

R



MF NO	Description	Type	Symbol
01 42 00	section indicators for partial building, typical	R	
01 42 00	wall type indicator, medium line, typical	R	
01 42 00	window type identifier, 2.5 mm (3/32") text, medium line, typical	R	

UNIFORM DRAWING SYSTEM

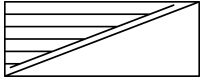
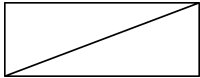
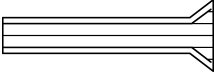
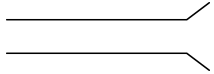
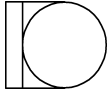
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SYMBOLS

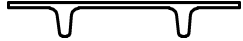
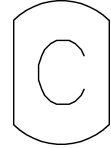
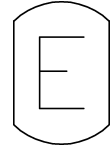
MF NO	Description	Type	Symbol

DIV 02 EXISTING CONDITIONS

02 30 00	subsurface investigation, trench exploration completed	I	
02 30 00	subsurface investigation, trench exploration proposed	I	
02 30 00	subsurface investigation, tunnel exploration completed	I	
02 30 00	subsurface investigation, tunnel exploration proposed	I	
02 50 00	site remediation, storage container agent	I	

MF NO	Description	Type	Symbol

DIV 03 CONCRETE

03 30 00	concrete, cast in place	M	
03 41 00	beam, precast, double T shape	O	
03 48 00	precast concrete, communications vault	I	
03 48 00	precast concrete, electrical vault	I	
03 48 00	precast concrete, fuel oil vault	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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MF NO	Description	Type	Symbol
03 48 00	precast concrete, manhole, transformer vault	I	
03 48 00	precast concrete, telephone vault	I	
03 48 00	precast concrete, transformer pad	I	
03 48 00	precast concrete, vault, natural gas valve	I	
03 50 00	concrete, lightweight	M	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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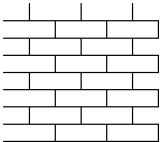
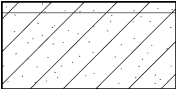
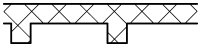
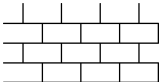
SYMBOLS

MF NO	Description	Type	Symbol
DIV 04 MASONRY			
04 05 00	grout	M	
04 21 00	brick, common/face	M	
04 21 00	brick, English bond elevation	M	
04 21 00	brick, Flemish bond elevation	M	
04 21 00	brick, glazed	M	

UDS-06.28

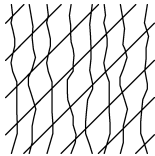
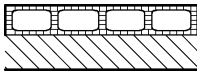
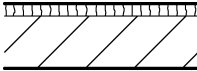
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MF NO	Description	Type	Symbol
04 21 00	brick, running bond elevation	M	
04 21 00	brick, stack bond elevation	M	
04 21 00	masonry, structural clay tile, glazed	M	
04 21 00	terra cotta quarry, large scale	M	
04 21 00	terra cotta, elevation	M	

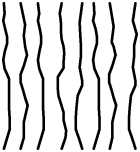
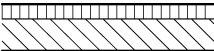
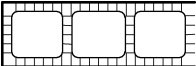
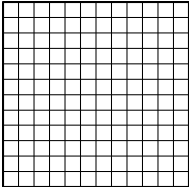
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SYMBOLS

MF NO	Description	Type	Symbol
04 21 00	terra cotta, glazed	M	
04 21 00	terra cotta, glazed one face, large scale	M	
04 21 00	terra cotta, hollow	M	
04 21 00	terra cotta, large scale	M	
04 21 00	terra cotta, small scale	M	

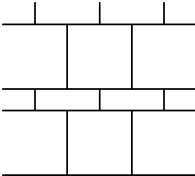
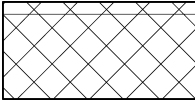
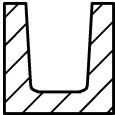
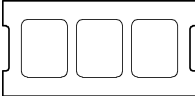
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MF NO	Description	Type	Symbol
04 21 00	terra cotta, unglazed	M	
04 21 00	terra cotta, veneer	M	
04 21 00	tile, structural clay	M	
04 21 00	tile, structural floor units	M	
04 22 00	block elevation	M	

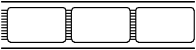
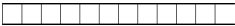
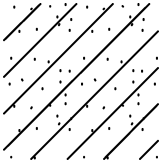
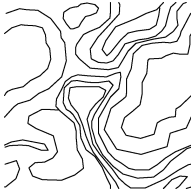
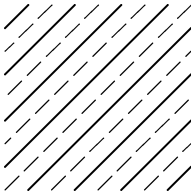
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SYMBOLS

MF NO	Description	Type	Symbol
04 22 00	brick block coursed elevation	M	
04 22 00	concrete block, glazed	M	
04 22 00	concrete bond beam lintel	M	
04 22 00	concrete masonry unit, 8x8x16	M	
04 22 00	concrete masonry unit, 8x8x16 end	M	

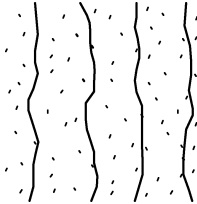
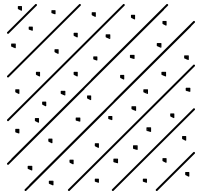
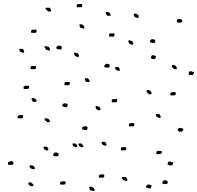
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MF NO	Description	Type	Symbol
04 23 00	glass block, large scale	M	
04 23 00	glass block, small scale	M	
04 24 00	masonry, adobe rammed earth	M	
04 40 00	marble stone	M	
04 40 00	stone ashler	M	

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SYMBOLS

MF NO	Description	Type	Symbol
04 40 00	stone cut	M	
04 40 00	stone rubble	M	
04 40 00	stone, squared elevation	M	
04 50 00	fire brick	M	
04 72 00	stone, cast	M	

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MF NO	Description	Type	Symbol
DIV 05 METALS			
05 05 00	weld, basic back, arrow side	I	
05 05 00	weld, basic fillet, arrow side	I	
05 05 00	weld, basic fillet, both sides	I	
05 05 00	weld, basic plug or slot, arrow side	I	
05 05 00	weld, double bevel fillet, both sides	I	

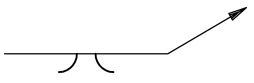
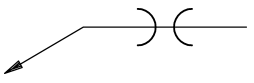
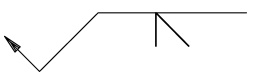
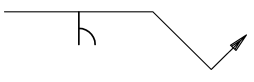
U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
05 05 00	weld, double J groove, both sides	I	
05 05 00	weld, double U groove, both sides	I	
05 05 00	weld, double V groove, both sides	I	
05 05 00	weld, flare bevel, arrow side	I	
05 05 00	weld, flare bevel, both sides	I	

UNIFORM DRAWING SYSTEM

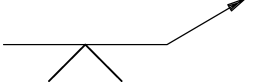
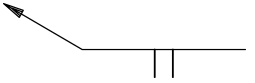
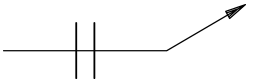
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MF NO	Description	Type	Symbol
05 05 00	weld, groove flare V, arrow side	I	
05 05 00	weld, groove flare V, both sides	I	
05 05 00	weld, single bevel groove, arrow side	I	
05 05 00	weld, single J groove, arrow side	I	
05 05 00	weld, single U groove, arrow side	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
05 05 00	weld, single V groove, arrow side	I	
05 05 00	weld, square groove, arrow side	I	
05 05 00	weld, square groove, both sides	I	
05 05 00	weld, supplementary concave	I	
05 05 00	weld, supplementary convex	I	

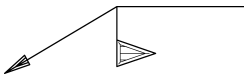
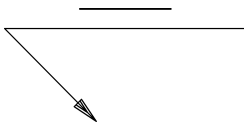
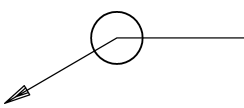
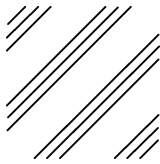
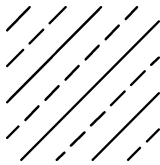
UDS-06.33

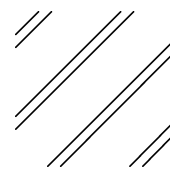
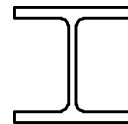
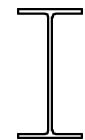
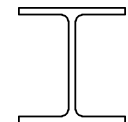
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SYMBOLS

MF NO	Description	Type	Symbol
05 05 00	weld, supplementary field	I	
05 05 00	weld, supplementary flush	I	
05 05 00	weld, supplementary, all around	I	
05 05 00	aluminum	M	
05 05 00	bronze brass	M	

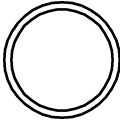
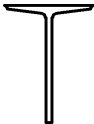
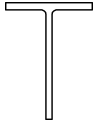
MF NO	Description	Type	Symbol
05 05 00	steel and other metals	M	
05 10 00	beam, structural steel, HP shape	O	
05 10 00	beam, structural steel, M shape	O	
05 10 00	beam, structural steel, S shape	O	
05 10 00	beam, structural steel, W shape	O	

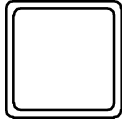
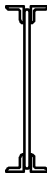
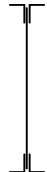
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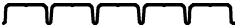
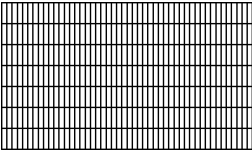
SYMBOLS

MF NO	Description	Type	Symbol
05 10 00	C channel, metal light-gage	0	
05 10 00	pipe standard	0	
05 10 00	steel angle	0	
05 10 00	structural steel tee, ST shape	0	
05 10 00	structural steel tee, WT shape	0	

MF NO	Description	Type	Symbol
05 10 00	structural steel, Z shape	0	
05 10 00	structural tubing, steel	0	
05 20 00	bar joist double, steel	0	
05 20 00	bar joist single, steel	0	
05 30 00	metal deck, corrugated	0	

UNIFORM DRAWING SYSTEM

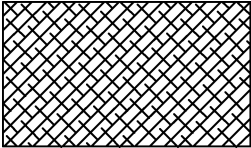
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MF NO	Description	Type	Symbol
05 30 00	metal deck, form	O	
05 30 00	metal deck, hi-form	O	
05 30 00	metal deck, ribbed	O	
05 50 00	sheet metal and all metals	M	
05 53 00	grating, plan	M	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

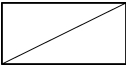
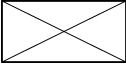
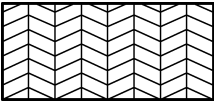
MF NO	Description	Type	Symbol
05 53 00	grating, section	M	
05 54 00	checker plate, plan	M	
06 05 00	wood, hardboard	M	
06 10 00	board, oriented strand	M	
06 10 00	particleboard	M	

DIV 06 WOOD, PLASTICS, and COMPOSITES

UDS-06.36

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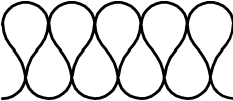
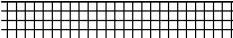
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MF NO	Description	Type	Symbol
06 10 00	plywood	M	
06 10 00	wood blocking or shim	M	
06 10 00	wood framing, continuous	M	
06 10 00	wood, glued-laminated	M	
06 20 00	plastic on plywood	M	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
06 20 00	wood finish	M	
06 40 00	particleboard woodwork, architectural	M	
DIV 07 THERMAL and MOISTURE PROTECTION			
07 21 00	insulation	M	
07 21 00	insulation, loose fill	M	
07 21 00	insulation, rigid board	M	

UDS-06.37

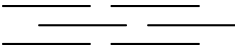
UNIFORM DRAWING SYSTEM

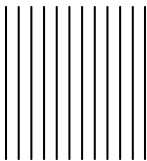
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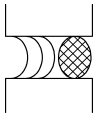
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SYMBOLS

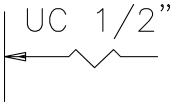
MF NO	Description	Type	Symbol

07 31 00	wood shingles siding	M	

07 40 00	sheet metal	M	

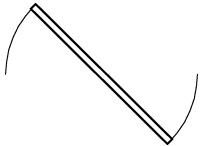
07 92 00	sealant and backer rod	M	

DIV 08 OPENINGS

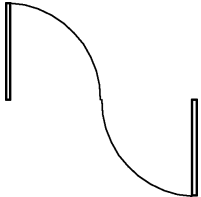
08 10 00	door, undercut	I	

08 10 00	door, bifolding	O	

MF NO	Description	Type	Symbol

08 10 00	door, center pivot	O	

08 10 00	door, double	O	

08 10 00	door, double egress	O	

08 10 00	door, double swing	O	

08 10 00	door, double uneven	O	

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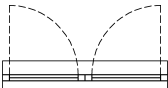
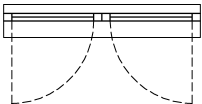
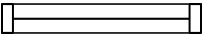
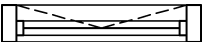
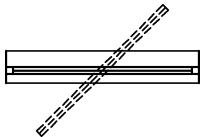
SYMBOLS

MF NO	Description	Type	Symbol
08 10 00	door, pocket	0	
08 10 00	door, single full swing	0	
08 10 00	door, single hinged or pivot	0	
08 10 00	door, sliding	0	
08 10 00	door, sliding surface	0	

MF NO	Description	Type	Symbol
08 33 00	door, coiling	0	
08 34 00	door, revolving dark room	0	
08 36 00	door, overhead	0	
08 42 00	door, revolving	0	
08 50 00	window, awning	0	

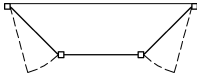
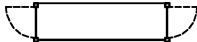
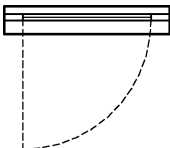
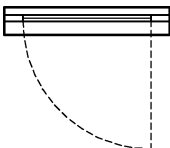
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MF NO	Description	Type	Symbol
08 50 00	window, double casement (inswing)	0	
08 50 00	window, double casement (outswing)	0	
08 50 00	window, fixed	0	
08 50 00	window, jalousie	0	
08 50 00	window, pivot	0	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

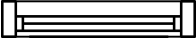
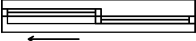
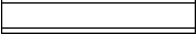
MF NO	Description	Type	Symbol
08 50 00	window, projected bay with casement windows	0	
08 50 00	window, projected bow	0	
08 50 00	window, projected box	0	
08 50 00	window, single casement left jamb hinge	0	
08 50 00	window, single casement right jamb hinge	0	

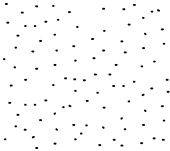
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SYMBOLS

MF NO	Description	Type	Symbol
08 50 00	window, single, double, or triple hung	O	
08 50 00	window, sliding right operating sash	O	
08 70 00	door, hardware, electric opener	I	
08 71 00	threshold	O	
08 80 00	glass	M	

MF NO	Description	Type	Symbol
08 80 00	glass elevation	M	
DIV 09 FINISHES			
09 05 00	plaster, gypsum or portland cement	M	
09 20 00	plaster finish with metal lath	M	
09 22 00	furring channel, metal support assembly	O	
09 22 00	furring hat channel, metal support assembly	O	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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MF NO	Description	Type	Symbol
09 23 00	plaster, gypsum on masonry	M	
09 23 00	plaster, gypsum, solid partition	M	
09 29 00	gypsum board finish	M	
09 30 00	tile, ceramic elevation	M	
09 50 00	tee suspension, ceiling assemblies	O	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
09 51 00	tile, acoustical ceiling	M	
09 64 00	wood flooring	M	
09 66 00	terrazzo finish	M	
09 68 00	carpet and pad	M	
DIV 10 SPECIALTIES			
10 13 00	directory, wall mounted	O	

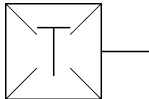
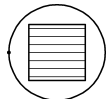
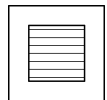
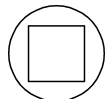
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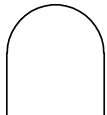
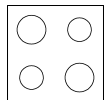
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SYMBOLS

MF NO	Description	Type	Symbol
10 17 00	telephone booth	0	
10 44 00	extinguisher, water	I	
10 44 00	fire protection, extinguisher, all-type, automatic actuated	I	
10 44 00	fire protection, extinguisher, all-type, manually actuated	I	
10 44 00	fire suppression, extinguisher, automatic actuated dry chemical	I	

MF NO	Description	Type	Symbol
10 44 00	fire suppression, extinguisher, carbon dioxide	I	
10 44 00	fire suppression, extinguisher, carbon dioxide manually actuated	I	
DIV 11 EQUIPMENT			
11 00 00	can washer	0	
11 00 00	range	0	
11 00 00	refrigerator	0	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

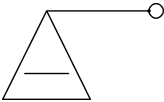
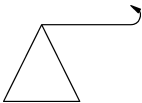
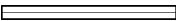
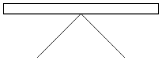
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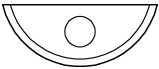
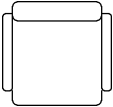
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SYMBOLS

MF NO	Description	Type	Symbol
11 12 00	parking control equipment, traffic arm with card reader	I	
11 12 00	parking control equipment, traffic arm, mechanical, swing	I	
11 48 00	dishwasher	O	
11 52 00	screen, projection ceiling- mounted	O	
11 59 00	easel	O	

MF NO	Description	Type	Symbol
11 62 00	instrumental equipment, bell	I	
11 74 00	lavatory, dental	O	
DIV 12 FURNISHINGS			
12 22 00	curtains and drapes	O	
12 40 00	table lamp	O	
12 50 00	chair with arms	O	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

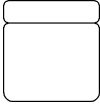
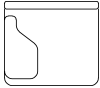
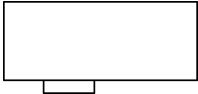
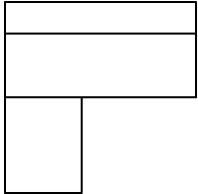
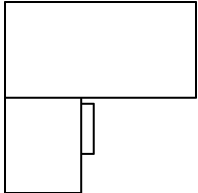
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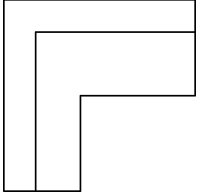
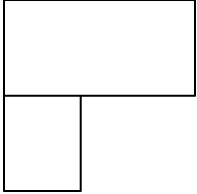
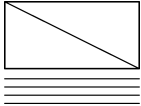
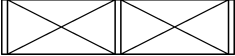
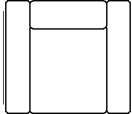
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SYMBOLS

MF NO	Description	Type	Symbol
12 50 00	chair without arms	0	
12 50 00	chair, classroom	0	
12 50 00	credenza	0	
12 50 00	desk console	0	
12 50 00	desk with left return	0	

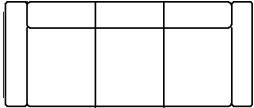
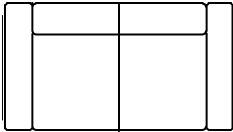
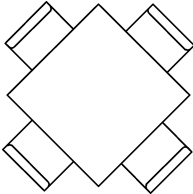
MF NO	Description	Type	Symbol
12 50 00	desk, L unit left return	0	
12 50 00	desk, secretarial left return	0	
12 50 00	file, lateral, four drawer	0	
12 50 00	shelving equipment	0	
12 50 00	sofa, chair	0	

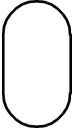
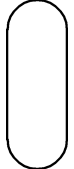
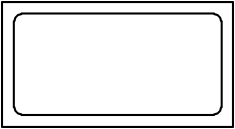
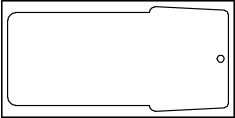
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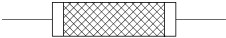
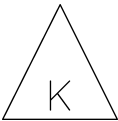
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SYMBOLS

MF NO	Description	Type	Symbol
12 50 00	sofa, three cushion	0	
12 50 00	sofa, two cushion	0	
12 50 00	table	0	
12 50 00	table, square with armless chairs	0	
12 92 00	plant, interior or artificial	0	

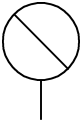
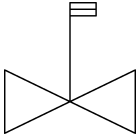
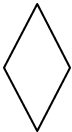
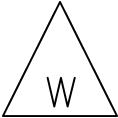
MF NO	Description	Type	Symbol
13 17 00	bath, hydrotherapy arm	0	
13 17 00	bath, hydrotherapy hubbard	0	
13 17 00	bath, hydrotherapy leg	0	
13 17 00	bath, institutional	0	
13 17 00	bath, whirlpool	0	

MF NO	Description	Type	Symbol
13 48 00	vibration control	I	
DIV 21 FIRE SUPPRESSION			
21 10 00	fire suppression, fire department key box	I	
21 10 00	fire suppression, sprinkler branch heads	I	
21 10 00	fire suppression, sprinkler with guard	I	
21 10 00	fire line = F; thin line, 2.5 mm (3/32") text	L	

MF NO	Description	Type	Symbol
21 10 00	fire protection sprinkler line = SP; thin line, 2.5 mm (3/32") text	L	
21 10 00	fire protection sprinkler line, main supply = S; thin line, 2.5 mm (3/32") text	L	
21 10 00	standpipe line, combination = CSP; thin line, 2.5 mm (3/32") text	L	
21 10 00	standpipe line, dry = DSP; thin line, 2.5 mm (3/32") text	L	
21 10 00	standpipe line, wet = WSP; thin line, 2.5 mm (3/32") text	L	

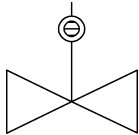
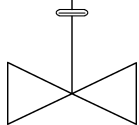
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MF NO	Description	Type	Symbol
21 11 00	detector switch, tamper position	I	
21 11 00	fire suppression, butterfly valve, indicating	I	
21 11 00	fire suppression, control valve	I	
21 11 00	fire suppression, deluge valve	I	
21 11 00	fire suppression, domestic water shutoff	I	

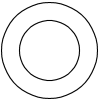
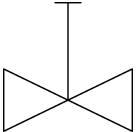
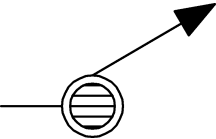
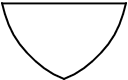
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SYMBOLS

MF NO	Description	Type	Symbol
21 11 00	fire suppression, flush mounted sprinkler heads	I	 
21 11 00	fire suppression, indicator post valve	I	
21 11 00	fire suppression, key operated valve	I	
21 11 00	fire suppression, meter (CFM)	I	
21 11 00	fire suppression, meter (GPM)	I	

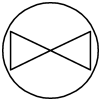
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MF NO	Description	Type	Symbol
21 11 00	fire suppression, nipped up upright sprinkler	I	
21 11 00	fire suppression, non-indicating, non-rising stem valve	I	
21 11 00	fire suppression, nozzle, charged monitor	I	
21 11 00	fire suppression, nozzle, special spray	I	
21 11 00	fire suppression, outside sprinkler	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

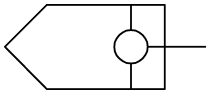
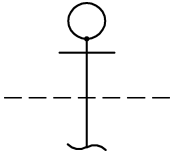
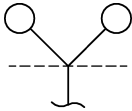
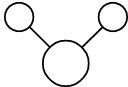
MF NO	Description	Type	Symbol
21 11 00	fire suppression, pendant head sprinklers	I	 
21 11 00	fire suppression, post indicator valve	I	
21 11 00	fire suppression, pre-action valve	I	
21 11 00	fire suppression, pressure switch	I	
21 11 00	fire suppression, pressure tank	I	

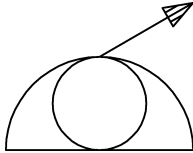
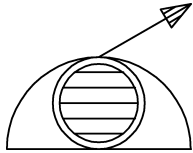
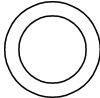
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SYMBOLS

MF NO	Description	Type	Symbol
21 11 00	hydrant, private housed two-hose outlet	I	
21 12 00	fire department connection, one-way	I	
21 12 00	fire suppression, department connection, two-way siamese	I	
21 12 00	fire suppression, fire department connection, siamese free standing	I	
21 12 00	fire suppression, fire hose connection, inspector's test	I	

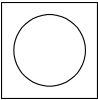
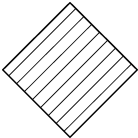
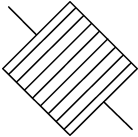
MF NO	Description	Type	Symbol
21 12 00	fire suppression, hose cabinet or connection	I	
21 12 00	standpipe, dry hose station	I	
21 12 00	standpipe, hose cabinet, charged	I	
21 13 00	fire suppression, automatic actuated wet extinguishing system	I	
21 13 00	fire suppression, dry automatic actuated	I	

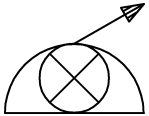
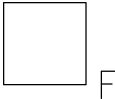
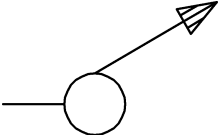
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SYMBOLS

MF NO	Description	Type	Symbol
21 13 00	fire suppression, dry manually actuated	I	
21 13 00	fire suppression, dry pipe valve	I	
21 13 00	fire suppression, dry pipe, quick open valve	I	
21 13 00	fire suppression, foam automatic actuated	I	
21 13 00	fire suppression, foam manually actuated	I	

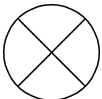
MF NO	Description	Type	Symbol
21 13 00	fire suppression, foam station reel	I	
21 13 00	fire suppression, foam system	I	
21 13 00	fire suppression, manual foam station	I	
21 13 00	fire suppression, manually actuated wet extinguishing system	I	
21 13 00	fire suppression, nozzle, dry monitor	I	

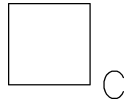
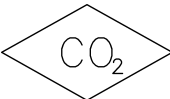
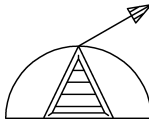
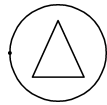
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SYMBOLS

MF NO	Description	Type	Symbol
21 13 00	fire suppression, sprinkler heads, sidewall pendant	I	
21 13 00	fire suppression, sprinkler heads, sidewall upright	I	
21 13 00	fire suppression, sprinkler riser	I	
21 13 00	fire suppression, switch, pressure detector	I	
21 13 00	fire suppression, test header	I	

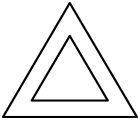
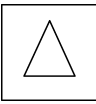
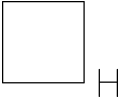
21 21 00	fire protection, manual carbon dioxide station	I	
21 21 00	fire suppression, extinguisher, carbon dioxide automatic actuated	I	
21 21 00	fire suppression, extinguisher, carbon dioxide system	I	
21 21 00	fire suppression, reel carbon dioxide station	I	
21 22 00	fire suppression, automatic actuated halon	I	

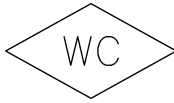
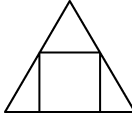
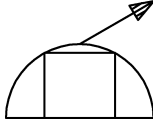
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SYMBOLS

MF NO	Description	Type	Symbol
21 22 00	fire suppression, halon control panel	I	
21 22 00	fire suppression, halon extinguisher	I	
21 22 00	fire suppression, halon manually actuated extinguisher	I	
21 22 00	fire suppression, halon system	I	
21 22 00	fire suppression, manual halon station	I	

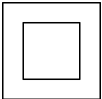
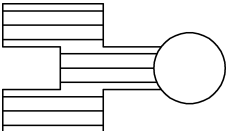
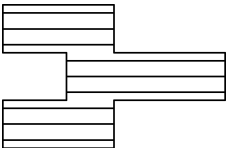
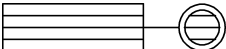
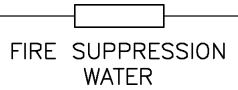
MF NO	Description	Type	Symbol
21 23 00	fire suppression, manual wet chemical station	I	
21 23 00	fire suppression, wet chemical system	I	
21 24 00	fire suppression, dry chemical system	I	
21 24 00	fire suppression, extinguisher, dry chemical	I	
21 24 00	fire suppression, extinguisher, dry chemical station reel	I	

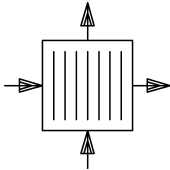
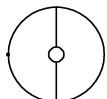
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SYMBOLS

MF NO	Description	Type	Symbol
21 24 00	fire suppression, extinguisher, manually actuated dry chemical	I	
21 30 00	fire suppression, fire pump test header, freestanding	I	
21 30 00	fire suppression, fire pump test header, wall mounted	I	
21 30 00	fire suppression, fire pump with drives	I	
21 41 00	storage tank, fire suppression water	I	

MF NO	Description	Type	Symbol
DIV 22 PLUMBING			
22 05 00	pipng, air heater (plate or tubular)	I	
22 05 00	pipng, air heater (rotating type)	I	
22 11 00	pipng, air eliminator	I	
22 11 00	pipng, air separator	I	
22 11 00	utility, water regulator valve	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol
22 11 00	water main, private	I	=====
22 11 00	drain line = D; thin line, 2.5 mm (3/32") text	L	——— D ———
22 11 00	drain line, indirect = IW; thin line, 2.5 mm (3/32") text	L	——— IW ———
22 11 00	pipe line, cast iron; thin continuous line, 2.5 mm (3/32") text	L	——— CI ———
22 11 00	pipe line, clay tile = CT; thin line, 2.5 mm (3/32") text	L	——— CT ———

22 11 00	pipe line, ductile iron = DI; thin line, 2.5 mm (3/32") text	L	——— DI ———
22 11 00	waste line, and vent, combination = SV; thin line, 2.5 mm (3/32") text	L	——— SV ———
22 11 00	waste line, sanitary soil (above floor) = SS; thin line, 2.5 mm (3/32") text	L	——— SS ———
22 11 00	waste line, sanitary soil (below floor); thin line, 2.5 mm (3/32") text	L	— — SS — —
22 11 00	water line, cold; thin continuous line, 5 mm (3/16") dash, 2 mm (5/64") space	L	——— — ———

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.55

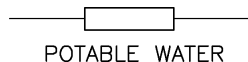
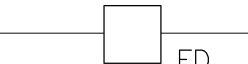
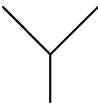
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SYMBOLS

MF NO	Description	Type	Symbol
22 11 00	water line, drinking return = DWR; thin line, 2.5 mm (3/32") text	L	———DWR———
22 11 00	water line, drinking supply = DWS; thin line, 2.5 mm (3/32") text	L	———DWS———
22 11 00	water line, soft = SW; thin line, 2.5 mm (3/32") text	L	———SW———
22 11 00	water line, tempered return = TWR; thin line, 2.5 mm (3/32") text	L	———TWR———
22 11 00	water line, tempered supply = TWS; thin line, 2.5 mm (3/32") text	L	———TWS———

MF NO	Description	Type	Symbol
22 12 00	storage tank, potable water	I	 POTABLE WATER
22 13 00	drain, floor	I	 FD
22 13 00	pipng, grease trap	I	
22 14 00	pipng, drain, open funnel	I	
22 14 00	drain line, storm (above floor); thin line, 2.5 mm (3/32") text	L	———SD———

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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MF NO	Description	Type	Symbol
22 14 00	drain line, storm (below floor); thin line, 2.5 mm (3/32") text	L	
22 14 00	pipe line, reinforced concrete = RCP; thin line, 2.5 mm (3/32") text	L	
22 15 00	compressed air line = A; thin line, 2.5 mm (3/32") text	L	
22 31 00	utility, water softener	I	
22 40 00	plumbing fixtures, shower, overhead gang	I	

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SYMBOLS

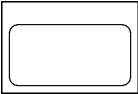
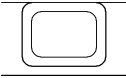
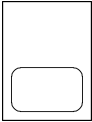
MF NO	Description	Type	Symbol
22 40 00	bath, emergency	O	
22 40 00	bath, foot	O	
22 40 00	bath, infant	O	
22 40 00	bath, recessed	O	
22 40 00	bath, rimmed	O	

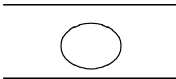
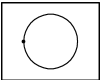
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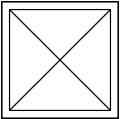
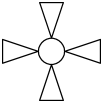
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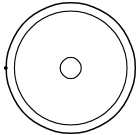
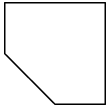
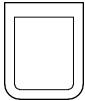
U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
22 40 00	bath, sitz	0	
22 40 00	bidet	0	
22 40 00	laundry, single tray	0	
22 40 00	lavatory countertop	0	
22 40 00	lavatory, accessible	0	

MF NO	Description	Type	Symbol
22 40 00	lavatory, corner	0	
22 40 00	lavatory, integral countertop	0	
22 40 00	lavatory, medical manicure	0	
22 40 00	lavatory, wall hung	0	
22 40 00	shower head	0	

MF NO	Description	Type	Symbol
22 40 00	shower stall	0	
22 40 00	shower, pedestal gang	0	
22 40 00	sink with drainboard	0	
22 40 00	sink with garbage disposal	0	
22 40 00	sink with left & right drain board	0	

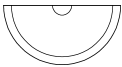
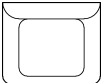
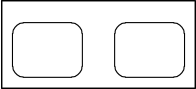
MF NO	Description	Type	Symbol
22 40 00	sink, circular wash type	0	
22 40 00	sink, floor	0	
22 40 00	sink, flushing rimmed clinical	0	
22 40 00	sink, general	0	
22 40 00	sink, laundry	0	

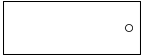
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SYMBOLS

MF NO	Description	Type	Symbol
22 40 00	sink, semi-circular wash	0	
22 40 00	sink, service, cast iron enameled	0	
22 40 00	sink, service, metal	0	
22 40 00	sink, two-compartment type	0	
22 40 00	sink, two compartment with left & right drainboards	0	

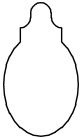
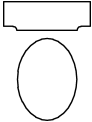
MF NO	Description	Type	Symbol
22 40 00	urinal, corner type	0	
22 40 00	urinal, floor mounted	0	
22 40 00	urinal, trough type	0	
22 40 00	urinal, wall hung	0	
22 40 00	water cooler, freestanding electric	0	

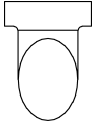
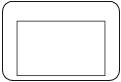
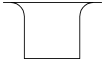
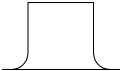
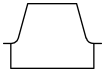
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SYMBOLS

MF NO	Description	Type	Symbol
22 40 00	water cooler, wall hung electric	0	
22 40 00	water closet, flush valve floor outlet	0	
22 40 00	water closet, flush valve wall hung	0	
22 40 00	water closet, integral tank	0	
22 40 00	water closet, tank type	0	

MF NO	Description	Type	Symbol
22 40 00	water closet, wall hung tank	0	
22 43 00	sink, surgeon scrub	0	
22 47 00	drinking fountain, projecting type	0	
22 47 00	drinking fountain, recessed type	0	
22 47 00	drinking fountain, semi-recessed type	0	

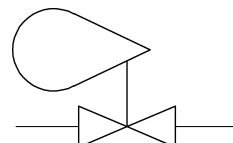
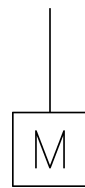
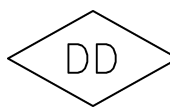
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SYMBOLS

MF NO	Description	Type	Symbol
22 62 00	vacuum air line = VAC; thin line, 2.5 mm (3/32") text	L	——— VAC ———
22 62 00	vacuum cleaning line = VC; thin line, 2.5 mm (3/32") text	L	——— VC ———
22 62 00	vacuum pump discharge line = VPD; thin line, 2.5 mm (3/32") text	L	——— VPD ———
22 63 00	liquid oxygen line = LOX; thin line, 2.5 mm (3/32") text	L	——— LOX ———
22 63 00	nitrous oxide line = NO; thin line, 2.5 mm (3/32") text	L	——— NO ———

MF NO	Description	Type	Symbol
22 63 00	oxygen line = O; thin line, 2.5 mm (3/32") text	L	——— O ———
DIV 23 HEATING, VENTILATING, and AIR CONDITIONING			
23 09 00	air distribution, controller, liquid level	I	
23 09 00	air distribution, damper control, electric operated	I	
23 09 00	air distribution, duct detector	I	
23 09 00	air distribution, pneumatic operated damper control	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol
23 09 00	control panel for heating, ventilating and air conditioning	I	
23 09 00	HVAC control, switch, normally closed flow	I	
23 09 00	HVAC control, switch, normally open flow	I	
23 09 00	HVAC control, three-way air motor controlled valve	I	
23 09 00	HVAC controls, air motor controlled gate valve	I	

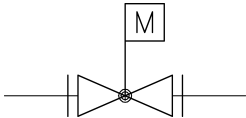
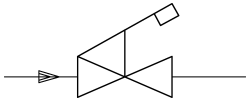
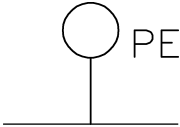
MF NO	Description	Type	Symbol
23 09 00	HVAC controls, automatic governor operated valve	I	
23 09 00	HVAC controls, differential oil pressure switch	I	
23 09 00	HVAC controls, dual pressure switch	I	
23 09 00	HVAC controls, electric pneumatic control	I	
23 09 00	HVAC controls, flanged motor operated gate valve	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.63

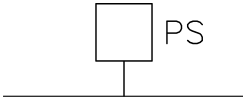
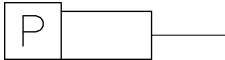
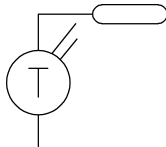
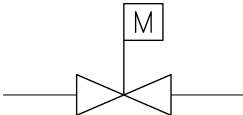
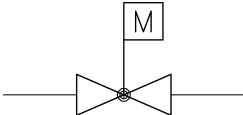
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MF NO	Description	Type	Symbol
23 09 00	HVAC controls, flanged motor operated globe valve	I	
23 09 00	HVAC controls, fusible link quick valve	I	
23 09 00	HVAC controls, pneumatic electric control	I	
23 09 00	HVAC controls, pressure stat	I	
23 09 00	HVAC controls, pressure switch with high pressure cutout	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 09 00	HVAC controls, pressure switch, type 1	I	
23 09 00	HVAC controls, pressure switch, type 2	I	
23 09 00	HVAC controls, remote bulb thermostat	I	
23 09 00	HVAC controls, screwed motor operated gate valve	I	
23 09 00	HVAC controls, screwed motor operated globe valve	I	

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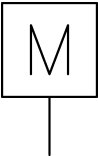
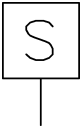
SYMBOLS

MF NO	Description	Type	Symbol
23 09 00	HVAC controls, self-contained thermostat	I	
23 09 00	HVAC controls, solenoid valve	I	
23 09 00	HVAC controls, spring check valve	I	
23 09 00	HVAC controls, thermal bulb	I	
23 09 00	HVAC controls, thermometer	I	

MF NO	Description	Type	Symbol
23 09 00	HVAC controls, thermometer well	I	
23 09 00	HVAC controls, thermostat, electric	I	
23 09 00	HVAC controls, thermostat, pneumatic	I	
23 09 00	HVAC controls, thermostat, self-contained	I	
23 09 00	HVAC controls, three-way electric motor controlled valve	I	

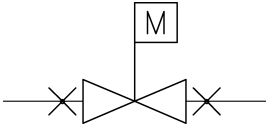
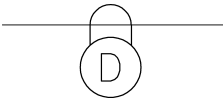
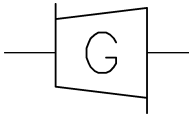
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MF NO	Description	Type	Symbol
23 09 00	HVAC controls, valve actuator electric motor	I	
23 09 00	HVAC controls, valve actuator electric solenoid	I	
23 09 00	HVAC controls, valve actuator pneumatic motor	I	
23 09 00	HVAC controls, valve actuator pneumatic motor diaphragm	I	
23 09 00	HVAC controls, vapor regulated suction valve	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 09 00	HVAC controls, welded motor operated gate valve	I	
23 10 00	piping, engine (indicate fuel)	I	
23 10 00	piping, gas turbine	I	
23 11 00	fire suppression, LP gas shutoff	I	
23 11 00	fire suppression, natural gas shutoff	I	

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SYMBOLS

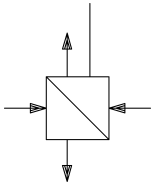
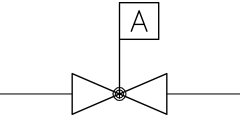
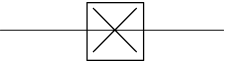
MF NO	Description	Type	Symbol
23 11 00	fuel oil discharge line = FOD; thin line, 2.5 mm (3/32") text	L	——— FOD ———
23 11 00	fuel oil flow line = FOF; thin line, 2.5 mm (3/32") text	L	——— FOF ———
23 11 00	fuel oil gauge line = FOG; 2.5 mm (3/32") text	L	——— FOG ———
23 11 00	gas line, high pressure = HG; thin line, 2.5 mm (3/32") text	L	——— HG ———
23 11 00	gas line, liquid petroleum = LPG; thin line, 2.5 mm (3/32") text	L	——— LPG ———

MF NO	Description	Type	Symbol
23 11 00	gas line, low pressure = G; thin line, 2.5 mm (3/32") text	L	——— G ———
23 11 00	gas line, medium pressure = MG; thin line, 2.5 mm (3/32") text	L	——— MG ———
23 11 00	return line, fuel oil = FOR; thin line, 2.5 mm (3/32") text	L	——— FOR ———
23 11 00	supply line, fuel oil suction = FOS; 2.5 mm (3/32") text	L	——— FOS ———
23 11 00	vent line, fuel oil tank = FOV; 2.5 mm (3/32") text	L	——— FOV ———

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS**UDS-06.67**

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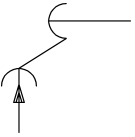
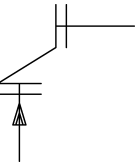
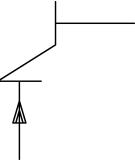
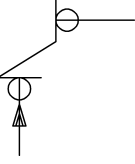
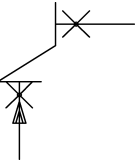
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MF NO	Description	Type	Symbol
23 13 00	storage tank, facility fuel storage	I	 FACILITY FUEL
23 20 00	heater, live steam superheater	I	
23 20 00	HVAC control, air motor controlled globe valve	I	
23 20 00	piping, anchor intermediate	I	
23 20 00	piping, anchor main	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, angle check valve, bell & spigot	I	
23 20 00	piping, angle check valve, flanged	I	
23 20 00	piping, angle check valve, screwed	I	
23 20 00	piping, angle check valve, soldered	I	
23 20 00	piping, angle check valve, welded	I	

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MF NO	Description	Type	Symbol
23 20 00	pipng, angle gate valve, flanged (elevation)	I	
23 20 00	pipng, angle gate valve, flanged (plan)	I	
23 20 00	pipng, angle gate valve, screwed (elevation)	I	
23 20 00	pipng, angle gate valve, screwed (plan)	I	
23 20 00	pipng, angle gate valve, welded (elevation)	I	

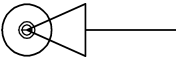
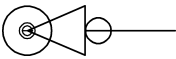
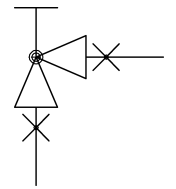
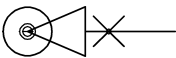
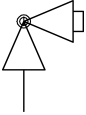
U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	pipng, angle gate valve, welded (plan)	I	
23 20 00	pipng, angle globe valve (elevation)	I	
23 20 00	pipng, angle globe valve, flanged (elevation)	I	
23 20 00	pipng, angle globe valve, flanged (plan)	I	
23 20 00	pipng, angle globe valve, screwed (elevation)	I	

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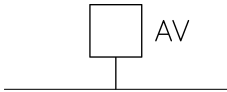
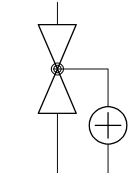
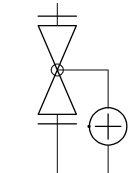
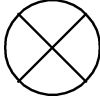
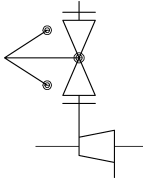
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MF NO	Description	Type	Symbol
23 20 00	piping, angle globe valve, screwed (plan)	I	
23 20 00	piping, angle globe valve, soldered (plan)	I	
23 20 00	piping, angle globe valve, welded (elevation)	I	
23 20 00	piping, angle globe valve, welded (plan)	I	
23 20 00	piping, angle hose valve	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, automatic air vent	I	
23 20 00	piping, automatic bypass valve	I	
23 20 00	piping, automatic bypass valve, flanged	I	
23 20 00	piping, automatic expansion valve	I	
23 20 00	piping, automatic governor operated valve, flanged	I	

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MF NO	Description	Type	Symbol
23 20 00	piping, automatic reducing valve	I	
23 20 00	piping, automatic reducing valve, flanged	I	
23 20 00	piping, ball joint	I	
23 20 00	piping, ball valve	I	
23 20 00	piping, barometric condenser	I	

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SYMBOLS

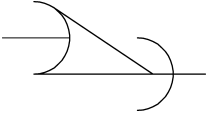
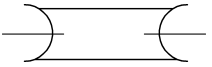
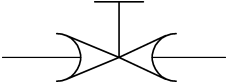
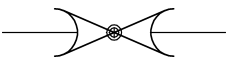
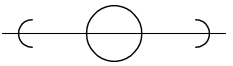
MF NO	Description	Type	Symbol
23 20 00	piping, base elbow, screwed	I	
23 20 00	piping, bell & spigot cap	I	
23 20 00	piping, bell & spigot concentric reducer	I	
23 20 00	piping, bell & spigot connecting pipe joint	I	
23 20 00	piping, bell & spigot crossover	I	

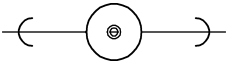
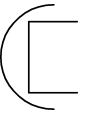
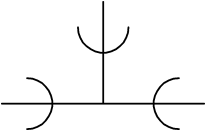
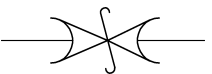
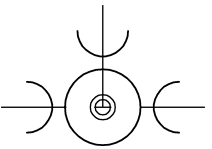
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	pipng, bell & spigot eccentric reducer	I	
23 20 00	pipng, bell & spigot expansion bell joint	I	
23 20 00	pipng, bell & spigot gate valve (elevation)	I	
23 20 00	pipng, bell & spigot globe valve (elevation)	I	
23 20 00	pipng, bell & spigot outlet down tee	I	

MF NO	Description	Type	Symbol
23 20 00	pipng, bell & spigot outlet up tee	I	
23 20 00	pipng, bell & spigot pipe plug	I	
23 20 00	pipng, bell & spigot reducing tee	I	
23 20 00	pipng, bell & spigot safety valve	I	
23 20 00	pipng, bell & spigot side outlet tee	I	

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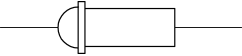
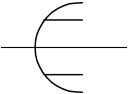
SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, bell & spigot sleeve	I	
23 20 00	piping, bell & spigot stop valve	I	
23 20 00	piping, bell & spigot straight size tee	I	
23 20 00	piping, bell & spigot turned down elbow	I	
23 20 00	piping, bell & spigot turned up elbow	I	

MF NO	Description	Type	Symbol
23 20 00	piping, bell & spigot, 45 degree elbow	I	
23 20 00	piping, bell & spigot, 90 degree elbow	I	
23 20 00	piping, bell & spigot, bull plug	I	
23 20 00	piping, bell & spigot, side outlet down tee	I	
23 20 00	piping, blind flange	I	

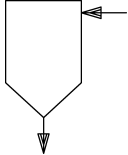
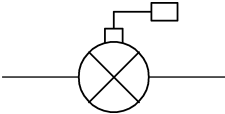
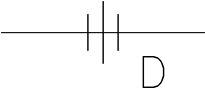
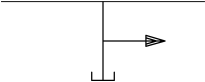
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MF NO	Description	Type	Symbol
23 20 00	piping, blow off strainer	I	
23 20 00	piping, boiler return trap	I	
23 20 00	piping, bushing bell & spigot	I	
23 20 00	piping, butterfly valve	I	
23 20 00	piping, capillary tube	I	

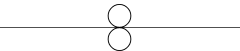
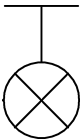
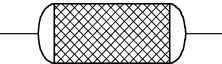
U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, cock bell & spigot	I	
23 20 00	piping, condenser jet	I	
23 20 00	piping, condenser water regulating valve	I	
23 20 00	piping, dielectric union	I	
23 20 00	piping, drain hose end	I	

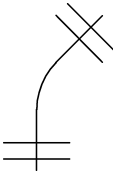
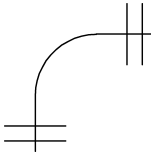
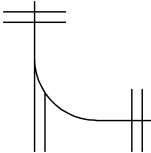
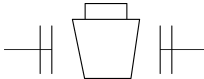
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MF NO	Description	Type	Symbol
23 20 00	piping, duplex strainer	I	
23 20 00	piping, expansion hand valve	I	
23 20 00	piping, expansion joint	I	
23 20 00	piping, expansion loop	I	
23 20 00	piping, filter and strainer line	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

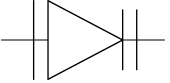
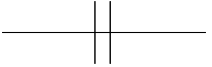
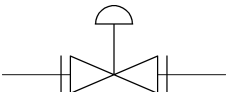
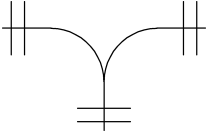
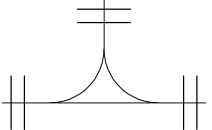
MF NO	Description	Type	Symbol
23 20 00	piping, flanged 45 degree elbow	I	
23 20 00	piping, flanged 90 degree elbow	I	
23 20 00	piping, flanged base elbow	I	
23 20 00	piping, flanged bull plug	I	
23 20 00	piping, flanged cock	I	

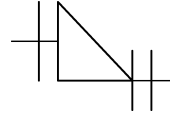
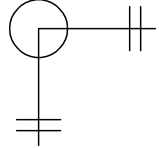
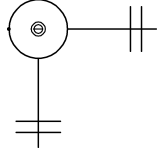
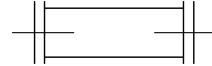
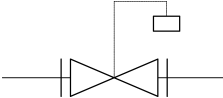
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, flanged concentric reducer	I	
23 20 00	piping, flanged connecting pipe joint	I	
23 20 00	piping, flanged diaphragm valve	I	
23 20 00	piping, flanged double branch elbow	I	
23 20 00	piping, flanged double sweep tee	I	

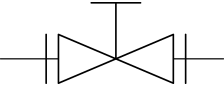
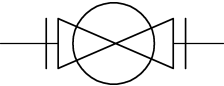
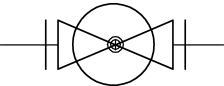
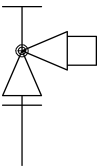
MF NO	Description	Type	Symbol
23 20 00	piping, flanged eccentric reducer	I	
23 20 00	piping, flanged elbow side outlet, down	I	
23 20 00	piping, flanged elbow side outlet, up	I	
23 20 00	piping, flanged expansion joint	I	
23 20 00	piping, flanged float valve	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.76

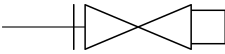
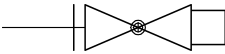
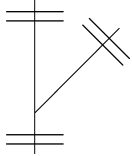
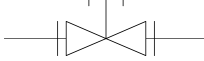
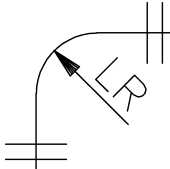
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MF NO	Description	Type	Symbol
23 20 00	pipng, flanged gate valve (elevation)	I	
23 20 00	pipng, flanged gate valve (plan)	I	
23 20 00	pipng, flanged globe valve (elevation)	I	
23 20 00	pipng, flanged globe valve (plan)	I	
23 20 00	pipng, flanged hose angle valve	I	

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SYMBOLS

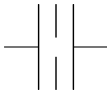
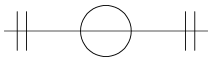
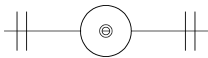
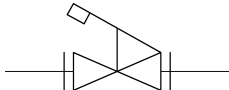
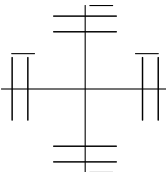
MF NO	Description	Type	Symbol
23 20 00	pipng, flanged hose gate valve	I	
23 20 00	pipng, flanged hose globe valve	I	
23 20 00	pipng, flanged lateral	I	
23 20 00	pipng, flanged lock shield valve	I	
23 20 00	pipng, flanged long radius elbow	I	

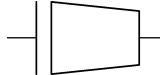
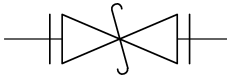
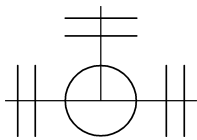
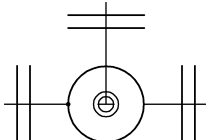
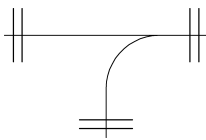
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, flanged orifice flange	I	
23 20 00	piping, flanged outlet down tee	I	
23 20 00	piping, flanged outlet up tee	I	
23 20 00	piping, flanged quick opening valve	I	
23 20 00	piping, flanged reducing cross	I	

MF NO	Description	Type	Symbol
23 20 00	piping, flanged reducing flange	I	
23 20 00	piping, flanged safety valve	I	
23 20 00	piping, flanged side outlet tee	I	
23 20 00	piping, flanged side outlet up tee	I	
23 20 00	piping, flanged single sweep tee	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

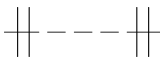
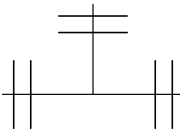
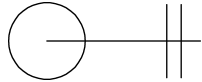
UDS-06.78

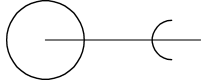
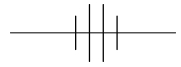
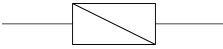
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, flanged sleeve	I	
23 20 00	piping, flanged spool piece	I	
23 20 00	piping, flanged stop valve	I	
23 20 00	piping, flanged straight size tee	I	
23 20 00	piping, flanged turned down elbow	I	

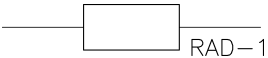
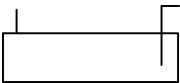
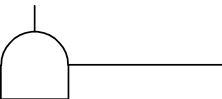
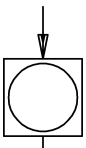
MF NO	Description	Type	Symbol
23 20 00	piping, flanged turned up elbow	I	
23 20 00	piping, flanged union	I	
23 20 00	piping, float and thermostatic trap	I	
23 20 00	piping, float trap	I	
23 20 00	piping, heat, liquid exchanger	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.79

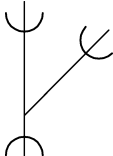
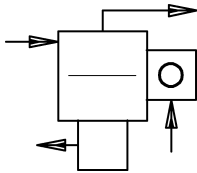
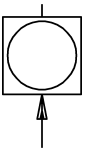
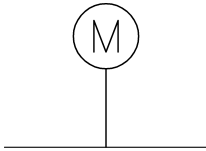
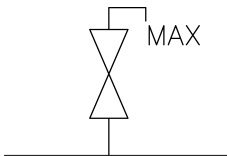
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MF NO	Description	Type	Symbol
23 20 00	piping, heat, transfer surface	I	
23 20 00	piping, high pressure horizontal receiver	I	
23 20 00	piping, high pressure vertical receiver	I	
23 20 00	piping, high side float valve	I	
23 20 00	piping, hose globe valve	I	

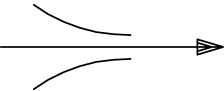
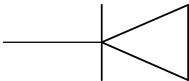
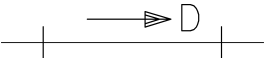
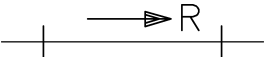
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, lateral bell & spigot	I	
23 20 00	piping, low pressure receiver	I	
23 20 00	piping, low side float valve	I	
23 20 00	piping, magnetic stop valve	I	
23 20 00	piping, manual air vent	I	

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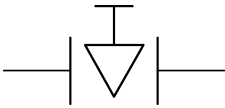
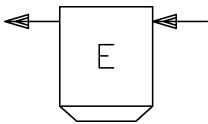
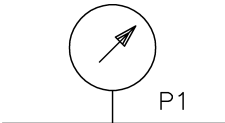
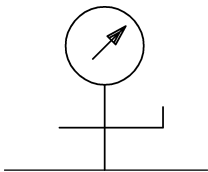
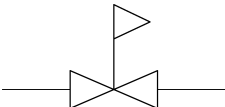
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MF NO	Description	Type	Symbol
23 20 00	piping, needle valve	I	
23 20 00	piping, nozzle flow	I	
23 20 00	piping, pipe plug	I	
23 20 00	piping, pitch or pipe drop	I	
23 20 00	piping, pitch or pipe rise	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, plug valve	I	
23 20 00	piping, precipitator	I	
23 20 00	piping, pressure gage	I	
23 20 00	piping, pressure gage and cock	I	
23 20 00	piping, pressure reducing valve	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, reducing bell & spigot cross	I	
23 20 00	piping, relief or safety valve	I	
23 20 00	piping, rupture disc	I	
23 20 00	piping, screwed 45 degree elbow	I	
23 20 00	piping, screwed 90 degree elbow	I	

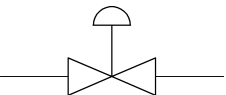
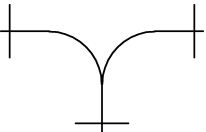
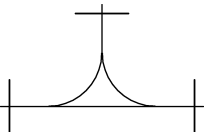
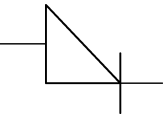
MF NO	Description	Type	Symbol
23 20 00	piping, screwed bushing	I	
23 20 00	piping, screwed cap	I	
23 20 00	piping, screwed cock	I	
23 20 00	piping, screwed concentric reducer	I	
23 20 00	piping, screwed connecting pipe joint	I	

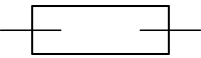
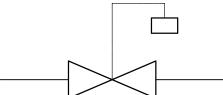
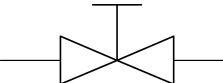
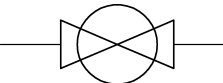
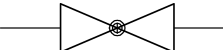
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, screwed crossover	I	
23 20 00	piping, screwed diaphragm valve	I	
23 20 00	piping, screwed double branch elbow	I	
23 20 00	piping, screwed double sweep tee	I	
23 20 00	piping, screwed eccentric reducer	I	

MF NO	Description	Type	Symbol
23 20 00	piping, screwed expansion joint	I	
23 20 00	piping, screwed float valve	I	
23 20 00	piping, screwed gate valve	I	
23 20 00	piping, screwed gate valve (plan)	I	
23 20 00	piping, screwed globe valve (elevation)	I	

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MF NO	Description	Type	Symbol
23 20 00	pipng, screwed globe valve (plan)	I	
23 20 00	pipng, screwed hose angle valve	I	
23 20 00	pipng, screwed hose gate valve	I	
23 20 00	pipng, screwed hose globe valve	I	
23 20 00	pipng, screwed lateral	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

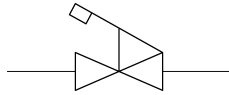
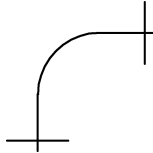
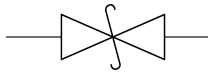
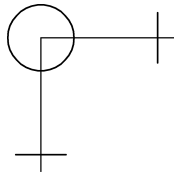
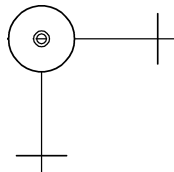
MF NO	Description	Type	Symbol
23 20 00	pipng, screwed lock shield valve	I	
23 20 00	pipng, screwed long radius elbow	I	
23 20 00	pipng, screwed outlet down tee	I	
23 20 00	pipng, screwed outlet up tee	I	
23 20 00	pipng, screwed pipe plug	I	

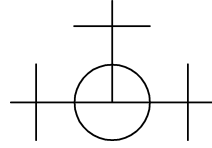
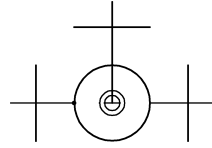
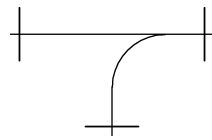
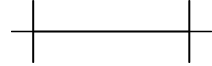
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, screwed quick opening valve	I	
23 20 00	piping, screwed reducing elbow	I	
23 20 00	piping, screwed safety valve	I	
23 20 00	piping, screwed side outlet elbow, down	I	
23 20 00	piping, screwed side outlet elbow, up	I	

MF NO	Description	Type	Symbol
23 20 00	piping, screwed side outlet tee	I	
23 20 00	piping, screwed side outlet up tee	I	
23 20 00	piping, screwed single sweep tee	I	
23 20 00	piping, screwed sleeve	I	
23 20 00	piping, screwed stop valve	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, screwed straight size tee	I	
23 20 00	piping, screwed street elbow	I	
23 20 00	piping, screwed turned down elbow	I	
23 20 00	piping, screwed turned up elbow	I	
23 20 00	piping, screwed union	I	

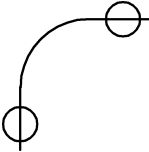
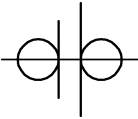
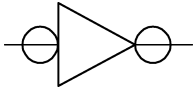
MF NO	Description	Type	Symbol
23 20 00	piping, side outlet elbow, bell & spigot, outlet down	I	
23 20 00	piping, side outlet elbow, bell & spigot, outlet up	I	
23 20 00	piping, sight glass	I	
23 20 00	piping, sleeve	I	
23 20 00	piping, soldered 45 degree elbow	I	

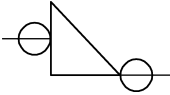
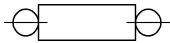
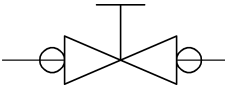
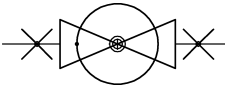
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	pipng, soldered 90 degree elbow	I	
23 20 00	pipng, soldered bushing	I	
23 20 00	pipng, soldered cock	I	
23 20 00	pipng, soldered concentric reducer	I	
23 20 00	pipng, soldered connecting pipe joint	I	

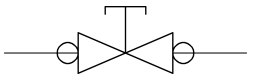
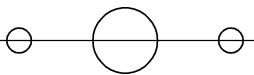
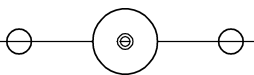
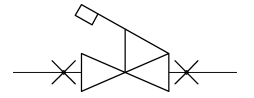
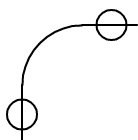
MF NO	Description	Type	Symbol
23 20 00	pipng, soldered eccentric reducer	I	
23 20 00	pipng, soldered expansion joint	I	
23 20 00	pipng, soldered gate valve	I	
23 20 00	pipng, soldered globe valve (elevation)	I	
23 20 00	pipng, soldered globe valve (plan)	I	

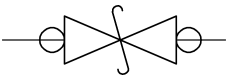
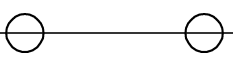
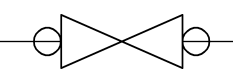
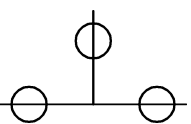
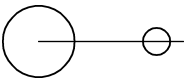
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	pipng, soldered lock shield valve	I	
23 20 00	pipng, soldered outlet down tee	I	
23 20 00	pipng, soldered outlet up tee	I	
23 20 00	pipng, soldered quick opening valve	I	
23 20 00	pipng, soldered reducing elbow	I	

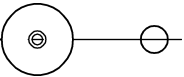
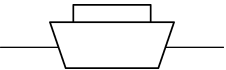
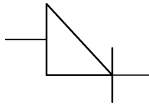
MF NO	Description	Type	Symbol
23 20 00	pipng, soldered safety valve	I	
23 20 00	pipng, soldered sleeve	I	
23 20 00	pipng, soldered stop valve	I	
23 20 00	pipng, soldered straight size tee	I	
23 20 00	pipng, soldered turned down elbow	I	

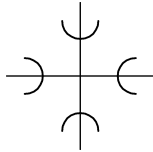
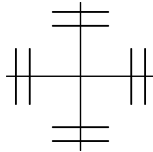
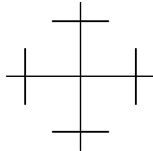
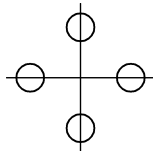
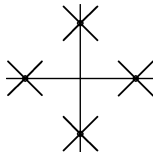
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	pipng, soldered turned up elbow	I	
23 20 00	pipng, soldered union	I	
23 20 00	pipng, square head cock	I	
23 20 00	pipng, steam trap (indicate type)	I	
23 20 00	pipng, straight crown eccentric reducer	I	

MF NO	Description	Type	Symbol
23 20 00	pipng, straight size bell & spigot cross	I	
23 20 00	pipng, straight size flanged cross	I	
23 20 00	pipng, straight size screwed cross	I	
23 20 00	pipng, straight size soldered cross	I	
23 20 00	pipng, straight size welded cross	I	

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MF NO	Description	Type	Symbol
23 20 00	piping, straight way bell & spigot check valve	I	
23 20 00	piping, straight way flanged check valve	I	
23 20 00	piping, straight way screwed check valve	I	
23 20 00	piping, straight way soldered check valve	I	
23 20 00	piping, straight way welded check valve	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

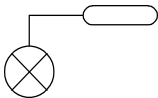
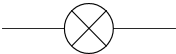
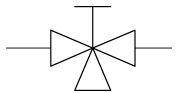
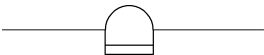
MF NO	Description	Type	Symbol
23 20 00	piping, strainer	I	
23 20 00	piping, strainer (plan)	I	
23 20 00	piping, swing gate check valve	I	
23 20 00	piping, temperature gage	I	
23 20 00	piping, temperature pressure relief valve	I	

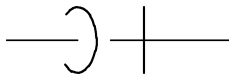
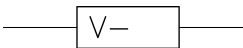
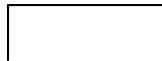
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, thermostatic blast trap	I	
23 20 00	piping, thermostatic expansion valve	I	
23 20 00	piping, thermostatic trap	I	
23 20 00	piping, three-way manual valve	I	
23 20 00	piping, trap scale	I	

MF NO	Description	Type	Symbol
23 20 00	piping, turned down 45 degree elbow	I	
23 20 00	piping, unclassified valve	I	
23 20 00	piping, valve actuator manual gear	I	
23 20 00	piping, valve actuator manual lever	I	
23 20 00	piping, valve actuator manual non-rise stem	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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MF NO	Description	Type	Symbol
23 20 00	pipng, valve actuator manual out stem/yoke	I	
23 20 00	pipng, valve compressor suction pressure	I	
23 20 00	pipng, valve, constant pressure suction	I	
23 20 00	pipng, valve, evaporative pressure, regular snap action	I	
23 20 00	pipng, valve, evaporative pressure, regular throttling	I	

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SYMBOLS

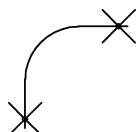
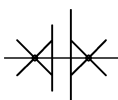
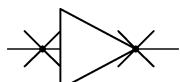
MF NO	Description	Type	Symbol
23 20 00	pipng, valve, evaporative pressure, regular throttling evaporator	I	
23 20 00	pipng, valve, refrigerant reversing	I	
23 20 00	pipng, valve, snap action	I	
23 20 00	pipng, valve, thermosuction	I	
23 20 00	pipng, water valve	I	

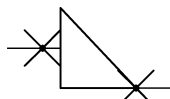
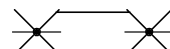
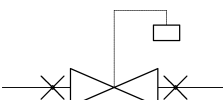
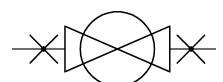
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, welded 45 degree elbow	I	
23 20 00	piping, welded 90 degree elbow	I	
23 20 00	piping, welded bushing	I	
23 20 00	piping, welded cock	I	
23 20 00	piping, welded concentric reducer	I	

MF NO	Description	Type	Symbol
23 20 00	piping, welded connecting pipe joint	I	
23 20 00	piping, welded eccentric reducer	I	
23 20 00	piping, welded expansion joint	I	
23 20 00	piping, welded float valve	I	
23 20 00	piping, welded gate valve (plan)	I	

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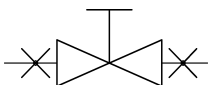
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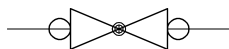
SYMBOLS

MF NO	Description	Type	Symbol

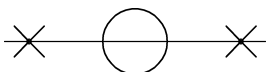
23 20 00 piping, welded gate valve (elevation) I



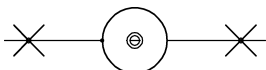
23 20 00 piping, welded globe valve I



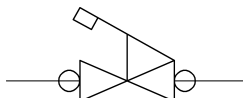
23 20 00 piping, welded outlet down tee I



23 20 00 piping, welded outlet up tee I

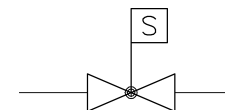


23 20 00 piping, welded quick opening valve I

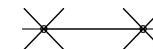


MF NO	Description	Type	Symbol

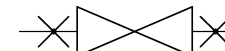
23 20 00 piping, welded safety valve I



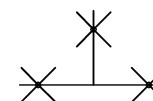
23 20 00 piping, welded sleeve I



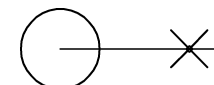
23 20 00 piping, welded stop valve I



23 20 00 piping, welded straight size tee I



23 20 00 piping, welded turned down elbow I

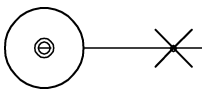
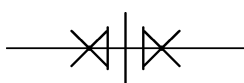


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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	piping, welded turned up elbow	I	
23 20 00	piping, welded union	I	
23 20 00	air relief line = ATV; thin line, 2.5 mm (3/32") text	L	——— ATV ———
23 20 00	boiler blow down line = BBD; thin line, 2.5 mm (3/32") text	L	——— BBD ———
23 20 00	condensate line = C; thin line, 2.5 mm (3/32") text	L	——— C ———

23 20 00	drain line, condensate (below floor) = ST; thin line, 5 mm (3/16") dash, 3 mm space, 2.5 mm (3/32") text	L	——— ST ———
23 20 00	humidification line = H; thin line, 2.5 mm (3/32") text	L	——— H ———
23 20 00	pumped condensate line = PC; thin line, 2.5 mm (3/32") text	L	——— PC ———
23 20 00	return line, brine = BR; thin line, 2.5 mm (3/32") text	L	——— BR ———
23 20 00	return line, condenser water = CR; thin line, 2.5 mm (3/32") text	L	——— CR ———

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	return line, dual temperature = DTR; thin line, 2.5 mm (3/32") text	L	——— DTR ———
23 20 00	return line, glycol heating = GHR; thin line, 2.5 mm (3/32") text	L	——— GHR ———
23 20 00	return line, high pressure condensate = HPC; thin line, 2.5 mm (3/32") text	L	——— HPC ———
23 20 00	return line, high temperature hot water = HTWR; thin line, 2.5 mm (3/32") text	L	——— HTWR ———
23 20 00	return line, low pressure condensate = LPC; thin line, 2.5 mm (3/32") text	L	——— LPC ———

MF NO	Description	Type	Symbol
23 20 00	return line, low temperature hot water = HWR; thin line, 2.5 mm (3/32") text	L	——— HWR ———
23 20 00	return line, medium pressure condensate = MPC; thin line, 2.5 mm (3/32") text	L	——— MPC ———
23 20 00	return line, medium temperature hot water = MTWR; thin line, 2.5 mm (3/32") text	L	——— MTWR ———
23 20 00	steam line, low pressure = LPS; thin line, 2.5 mm (3/32") text	L	——— LPS ———
23 20 00	steam line, medium pressure = MPS; thin line, 2.5 mm (3/32") text	L	——— MPS ———

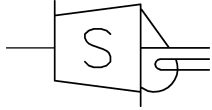
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SYMBOLS

MF NO	Description	Type	Symbol
23 20 00	supply line, brine = B; thin line, 2.5 mm (3/32") text	L	——— B ———
23 20 00	supply line, dual temperature = DTS; thin line, 2.5 mm (3/32") text	L	——— DTS ———
23 20 00	supply line, glycol heating = GHS; thin line, 2.5 mm (3/32") text	L	——— GHS ———
23 20 00	supply line, high pressure steam = HPS; thin line, 2.5 mm (3/32") text	L	——— HPS ———
23 20 00	supply line, low temperature hot water = HWS; thin line, 2.5 mm (3/32") text	L	——— HWS ———

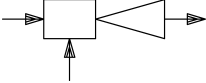
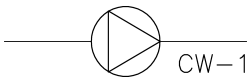
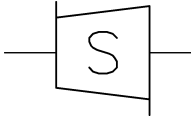
23 20 00	supply line, medium temperature hot water = MTWS; thin line, 2.5 mm (3/32") text	L	——— MTWS ———
23 20 00	water line, condenser flow = C; thin line, 2.5 mm (3/32") text	L	——— C ———
23 20 00	water line, hot; thin line, 5 mm (3/16") dash, 2 mm (5/64") space	L	— — — — —
23 20 00	water line, make up = MU; thin line, 2.5 mm (3/32") text	L	——— MU ———
23 21 00	piping, condensing steam turbine	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.97

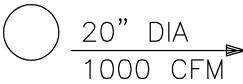
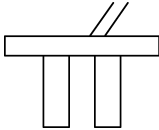
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MF NO	Description	Type	Symbol
23 21 00	piping, dynamic pump	I	
23 21 00	piping, pump (plan) (indicate use)	I	
23 21 00	piping, pump (schematic) (indicate use)	I	
23 21 00	piping, steam turbine	I	
23 23 00	refrigerant discharge line = RD; thin line, 2.5 mm (3/32") text	L	

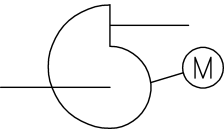
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SYMBOLS

MF NO	Description	Type	Symbol
23 23 00	refrigerant liquid line = RL; thin line, 2.5 mm (3/32") text	L	
23 23 00	refrigerant suction line = RS; thin line, 2.5 mm (3/32") text	L	
23 30 00	air distribution, ceiling spout outlet	I	
23 30 00	air distribution, supply outlet, wall	I	
23 30 00	damper heater, duct, electric	I	

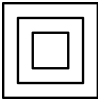
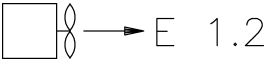
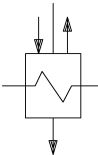
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MF NO	Description	Type	Symbol
23 30 00	damper, manual volume	I	
23 30 00	duct section, change in static pressure rating tag	I	
23 30 00	duct section, static pressure rating tag	I	
23 30 00	fan, blower	I	
23 30 00	fan, exhaust roof vent	I	

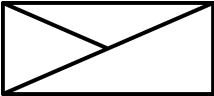
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SYMBOLS

MF NO	Description	Type	Symbol
23 30 00	fan, intake roof vent	I	
23 30 00	fan, louvered roof vent	I	
23 30 00	fan, propeller	I	
23 30 00	heater, feed with air outlet	I	
23 31 00	access door (AD) or access panel (AP)	I	

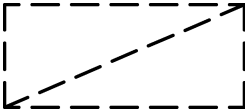
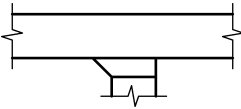
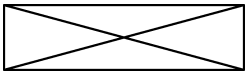
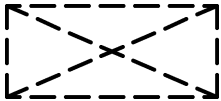
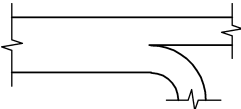
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MF NO	Description	Type	Symbol
23 31 00	air distribution, flexible connector	I	
23 31 00	air distribution, transition	I	
23 31 00	duct section, exhaust air down	I	
23 31 00	duct section, exhaust air up	I	
23 31 00	duct section, return air	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 31 00	duct section, return air down	I	
23 31 00	duct section, standard branch for supply and return	I	
23 31 00	duct section, supply air	I	
23 31 00	duct section, supply air down	I	
23 31 00	duct section, wye junction	I	

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MF NO	Description	Type	Symbol
23 31 00	duct, flexible	I	
23 31 00	ductwork, change in elevation	I	
23 33 00	air distribution, adjustable blank off damper	I	
23 33 00	air distribution, adjustable damper plaque	I	
23 33 00	air distribution, barometric damper	I	

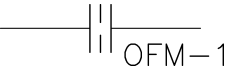
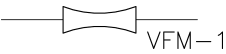
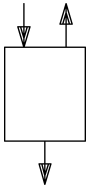
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SYMBOLS

MF NO	Description	Type	Symbol
23 33 00	air distribution, ductwork cowl (gooseneck)	I	
23 33 00	air distribution, ductwork sound attenuator	I	
23 33 00	air distribution, fire and smoke damper	I	
23 33 00	air distribution, fire damper	I	
23 33 00	air distribution, flow switch	I	

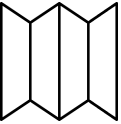
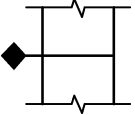
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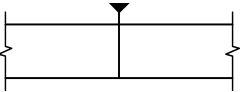
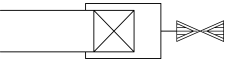
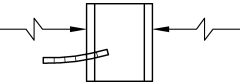
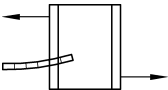
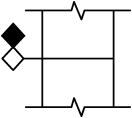
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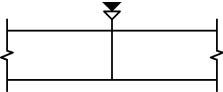
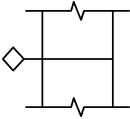
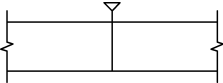
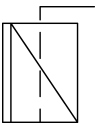
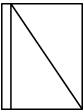
MF NO	Description	Type	Symbol
23 33 00	air distribution, orifice flowmeter	I	 OFM-1
23 33 00	air distribution, smoke damper	I	 SD
23 33 00	air distribution, turning vane in ductwork	I	
23 33 00	air distribution, venturi flowmeter	I	 VFM-1
23 33 00	air distribution, water heater direct contact feed	I	

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SYMBOLS

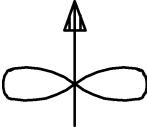
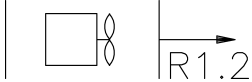
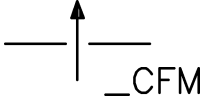
MF NO	Description	Type	Symbol
23 33 00	damper, back draft	I	 BDD
23 33 00	damper, fire	I	 FD
23 33 00	ductwork, direction of flow	I	
23 33 00	ductwork, flexible connector	I	
23 33 00	fire damper (horizontal orientation in rectangular duct)	I	

MF NO	Description	Type	Symbol
23 33 00	fire damper (vertical orientation in rectangular duct)	I	
23 33 00	heat stop, fire rated ceiling	I	
23 33 00	light troffer inlet, return air	I	
23 33 00	light troffer outlet, supply air	I	
23 33 00	smoke and fire damper (horizontal orientation in rectangular duct)	I	

MF NO	Description	Type	Symbol
23 33 00	smoke and fire damper (vertical orientation in rectangular duct)	I	
23 33 00	smoke damper (horizontal orientation in rectangular duct)	I	
23 33 00	smoke damper (vertical orientation in rectangular duct)	I	
23 33 00	spin-in with volume damper	I	
23 33 00	spin-in without volume damper	I	

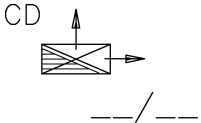
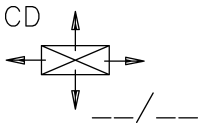
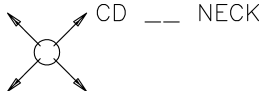
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MF NO	Description	Type	Symbol
23 34 00	air distribution, centrifugal fan pump	I	
23 34 00	air distribution, duct fan	I	
23 34 00	air distribution, fan	I	
23 34 00	fan, axial flow	I	
23 37 00	air distribution, ventilation openings	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 37 00	damper, standard branch, return	I	
23 37 00	damper, standard branch, supply	I	
23 37 00	diffuser, ceiling, corner blow	I	
23 37 00	diffuser, ceiling, four-way, rectangular or square	I	
23 37 00	diffuser, ceiling, round	I	

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MF NO	Description	Type	Symbol
23 37 00	diffuser, ceiling, three-way rectangular or square	I	
23 37 00	diffuser, ceiling, two-way, rectangular or square	I	
23 37 00	diffuser, ceiling, with combination light	I	
23 37 00	diffuser, linear	I	
23 37 00	diffuser, linear slot supply	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 37 00	diffuser, side wall supply	I	
23 37 00	door grille	I	
23 37 00	ductwork, ceiling	I	
23 37 00	ductwork, exhaust inlet wall	I	
23 37 00	ductwork, return air ceiling	I	

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MF NO	Description	Type	Symbol
23 37 00	ductwork, supply air ceiling	I	
23 37 00	grille, transfer	I	
23 37 00	louver, door or wall opening	I	
23 37 00	louver, intake and screen	I	
23 37 00	register grille, ceiling supply	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 37 00	register grille, side wall supply	I	
23 37 00	return air grille with sound boot	I	
23 40 00	air distribution, automatic filter panel	I	
23 40 00	air distribution, filter and dehumidifier	I	
23 40 00	air distribution, filter line	I	

UNIFORM DRAWING SYSTEM

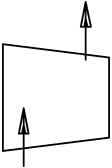
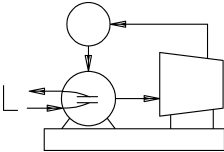
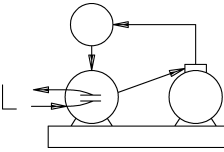
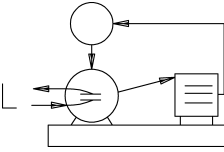
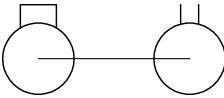
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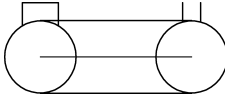
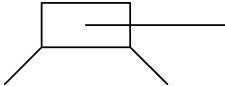
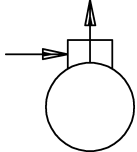
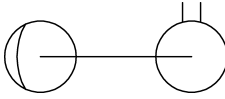
MF NO	Description	Type	Symbol
23 50 00	heater, flue gas reheater	I	
23 50 00	piping, flate plate heat exchanger	I	
23 50 00	piping, plate fin cross flow	I	
23 52 00	equipment, boiler	I	
23 52 00	generator, steam	I	

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SYMBOLS

MF NO	Description	Type	Symbol
23 52 00	heat-generation equipment, check valve	I	
23 55 00	heater, desuperheater	I	
23 57 00	HVAC equipment, heat exchanger	I	
23 57 00	HVAC equipment, intercooler desuperheater	I	
23 57 00	piping, pipe heat	I	

MF NO	Description	Type	Symbol
23 61 00	refrigeration equipment, centrifugal compressor	I	
23 61 00	refrigeration equipment, chilling centrifugal unit	I	
23 61 00	refrigeration equipment, chilling reciprocating unit	I	
23 61 00	refrigeration equipment, chilling rotary screw unit	I	
23 61 00	refrigeration equipment, compressor, motor enclosed, reciprocating	I	

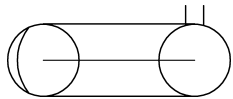
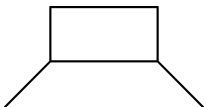
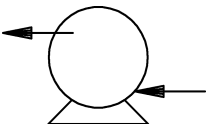
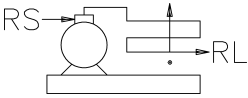
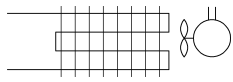
MF NO	Description	Type	Symbol
23 61 00	refrigeration equipment, compressor, motor sealed, reciprocating	I	
23 61 00	refrigeration equipment, compressor, open crankcase, reciprocating	I	
23 61 00	refrigeration equipment, compressor, reciprocating	I	
23 61 00	refrigeration equipment, compressor, rotary motor encased	I	
23 61 00	refrigeration equipment, compressor, rotary motor enclosed with crank belt	I	

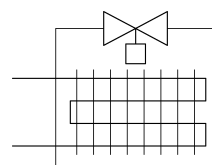
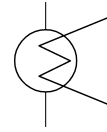
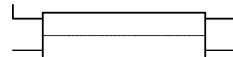
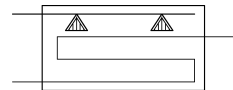
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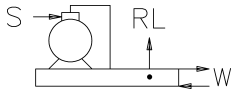
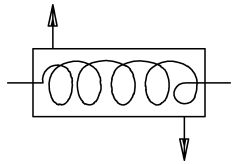
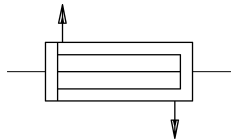
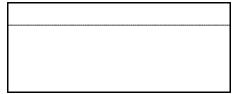
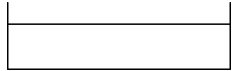
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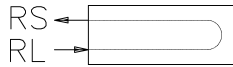
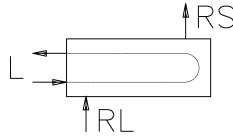
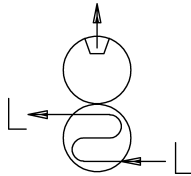
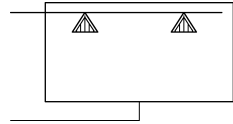
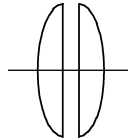
U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
23 61 00	refrigeration equipment, compressor, rotary motor sealed	I	
23 61 00	refrigeration equipment, open crankcase, reciprocating	I	
23 61 00	refrigeration equipment, rotary compressor	I	
23 63 00	refrigeration equipment, air-cooled condensing unit	I	
23 63 00	refrigeration equipment, air-cooled fin condenser, forced air	I	

MF NO	Description	Type	Symbol
23 63 00	refrigeration equipment, air- cooled fin condenser, static	I	
23 63 00	refrigeration equipment, condenser surface	I	
23 63 00	refrigeration equipment, double bundle condenser	I	
23 63 00	refrigeration equipment, evaporative condenser	I	
23 63 00	refrigeration equipment, water cooled condenser	I	

MF NO	Description	Type	Symbol
23 63 00	refrigeration equipment, water cooled condensing unit	I	
23 63 00	refrigeration equipment, water cooled shell/coil condenser	I	
23 63 00	refrigeration equipment, water cooled shell/tube condenser	I	
23 64 00	chiller tank, closed, liquid	I	
23 64 00	chiller tank, open, liquid	I	

MF NO	Description	Type	Symbol
23 64 00	chiller, liquid direct expansion	I	
23 64 00	chiller, liquid flooded	I	
23 64 00	refrigeration equipment, chilling absorption unit	I	
23 65 00	refrigeration equipment, cooling tower	I	
23 70 00	HVAC equipment, drive fluid	I	

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MF NO	Description	Type	Symbol
23 72 00	HVAC controls, rotary heat wheel	I	
23 76 00	refrigeration equipment, bare tube gravity air evaporator	I	
23 76 00	refrigeration equipment, coil loop	I	
23 76 00	refrigeration equipment, condenser evaporator cascade system	I	
23 76 00	refrigeration equipment, evaporator, finned circular ceiling	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

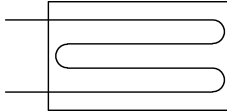
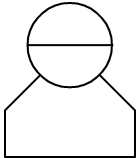
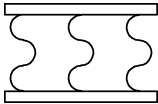
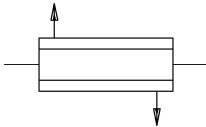
MF NO	Description	Type	Symbol
23 76 00	refrigeration equipment, evaporator, finned coil natural convection	I	
23 76 00	refrigeration equipment, evaporator, finned gravity air	I	
23 76 00	refrigeration equipment, evaporator, forced convection	I	
23 76 00	refrigeration equipment, evaporator, forced convection cool unit	I	
23 76 00	refrigeration equipment, evaporator, pipe coil	I	

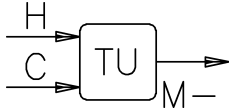
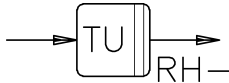
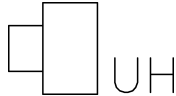
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SYMBOLS

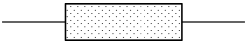
MF NO	Description	Type	Symbol
23 76 00	refrigeration equipment, evaporator, plate coil	I	
23 76 00	refrigeration equipment, immersion cool unit	I	
23 76 00	refrigeration equipment, plate coil head or manifold evaporator	I	
23 76 00	refrigeration equipment, water cooled concentric tube condenser	I	
23 80 00	electrical, heater, electric resistance	I	

MF NO	Description	Type	Symbol
23 81 00	HVAC equipment, room air conditioning equipment	I	
23 82 00	heating, mixing terminal unit	I	
23 82 00	heating, reheat terminal unit	I	
23 82 00	heating, unit (indicate type)	I	
23 82 00	heating, variable volume terminal unit, reheat	I	

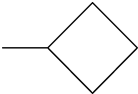
IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.112

MF NO	Description	Type	Symbol

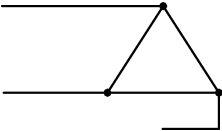
23 84 00	dehumidifier	I	

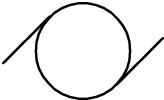
DIV 25 INTEGRATED AUTOMATION

25 00 00	control instrumentation, generic annunciation device	I	

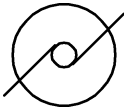
25 30 00	control panel, building equipment	I	

DIV 26 ELECTRICAL

26 00 00	electrical, delta connection	I	

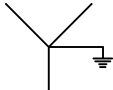
26 00 00	electrical, motor, single- phase	I	

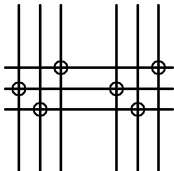
MF NO	Description	Type	Symbol

26 00 00	electrical, motor, three- phase	I	

26 00 00	electrical, transformer, one- line diagram	I	

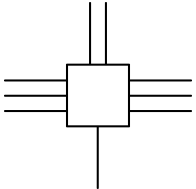
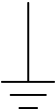
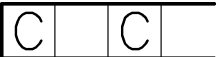
26 00 00	electrical, transformer, plan	I	

26 00 00	electrical, wye connection	I	

26 05 00	electrical, duct cell floor header	I	

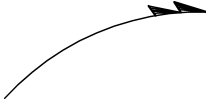
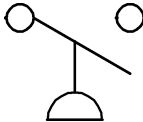
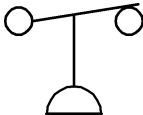
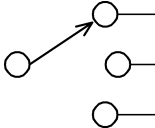
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MF NO	Description	Type	Symbol
26 05 00	electrical, duct, trolley	I	
26 05 00	electrical, duct, underfloor junction box	I	
26 05 00	electrical, earth ground	I	
26 05 00	electrical, junction box	I	
26 05 00	electrical, ladder cable tray	I	

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SYMBOLS

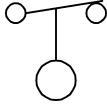
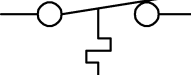
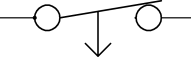
MF NO	Description	Type	Symbol
26 05 00	electrical, panelboard, home run to (arrowheads indicate the number of circuits)	I	
26 05 00	electrical, pressure switch-close on increase	I	
26 05 00	electrical, pressure switch-open on increase	I	
26 05 00	electrical, pull box	I	
26 05 00	electrical, switch, multiposition	I	

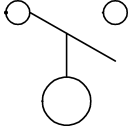
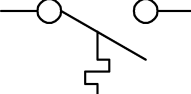
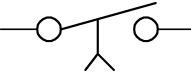
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SYMBOLS

MF NO	Description	Type	Symbol
26 05 00	electrical, switch, normally closed float	I	
26 05 00	electrical, switch, normally closed foot operated	I	
26 05 00	electrical, switch, normally closed limit	I	
26 05 00	electrical, switch, normally closed temperature activated	I	
26 05 00	electrical, switch, normally closed time delay	I	

MF NO	Description	Type	Symbol
26 05 00	electrical, switch, normally open float	I	
26 05 00	electrical, switch, normally open limit	I	
26 05 00	electrical, switch, normally open temperature activated	I	
26 05 00	electrical, switch, normally open time delay	I	
26 05 00	electrical, switch, single break	I	

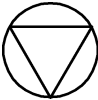
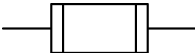
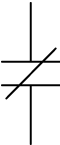
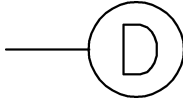
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MF NO	Description	Type	Symbol
26 05 00	electrical, wireway	I	
26 05 00	rigid conduit line = RC; thin line, 2.5 mm (3/32") text	L	
26 09 00	electrical, meter	I	
26 10 00	electrical, substation	I	
26 20 00	electrical, busway	I	

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SYMBOLS

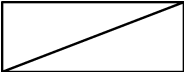
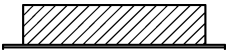
MF NO	Description	Type	Symbol
26 20 00	electrical, floor outlet, data communication	I	
26 20 00	electrical, fuse with rating	I	
26 20 00	electrical, normally closed relay contact	I	
26 20 00	electrical, normally open relay contact	I	
26 20 00	electrical, outlet, data communication	I	

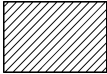
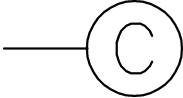
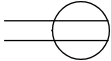
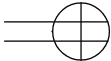
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SYMBOLS

MF NO	Description	Type	Symbol
26 20 00	electrical, push button	I	
26 24 00	electrical, distribution panel	I	 DP#__
26 24 00	electrical, lighting panel	I	 LP
26 24 00	electrical, panelboard cabinet, flush mounted	I	
26 24 00	electrical, panelboard cabinet, surface mounted	I	

MF NO	Description	Type	Symbol
26 24 00	electrical, power panel	I	 PP#__
26 27 00	electrical, receptacle, clock hanger	I	
26 27 00	electrical, receptacle, duplex	I	
26 27 00	electrical, receptacle, duplex on emergency power	I	
26 27 00	electrical, receptacle, duplex with ground fault circuit interrupter	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

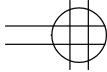
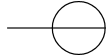
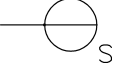
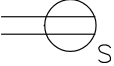
UDS-06.117

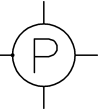
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SYMBOLS

MF NO	Description	Type	Symbol
26 27 00	electrical, receptacle, quadraplex	I	
26 27 00	electrical, receptacle, single	I	
26 27 00	electrical, receptacle, single with switch	I	
26 27 00	electrical, receptacle, special purpose	I	
26 27 00	electrical, receptacle, switched duplex	I	

MF NO	Description	Type	Symbol
26 27 00	electrical, switch with pilot light	I	
26 27 00	electrical, switch, ceiling mounted pull	I	
26 27 00	electrical, switch, double pole	I	
26 27 00	electrical, switch, four-way	I	
26 27 00	electrical, switch, key operated	I	

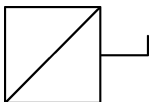
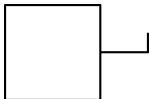
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SYMBOLS

MF NO	Description	Type	Symbol
26 27 00	electrical, switch, lamp holder pole	I	
26 27 00	electrical, switch, low voltage master	I	
26 27 00	electrical, switch, single pole	I	
26 27 00	electrical, switch, three-way	I	
26 27 00	electrical, switch, timer operated	I	

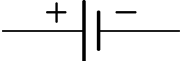
MF NO	Description	Type	Symbol
26 28 00	electrical, circuit breaker	I	
26 28 00	electrical, disconnect switch, fused	I	
26 28 00	electrical, disconnect switch, unfused	I	
26 28 00	electrical, fused switch	I	
26 28 00	electrical, fusible link	I	

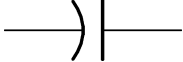
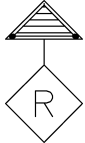
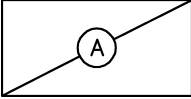
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SYMBOLS

MF NO	Description	Type	Symbol
26 29 00	electrical, starter or motor controller	I	
26 29 00	electrical, starter, combination with disconnect switch	I	
26 29 00	electrical, time clock	I	
26 32 00	electrical, generator, power	I	
26 33 00	electrical, battery	I	

MF NO	Description	Type	Symbol
26 35 00	electrical, capacitor	I	
26 41 00	lightning arrester	I	
26 42 00	rectifier, cathodic protection sanitary	I	
26 50 00	lighting, incandescent ceiling mounted	I	
26 51 00	electrical, light fixture, recessed fluorescent A, 600 mm x 1200 mm (2x4)	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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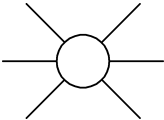
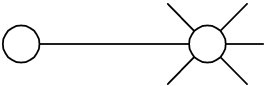
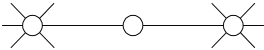
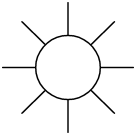
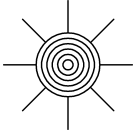
SYMBOLS

MF NO	Description	Type	Symbol
26 51 00	electrical, light fixture, recessed fluorescent B, 300 mm x 1200 mm (1x4)	I	
26 51 00	electrical, light fixture, recessed fluorescent C, 300 mm x 2400 mm (1x8)	I	
26 51 00	electrical, light fixture, surface mounted fluorescent A, 600 mm x 1200 mm (2x4)	I	
26 51 00	electrical, light fixture, surface mounted fluorescent B, 300 mm x 1200 mm (1x4)	I	
26 51 00	electrical, light fixture, surface mounted fluorescent C, 300 mm x 2400 mm (1x8)	I	

MF NO	Description	Type	Symbol
26 52 00	electrical, exit sign, wall mounted light	I	
26 52 00	electrical, light fixture, fluorescent emergency	I	
26 52 00	lighting, one emergency battery power	I	
26 52 00	lighting, three emergency battery power	I	
26 56 00	electrical, street light with bracket	I	

UNIFORM DRAWING SYSTEM

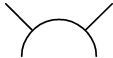
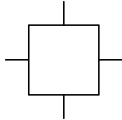
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MF NO	Description	Type	Symbol
26 56 00	light post without arm	I	
26 56 00	light post, one arm, one head	I	
26 56 00	light post, two arms, two heads	I	
26 56 00	lighting, airfield runway	I	
26 56 00	lighting, airfield taxiway	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
26 56 00	lighting, exterior building	I	
26 56 00	lighting, runway	I	
DIV 27 COMMUNICATIONS			
27 00 00	power line = P; thin line, 2.5 mm (3/32") text	L	
27 05 00	outlet, combination telephone/ data communication	I	
27 10 00	cable television line = CATV; thin line, 2.5 mm (3/32") text	L	

UDS-06.122

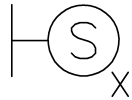
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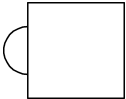
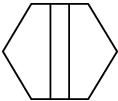
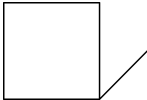
SYMBOLS

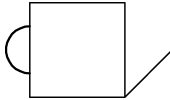
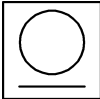
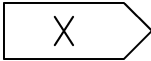
MF NO	Description	Type	Symbol
27 10 00	closed circuit television line = CCTV; thin line, 2.5 mm (3/32") text	L	———CCTV———
27 10 00	fiberoptics line = FO; thin line, 2.5 mm (3/32") text	L	———FO———
27 30 00	electrical, floor receptacle, telephone	I	
27 30 00	telephone, wall mounted	I	
27 30 00	telephone line = T; thin line, 2.5 mm (3/32") text	L	———T———

MF NO	Description	Type	Symbol
27 40 00	electrical, speaker, ceiling mounted, "X" indicates the type, provide schedule on legend	I	
27 40 00	electrical, speaker, wall mounted, "X" indicates the type, provide schedule on legend	I	
27 51 00	intercom line = I thin line, 2.5 mm (3/32") text	L	——— ———
27 51 00	sound line = S; thin line, 2.5 mm (3/32") text	L	———S———
27 52 00	nurse call line = NC; thin line, 2.5 mm (3/32") text	L	———NC———

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.123

MF NO	Description	Type	Symbol
DIV 28 ELECTRONIC SAFETY and SECURITY			
28 10 00	panic duress switch	I	
28 10 00	security access, annunciator panel	I	
28 10 00	security access, bell	I	
28 10 00	security access, bidirectional speaker	I	
28 10 00	security access, buzzer	I	

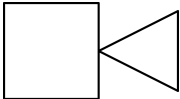
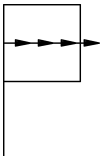
MF NO	Description	Type	Symbol
28 10 00	security access, buzzer, combination bell	I	
28 10 00	security access, control unit	I	
28 10 00	security access, control unit with closed circuit television camera	I	
28 10 00	security access, controlled access point	I	
28 10 00	security access, generic "X" indicates the type, provide schedule or legend	I	

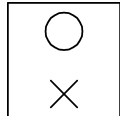
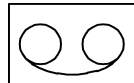
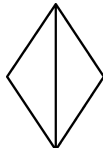
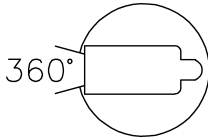
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SYMBOLS

MF NO	Description	Type	Symbol
28 10 00	security access, horn or siren	I	
28 10 00	security access, infrared and ultrasonic motion detector	I	
28 10 00	security access, intercom station	I	
28 10 00	security access, master station, intercom	I	
28 10 00	security access, outdoor microwave transmission unit	I	

MF NO	Description	Type	Symbol
28 10 00	security access, panic alarm	I	
28 10 00	security access, video camera with lens, motion detector with pan and zoom	I	
28 10 00	security access, video tape recorder	I	
28 10 00	security access, volumetric sensor	I	
28 13 00	security access, panning camera traverse angle	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

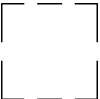
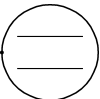
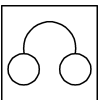
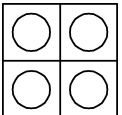
UDS-06.125

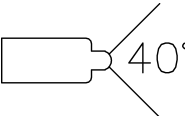
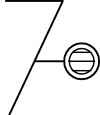
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SYMBOLS

MF NO	Description	Type	Symbol
28 13 00	security access, passive infrared motion detector	I	
28 13 00	security access, sensor, buried vehicular	I	
28 13 00	security access, switch, balanced magnetic control	I	
28 13 00	security access, telephone handset	I	
28 13 00	security access, touch pad lock or device	I	

MF NO	Description	Type	Symbol
28 13 00	security access, ultrasonic motion detector	I	
28 13 00	security access, video camera with lens	I	
28 13 00	security access, video camera with lens, angle of view	I	
28 13 00	security access, video camera with lens, motion detector with pan, tilt and zoom	I	
28 30 00	alarm, check valve	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

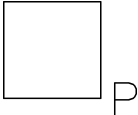
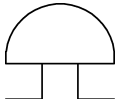
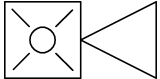
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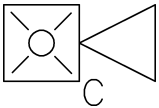
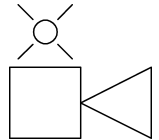
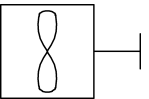
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SYMBOLS

MF NO	Description	Type	Symbol
28 30 00	alarm, fire, communicator	I	
28 30 00	alarm, fire, control panel	I	
28 30 00	alarm, fire, manual pull station	I	
28 30 00	alarm, gong	I	
28 30 00	alarm, horn/light, one assembly	I	

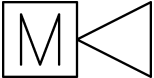
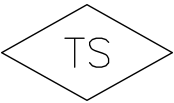
MF NO	Description	Type	Symbol
28 30 00	alarm, horn/light, one assembly with chime	I	
28 30 00	alarm, horn/light, separate assembly	I	
28 30 00	alarm, lamp light, signal light, strobe	I	
28 30 00	alarm, manual control	I	
28 30 00	alarm, master control panel	I	

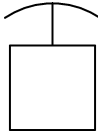
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SYMBOLS

MF NO	Description	Type	Symbol
28 30 00	alarm, mini horn	I	
28 30 00	alarm, sprinkler system water flow bell	I	
28 30 00	alarm, tamper switch	I	
28 30 00	alarm, transponder or transmitter	I	
28 30 00	alarm, voice communication panel	I	

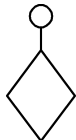
MF NO	Description	Type	Symbol
28 30 00	detection switch, abort	I	
28 30 00	detection switch, valve tamper	I	
28 30 00	detection, gas	I	
28 30 00	detection, smoke control and pressure panel	I	
28 30 00	detector, flame flicker	I	

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SYMBOLS

MF NO	Description	Type	Symbol
28 30 00	detector, flow switch	I	
28 30 00	detector, heat	I	
28 30 00	detector, heat smoke	I	
28 30 00	detector, heat, combination	I	
28 30 00	detector, heat, fixed temperature	I	

MF NO	Description	Type	Symbol
28 30 00	detector, heat, rate compensation	I	
28 30 00	detector, heat, rate of rise	I	
28 30 00	detector, ionization and heat smoke	I	
28 30 00	detector, ionization and photoelectric smoke	I	
28 30 00	detector, ionization smoke	I	

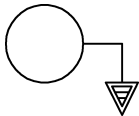
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MF NO	Description	Type	Symbol
28 30 00	detector, ionization, photoelectric, and heat smoke	I	
28 30 00	detector, photoelectric and heat smoke	I	
28 30 00	detector, photoelectric smoke	I	
28 30 00	detector, smoke	I	
28 30 00	detector, smoke, for duct	I	

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SYMBOLS

MF NO	Description	Type	Symbol
28 30 00	detector, switch level	I	
28 30 00	fire alarm annunciator panel	I	
28 30 00	fire alarm station, manual pull	I	
28 31 00	fire alarm line = FA; thin line, 2.5 mm (3/32") text	L	
DIV 31 EARTHWORK			
33 11 00	water line, public main = PW; thin line, 2.5 mm (3/32") text	L	

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MF NO	Description	Type	Symbol
31 20 00	earthwork, ditch and berm barrier	I	
31 20 00	earth, crushed rock gravel	M	
31 20 00	earth, undisturbed	M	
31 20 00	earthwork rock	M	
31 20 00	earthwork, compacted fill	M	

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SYMBOLS

MF NO	Description	Type	Symbol
31 20 00	sand	M	
31 20 00	sand clay gravel	M	
31 23 00	earthwork gravel, porous fill	M	
31 25 00	erosion and sedimentation control, filtration bed	M	
31 37 00	riprap	M	

UNIFORM DRAWING SYSTEM

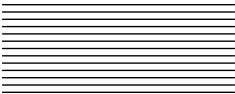
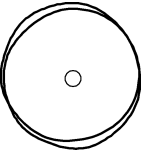
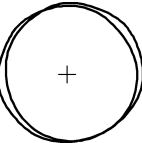
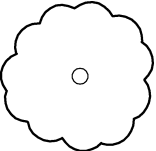
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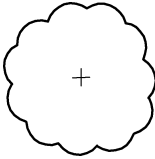
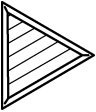
SYMBOLS

MF NO	Description	Type	Symbol

DIV 32 EXTERIOR IMPROVEMENTS

32 10 00	asphalt, section	M	
32 31 00	fence; thin line, medium line X	L	
32 93 00	tree, deciduous existing	M	
32 93 00	tree, deciduous new	M	
32 93 00	tree, generic existing	M	

MF NO	Description	Type	Symbol

32 93 00	tree, generic new	M	
33 05 00	utility services, manhole	I	
33 11 00	piping, thrust block	I	
33 11 00	utility, water handhole	I	
33 11 00	utility, water manhole	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

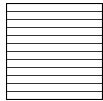
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SYMBOLS

MF NO	Description	Type	Symbol
33 11 00	utility, water meter	I	
33 11 00	utility, water meter station	I	
33 11 00	utility, water plant	I	
33 11 00	utility, water station pump	I	
33 11 00	utility, water tank	I	

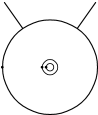
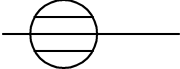
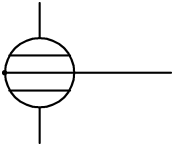
MF NO	Description	Type	Symbol
33 11 00	utility, water valve vault	I	
33 11 00	return line, chilled water; thin line, 2.5 mm (3/32") text	L	
33 11 00	supply line, chilled water; thin line, 2.5 mm (3/32") text	L	
33 11 00	water line, cold; thin line, 2.5 mm (3/32") text	L	
33 11 00	water line, hot; thin line, 2.5 mm (3/32") text	L	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.133

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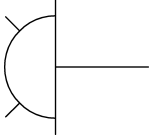
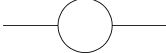
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MF NO	Description	Type	Symbol
33 11 00	water line, public main = PW; thin line, 2.5 mm (3/32") text	L	
33 12 00	hydrant pan, fire	I	
33 12 00	hydrant, fire	I	
33 12 00	hydrant, one hose outlet	I	
33 12 00	hydrant, two hose outlet	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

MF NO	Description	Type	Symbol
33 12 00	hydrant, wall	I	
33 12 00	hydrant, wall two hose outlet	I	
33 12 00	utility, utility pole	I	
33 16 00	storage tank, water utility	I	
33 30 00	utility, sanitary manhole	I	

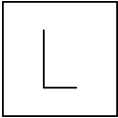
UDS-06.134

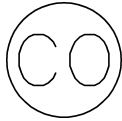
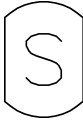
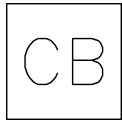
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SYMBOLS

MF NO	Description	Type	Symbol
33 30 00	utility, sanitary meter	I	
33 30 00	utility, sanitary pressure vessel	I	
33 30 00	utility, sanitary sewer lift station	I	
33 31 00	sanitary sewer force line; thin line, 2.5 mm (3/32") text	L	
33 36 00	utility, septic tank	I	

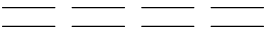
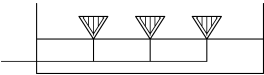
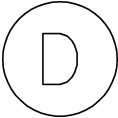
MF NO	Description	Type	Symbol
33 39 00	utility, sanitary cleanout	I	
33 39 00	utility, sanitary valve vault	I	
33 42 00	pipe line, culvert; thin continuous line, 2.5 mm (3/32") text	L	
33 44 00	drainage, catch basin	I	
33 44 00	drainage, catch basin, round	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.135

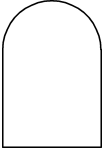
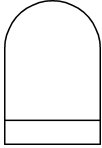
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MF NO	Description	Type	Symbol
33 46 00	drainage, open tile drain	I	
33 47 00	drainage, spray pond	I	
33 49 00	utility, storm drainage manhole	I	
33 50 00	utility, gas plant	I	
33 51 00	piping, gas shutoff	I	

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

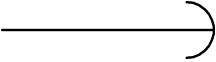
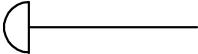
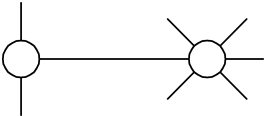
MF NO	Description	Type	Symbol
33 51 00	piping, natural gas receiver	I	
33 51 00	utility, manhole, natural gas	I	
33 51 00	utility, meter, natural gas	I	
33 51 00	utility, natural gas trap	I	
33 56 00	storage tank, fuel storage	I	 FUEL STORAGE

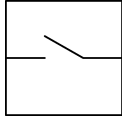
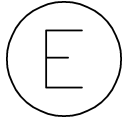
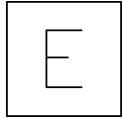
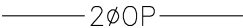
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SYMBOLS

MF NO	Description	Type	Symbol
33 70 00	electrical, guy wire	I	
33 70 00	electrical, handhole	I	
33 70 00	electrical, transformer, current	I	
33 71 00	electrical, aerial service weather head	I	
33 71 00	light post, one arm in power pole	I	

MF NO	Description	Type	Symbol
33 71 00	utility, distribution switch or switching station	I	
33 71 00	utility, electrical manhole	I	
33 71 00	utility, primary electrical handhole	I	
33 71 00	electric line, 2-phase primary overhead = OP; thin line, 2.5 mm (3/32") text	L	
33 71 00	electric line, 2-phase primary underground = UP; thin line, 2.5 mm (3/32") text	L	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol
33 71 00	electric line, 2-phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	L	———2∅OS———
33 71 00	electric line, 2-phase secondary underground = US; thin line, 2.5 mm (3/32") text	L	———2∅US———
33 71 00	electric line, 3-phase primary overhead = OP; thin line, 2.5 mm (3/32") text	L	———3∅OP———
33 71 00	electric line, 3-phase primary underground = UP; thin line, 2.5 mm (3/32") text	L	———3∅UP———
33 71 00	electric line, 3-phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	L	———3∅OS———

33 71 00	electric line, 3-phase secondary underground = US; thin line, 2.5 mm (3/32") text	L	———3∅US———
33 71 00	electric line, single phase primary overhead = OP; thin line, 2.5 mm (3/32") text	L	———1∅OP———
33 71 00	electric line, single phase primary underground = UP; thin line, 2.5 mm (3/32") text	L	———1∅UP———
33 71 00	electric line, single phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	L	———1∅OS———
33 71 00	electric line, single phase secondary underground = US; thin line, 2.5 mm (3/32") text	L	———1∅US———

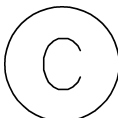
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SYMBOLS

MF NO	Description	Type	Symbol

33 81 00	utility, communications manhole	I	

33 81 00	utility, telephone manhole	I	

DIV 40 PROCESS INTEGRATION

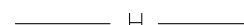
40 13 00	argon line = AR; thin line, 2.5 mm (3/32") text	L	

40 13 00	helium line = HE; thin line, 2.5 mm (3/32") text	L	

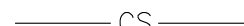
40 13 00	liquid nitrogen line = LN; thin line, 2.5 mm (3/32") text	L	

MF NO	Description	Type	Symbol

40 13 00	nitrogen line = N; thin line, 2.5 mm (3/32") text	L	

40 14 00	hydrogen line = H; thin line, 2.5 mm (3/32") text	L	

40 20 00	fill line = FILL; thin line 2.5 mm (3/32") text	L	

40 20 00	pipe line, chemical supply = CS; thin line, 2.5 mm (3/32") text	L	

40 23 00	return line, industrial hot water = IHR; thin line, 2.5 mm (3/32") text	L	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

MF NO	Description	Type	Symbol

40 23 00	supply line, industrial hot water = IHW; thin line, 2.5 mm (3/32") text	L	——— IHW ———

40 23 00	waste line, industrial = INW; thin line, 2.5 mm (3/32") text	L	——— INW ———

40 23 00	water line, industrial cold = ICW; thin line, 2.5 mm (3/32") text	L	——— ICW ———

40 25 00	waste line, acid = ACID; thin line, 2.5 mm (3/32") text	L	——— ACID ———

DIV 44 POLLUTION CONTROL EQUIPMENT

44 42 00	equipment, oil separator	I	

MF NO	Description	Type	Symbol

44 42 00	fluid waste treatment, grit-collecting chamber	I	

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

UDS-06.140

Symbols Index

by Alpha with MasterFormat 2004 Numbers (MF NO) & Symbol Type (TYPE)

DESCRIPTION	MF NO	TYPE	PAGE
A			
access door (AD) or access panel (AP)	23 31 00	I	06.99
air distribution, adjustable blank off damper	23 33 00	I	06.101
air distribution, adjustable damper plaque	23 33 00	I	06.101
air distribution, automatic filter panel	23 40 00	I	06.106
air distribution, barometric damper	23 33 00	I	06.101
air distribution, ceiling spout outlet	23 30 00	I	06.98
air distribution, centrifugal fan pump	23 34 00	I	06.104
air distribution, controller, liquid level	23 09 00	I	06.62
air distribution, damper control, electric operated	23 09 00	I	06.62
air distribution, duct detector	23 09 00	I	06.62
air distribution, duct fan	23 34 00	I	06.104

DESCRIPTION	MF NO	TYPE	PAGE
air distribution, ductwork cowl (gooseneck)	23 33 00	I	06.101
air distribution, ductwork sound attenuator	23 33 00	I	06.101
air distribution, fan	23 34 00	I	06.104
air distribution, filter and dehumidifier	23 40 00	I	06.106
air distribution, filter line	23 40 00	I	06.106
air distribution, fire and smoke damper	23 33 00	I	06.101
air distribution, fire damper	23 33 00	I	06.101
air distribution, flexible connector	23 31 00	I	06.100
air distribution, flow switch	23 33 00	I	06.101
air distribution, orifice flowmeter	23 33 00	I	06.102
air distribution, pneumatic operated damper control	23 09 00	I	06.62
air distribution, smoke damper	23 33 00	I	06.102

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
air distribution, supply outlet, wall	23 30 00	I	06.98
air distribution, transition	23 31 00	I	06.100
air distribution, turning vane in ductwork	23 33 00	I	06.102
air distribution, ventilation openings	23 37 00	I	06.104
air distribution, venturi flowmeter	23 33 00	I	06.102
air distribution, water heater direct contact feed	23 33 00	I	06.102
air relief line = ATV; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
alarm, check valve	28 30 00	I	06.126
alarm, fire, communicator	28 30 00	I	06.127
alarm, fire, control panel	28 30 00	I	06.127
alarm, fire, manual pull station	28 30 00	I	06.127
alarm, gong	28 30 00	I	06.127
alarm, horn/light, one assembly	28 30 00	I	06.127
alarm, horn/light, one assembly with chime	28 30 00	I	06.127
alarm, horn/light, separate assembly	28 30 00	I	06.127

DESCRIPTION	MF NO	TYPE	PAGE
alarm, lamp light, signal light, strobe	28 30 00	I	06.127
alarm, manual control	28 30 00	I	06.127
alarm, master control panel	28 30 00	I	06.127
alarm, mini horn	28 30 00	I	06.128
alarm, sprinkler system water flow bell	28 30 00	I	06.128
alarm, tamper switch	28 30 00	I	06.128
alarm, transponder or transmitter	28 30 00	I	06.128
alarm, voice communication panel	28 30 00	I	06.128
aluminum	05 05 00	M	06.34
and	01 00 00	T	06.5
argon line = AR; thin line, 2.5 mm (3/32") text	40 13 00	L	06.139
asphalt, section	32 10 00	M	06.132
at	01 00 00	T	06.5
B			
bar joist double, steel	05 20 00	O	06.35

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
bar joist single, steel	05 20 00	O	06.35
bath, emergency	22 40 00	O	06.57
bath, foot	22 40 00	O	06.57
bath, hydrotherapy arm	13 17 00	O	06.46
bath, hydrotherapy hubbard	13 17 00	O	06.46
bath, hydrotherapy leg	13 17 00	O	06.46
bath, infant	22 40 00	O	06.57
bath, institutional	13 17 00	O	06.46
bath, recessed	22 40 00	O	06.57
bath, rimmed	22 40 00	O	06.57
bath, sitz	22 40 00	O	06.58
bath, whirlpool	13 17 00	O	06.46
beam, precast, double T shape	03 41 00	O	06.27
beam, structural steel, HP shape	05 10 00	O	06.34
beam, structural steel, M shape	05 10 00	O	06.34

DESCRIPTION	MF NO	TYPE	PAGE
beam, structural steel, S shape	05 10 00	O	06.34
beam, structural steel, W shape	05 10 00	O	06.35
bidet	22 40 00	O	06.58
block elevation	04 22 00	M	06.30
board, oriented strand	06 10 00	M	06.36
boiler blow down line = BBD; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
break, round (user defines size)	01 42 00	R	06.10
break, straight (see section indicators, building, with break standards)	01 42 00	R	06.10
brick block coursed elevation	04 22 00	M	06.30
brick, common/face	04 21 00	M	06.28
brick, English bond elevation	04 21 00	M	06.28
brick, Flemish bond elevation	04 21 00	M	06.28
brick, glazed	04 21 00	M	06.28
brick, running bond elevation	04 21 00	M	06.29

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
brick, stack bond elevation	04 21 00	M	06.29
bronze brass	05 05 00	M	06.34
C			
C channel, metal light-gage	05 10 00	O	06.35
cable television line = CATV thin line, 2.5 mm (3/32") text	27 10 00	L	06.122
can washer	11 00 00	O	06.43
carpet and pad	09 68 00	M	06.42
center line	01 00 00	T	06.5
center line indicator; thin line, 2 mm (5/64") dash, 2 mm (5/64") space	01 42 00	L	06.8
chair with arms	12 50 00	O	06.44
chair without arms	12 50 00	O	06.45
chair, classroom	12 50 00	O	06.45
checker plate, plan	05 54 00	M	06.36
chiller tank, closed, liquid	23 64 00	I	06.110

DESCRIPTION	MF NO	TYPE	PAGE
chiller tank, open, liquid	23 64 00	I	06.110
chiller, liquid direct expansion	23 64 00	I	06.110
chiller, liquid flooded	23 64 00	I	06.110
closed circuit television line = CCTV; thin line, 2.5 mm (3/32") text	27 10 00	L	06.123
column, circular symbol	01 00 00	O	06.5
column, I beam symbol	01 00 00	O	06.5
column, square symbol	01 00 00	O	06.5
compressed air line = A; thin line, 2.5 mm (3/32") text	22 15 00	L	06.57
concrete block, glazed	04 22 00	M	06.30
concrete bond beam lintel	04 22 00	M	06.30
concrete masonry unit 8x8x16	04 22 00	M	06.30
concrete masonry unit 8x8x16 end	04 22 00	M	06.30
concrete, cast in place	03 30 00	M	06.27
concrete, lightweight	03 50 00	M	06.28

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
condensate line = C; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
contract limit line; wide line with dot, 1 mm (1/16") diameter dot, 3 mm (1/8") space	01 42 00	L	06.8
control instrumentation, generic annunciation device	25 00 00	I	06.113
control panel for heating, ventilating and air conditioning	23 09 00	I	06.63
control panel, building equipment	25 30 00	I	06.113
credenza	12 50 00	O	06.45
curtains and drapes	12 22 00	O	06.44
D			
damper heater, duct, electric	23 30 00	I	06.98
damper, back draft	23 33 00	I	06.102
damper, fire	23 33 00	I	06.102
damper, manual volume	23 30 00	I	06.99
damper, standard branch, return	23 37 00	I	06.104

DESCRIPTION	MF NO	TYPE	PAGE
damper, standard branch, supply	23 37 00	I	06.104
degree(s)	01 00 00	T	06.5
dehumidifier	23 84 00	I	06.113
demolition line; medium line, 4 mm (5/32") dash, 2 mm (5/64") space	01 42 00	L	06.8
desk console	12 50 00	O	06.45
desk with left return	12 50 00	O	06.45
desk, L unit left return	12 50 00	O	06.45
desk, secretarial left return	12 50 00	O	06.45
detail indicator for small conditions, 45 degree arrow, 2.5 mm (3/32") text, medium line	01 42 00	R	06.10
detail indicator, dashed circle 2.5 mm (3/32") text, typical	01 42 00	R	06.10
detail indicator, dashed rectangle, 2.5 mm (3/32") text, typical	01 42 00	R	06.11
detection switch, abort	28 30 00	I	06.128

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DESCRIPTION	MF NO	TYPE	PAGE
detection switch, valve tamper	28 30 00	I	06.128
detection, gas	28 30 00	I	06.128
detection, smoke control and pressure panel	28 30 00	I	06.128
detector switch, tamper position	21 11 00	I	06.48
detector, flame flicker	28 30 00	I	06.128
detector, flow switch	28 30 00	I	06.129
detector, heat	28 30 00	I	06.129
detector, heat smoke	28 30 00	I	06.129
detector, heat, combination	28 30 00	I	06.129
detector, heat, fixed temperature	28 30 00	I	06.129
detector, heat, rate compensation	28 30 00	I	06.129
detector, heat, rate of rise	28 30 00	I	06.129
detector, ionization and heat smoke	28 30 00	I	06.129
detector, ionization and photoelectric smoke	28 30 00	I	06.129
detector, ionization smoke	28 30 00	I	06.129

U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
detector, ionization, photoelectric, and heat smoke	28 30 00	I	06.130
detector, photoelectric and heat smoke	28 30 00	I	06.130
detector, photoelectric smoke	28 30 00	I	06.130
detector, smoke	28 30 00	I	06.130
detector, smoke, for duct	28 30 00	I	06.130
detector, switch level	28 30 00	I	06.130
diffuser, ceiling, corner blow	23 37 00	I	06.104
diffuser, ceiling, four-way, rectangular or square	23 37 00	I	06.104
diffuser, ceiling, round	23 37 00	I	06.104
diffuser, ceiling, three-way rectangular or square	23 37 00	I	06.105
diffuser, ceiling, two-way, rectangular or square	23 37 00	I	06.105
diffuser, ceiling, with combination light	23 37 00	I	06.105
diffuser, linear	23 37 00	I	06.105
diffuser, linear slot supply	23 37 00	I	06.105
diffuser, side wall supply	23 37 00	I	06.105

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
dimension line: continuous, thin line with medium line for terminator, typical	01 42 00	R	06.11
dimension line: continuous, thin line with medium line for terminator	01 42 00	R	06.12
directory, wall mounted	10 13 00	O	06.42
dishwasher	11 48 00	O	06.44
divide by, per	01 00 00	T	06.5
dollar (USD)	01 00 00	T	06.6
door grille	23 37 00	I	06.105
door opening/borrowed light identifier, 2.5 mm (3/32") text, medium line, typical	01 42 00	R	06.12
door, bifolding	08 10 00	O	06.38
door, center pivot	08 10 00	O	06.38
door, coiling	08 33 00	O	06.39
door, double	08 10 00	O	06.38

DESCRIPTION	MF NO	TYPE	PAGE
door, double egress	08 10 00	O	06.38
door, double swing	08 10 00	O	06.38
door, double uneven	08 10 00	O	06.38
door, hardware, electric opener	08 70 00	I	06.41
door, overhead	08 36 00	O	06.39
door, pocket	08 10 00	O	06.39
door, revolving	08 42 00	O	06.39
door, revolving dark room	08 34 00	O	06.39
door, single full swing	08 10 00	O	06.39
door, single hinged or pivot	08 10 00	O	06.39
door, sliding	08 10 00	O	06.39
door, sliding surface	08 10 00	O	06.39
door, undercut	08 10 00	I	06.38
drain line = D; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
drain line, condensate (below floor) = ST; thin line, 5 mm (3/16") dash, 3 mm space, 2.5 mm (3/32") text	23 20 00	L	06.95
drain line, indirect = IW; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
drain line, storm (above floor); thin line, 2.5 mm (3/32") text	22 14 00	L	06.56
drain line, storm (below floor); thin line, 2.5 mm (3/32") text	22 14 00	L	06.57
drain, floor	22 13 00	I	06.56
drainage, catch basin	33 44 00	I	06.135
drainage, catch basin, round	33 44 00	I	06.135
drainage, open tile drain	33 46 00	I	06.136
drainage, spray pond	33 47 00	I	06.136
drawing block title, typical	01 42 00	R	06.12
drinking fountain, projecting type	22 47 00	O	06.61
drinking fountain, recessed type	22 47 00	O	06.61
drinking fountain, semi-recessed type	22 47 00	O	06.61
duct section, change in static pressure rating tag	23 30 00	I	06.99

DESCRIPTION	MF NO	TYPE	PAGE
duct section, exhaust air down	23 31 00	I	06.100
duct section, exhaust air up	23 31 00	I	06.100
duct section, return air	23 31 00	I	06.100
duct section, return air down	23 31 00	I	06.100
duct section, standard branch for supply and return	23 31 00	I	06.100
duct section, static pressure rating tag	23 30 00	I	06.99
duct section, supply air	23 31 00	I	06.100
duct section, supply air down	23 31 00	I	06.100
duct section, wye junction	23 31 00	I	06.100
duct, flexible	23 31 00	I	06.101
ductwork, ceiling	23 37 00	I	06.105
ductwork, change in elevation	23 31 00	I	06.101
ductwork, direction of flow	23 33 00	I	06.102
ductwork, exhaust inlet wall	23 37 00	I	06.105
ductwork, flexible connector	23 33 00	I	06.102

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
ductwork, return air ceiling	23 37 00	I	06.105
ductwork, supply air ceiling	23 37 00	I	06.106
E			
earth, crushed rock gravel	31 20 00	M	06.131
earth, undisturbed	31 20 00	M	06.131
earthwork gravel, porous fill	31 23 00	M	06.131
earthwork rock	31 20 00	M	06.131
earthwork, compacted fill	31 20 00	M	06.131
earthwork, ditch and berm barrier	31 20 00	I	06.131
easel	11 59 00	O	06.44
electric line, 2-phase primary overhead = OP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.137
electric line, 2-phase primary underground = UP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.137

DESCRIPTION	MF NO	TYPE	PAGE
electric line, 2-phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, 2-phase secondary underground = US; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, 3-phase primary overhead = OP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, 3-phase primary underground = UP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, 3-phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, 3-phase secondary underground = US; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, single phase primary overhead = OP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
electric line, single phase primary underground = UP; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, single phase secondary overhead = OS; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electric line, single phase secondary underground = US; thin line, 2.5 mm (3/32") text	33 71 00	L	06.138
electrical, aerial service weather head	33 71 00	I	06.137
electrical, battery	26 33 00	I	06.120
electrical, busway	26 20 00	I	06.116
electrical, capacitor	26 35 00	I	06.120
electrical, circuit breaker	26 28 00	I	06.119
electrical, delta connection	26 00 00	I	06.113
electrical, disconnect switch, fused	26 28 00	I	06.119
electrical, disconnect switch, unfused	26 28 00	I	06.119
electrical, distribution panel	26 24 00	I	06.117

DESCRIPTION	MF NO	TYPE	PAGE
electrical, duct cell floor header	26 05 00	I	06.113
electrical, duct, trolley	26 05 00	I	06.114
electrical, duct, underfloor junction box	26 05 00	I	06.114
electrical, earth ground	26 05 00	I	06.114
electrical, exit sign, wall mounted light	26 52 00	I	06.121
electrical, floor outlet, data communication	26 20 00	I	06.116
electrical, floor receptacle, telephone	27 30 00	I	06.123
electrical, fuse with rating	26 20 00	I	06.116
electrical, fused switch	26 28 00	I	06.119
electrical, fusible link	26 28 00	I	06.119
electrical, generator, power	26 32 00	I	06.120
electrical, guy wire	33 70 00	I	06.137
electrical, handhole	33 70 00	I	06.137
electrical, heater, electric resistance	23 80 00	I	06.112
electrical, junction box	26 05 00	I	06.114

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DESCRIPTION	MF NO	TYPE	PAGE
electrical, ladder cable tray	26 05 00	I	06.114
electrical, light fixture, fluorescent emergency	26 52 00	I	06.121
electrical, light fixture, recessed fluorescent A, 600 mm x 1200 mm (2x4)	26 51 00	I	06.120
electrical, light fixture, recessed fluorescent B, 300 mm x 1200 mm (1x4)	26 51 00	I	06.121
electrical, light fixture, recessed fluorescent C, 300 mm x 2400 mm (1x8)	26 51 00	I	06.121
electrical, light fixture, surface mounted fluorescent A, 600 mm x 1200 mm (2x4)	26 51 00	I	06.121
electrical, light fixture, surface mounted fluorescent B, 300 mm x 1200 mm (1x4)	26 51 00	I	06.121
electrical, light fixture, surface mounted fluorescent C, 300 mm x 2400 mm (1x8)	26 51 00	I	06.121
electrical, lighting panel	26 24 00	I	06.117

DESCRIPTION	MF NO	TYPE	PAGE
electrical, meter	26 09 00	I	06.116
electrical, motor, single-phase	26 00 00	I	06.113
electrical, motor, three-phase	26 00 00	I	06.113
electrical, normally closed relay contact	26 20 00	I	06.116
electrical, normally open relay contact	26 20 00	I	06.116
electrical, outlet, data communication	26 20 00	I	06.116
electrical, panelboard cabinet, flush mounted	26 24 00	I	06.117
electrical, panelboard cabinet, surface mounted	26 24 00	I	06.117
electrical, panelboard, home run to (arrowheads indicate the number of circuits)	26 05 00	I	06.114
electrical, power panel	26 24 00	I	06.117
electrical, pressure switch-close on increase	26 05 00	I	06.114
electrical, pressure switch-open on increase	26 05 00	I	06.114
electrical, pull box	26 05 00	I	06.114
electrical, push button	26 20 00	I	06.117

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
electrical, receptacle, quadraplex	26 27 00	I	06.117
electrical, receptacle, clock hanger	26 27 00	I	06.117
electrical, receptacle, duplex	26 27 00	I	06.117
electrical, receptacle, duplex with ground fault circuit interrupter	26 27 00	I	06.117
electrical, receptacle, duplex on emergency power	26 27 00	I	06.118
electrical, receptacle, single	26 27 00	I	06.118
electrical, receptacle, single with switch	26 27 00	I	06.118
electrical, receptacle, special purpose	26 27 00	I	06.118
electrical, receptacle, switched duplex	26 27 00	I	06.118
electrical, speaker, ceiling mounted	27 40 00	I	06.123
electrical, speaker, wall mounted "X" indicates the type	27 40 00	I	06.123
electrical, starter or motor controller	26 29 00	I	06.120
electrical, starter, combination with disconnect switch	26 29 00	I	06.120
electrical, street light with bracket	26 56 00	I	06.121

DESCRIPTION	MF NO	TYPE	PAGE
electrical, substation	26 10 00	I	06.116
electrical, switch with pilot light	26 27 00	I	06.118
electrical, switch, ceiling mounted pull	26 27 00	I	06.118
electrical, switch, double pole	26 27 00	I	06.118
electrical, switch, four-way	26 27 00	I	06.118
electrical, switch, key operated	26 27 00	I	06.118
electrical, switch, lamp holder pole	26 27 00	I	06.119
electrical, switch, low voltage master	26 27 00	I	06.119
electrical, switch, multiposition	26 05 00	I	06.114
electrical, switch, normally closed float	26 05 00	I	06.115
electrical, switch, normally closed foot operated	26 05 00	I	06.115
electrical, switch, normally closed limit	26 05 00	I	06.115
electrical, switch, normally closed temperature activated	26 05 00	I	06.115
electrical, switch, normally closed time delay	26 05 00	I	06.115
electrical, switch, normally open float	26 05 00	I	06.115

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
electrical, switch, normally open limit	26 05 00	I	06.115
electrical, switch, normally open temperature activated	26 05 00	I	06.115
electrical, switch, normally open time delay	26 05 00	I	06.115
electrical, switch, single break	26 05 00	I	06.115
electrical, switch, single pole	26 27 00	I	06.119
electrical, switch, three-way	26 27 00	I	06.119
electrical, switch, timer operated	26 27 00	I	06.119
electrical, time clock	26 29 00	I	06.120
electrical, transformer, current	33 70 00	I	06.137
electrical, transformer, one-line diagram	26 00 00	I	06.113
electrical, transformer, plan	26 00 00	I	06.113
electrical, wireway	26 05 00	I	06.116
electrical, wye connection	26 00 00	I	06.113
elevation indicator, interior, single view, 16 mm (5/8") diameter	01 42 00	R	06.13

DESCRIPTION	MF NO	TYPE	PAGE
elevation indicator, exterior, 16 mm (5/8") diameter	01 42 00	R	06.13
elevation indicator, exterior, 16 mm (5/8") diameter	01 42 00	R	06.13
elevation indicator, interior, multiple view, 16 mm (5/8") diameter	01 42 00	R	06.13
equals, equal to	01 00 00	T	06.6
equipment, boiler	23 52 00	I	06.107
equipment, oil separator	44 42 00	I	06.140
erosion and sedimentation control, filtration bed	31 25 00	M	06.131
existing to remain line; thin line	01 42 00	L	06.8
extinguisher, water	10 44 00	I	06.43
F			
fan, axial flow	23 34 00	I	06.104
fan, blower	23 30 00	I	06.99
fan, exhaust roof vent	23 30 00	I	06.99
fan, intake roof vent	23 30 00	I	06.99

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
fan, louvered roof vent	23 30 00	I	06.99
fan, propeller	23 30 00	I	06.99
features above line indicator; thin dashed line	01 42 00	L	06.8
fence; thin line, medium line X	32 31 00	L	06.132
fiberoptics line = FO; thin line, 2.5 mm (3/32") text	27 10 00	L	06.123
file, lateral, four drawer	12 50 00	O	06.45
fill line = FILL; thin line 2.5 mm (3/32") text	40 20 00	L	06.139
fire alarm annunciator panel	28 30 00	I	06.130
fire alarm line = FA thin line, 2.5 mm (3/32") text	28 31 00	L	06.130
fire alarm station, manual pull	28 30 00	I	06.130
fire brick	04 50 00	M	06.31
fire damper (horizontal orientation in rectangular duct)	23 33 00	I	06.102
fire damper (vertical orientation in rectangular duct)	23 33 00	I	06.103
fire department connection, one- way	21 12 00	I	06.50
fire line = F; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47

DESCRIPTION	MF NO	TYPE	PAGE
fire protection sprinkler line = SP; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47
fire protection sprinkler line, main supply = S; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47
fire protection, extinguisher, all- type, automatic actuated	10 44 00	I	06.43
fire protection, extinguisher, all- type, manually actuated	10 44 00	I	06.43
fire protection, manual carbon dioxide station	21 21 00	I	06.52
fire resistive rated line, 1 hour; fine line, 2.5 mm (3/32") diamond, 14 mm (9/16") repeat	01 42 00	L	06.8
fire resistive rated line, 2 hour; fine line, 2.5 mm (3/32") diamond, 12 mm (29/64") repeat	01 42 00	L	06.8
fire resistive rated line, 3 hour; fine line, 2.5 mm (3/32") diamond, 8 mm (21/64") repeat	01 42 00	L	06.8
fire resistive rated line, 4 hour; fine line, 2.5 mm (3/32") diamond, 7 mm (9/32") repeat	01 42 00	L	06.9

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
fire suppression, automatic actuated halon	21 22 00	I	06.52
fire suppression, automatic actuated wet extinguishing system	21 13 00	I	06.50
fire suppression, butterfly valve, indicating	21 11 00	I	06.48
fire suppression, control valve	21 11 00	I	06.48
fire suppression, deluge valve	21 11 00	I	06.48
fire suppression, department connection, two-way siamese	21 12 00	I	06.50
fire suppression, domestic water shutoff	21 11 00	I	06.48
fire suppression, dry automatic actuated	21 13 00	I	06.50
fire suppression, dry chemical system	21 24 00	I	06.53
fire suppression, dry manually actuated	21 13 00	I	06.51
fire suppression, dry pipe valve	21 13 00	I	06.51
fire suppression, dry pipe, quick open valve	21 13 00	I	06.51
fire suppression, extinguisher, carbon dioxide	10 44 00	I	06.43

DESCRIPTION	MF NO	TYPE	PAGE
fire suppression, extinguisher, carbon dioxide manually actuated	10 44 00	I	06.43
fire suppression, extinguisher, automatic actuated dry chemical	10 44 00	I	06.43
fire suppression, extinguisher, carbon dioxide automatic actuated	21 21 00	I	06.52
fire suppression, extinguisher, carbon dioxide system	21 21 00	I	06.52
fire suppression, extinguisher, dry chemical	21 24 00	I	06.53
fire suppression, extinguisher, dry chemical station reel	21 24 00	I	06.53
fire suppression, extinguisher, manually actuated dry chemical	21 24 00	I	06.54
fire suppression, fire department connection, siamese free standing	21 12 00	I	06.50
fire suppression, fire department key box	21 10 00	I	06.47
fire suppression, fire hose connection, inspector's test	21 12 00	I	06.50
fire suppression, fire pump test header, free standing	21 30 00	I	06.54
fire suppression, fire pump test header, wall mounted	21 30 00	I	06.54

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
fire suppression, fire pump with drives	21 30 00	I	06.54
fire suppression, flush mounted sprinkler heads	21 11 00	I	06.48
fire suppression, foam automatic actuated	21 13 00	I	06.51
fire suppression, foam manually actuated	21 13 00	I	06.51
fire suppression, foam station reel	21 13 00	I	06.51
fire suppression, foam system	21 13 00	I	06.51
fire suppression, halon control panel	21 22 00	I	06.53
fire suppression, halon extinguisher	21 22 00	I	06.53
fire suppression, halon manually actuated extinguisher	21 22 00	I	06.53
fire suppression, halon system	21 22 00	I	06.53
fire suppression, hose cabinet or connection	21 12 00	I	06.50
fire suppression, indicator post valve	21 11 00	I	06.48
fire suppression, key operated valve	21 11 00	I	06.48
fire suppression, LP gas shutoff	23 11 00	I	06.66
fire suppression, manual foam station	21 13 00	I	06.51

DESCRIPTION	MF NO	TYPE	PAGE
fire suppression, manual halon station	21 22 00	I	06.53
fire suppression, manual wet chemical station	21 23 00	I	06.53
fire suppression, manually actuated wet extinguishing system	21 13 00	I	06.51
fire suppression, meter (CFM)	21 11 00	I	06.48
fire suppression, meter (GPM)	21 11 00	I	06.48
fire suppression, natural gas shutoff	23 11 00	I	06.66
fire suppression, nipped up upright sprinkler	21 11 00	I	06.49
fire suppression, non-indicating, non-rising stem valve	21 11 00	I	06.49
fire suppression, nozzle, charged monitor	21 11 00	I	06.49
fire suppression, nozzle, dry monitor	21 13 00	I	06.51
fire suppression, nozzle, special spray	21 11 00	I	06.49
fire suppression, outside sprinkler	21 11 00	I	06.49
fire suppression, pendant head sprinklers	21 11 00	I	06.49
fire suppression, post indicator valve	21 11 00	I	06.49

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
fire suppression, pre-action valve	21 11 00	I	06.49
fire suppression, pressure switch	21 11 00	I	06.49
fire suppression, pressure tank	21 11 00	I	06.49
fire suppression, reel carbon dioxide station	21 21 00	I	06.52
fire suppression, sprinkler branch heads	21 10 00	I	06.47
fire suppression, sprinkler heads, sidewall pendant	21 13 00	I	06.52
fire suppression, sprinkler heads, sidewall upright	21 13 00	I	06.52
fire suppression, sprinkler riser	21 13 00	I	06.52
fire suppression, sprinkler with guard	21 10 00	I	06.47
fire suppression, switch, pressure detector	21 13 00	I	06.52
fire suppression, test header	21 13 00	I	06.52
fire suppression, wet chemical system	21 23 00	I	06.53
fire-rated, smoke barrier line, 1 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text 3.2mm (1/8") space 14 mm (9/16") repeat	01 42 00	L	06.9

DESCRIPTION	MF NO	TYPE	PAGE
fire-rated, smoke barrier line, 2 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text 3.2mm (1/8") space 12 mm (29/64") repeat	01 42 00	L	06.9
fire-rated, smoke barrier line, 3 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text 3.2mm (1/8") space 8 mm (21/64") repeat	01 42 00	L	06.9
fire-rated, smoke barrier line, 4 hour; fine line, 2.5 mm (3/32") diamond, 2.5 mm (3/32") text 3.2mm (1/8") space 7 mm (9/32") repeat	01 42 00	L	06.9
fluid waste treatment, grit-collecting chamber	44 42 00	I	06.140
foot, feet	01 00 00	T	06.6
fuel oil discharge line = FOD; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
fuel oil flow line = FOF; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
fuel oil gauge line = FOG; 2.5 mm (3/32") text	23 11 00	L	06.67
furniture, fixture & equipment indicator, medium line, typical	01 42 00	R	06.14

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
furring channel, metal support assembly	09 22 00	O	06.41
furring hat channel, metal support assembly	09 22 00	O	06.41
G			
gas line, high pressure = HG; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
gas line, liquid petroleum = LPG; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
gas line, low pressure = G; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
gas line, medium pressure = MG; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
generator, steam	23 52 00	I	06.107
glass	08 80 00	M	06.41
glass block, large scale	04 23 00	M	06.31
glass block, small scale	04 23 00	M	06.31
glass elevation	08 80 00	M	06.41
graphic scale, 1' = 10'-0"	01 42 00	R	06.18
graphic scale, 1' = 100'-0"	01 42 00	R	06.17
graphic scale, 1' = 20'-0"	01 42 00	R	06.18

DESCRIPTION	MF NO	TYPE	PAGE
graphic scale, 1' = 200'-0"	01 42 00	R	06.17
graphic scale, 1' = 30'-0"	01 42 00	R	06.18
graphic scale, 1' = 40'-0"	01 42 00	R	06.18
graphic scale, 1' = 50'-0"	01 42 00	R	06.17
graphic scale, 1 1/2" = 1'-0"	01 42 00	R	06.20
graphic scale, 1" = 1"	01 42 00	R	06.20
graphic scale, 1" = 1'-0"	01 42 00	R	06.20
graphic scale, 1" = 1000'-0"	01 42 00	R	06.17
graphic scale, 1" = 500'-0"	01 42 00	R	06.17
graphic scale, 1/16" = 1'-0"	01 42 00	R	06.18
graphic scale, 1/2" = 1'-0"	01 42 00	R	06.19
graphic scale, 1/4" = 1'-0"	01 42 00	R	06.19
graphic scale, 1/8" = 1'-0"	01 42 00	R	06.19
graphic scale, 1:1	01 42 00	R	06.16
graphic scale, 1:10	01 42 00	R	06.16

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DESCRIPTION	MF NO	TYPE	PAGE
graphic scale, 1:100	01 42 00	R	06.15
graphic scale, 1:1000	01 42 00	R	06.14
graphic scale, 1:2	01 42 00	R	06.16
graphic scale, 1:20	01 42 00	R	06.16
graphic scale, 1:200	01 42 00	R	06.15
graphic scale, 1:2000	01 42 00	R	06.14
graphic scale, 1:30	01 42 00	R	06.15
graphic scale, 1:5	01 42 00	R	06.16
graphic scale, 1:50	01 42 00	R	06.15
graphic scale, 1:500	01 42 00	R	06.15
graphic scale, 1:5000	01 42 00	R	06.14
graphic scale, 3" = 1'-0"	01 42 00	R	06.20
graphic scale, 3/4" = 1'-0"	01 42 00	R	06.19
graphic scale, 3/8" = 1'-0"	01 42 00	R	06.19
graphic scale, 6" = 1'-0"	01 42 00	R	06.20

DESCRIPTION	MF NO	TYPE	PAGE
grating, plan	05 53 00	M	06.36
grating, section	05 53 00	M	06.36
greater than	01 00 00	T	06.6
greater than or equal to	01 00 00	T	06.6
grille, transfer	23 37 00	I	06.106
grout	04 05 00	M	06.28
gypsum board finish	09 29 00	M	06.41
H			
heat stop, fire rated ceiling	23 33 00	I	06.103
heater, desuperheater	23 55 00	I	06.107
heater, feed with air outlet	23 30 00	I	06.99
heater, flue gas reheater	23 50 00	I	06.107
heater, live steam superheater	23 20 00	I	06.68
heat-generation equipment, check valve	23 52 00	I	06.107
heating, mixing terminal unit	23 82 00	I	06.112

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
heating, reheat terminal unit	23 82 00	I	06.112
heating, unit (indicate type)	23 82 00	I	06.112
heating, variable volume terminal unit, reheat	23 82 00	I	06.112
helium line = HE; thin line, 2.5 mm (3/32") text	40 13 00	L	06.139
hidden features line; thin line	01 42 00	L	06.9
humidification line = H; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
HVAC control, air motor controlled globe valve	23 20 00	I	06.68
HVAC control, switch, normally closed flow	23 09 00	I	06.63
HVAC control, switch, normally open flow	23 09 00	I	06.63
HVAC control, three-way air motor controlled valve	23 09 00	I	06.63
HVAC controls, air motor controlled gate valve	23 09 00	I	06.63
HVAC controls, automatic governor operated valve	23 09 00	I	06.63
HVAC controls, differential oil pressure switch	23 09 00	I	06.63
HVAC controls, dual pressure switch	23 09 00	I	06.63
HVAC controls, electric pneumatic control	23 09 00	I	06.63

DESCRIPTION	MF NO	TYPE	PAGE
HVAC controls, flanged motor operated gate valve	23 09 00	I	06.63
HVAC controls, flanged motor operated globe valve	23 09 00	I	06.64
HVAC controls, fusible link quick valve	23 09 00	I	06.64
HVAC controls, pneumatic electric control	23 09 00	I	06.64
HVAC controls, pressure stat	23 09 00	I	06.64
HVAC controls, pressure switch with high pressure cutout	23 09 00	I	06.64
HVAC controls, pressure switch, type 1	23 09 00	I	06.64
HVAC controls, pressure switch, type 2	23 09 00	I	06.64
HVAC controls, remote bulb thermostat	23 09 00	I	06.64
HVAC controls, rotary heat wheel	23 72 00	I	06.111
HVAC controls, screwed motor operated gate valve	23 09 00	I	06.64
HVAC controls, screwed motor operated globe valve	23 09 00	I	06.64
HVAC controls, self contained thermostat	23 09 00	I	06.65
HVAC controls, solenoid valve	23 09 00	I	06.65
HVAC controls, spring check valve	23 09 00	I	06.65

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DESCRIPTION	MF NO	TYPE	PAGE
HVAC controls, thermal bulb	23 09 00	I	06.65
HVAC controls, thermometer	23 09 00	I	06.65
HVAC controls, thermometer well	23 09 00	I	06.65
HVAC controls, thermostat, electric	23 09 00	I	06.65
HVAC controls, thermostat, pneumatic	23 09 00	I	06.65
HVAC controls, thermostat, self-contained	23 09 00	I	06.65
HVAC controls, three-way electric motor controlled valve	23 09 00	I	06.65
HVAC controls, valve actuator electric motor	23 09 00	I	06.66
HVAC controls, valve actuator electric solenoid	23 09 00	I	06.66
HVAC controls, valve actuator pneumatic motor	23 09 00	I	06.66
HVAC controls, valve actuator pneumatic motor diaphragm	23 09 00	I	06.66
HVAC controls, vapor regulated suction valve	23 09 00	I	06.66
HVAC controls, welded motor operated gate valve	23 09 00	I	06.66
HVAC controls, welded motor operated gate valve	23 09 00	I	06.66
HVAC equipment, drive fluid	23 70 00	I	06.110

DESCRIPTION	MF NO	TYPE	PAGE
HVAC equipment, heat exchanger	23 57 00	I	06.107
HVAC equipment, intercooler desuperheater	23 57 00	I	06.107
HVAC equipment, room air conditioning equipment	23 81 00	I	06.112
hydrant pan, fire	33 12 00	I	06.134
hydrant, fire	33 12 00	I	06.134
hydrant, one hose outlet	33 12 00	I	06.134
hydrant, private housed two hose outlet	21 11 00	I	06.50
hydrant, two hose outlet	33 12 00	I	06.134
hydrant, wall	33 12 00	I	06.134
hydrant, wall two hose outlet	33 12 00	I	06.134
hydrogen line = H; thin line, 2.5 mm (3/32") text	40 14 00	L	06.139
identification device indicator, 2 mm (5/64") text, 3 mm (1/8") sides	01 42 00	R	06.21
inch(es)	01 00 00	T	06.6

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
insertion point, 4 mm (5/32") wide/high hidden line	01 42 00	R	06.21
instrumental equipment, bell	11 62 00	I	06.44
insulation	07 21 00	M	06.37
insulation, loose fill	07 21 00	M	06.37
insulation, rigid board	07 21 00	M	06.37
intercom line = I thin line, 2.5 mm (3/32") text	27 51 00	L	06.123
K			
keynote indicator, 2.5 mm (3/32") text, 60 degree angles, 6 mm (1/4") high, medium line	01 42 00	R	06.21
L			
laundry, single tray	22 40 00	O	06.58
lavatory countertop	22 40 00	O	06.58
lavatory, accessible	22 40 00	O	06.58
lavatory, corner	22 40 00	O	06.58
lavatory, dental	11 74 00	O	06.44

DESCRIPTION	MF NO	TYPE	PAGE
lavatory, integral countertop	22 40 00	O	06.58
lavatory, medical manicure	22 40 00	O	06.58
lavatory, wall hung	22 40 00	O	06.58
leader, curved, 3:1 filled arrow, 3 mm (1/8") text, medium line	01 42 00	R	06.21
leader, straight, 3:1 filled arrow, 3 mm (1/8") text, medium line	01 42 00	R	06.21
less than	01 00 00	T	06.6
less than or equal to	01 00 00	T	06.6
light post without arm	26 56 00	I	06.122
light post, one arm in power pole	33 71 00	I	06.137
light post, one arm, one head	26 56 00	I	06.122
light post, two arms, two heads	26 56 00	I	06.122
light troffer inlet, return air	23 33 00	I	06.103
light troffer outlet, supply air	23 33 00	I	06.103

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
lighting, airfield runway	26 56 00	I	06.122
lighting, airfield taxiway	26 56 00	I	06.122
lighting, exterior building	26 56 00	I	06.122
lighting, incandescent ceiling mounted	26 50 00	I	06.120
lighting, one emergency battery power	26 52 00	I	06.121
lighting, runway	26 56 00	I	06.122
lighting, three emergency battery power	26 52 00	I	06.121
lightning arrestor	26 41 00	I	06.120
liquid nitrogen line = LN; thin line, 2.5 mm (3/32") text	40 13 00	L	06.139
liquid oxygen line = LOX; thin line, 2.5 mm (3/32") text	22 63 00	L	06.62
louver type identifier, L = louver, 3 = type, similiar to window type identifier, medium line	01 42 00	R	06.22
louver, door or wall opening	23 37 00	I	06.106
louver, intake and screen	23 37 00	I	06.106

DESCRIPTION	MF NO	TYPE	PAGE
M			
marble stone	04 40 00	M	06.31
masonry, adobe rammed earth	04 24 00	M	06.31
masonry, structural clay tile glazed	04 21 00	M	06.29
match line indicator, extra wide center line, 3 mm (1/8") text, medium line, typical	01 42 00	R	06.21
metal deck, corrugated	05 30 00	O	06.35
metal deck, form	05 30 00	O	06.36
metal deck, hi-form	05 30 00	O	06.36
metal deck, ribbed	05 30 00	O	06.36
minus	01 00 00	T	06.6
multiply by, by	01 00 00	T	06.6
N			
new line; medium line	01 42 00	L	06.9
nitrogen line = N; thin line, 2.5 mm (3/32") text	40 13 00	L	06.139

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
nitrous oxide line = NO; thin line, 2.5 mm (3/32") text	22 63 00	L	06.62
north indicator (user defines circle size)	01 42 00	R	06.22
number, pound	01 00 00	T	06.7
nurse call line = NC thin line, 2.5 mm (3/32") text	27 52 00	L	06.123
O			
outlet, combination telephone/ data communication	27 05 00	I	06.122
oxygen line = O; thin line, 2.5 mm (3/32") text	22 63 00	L	06.62
P			
panic duress switch	28 10 00	I	06.124
parking control equipment, traffic arm with card reader	11 12 00	I	06.44
parking control equipment, traffic arm, mechanical, swing	11 12 00	I	06.44
particleboard	06 10 00	M	06.36
particleboard woodwork, architectural	06 40 00	M	06.37
percent	01 00 00	T	06.7

DESCRIPTION	MF NO	TYPE	PAGE
pipe line, cast iron; thin continuous line, 2.5 mm (3/32") text	22 11 00	L	06.55
pipe line, chemical supply = CS; thin line, 2.5 mm (3/32") text	40 20 00	L	06.139
pipe line, clay tile = CT; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
pipe line, culvert; thin continuous line, 2.5 mm (3/32") text	33 42 00	L	06.135
pipe line, ductile iron = DI; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
pipe line, reinforced concrete = RCP; thin line, 2.5 mm (3/32") text	22 14 00	L	06.57
pipe standard	05 10 00	O	06.34
piping, air eliminator	22 11 00	I	06.54
piping, air heater (plate or tubular)	22 05 00	I	06.54
piping, air heater (rotating type)	22 05 00	I	06.54
piping, air separator	22 11 00	I	06.54
piping, anchor intermediate	23 20 00	I	06.68

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, anchor main	23 20 00	I	06.68
pipng, angle check valve, bell & spigot	23 20 00	I	06.68
pipng, angle check valve, flanged	23 20 00	I	06.68
pipng, angle check valve, screwed	23 20 00	I	06.68
pipng, angle check valve, soldered	23 20 00	I	06.68
pipng, angle check valve, welded	23 20 00	I	06.69
pipng, angle gate valve, flanged (elevation)	23 20 00	I	06.69
pipng, angle gate valve, flanged (plan)	23 20 00	I	06.69
pipng, angle gate valve, screwed (elevation)	23 20 00	I	06.69
pipng, angle gate valve, screwed (plan)	23 20 00	I	06.69
pipng, angle gate valve, welded (elevation)	23 20 00	I	06.69
pipng, angle gate valve, welded (plan)	23 20 00	I	06.69
pipng, angle globe valve (elevation)	23 20 00	I	06.69
pipng, angle globe valve, flanged (elevation)	23 20 00	I	06.69
pipng, angle globe valve, flanged (plan)	23 20 00	I	06.69

DESCRIPTION	MF NO	TYPE	PAGE
pipng, angle globe valve, screwed (elevation)	23 20 00	I	06.69
pipng, angle globe valve, screwed (plan)	23 20 00	I	06.70
pipng, angle globe valve, soldered (plan)	23 20 00	I	06.70
pipng, angle globe valve, welded (elevation)	23 20 00	I	06.70
pipng, angle globe valve, welded (plan)	23 20 00	I	06.70
pipng, angle hose valve	23 20 00	I	06.70
pipng, automatic air vent	23 20 00	I	06.70
pipng, automatic by-pass valve	23 20 00	I	06.70
pipng, automatic bypass valve, flanged	23 20 00	I	06.70
pipng, automatic expansion valve	23 20 00	I	06.70
pipng, automatic governor operated valve, flanged	23 20 00	I	06.70
pipng, automatic reducing valve	23 20 00	I	06.71
pipng, automatic reducing valve, flanged	23 20 00	I	06.71
pipng, ball joint	23 20 00	I	06.71
pipng, ball valve	23 20 00	I	06.71

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, barometric condenser	23 20 00	I	06.71
pipng, base elbow, screwed	23 20 00	I	06.71
pipng, bell & spigot cap	23 20 00	I	06.71
pipng, bell & spigot concentric reducer	23 20 00	I	06.71
pipng, bell & spigot connecting pipe joint	23 20 00	I	06.71
pipng, bell & spigot crossover	23 20 00	I	06.71
pipng, bell & spigot eccentric reducer	23 20 00	I	06.72
pipng, bell & spigot expansion bell joint	23 20 00	I	06.72
pipng, bell & spigot gate valve (elevation)	23 20 00	I	06.72
pipng, bell & spigot globe valve (elevation)	23 20 00	I	06.72
pipng, bell & spigot outlet down tee	23 20 00	I	06.72
pipng, bell & spigot outlet up tee	23 20 00	I	06.72
pipng, bell & spigot pipe plug	23 20 00	I	06.72
pipng, bell & spigot reducing tee	23 20 00	I	06.72
pipng, bell & spigot safety valve	23 20 00	I	06.72

DESCRIPTION	MF NO	TYPE	PAGE
pipng, bell & spigot side outlet tee	23 20 00	I	06.72
pipng, bell & spigot sleeve	23 20 00	I	06.73
pipng, bell & spigot stop valve	23 20 00	I	06.73
pipng, bell & spigot straight size tee	23 20 00	I	06.73
pipng, bell & spigot turned down elbow	23 20 00	I	06.73
pipng, bell & spigot turned up elbow	23 20 00	I	06.73
pipng, bell & spigot, 45 degree elbow	23 20 00	I	06.73
pipng, bell & spigot, 90 degree elbow	23 20 00	I	06.73
pipng, bell & spigot, bull plug	23 20 00	I	06.73
pipng, bell & spigot, side outlet down tee	23 20 00	I	06.73
pipng, blind flange	23 20 00	I	06.73
pipng, blow off strainer	23 20 00	I	06.74
pipng, boiler return trap	23 20 00	I	06.74
pipng, bushing bell & spigot	23 20 00	I	06.74
pipng, butterfly valve	23 20 00	I	06.74

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, capillary tube	23 20 00	I	06.74
pipng, cock bell & spigot	23 20 00	I	06.74
pipng, condenser jet	23 20 00	I	06.74
pipng, condenser water regulating valve	23 20 00	I	06.74
pipng, condensing steam turbine	23 21 00	I	06.97
pipng, dielectric union	23 20 00	I	06.74
pipng, drain hose end	23 20 00	I	06.74
pipng, drain, open funnel	22 14 00	I	06.56
pipng, duplex strainer	23 20 00	I	06.75
pipng, dynamic pump	23 21 00	I	06.98
pipng, engine (indicate fuel)	23 10 00	I	06.66
pipng, expansion hand valve	23 20 00	I	06.75
pipng, expansion joint	23 20 00	I	06.75
pipng, expansion loop	23 20 00	I	06.75
pipng, filter and strainer line	23 20 00	I	06.75

DESCRIPTION	MF NO	TYPE	PAGE
pipng, flanged 45 degree elbow	23 20 00	I	06.75
pipng, flanged 90 degree elbow	23 20 00	I	06.75
pipng, flanged base elbow	23 20 00	I	06.75
pipng, flanged bull plug	23 20 00	I	06.75
pipng, flanged cock	23 20 00	I	06.75
pipng, flanged concentric reducer	23 20 00	I	06.76
pipng, flanged connecting pipe joint	23 20 00	I	06.76
pipng, flanged diaphragm valve	23 20 00	I	06.76
pipng, flanged double branch elbow	23 20 00	I	06.76
pipng, flanged double sweep tee	23 20 00	I	06.76
pipng, flanged eccentric reducer	23 20 00	I	06.76
pipng, flanged elbow side outlet, down	23 20 00	I	06.76
pipng, flanged elbow side outlet, up	23 20 00	I	06.76
pipng, flanged expansion joint	23 20 00	I	06.76
pipng, flanged float valve	23 20 00	I	06.76

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DESCRIPTION	MF NO	TYPE	PAGE
pipng, flanged gate valve (elevation)	23 20 00	I	06.77
pipng, flanged gate valve (plan)	23 20 00	I	06.77
pipng, flanged globe valve (plan)	23 20 00	I	06.77
pipng, flanged globe valve (elevation)	23 20 00	I	06.77
pipng, flanged hose angle valve	23 20 00	I	06.77
pipng, flanged hose gate valve	23 20 00	I	06.77
pipng, flanged hose globe valve	23 20 00	I	06.77
pipng, flanged lateral	23 20 00	I	06.77
pipng, flanged lock shield valve	23 20 00	I	06.77
pipng, flanged long radius elbow	23 20 00	I	06.77
pipng, flanged orifice flange	23 20 00	I	06.78
pipng, flanged outlet down tee	23 20 00	I	06.78
pipng, flanged outlet up tee	23 20 00	I	06.78
pipng, flanged quick opening valve	23 20 00	I	06.78
pipng, flanged reducing cross	23 20 00	I	06.78

DESCRIPTION	MF NO	TYPE	PAGE
pipng, flanged reducing flange	23 20 00	I	06.78
pipng, flanged safety valve	23 20 00	I	06.78
pipng, flanged side outlet tee	23 20 00	I	06.78
pipng, flanged side outlet up tee	23 20 00	I	06.78
pipng, flanged single sweep tee	23 20 00	I	06.78
pipng, flanged sleeve	23 20 00	I	06.79
pipng, flanged spool piece	23 20 00	I	06.79
pipng, flanged stop valve	23 20 00	I	06.79
pipng, flanged straight size tee	23 20 00	I	06.79
pipng, flanged turned down elbow	23 20 00	I	06.79
pipng, flanged turned up elbow	23 20 00	I	06.79
pipng, flanged union	23 20 00	I	06.79
pipng, flate plate heat exchanger	23 50 00	I	06.107
pipng, float and thermostatic trap	23 20 00	I	06.79
pipng, float trap	23 20 00	I	06.79

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, gas shutoff	33 51 00	I	06.136
pipng, gas turbine	23 10 00	I	06.66
pipng, grease trap	22 13 00	I	06.56
pipng, heat, liquid exchanger	23 20 00	I	06.79
pipng, heat, transfer surface	23 20 00	I	06.80
pipng, high pressure horizontal receiver	23 20 00	I	06.80
pipng, high pressure vertical receiver	23 20 00	I	06.80
pipng, high side float valve	23 20 00	I	06.80
pipng, hose globe valve	23 20 00	I	06.80
pipng, lateral bell & spigot	23 20 00	I	06.80
pipng, low pressure receiver	23 20 00	I	06.80
pipng, low side float valve	23 20 00	I	06.80
pipng, magnetic stop valve	23 20 00	I	06.80
pipng, manual air vent	23 20 00	I	06.80
pipng, natural gas receiver	33 51 00	I	06.136

DESCRIPTION	MF NO	TYPE	PAGE
pipng, needle valve	23 20 00	I	06.81
pipng, nozzle flow	23 20 00	I	06.81
pipng, pipe heat	23 57 00	I	06.107
pipng, pipe plug	23 20 00	I	06.81
pipng, pitch or pipe drop	23 20 00	I	06.81
pipng, pitch or pipe rise	23 20 00	I	06.81
pipng, plate fin cross flow	23 50 00	I	06.107
pipng, plug valve	23 20 00	I	06.81
pipng, precipitator	23 20 00	I	06.81
pipng, pressure gage	23 20 00	I	06.81
pipng, pressure gage and cock	23 20 00	I	06.81
pipng, pressure reducing valve	23 20 00	I	06.81
pipng, pump (plan) (indicate use)	23 21 00	I	06.98
pipng, pump (schematic) (indicate use)	23 21 00	I	06.98
pipng, reducing bell & spigot cross	23 20 00	I	06.82

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, relief or safety valve	23 20 00	I	06.82
pipng, rupture disc	23 20 00	I	06.82
pipng, screwed 45 degree elbow	23 20 00	I	06.82
pipng, screwed 90 degree elbow	23 20 00	I	06.82
pipng, screwed bushing	23 20 00	I	06.82
pipng, screwed cap	23 20 00	I	06.82
pipng, screwed cock	23 20 00	I	06.82
pipng, screwed concentric reducer	23 20 00	I	06.82
pipng, screwed connecting pipe joint	23 20 00	I	06.82
pipng, screwed crossover	23 20 00	I	06.83
pipng, screwed diaphragm valve	23 20 00	I	06.83
pipng, screwed double branch elbow	23 20 00	I	06.83
pipng, screwed double sweep tee	23 20 00	I	06.83
pipng, screwed eccentric reducer	23 20 00	I	06.83
pipng, screwed expansion joint	23 20 00	I	06.83

DESCRIPTION	MF NO	TYPE	PAGE
pipng, screwed float valve	23 20 00	I	06.83
pipng, screwed gate valve	23 20 00	I	06.83
pipng, screwed gate valve (plan)	23 20 00	I	06.83
pipng, screwed globe valve (elevation)	23 20 00	I	06.83
pipng, screwed globe valve (plan)	23 20 00	I	06.84
pipng, screwed hose angle valve	23 20 00	I	06.84
pipng, screwed hose gate valve	23 20 00	I	06.84
pipng, screwed hose globe valve	23 20 00	I	06.84
pipng, screwed lateral	23 20 00	I	06.84
pipng, screwed lock shield valve	23 20 00	I	06.84
pipng, screwed long radius elbow	23 20 00	I	06.84
pipng, screwed outlet down tee	23 20 00	I	06.84
pipng, screwed outlet up tee	23 20 00	I	06.84
pipng, screwed pipe plug	23 20 00	I	06.84
pipng, screwed quick opening valve	23 20 00	I	06.85

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, screwed reducing elbow	23 20 00	I	06.85
pipng, screwed safety valve	23 20 00	I	06.85
pipng, screwed side outlet elbow, down	23 20 00	I	06.85
pipng, screwed side outlet elbow, up	23 20 00	I	06.85
pipng, screwed side outlet tee	23 20 00	I	06.85
pipng, screwed side outlet up tee	23 20 00	I	06.85
pipng, screwed single sweep tee	23 20 00	I	06.85
pipng, screwed sleeve	23 20 00	I	06.85
pipng, screwed stop valve	23 20 00	I	06.85
pipng, screwed straight size tee	23 20 00	I	06.86
pipng, screwed street elbow	23 20 00	I	06.86
pipng, screwed turned down elbow	23 20 00	I	06.86
pipng, screwed turned up elbow	23 20 00	I	06.86
pipng, screwed union	23 20 00	I	06.86
pipng, side outlet elbow, bell & spigot, outlet down	23 20 00	I	06.86

DESCRIPTION	MF NO	TYPE	PAGE
pipng, side outlet elbow, bell & spigot, outlet up	23 20 00	I	06.86
pipng, sight glass	23 20 00	I	06.86
pipng, sleeve	23 20 00	I	06.86
pipng, soldered 45 degree elbow	23 20 00	I	06.86
pipng, soldered 90 degree elbow	23 20 00	I	06.87
pipng, soldered bushing	23 20 00	I	06.87
pipng, soldered cock	23 20 00	I	06.87
pipng, soldered concentric reducer	23 20 00	I	06.87
pipng, soldered connecting pipe joint	23 20 00	I	06.87
pipng, soldered eccentric reducer	23 20 00	I	06.87
pipng, soldered expansion joint	23 20 00	I	06.87
pipng, soldered gate valve	23 20 00	I	06.87
pipng, soldered globe valve (elevation)	23 20 00	I	06.87
pipng, soldered globe valve (plan)	23 20 00	I	06.87
pipng, soldered lock shield valve	23 20 00	I	06.88

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, soldered outlet down tee	23 20 00	I	06.88
pipng, soldered outlet up tee	23 20 00	I	06.88
pipng, soldered quick opening valve	23 20 00	I	06.88
pipng, soldered reducing elbow	23 20 00	I	06.88
pipng, soldered safety valve	23 20 00	I	06.88
pipng, soldered sleeve	23 20 00	I	06.88
pipng, soldered stop valve	23 20 00	I	06.88
pipng, soldered straight size tee	23 20 00	I	06.88
pipng, soldered turned down elbow	23 20 00	I	06.88
pipng, soldered turned up elbow	23 20 00	I	06.89
pipng, soldered union	23 20 00	I	06.89
pipng, square head cock	23 20 00	I	06.89
pipng, steam trap (indicate type)	23 20 00	I	06.89
pipng, steam turbine	23 21 00	I	06.98
pipng, straight crown eccentric reducer	23 20 00	I	06.89

DESCRIPTION	MF NO	TYPE	PAGE
pipng, straight size bell & spigot cross	23 20 00	I	06.89
pipng, straight size flanged cross	23 20 00	I	06.89
pipng, straight size screwed cross	23 20 00	I	06.89
pipng, straight size soldered cross	23 20 00	I	06.89
pipng, straight size welded cross	23 20 00	I	06.89
pipng, straight way bell & spigot check valve	23 20 00	I	06.89
pipng, straight way flanged check valve	23 20 00	I	06.90
pipng, straight way screwed check valve	23 20 00	I	06.90
pipng, straight way soldered check valve	23 20 00	I	06.90
pipng, straight way welded check valve	23 20 00	I	06.90
pipng, strainer	23 20 00	I	06.90
pipng, strainer (plan)	23 20 00	I	06.90
pipng, swing gate check valve	23 20 00	I	06.90
pipng, temperature gage	23 20 00	I	06.90
pipng, temperature pressure relief valve	23 20 00	I	06.90

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, thermostatic blast trap	23 20 00	I	06.91
pipng, thermostatic expansion valve	23 20 00	I	06.91
pipng, thermostatic trap	23 20 00	I	06.91
pipng, three-way manual valve	23 20 00	I	06.91
pipng, thrust block	33 11 00	I	06.132
pipng, trap scale	23 20 00	I	06.91
pipng, turned down 45 degree elbow	23 20 00	I	06.91
pipng, unclassified valve	23 20 00	I	06.91
pipng, valve actuator manual out stem/yoke	23 20 00	I	06.91
pipng, valve actuator manual gear	23 20 00	I	06.91
pipng, valve actuator manual lever	23 20 00	I	06.91
pipng, valve actuator manual non-rise stem	23 20 00	I	06.92
pipng, valve compressor suction pressure	23 20 00	I	06.92
pipng, valve, constant pressure suction	23 20 00	I	06.92
pipng, valve, evaporative pressure, regular snap action	23 20 00	I	06.92

pipng, valve, evaporative pressure, regular throttling	23 20 00	I	06.92
pipng, valve, evaporative pressure, regular throttling evaporator	23 20 00	I	06.92
pipng, valve, refrigerant reversing	23 20 00	I	06.92
pipng, valve, snap action	23 20 00	I	06.92
pipng, valve, thermosuction	23 20 00	I	06.92
pipng, water valve	23 20 00	I	06.92
pipng, welded 45 degree elbow	23 20 00	I	06.93
pipng, welded 90 degree elbow	23 20 00	I	06.93
pipng, welded bushing	23 20 00	I	06.93
pipng, welded cock	23 20 00	I	06.93
pipng, welded concentric reducer	23 20 00	I	06.93
pipng, welded connecting pipe joint	23 20 00	I	06.93
pipng, welded eccentric reducer	23 20 00	I	06.93
pipng, welded expansion joint	23 20 00	I	06.93
pipng, welded float valve	23 20 00	I	06.93

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
pipng, welded gate valve (plan)	23 20 00	I	06.93
pipng, welded gate valve (elevation)	23 20 00	I	06.94
pipng, welded globe valve	23 20 00	I	06.94
pipng, welded outlet down tee	23 20 00	I	06.94
pipng, welded outlet up tee	23 20 00	I	06.94
pipng, welded quick opening valve	23 20 00	I	06.94
pipng, welded safety valve	23 20 00	I	06.94
pipng, welded sleeve	23 20 00	I	06.94
pipng, welded stop valve	23 20 00	I	06.94
pipng, welded straight size tee	23 20 00	I	06.94
pipng, welded turned down elbow	23 20 00	I	06.94
pipng, welded turned up elbow	23 20 00	I	06.95
pipng, welded union	23 20 00	I	06.95
plant, interior or artificial	12 92 00	O	06.46
plaster finish with metal lath	09 20 00	M	06.41

DESCRIPTION	MF NO	TYPE	PAGE
plaster, gypsum on masonry	09 23 00	M	06.42
plaster, gypsum or portland cement	09 05 00	M	06.41
plaster, gypsum, solid partition	09 23 00	M	06.42
plastic on plywood	06 20 00	M	06.37
plumbing fixtures, shower, overhead gang	22 40 00	I	06.57
plus	01 00 00	T	06.7
plus or minus	01 00 00	T	06.7
Plywood	06 10 00	M	06.37
power line = P thin line, 2.5 mm (3/32") text	27 00 00	L	06.122
precast concrete, communications vault	03 48 00	I	06.27
precast concrete, electrical vault	03 48 00	I	06.27
precast concrete, fuel oil vault	03 48 00	I	06.27
precast concrete, manhole, transformer vault	03 48 00	I	06.28
precast concrete, telephone vault	03 48 00	I	06.28
precast concrete, transformer pad	03 48 00	I	06.28

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
precast concrete, vault, natural gas valve	03 48 00	I	06.28
property line	01 00 00	T	06.7
property line; wide line, 5 mm (3/16") dash, 3 mm (1/8") space	01 42 00	L	06.9
pumped condensate line = PC; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
Q			
quality requirements, boring indicator	01 40 00	I	06.7
quality requirements, elevation indicator, finish	01 40 00	I	06.7
quality requirements, monument indicator	01 40 00	I	06.7
quality requirements, property corner indicator, existing, 5 mm (3/16") diameter, typical	01 40 00	I	06.7
quality requirements, property corner indicator, new	01 40 00	I	06.7
quality requirements, temporary ground point indicator, existing, 4 mm (5/32") square, typical	01 40 00	I	06.8

DESCRIPTION	MF NO	TYPE	PAGE
quality requirements, temporary ground point indicator, new	01 40 00	I	06.8
R			
range	11 00 00	O	06.43
rectifier, cathodic protection sanitary	26 42 00	I	06.120
reference grid indicator with reference grid lines, medium line, typical	01 42 00	R	06.23
refrigerant discharge line = RD; thin line, 2.5 mm (3/32") text	23 23 00	L	06.98
refrigerant liquid line = RL; thin line, 2.5 mm (3/32") text	23 23 00	L	06.98
refrigerant suction line = RS; thin line, 2.5 mm (3/32") text	23 23 00	L	06.98
refrigeration equipment, air-cooled condensing unit	23 63 00	I	06.109
refrigeration equipment, air-cooled fin condenser, forced air	23 63 00	I	06.109
refrigeration equipment, air-cooled fin condenser, static	23 63 00	I	06.109
refrigeration equipment, bare tube gravity air evaporator	23 76 00	I	06.111
refrigeration equipment, centrifugal compressor	23 61 00	I	06.108

IDENTITY (I), LINE (L), MATERIAL (M), OBJECT (O), REFERENCE (R), and TEXT (T) SYMBOLS

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
refrigeration equipment, chilling absorption unit	23 64 00	I	06.110
refrigeration equipment, chilling centrifugal unit	23 61 00	I	06.108
refrigeration equipment, chilling reciprocating unit	23 61 00	I	06.108
refrigeration equipment, chilling rotary screw unit	23 61 00	I	06.108
refrigeration equipment, coil loop	23 76 00	I	06.111
refrigeration equipment, compressor, motor enclosed, reciprocating	23 61 00	I	06.108
refrigeration equipment, compressor, motor sealed, reciprocating	23 61 00	I	06.108
refrigeration equipment, compressor, open crankcase, reciprocating	23 61 00	I	06.108
refrigeration equipment, compressor, reciprocating	23 61 00	I	06.108
refrigeration equipment, compressor, rotary motor sealed	23 61 00	I	06.108

DESCRIPTION	MF NO	TYPE	PAGE
refrigeration equipment, compressor, rotary motor encased	23 61 00	I	06.108
refrigeration equipment, compressor, rotary motor enclosed with crank belt	23 61 00	I	06.109
refrigeration equipment, condenser evaporator cascade system	23 76 00	I	06.111
refrigeration equipment, condenser surface	23 63 00	I	06.109
refrigeration equipment, cooling tower	23 65 00	I	06.110
refrigeration equipment, double bundle condenser	23 63 00	I	06.109
refrigeration equipment, evaporative condenser	23 63 00	I	06.109
refrigeration equipment, evaporator, finned circular ceiling	23 76 00	I	06.111
refrigeration equipment, evaporator, finned coil natural convection	23 76 00	I	06.111
refrigeration equipment, evaporator, finned gravity air	23 76 00	I	06.111

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
refrigeration equipment, evaporator, forced convection	23 76 00	I	06.111
refrigeration equipment, evaporator, forced convection cool unit	23 76 00	I	06.111
refrigeration equipment, evaporator, pipe coil	23 76 00	I	06.111
refrigeration equipment, evaporator, plate coil	23 76 00	I	06.112
refrigeration equipment, immersion cool unit	23 76 00	I	06.112
refrigeration equipment, open crankcase, reciprocating	23 61 00	I	06.109
refrigeration equipment, plate coil head or manifold evaporator	23 76 00	I	06.112
refrigeration equipment, rotary compressor	23 61 00	I	06.109
refrigeration equipment, water cooled concentric tube condenser	23 76 00	I	06.112
refrigeration equipment, water cooled condenser	23 63 00	I	06.109
refrigeration equipment, water cooled condensing unit	23 63 00	I	06.110
refrigeration equipment, water cooled shell/coil condenser	23 63 00	I	06.110
refrigeration equipment, water cooled shell/tube condenser	23 63 00	I	06.110

DESCRIPTION	MF NO	TYPE	PAGE
refrigerator	11 00 00	O	06.43
register grille, ceiling supply	23 37 00	I	06.106
register grille, side wall supply	23 37 00	I	06.106
return air grille with sound boot	23 37 00	I	06.106
return line, brine = BR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
return line, chilled water; thin line, 2.5 mm (3/32") text	33 11 00	L	06.133
return line, condenser water = CR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.95
return line, dual temperature = DTR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, fuel oil = FOR; thin line, 2.5 mm (3/32") text	23 11 00	L	06.67
return line, glycol heating = GHR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, high pressure condensate = HPC; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, high temperature hot water = HTWR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
return line, industrial hot water = IHR; thin line, 2.5 mm (3/32") text	40 23 00	L	06.139
return line, low pressure condensate = LPC; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, low temperature hot water = HWR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, medium pressure condensate = MPC; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
return line, medium temperature hot water = MTWR; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
revision indicator (shown with revision cloud), typical	01 42 00	R	06.23
rigid conduit line = RC; thin line, 2.5 mm (3/32") text	26 05 00	L	06.116
riprap	31 37 00	M	06.131
room identifier with room name and number, medium line, typical	01 42 00	R	06.24

DESCRIPTION	MF NO	TYPE	PAGE
room identifier, optional finishes A = floor finish type 2 = base finish type C = wall finish type 3 = ceiling finish type	01 42 00	R	06.24

S			
sand	31 20 00	M	06.131
sand clay gravel	31 20 00	M	06.131
sanitary sewer force line; thin line, 2.5 mm (3/32") text	33 31 00	L	06.135
screen, projection ceiling-mounted	11 52 00	O	06.44
sealant and backer rod	07 92 00	M	06.38
section indicators for building with break standards, typical	01 42 00	R	06.25
section indicators for partial building, typical	01 42 00	R	06.26
security access, annunciator panel	28 10 00	I	06.124
security access, bell	28 10 00	I	06.124
security access, bi directional speaker	28 10 00	I	06.124

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
security access, buzzer	28 10 00	I	06.124
security access, buzzer, combination bell	28 10 00	I	06.124
security access, control unit	28 10 00	I	06.124
security access, control unit with closed circuit television camera	28 10 00	I	06.124
security access, controlled access point	28 10 00	I	06.124
security access, generic "X" indicates the type	28 10 00	I	06.124
security access, horn or siren	28 10 00	I	06.125
security access, infrared and ultrasonic motion detector	28 10 00	I	06.125
security access, intercom station	28 10 00	I	06.125
security access, master station, intercom	28 10 00	I	06.125
security access, outdoor microwave transmission unit	28 10 00	I	06.125
security access, panic alarm	28 10 00	I	06.125
security access, panning camera transverse angle	28 13 00	I	06.125
security access, passive infrared motion detector	28 13 00	I	06.126
security access, sensor, buried vehicular	28 13 00	I	06.126

DESCRIPTION	MF NO	TYPE	PAGE
security access, switch, balanced magnetic control	28 13 00	I	06.126
security access, telephone handset	28 13 00	I	06.126
security access, touch pad lock or device	28 13 00	I	06.126
security access, ultrasonic motion detector	28 13 00	I	06.126
security access, video camera with lens	28 13 00	I	06.126
security access, video camera with lens, angle of view	28 13 00	I	06.126
security access, video camera with lens, motion detector with pan and zoom	28 10 00	I	06.125
security access, video camera with lens, motion detector with pan, tilt and zoom	28 13 00	I	06.126
security access, video tape recorder	28 10 00	I	06.125
security access, volumetric sensor	28 10 00	I	06.125
sheet metal	07 40 00	M	06.38
sheet metal and all metals	05 50 00	M	06.36
shelving equipment	12 50 00	O	06.45

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
shower head	22 40 00	O	06.58
shower stall	22 40 00	O	06.59
shower, pedestal gang	22 40 00	O	06.59
sink with drainboard	22 40 00	O	06.59
sink with garbage disposal	22 40 00	O	06.59
sink with left & right drain board	22 40 00	O	06.59
sink, circular wash type	22 40 00	O	06.59
sink, floor	22 40 00	O	06.59
sink, flushing rimmed clinical	22 40 00	O	06.59
sink, general	22 40 00	O	06.59
sink, laundry	22 40 00	O	06.59
sink, semi-circular wash	22 40 00	O	06.60
sink, service, cast iron enameled	22 40 00	O	06.60
sink, service, metal	22 40 00	O	06.60
sink, surgeon scrub	22 43 00	O	06.61

DESCRIPTION	MF NO	TYPE	PAGE
sink, two compartment type	22 40 00	O	06.60
sink, two compartment with left & right drainboards	22 40 00	O	06.60
site remediation, storage container agent	02 50 00	I	06.27
smoke and fire damper (horizontal orientation in	23 33 00	I	06.103
smoke and fire damper (vertical orientation in rectangular duct)	23 33 00	I	06.103
smoke barrier line, fine line, 2.5 mm (3/32") text, 14 mm (9/16") repeat	01 42 00	L	06.9
smoke damper (horizontal orientation in rectangular duct)	23 33 00	I	06.103
smoke damper (vertical orientation in rectangular duct)	23 33 00	I	06.103
sofa, chair	12 50 00	O	06.45
sofa, three cushion	12 50 00	O	06.46
sofa, two cushion	12 50 00	O	06.46
sound line = S thin line, 2.5 mm (3/32") text	27 51 00	L	06.123
spin-in with volume damper	23 33 00	I	06.103
spin-in without volume damper	23 33 00	I	06.103

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
standpipe line, combination = CSP; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47
standpipe line, dry = DSP; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47
standpipe line, wet = WSP; thin line, 2.5 mm (3/32") text	21 10 00	L	06.47
standpipe, dry hose station	21 12 00	I	06.50
standpipe, hose cabinet, charged	21 12 00	I	06.50
steam line, low pressure = LPS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
steam line, medium pressure = MPS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.96
steel and other metals	05 05 00	M	06.34
steel angle	05 10 00	O	06.35
stone ashler	04 40 00	M	06.31
stone cut	04 40 00	M	06.31
stone rubble	04 40 00	M	06.31
stone, cast	04 72 00	M	06.31

DESCRIPTION	MF NO	TYPE	PAGE
stone, squared elevation	04 40 00	M	06.31
storage tank, facility fuel	23 13 00	I	06.68
storage tank, fire suppression water	21 41 00	I	06.54
storage tank, fuel storage	33 56 00	I	06.136
storage tank, potable water	22 12 00	I	06.56
storage tank, water utility	33 16 00	I	06.134
structural steel tee, ST shape	05 10 00	O	06.35
structural steel tee, WT shape	05 10 00	O	06.35
structural steel, Z shape	05 10 00	O	06.35
structural tubing, steel	05 10 00	O	06.35
subsurface investigation, trench exploration completed	02 30 00	I	06.27
subsurface investigation, trench exploration proposed	02 30 00	I	06.27
subsurface investigation, tunnel exploration completed	02 30 00	I	06.27
subsurface investigation, tunnel exploration proposed	02 30 00	I	06.27
supply line, brine = B; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
supply line, chilled water; thin line, 2.5 mm (3/32") text	33 11 00	L	06.133
supply line, dual temperature = DTS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
supply line, fuel oil suction = FOS; 2.5 mm (3/32") text	23 11 00	L	06.67
supply line, glycol heating = GHS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
supply line, high pressure steam = HPS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
supply line, industrial hot water = IHW; thin line, 2.5 mm (3/32") text	40 23 00	L	06.140
supply line, low temperature hot water = HWS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
supply line, medium temperature hot water = MTWS; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97

DESCRIPTION	MF NO	TYPE	PAGE
T			
table	12 50 00	O	06.46
table lamp	12 40 00	O	06.44
table, square with armless chairs	12 50 00	O	06.46
tee suspension, ceiling assemblies	09 50 00	O	06.42
telephone booth	10 17 00	O	06.43
telephone line = T; thin line, 2.5 mm (3/32") text	27 30 00	L	06.123
telephone, wall mounted	27 30 00	I	06.123
terra cotta quarry, large scale	04 21 00	M	06.29
terra cotta, elevation	04 21 00	M	06.29
terra cotta, glazed	04 21 00	M	06.29
terra cotta, glazed one face, large scale	04 21 00	M	06.29
terra cotta, hollow	04 21 00	M	06.29
terra cotta, large scale	04 21 00	M	06.29
terra cotta, small scale	04 21 00	M	06.29

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
terra cotta, unglazed	04 21 00	M	06.30
terra cotta, veneer	04 21 00	M	06.30
terrazzo finish	09 66 00	M	06.42
threshold	08 71 00	O	06.41
tile, acoustical ceiling	09 51 00	M	06.42
tile, ceramic elevation	09 30 00	M	06.42
tile, structural clay	04 21 00	M	06.30
tile, structural floor units	04 21 00	M	06.30
tree, deciduous existing	32 93 00	M	06.132
tree, deciduous new	32 93 00	M	06.132
tree, generic existing	32 93 00	M	06.132
tree, generic new	32 93 00	M	06.132
U			
urinal, corner type	22 40 00	O	06.60
urinal, floor mounted	22 40 00	O	06.60

DESCRIPTION	MF NO	TYPE	PAGE
urinal, trough type	22 40 00	O	06.60
urinal, wall hung	22 40 00	O	06.60
utility services, manhole	33 05 00	I	06.132
utility, communications manhole	33 81 00	I	06.139
utility, distribution switch or switching station	33 71 00	I	06.137
utility, electrical manhole	33 71 00	I	06.137
utility, gas plant	33 50 00	I	06.136
utility, manhole, natural gas	33 51 00	I	06.136
utility, meter, natural gas	33 51 00	I	06.136
utility, natural gas trap	33 51 00	I	06.136
utility, primary electrical handhole	33 71 00	I	06.137
utility, sanitary cleanout	33 39 00	I	06.135
utility, sanitary manhole	33 30 00	I	06.134
utility, sanitary meter	33 30 00	I	06.135
utility, sanitary pressure vessel	33 30 00	I	06.135

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
utility, sanitary sewer lift station	33 30 00	I	06.135
utility, sanitary valve vault	33 39 00	I	06.135
utility, septic tank	33 36 00	I	06.135
utility, storm drainage manhole	33 49 00	I	06.136
utility, telephone manhole	33 81 00	I	06.139
utility, utility pole	33 12 00	I	06.134
utility, water handhole	33 11 00	I	06.132
utility, water manhole	33 11 00	I	06.132
utility, water meter	33 11 00	I	06.133
utility, water meter station	33 11 00	I	06.133
utility, water plant	33 11 00	I	06.133
utility, water regulator valve	22 11 00	I	06.54
utility, water softener	22 31 00	I	06.57
utility, water station pump	33 11 00	I	06.133
utility, water tank	33 11 00	I	06.133

DESCRIPTION	MF NO	TYPE	PAGE
utility, water valve vault	33 11 00	I	06.133
V			
vacuum air line = VAC; thin line, 2.5 mm (3/32") text	22 62 00	L	06.62
vacuum cleaning line = VC; thin line, 2.5 mm (3/32") text	22 62 00	L	06.62
vacuum pump discharge line = VPD; thin line, 2.5 mm (3/32") text	22 62 00	L	06.62
vent line, fuel oil tank = FOV; 2.5 mm (3/32") text	23 11 00	L	06.67
vibration control	13 48 00	I	06.47
W			
wall type indicator, medium line, typical	01 42 00	R	06.26
waste line, acid = ACID; thin line, 2.5 mm (3/32") text	40 25 00	L	06.140
waste line, and vent, combination = SV; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
waste line, industrial = INW; thin line, 2.5 mm (3/32") text	40 23 00	L	06.140

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SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
waste line, sanitary soil (above floor) = SS; thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
waste line, sanitary soil(below floor); thin line, 2.5 mm (3/32") text	22 11 00	L	06.55
water cooler, free standing electric	22 40 00	O	06.60
water cooler, wall hung electric	22 40 00	O	06.61
water line, cold; thin line, 2.5 mm (3/32") text	33 11 00	L	06.133
water line, cold; thin continuous line, 5 mm (3/16") dash, 2 mm (5/64") space	22 11 00	L	06.55
water line, condenser flow = C; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
water line, drinking return = DWR; thin line, 2.5 mm (3/32") text	22 11 00	L	06.56
water line, drinking supply = DWS; thin line, 2.5 mm (3/32") text	22 11 00	L	06.56
water line, hot; thin line, 2.5 mm (3/32") text	33 11 00	L	06.133

DESCRIPTION	MF NO	TYPE	PAGE
water line, hot; thin line, 5 mm (3/16") dash, 2mm (5/64") space	23 20 00	L	06.97
water line, industrial cold = ICW; thin line, 2.5 mm (3/32") text	40 23 00	L	06.140
water line, make up = MU; thin line, 2.5 mm (3/32") text	23 20 00	L	06.97
water line, public main = PW; thin line, 2.5 mm (3/32") text	33 11 00	L	06.130
water line, soft = SW; thin line, 2.5 mm (3/32") text	22 11 00	L	06.56
water line, tempered return = TWR; thin line, 2.5 mm (3/32") text	22 11 00	L	06.56
water line, tempered supply = TWS; thin line, 2.5 mm (3/32") text	22 11 00	L	06.56
water main, private	22 11 00	I	06.55
watercloset, flush valve floor outlet	22 40 00	O	06.61
watercloset, flush valve wall hung	22 40 00	O	06.61
watercloset, integral tank	22 40 00	O	06.61
watercloset, tank type	22 40 00	O	06.61

UNIFORM DRAWING SYSTEM

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U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
watercloset, wall hung tank	22 40 00	O	06.61
weld, basic back, arrow side	05 05 00	I	06.32
weld, basic fillet, arrow side	05 05 00	I	06.32
weld, basic fillet, both sides	05 05 00	I	06.32
weld, basic plug or slot, arrow side	05 05 00	I	06.32
weld, double bevel fillet, both sides	05 05 00	I	06.32
weld, double J groove, both sides	05 05 00	I	06.32
weld, double U groove, both sides	05 05 00	I	06.32
weld, double V groove, both sides	05 05 00	I	06.32
weld, flare bevel, arrow side	05 05 00	I	06.32
weld, flare bevel, both sides	05 05 00	I	06.32
weld, groove flare V, arrow side	05 05 00	I	06.33
weld, groove flare V, both sides	05 05 00	I	06.33
weld, single bevel groove, arrow side	05 05 00	I	06.33
weld, single J groove, arrow side	05 05 00	I	06.33

weld, single U groove, arrow side	05 05 00	I	06.33
weld, single V groove, arrow side	05 05 00	I	06.33
weld, square groove, arrow side	05 05 00	I	06.33
weld, square groove, both sides	05 05 00	I	06.33
weld, supplementary concave	05 05 00	I	06.33
weld, supplementary convex	05 05 00	I	06.33
weld, supplementary field	05 05 00	I	06.34
weld, supplementary flush	05 05 00	I	06.34
weld, supplementary, all around	05 05 00	I	06.34
window type identifier, 2.5 mm (3/32") text, medium line, typical	01 42 00	R	06.26
window, awning	08 50 00	O	06.39
window, double casement (inswing)	08 50 00	O	06.40
window, double casement (outswing)	08 50 00	O	06.40
window, fixed	08 50 00	O	06.40

UNIFORM DRAWING SYSTEM

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U.S. NATIONAL CAD STANDARD VERSION 3.1

SYMBOLS

DESCRIPTION	MF NO	TYPE	PAGE
window, jalousie	08 50 00	O	06.40
window, pivot	08 50 00	O	06.40
window, projected bay with casement windows	08 50 00	O	06.40
window, projected bow	08 50 00	O	06.40
window, projected box	08 50 00	O	06.40
window, single casement left jamb hinge	08 50 00	O	06.40
window, single casement right jamb hinge	08 50 00	O	06.40
window, single, double, or triple hung	08 50 00	O	06.41
window, sliding right operating sash	08 50 00	O	06.41
wood blocking or shim	06 10 00	M	06.37
wood finish	06 20 00	M	06.37
wood flooring	09 64 00	M	06.42
wood framing, continuous	06 10 00	M	06.37
wood shingles siding	07 31 00	M	06.38
wood, glued-laminated	06 10 00	M	06.37

DESCRIPTION	MF NO	TYPE	PAGE
wood, hardboard	06 05 00	M	06.36

Notations

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
99 Canal Center Plaza
Alexandria, VA 22314-1588**

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www.csinet.org

www.nationalcadstandard.org

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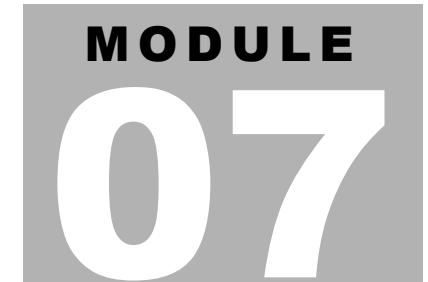
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Introduction

Notations: *A drawing note; textual information on drawings.*

The *Notations Module* establishes guidelines for the systematic presentation of textual information on drawings.

The *Notations Module*:

- establishes note formats.
- provides guidelines facilitating the creation and use of notes.
- establishes note location standards.

The benefits of note standards are:

- improved drawing clarity, readability, and consistency.
- improved coordination among drawings, specifications, and other documents.
- improved note terminology.
- enhanced communication between drawing preparers and users.
- improved quality through use of an industry standard.
- easier data management.
- consistent note format and content among design disciplines.

Notations

Drawings: *Graphic and textual information organized on a two-dimensional surface for the purpose of conveying data about a specific portion of a project.*

Specifications: *Define the qualitative requirements for products, materials, and workmanship on which the construction contract is based.*

Purpose of Notes

Construction documents include both drawings and specifications, which are meant to be complementary documents. **Drawings** convey design intent and may show multiple views, either of the whole project or its parts. **Specifications** provide detailed information and instructions concerning the project by setting requirements for the physical qualities, chemical properties, performance requirements, and standards of workmanship associated with the manufacture and installation of systems, assemblies, and components.

To more fully understand the drawings, text—in the form of notes—is added to the illustrations. The notes may provide:

- information
- identification
- instruction

Drawing notes, as part of the contract documents, have important legal consequences. Just as in creating a specification section, care must be taken to ensure that drawing notes do not establish a subdivision of the work; assign portions of the work to subcontractors; or create unintended obligations between the parties to the design and construction of the work. Terms used within notes should be consistent with terms used within the specifications. Notes should not include vague references such as “SEE SPECIFICATIONS.” They should be specific as discussed later under Reference Keynotes.

Historical Progression

Drawings produced during the late 19th and early 20th centuries were primarily graphic. These graphics used notes sparingly to identify building components and provide general instruction while requiring the designing architect or engineer to provide supplemental instruction in the field. This “master builder” method of practice has changed rapidly over the years and today has been replaced by the use of highly detailed and specific construction contract documents.

Drawing Blocks: *Drawing modules containing graphic or textual information. Refer to the Sheet Organization Module for additional information.*

During the post World War II era, “keying” became a standard method for improving drawing clarity through text reduction within the **drawing block**. A “keyed” note consisted of an alphanumeric indicator symbol and leader line with a legend of those symbols and the full text notes located elsewhere on the drawing sheet. The keying legend provided users with a single reference point for keyed notes and allowed a single note, written once, to be used in multiple drawing locations through repetition of the alphanumeric keyed symbols. As the information required on drawings became denser, the use of keyed notes improved drafting efficiency, resulting in clearer, more concise drawings.

MasterFormat: *A master list of numbers and titles classified by work results or construction practices that is primarily used to organize project manuals and detailed cost information, and relate drawing notations to specifications.*

“Keynoting” developed into a technique for “tying” keyed drawing notes to related specification sections more closely. While these “keynotes” might be organized by **MasterFormat™**, there was little consistency among design firms or the documents produced by those firms.

Types of Notes

Note Hierarchy:

- *General*
- *General Discipline*
- *General Sheet*

General Notes: *Notes that apply to the entire work. As such, general notes apply equally to all disciplines and to all sheets within the drawing set.*

Notes are text elements on a drawing that provide information concerning the work, design discipline, or sheet; identification of the drawing's graphic representations; and instruction concerning the use of the drawing or execution requirements for the work that is not otherwise specified.

There are five types of notes: general notes, general [discipline] notes, general sheet notes, reference keynotes, and sheet keynotes. General notes, general [discipline] notes, and general sheet notes do not directly correspond to a graphic representation and are not directly “linked” by symbol (or other identifier) to other drawings or specifications. Should these three types of notes appear on the same sheet, they are listed in the following hierarchical order:

- General Notes
- General [Discipline] Notes (such as General Architectural Notes)
- General Sheet Notes

General Notes

General notes are located within the **G-Series**, General Drawings sheet types.

General notes apply to the entire work and it is not necessary nor desirable to repeat them on subsequent sheets or at other locations within the drawing set. Likewise, general notes do not repeat specification content on the drawings nor are they repeated within the specifications. Carefully coordinate general notes with the contents of the project manual and Division 01 specification sections in particular. As with the Division 01 sections, the content and requirements expressed by the general notes should be prepared by the lead designer, then communicated and coordinated with other participating design disciplines to avoid repetitive or

contradictory language within the notes and specifications. Refer to *Figure 07.1* for a typical layout of the notes block.

Example: ABBREVIATIONS: REFERENCED FROM THE CONSTRUCTION SPECIFICATIONS INSTITUTE'S UNIFORM DRAWING SYSTEM TERMS AND ABBREVIATIONS MODULE

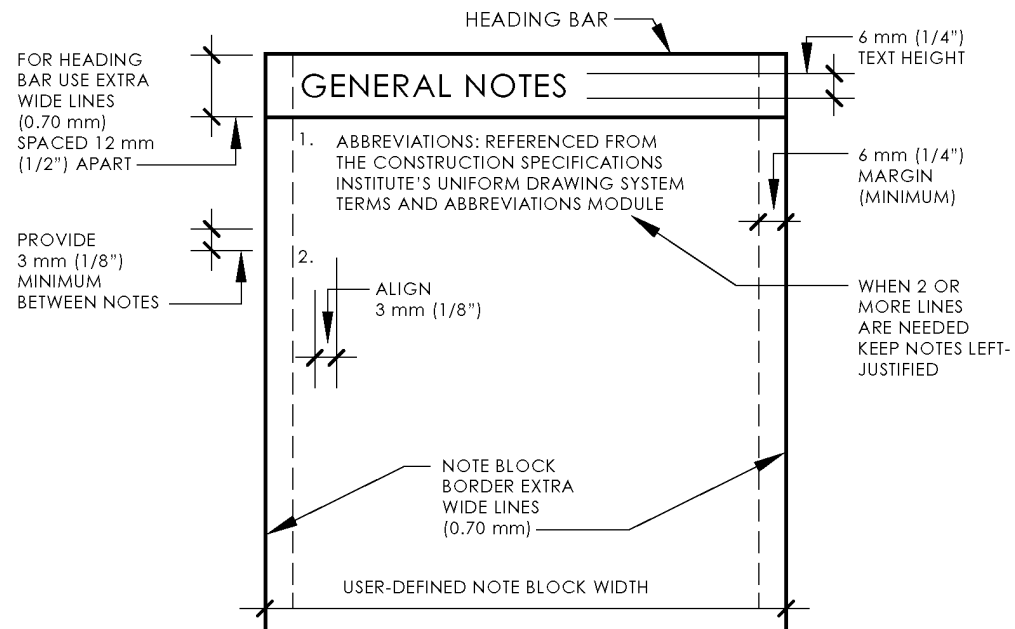


Figure 07.1 General notes.

General [Discipline] Notes

General [Discipline] Notes: *Notes that apply only to a particular design discipline. Users should provide a heading for these notes by replacing the [discipline] place holder with the name of the particular design discipline as in the following examples:*

General Architectural Notes
General Structural Notes
General Mechanical Notes
General Interior Design Notes

General [discipline] notes appear on the first or **0**-Series sheets within a particular design discipline and apply to all subsequent sheets within that discipline. For example, general civil notes appear on sheet C-001 and apply to all civil sheets within the drawing set.

Because general [discipline] notes apply to drawings of the discipline, they should not be repeated on other sheets within the discipline. These notes typically provide instruction concerning discipline-specific drafting conventions or other use of that discipline's drawings. General [discipline] notes do not replicate general notes. Coordination is necessary to ensure general [discipline] notes are coordinated with the project information, project requirements, and drafting conventions established within the general notes and may be presented in more detail elsewhere within the drawings or specifications. Refer to *Figures 07.1* and *07.2*.

Example: TOP OF STEEL ELEVATIONS INDICATED ARE BASED ON A FINISH FLOOR ELEVATION OF 30M (100'-0")—SEE SHEET C-101 FOR ACTUAL DATUM AND BENCHMARK INFORMATION

General Sheet Notes

General Sheet Notes: Notes that apply only to the particular sheet on which they appear.

General sheet notes are used to communicate sheet-specific information or instructions. General sheet notes are tabulated sequentially within the note block. General sheet notes follow the other types of general notes (general notes or general [discipline] notes) and precede any reference keynotes that may appear in the note block. Refer to *Figures 07.2* and *07.3*. General sheet notes should be written in the imperative mood and in a streamlined format similar to the preferred specification language presented in *The Project Resource Manual—CSI Manual of Practice* (PRM).

Example: DIMENSIONS (ON THIS SHEET ONLY) DRAWN TO PARTITION WALLS ARE TO FACE OF STUD UNLESS NOTED OTHERWISE

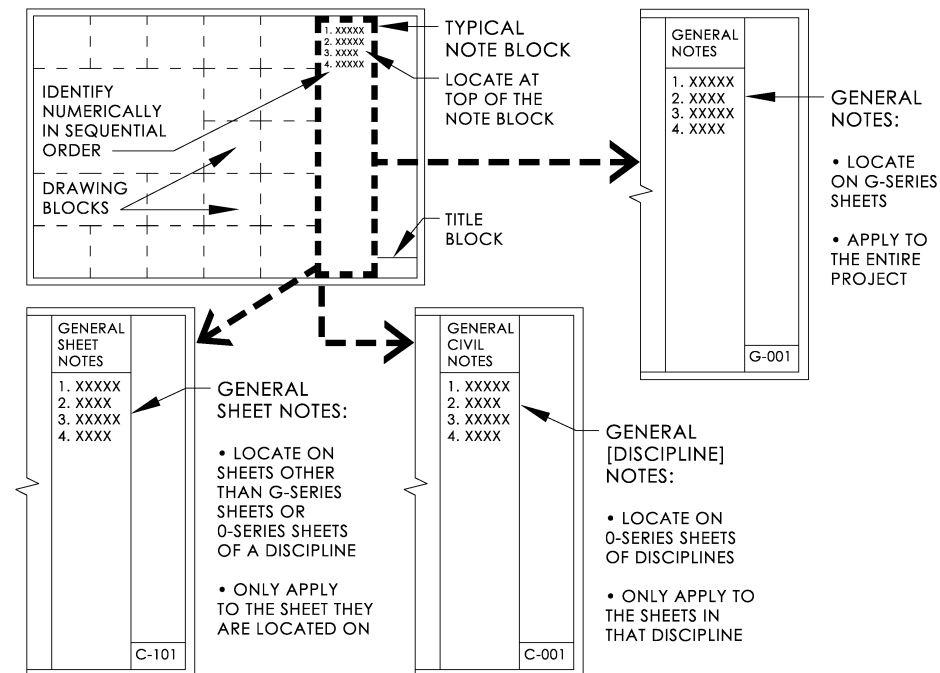


Figure 07.2 Three types of general notes—general notes, general sheet notes, and general [discipline] notes.

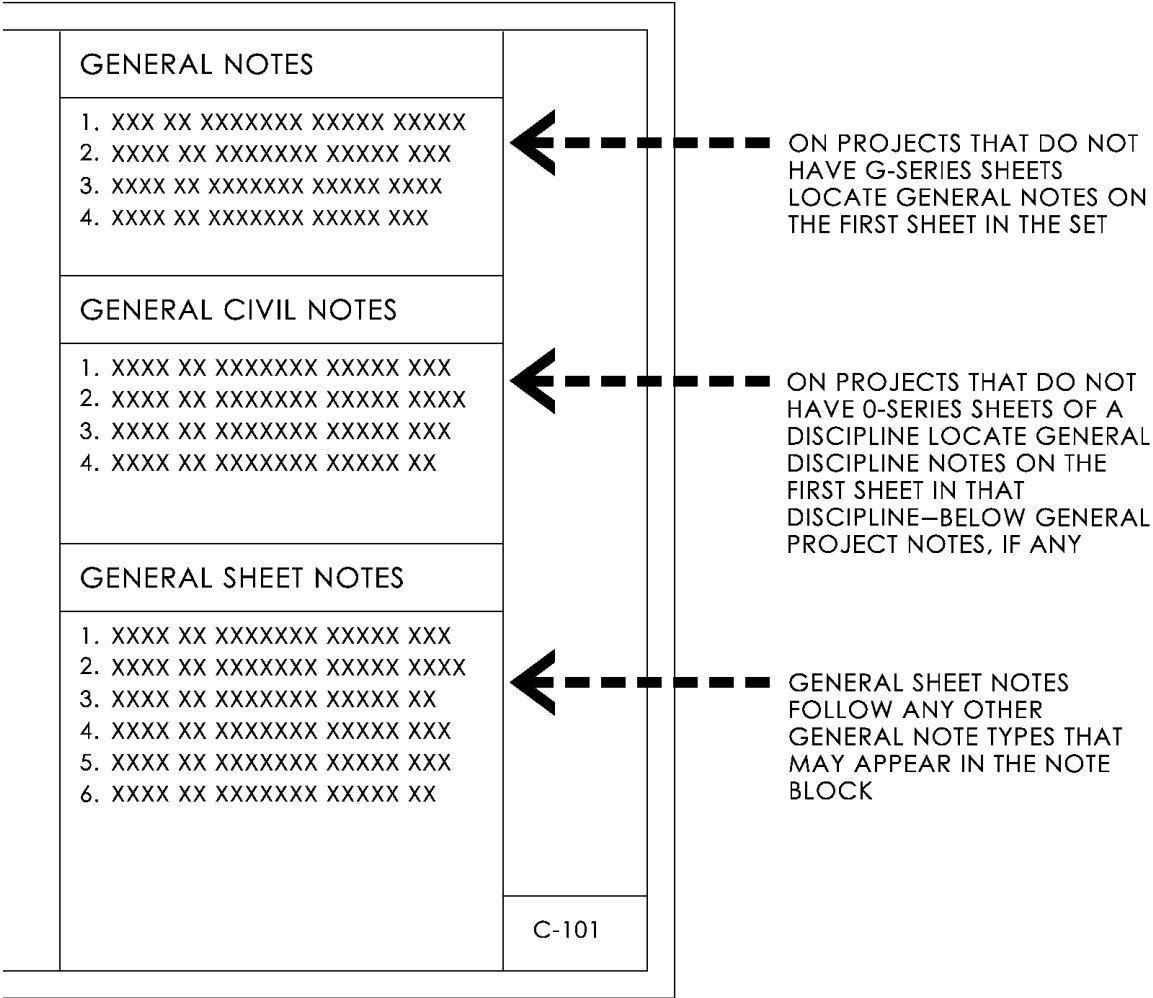


Figure 07.3 Hierarchy of general note types when sheet C-101 is the first sheet in the set. Notes should not include vague references such as “See Specifications.” Notes should be specific as discussed under Reference Keynotes.

Reference Keynotes: *Identify graphic representations of items and directly reference them to specific sections in the specifications.*

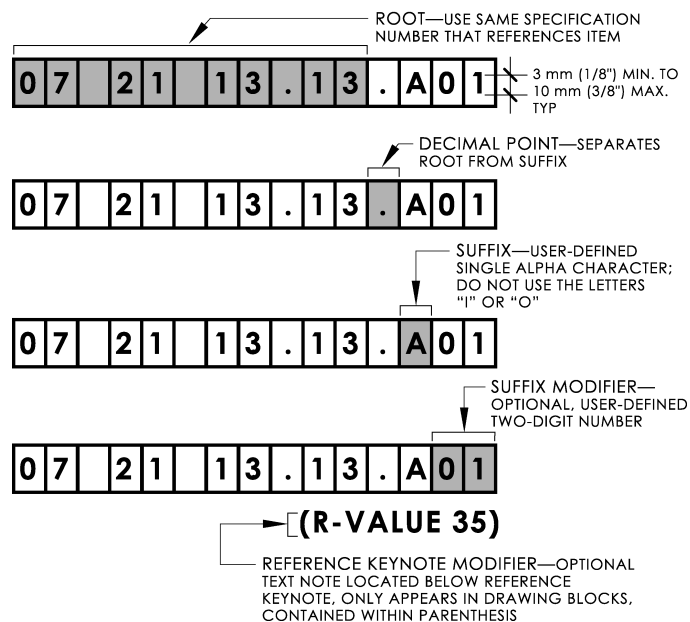


Figure 07.4 Components of reference keynotes.

Reference Keynotes

Reference keynotes may be used to identify graphic representations of items and directly reference them to specific sections in the specifications. Reference keynotes can identify General or Execution requirements from a specification section and can convey Division 01 requirements.

Example: 01 56 00.A01—TEMPORARY DUST BARRIER TYPE 1

Reference keynote symbols are located within the graphic and notation area of the drawing block. They consist of an identifier and are connected to the graphic by a leader. Each symbol that appears on the sheet is listed in the sheet's note block along with a brief, generic text note that describes the graphic. For clarity and more exacting identification, a given reference keynote is unique to the object or material it identifies. If an object or material is shown repetitively on the drawing sheet or elsewhere within the set of drawings, the same unique keynote should be used as a consistent identifier. Refer to *Figure 04.24* of the *Drafting Conventions Module* for a typical drawing block format.

Reference keynote symbols consist of the following components, as shown in *Figure 07.4*:

- **Root:** The specification section number corresponding to the section number location where the object or material is specified.
- **Decimal Point:** A place holder separating the root from the modifying suffix.
- **Suffix:** A capital letter following the decimal point, which allows multiple keynotes to reference the same specification section. The letters **I** and **O** should not be used as they may be visually confused with the numbers **1** and **0**. Reference keynotes always have a suffix.
- **Suffix Modifiers:** Optional numeric characters following the suffix allow creation of numerous unique reference keynotes that would otherwise be limited to the available letters of the alphabet. They can be customized as needed to further differentiate among related or similar items with different attributes (size, color, thickness, etc.). Suffix modifiers, when used, should always include two numerical characters, e.g., 07 70 00.A01.

- **Reference Keynote Modifiers:** Optional, user-defined descriptive text. These notes, when used, appear underneath the reference keynote symbol only in the drawing block. These modifiers serve to reduce the amount of unique keynotes required to identify variations in the size, number, spacing, or other feature of an object or material where that object or material might be shown elsewhere on the drawing in different configurations.

Reference keynotes are tabulated sequentially within the note block along with a brief generic text description to identify the item within the specifications. Reference keynotes follow any general notes (general notes, general [discipline] notes, or general sheet notes) that may appear in the note block. Reference keynotes that appear in the note block are formatted to include

- The full reference keynote symbol including the root, decimal point, suffix, and any suffix modifiers.
- The brief generic text describing the object or material with the same terminology used within the specifications. To ensure clarity and proper coordination among documents, avoid abbreviations, non-preferred terms, and terms that deviate from the specifications. Do not include any reference keynote modifiers that appear only in the drawing blocks.
- The note block may be formatted with optional headings identifying specification divisions and/or subheadings identifying specification section titles. These headings and subheadings provide drawing users with easier visual navigation of the reference keynotes and serve as an organizing aid for preparing the note block. It is essential that the reference keynote identifiers in the note block be carefully checked to ensure they are the same as those drawn within the graphic and notation areas of the drawing block. The text information following the symbol should be concise, consistent with the terminology contained in the specifications, and accurately identify the item. Likewise, the terminology used in the notes should reflect that of the specifications for ease of coordination and consistent communication of information. Refer to *Figures 07.5a*, *07.5b*, and *07.6*. It is an option to repeat the brief generic text description that appears in the note block, along with the reference keynote symbol, at every occurrence of the keynote within the drawing. Refer to *Figures 07.5a* and *07.5b*.

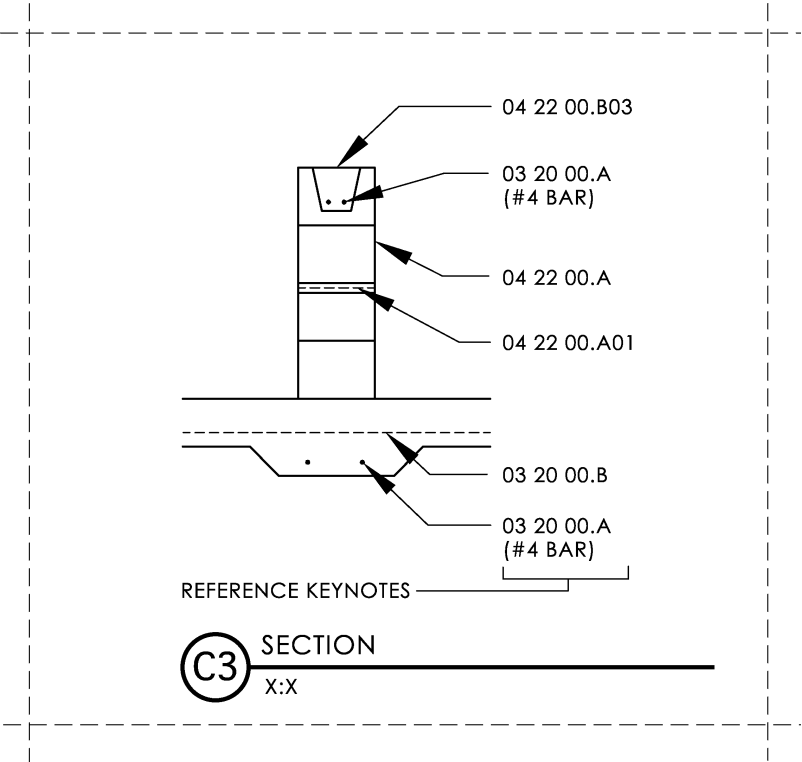


Figure 07.5a Reference keynotes in a drawing block.

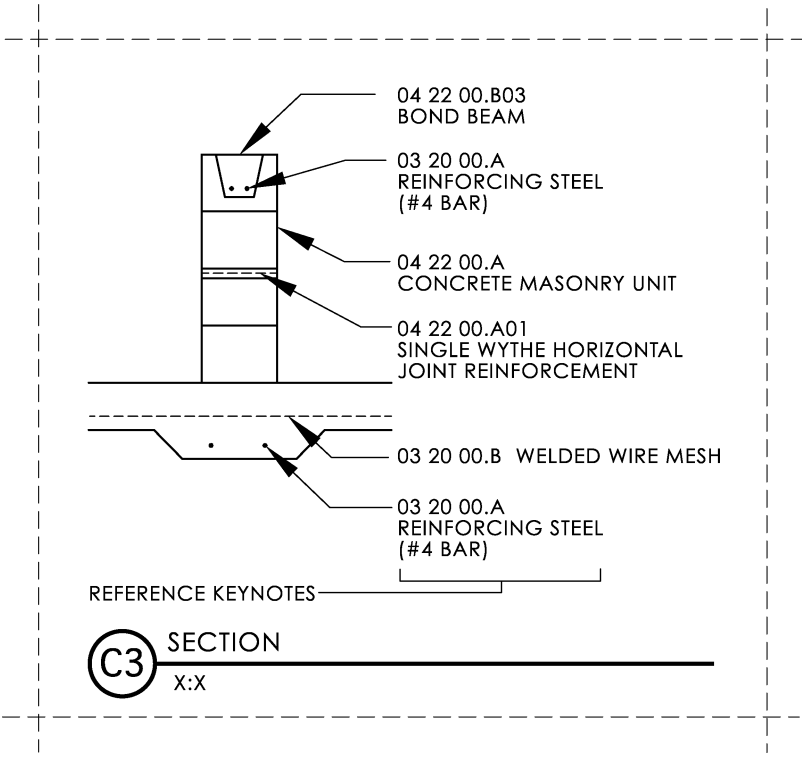


Figure 07.5b Reference keynotes in a drawing block with optional text descriptions.

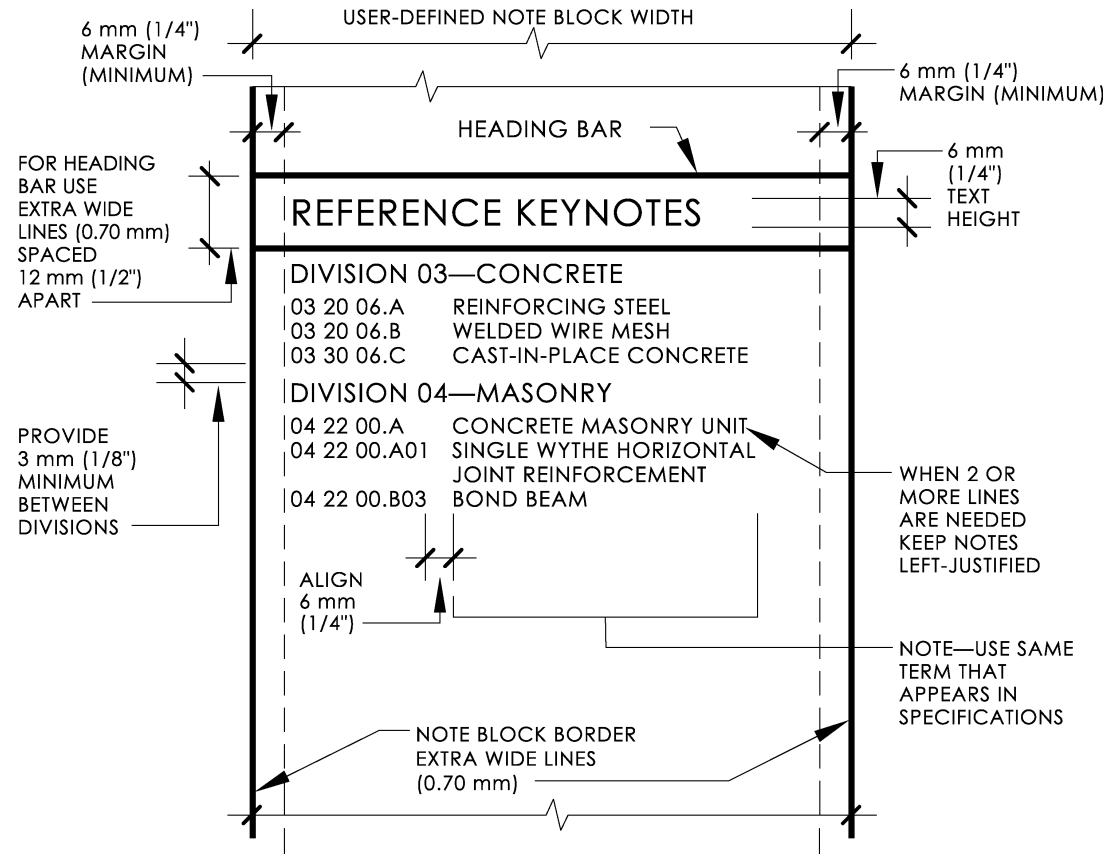


Figure 07.6 Typical reference keynotes in a note block.

Sheet Keynotes

Sheet Keynotes: *Identify, inform, and instruct without reference to the specifications.*

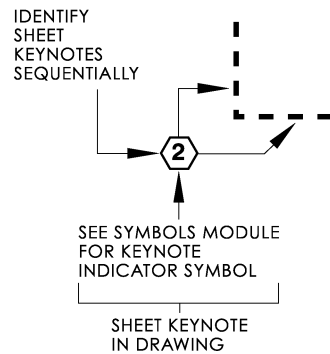


Figure 07.7 Keynote indicator.

Sheet keynotes are noted within the graphic and notation areas of the drawing block. They are drawn with a hexagonal symbol containing a numeral with leader(s) from the hexagon to the identified item. The bottom of the hexagonal symbol should always be drawn parallel to the bottom of the drawing sheet. The numeral for each symbol that appears on the sheet is listed in the sheet's note block along with a text note that describes the graphic. Numerals should be assigned sequentially for each identified item. Refer to Figures 07.7 and 07.8.

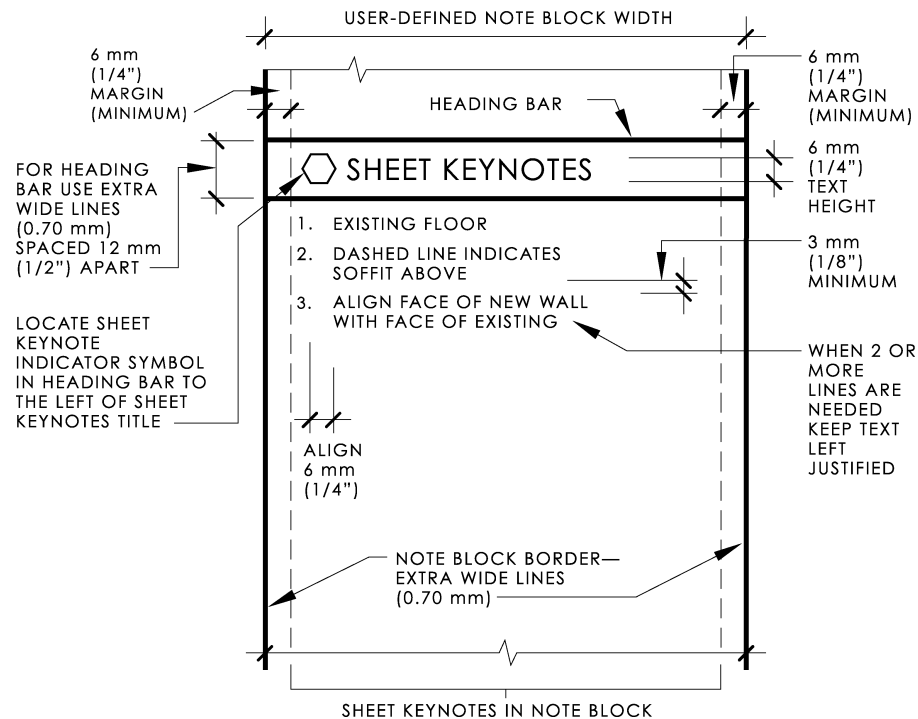


Figure 07.8 Sheet keynotes.

Sheet keynotes follow the listing of any reference keynotes within the note block. Each numeric identifier is listed in sequential order in the note block with the full text of the note. Sheet keynotes should not be used to identify items referenced in the specifications.

Note Block Hierarchy

Note Block: *Module or modules where general notes, keynotes, and key plans are located. Refer to the Sheet Organization Module.*

The placement of notes within the **note block** is shown in *Figure 07.9*. If a certain note type is not required, do not indicate a heading for that note type. Shift the note types upward that would normally be located beneath the (unused) notes. When laying out note blocks, users should consider the space required at the bottom of the note block, which is reserved for any applicable key plans. (See the *Drafting Conventions Module* and *Sheet Organization Module* for recommended key plan location.) Generally, the note block would be formatted as a single column of notes.

On a small project, the general notes would appear on the first drawing sheet within the set followed by general [discipline] notes, and general sheet notes. As hierarchical information, the general notes always appear as the first notes within their note blocks. Refer to *Figure 07.9*.

If more notes are required than will fit in a sheet's single-column note block, the note block should expand to the left and be formatted to allow multiple columns of notes. Refer to *Figure 07.10*.

On the applicable **0-Series** sheets as defined in the *Drawing Set Organization Module* where they appear, the general [discipline] notes are the first notes within the sheet's note block(s). An exception to this rule is on drawing sheets for small projects on which general [discipline] notes follow any general notes and precede any general sheet notes.

General sheet notes appear at the top of a sheet’s note block(s) except for **G**-Series (e.g., G-001) and **O**-Series (e.g., C-001) sheets where they follow any general notes or general [discipline] notes that may be on those sheets. Refer to *Figure 07.2*. General sheet notes are numbered sequentially as they are developed.

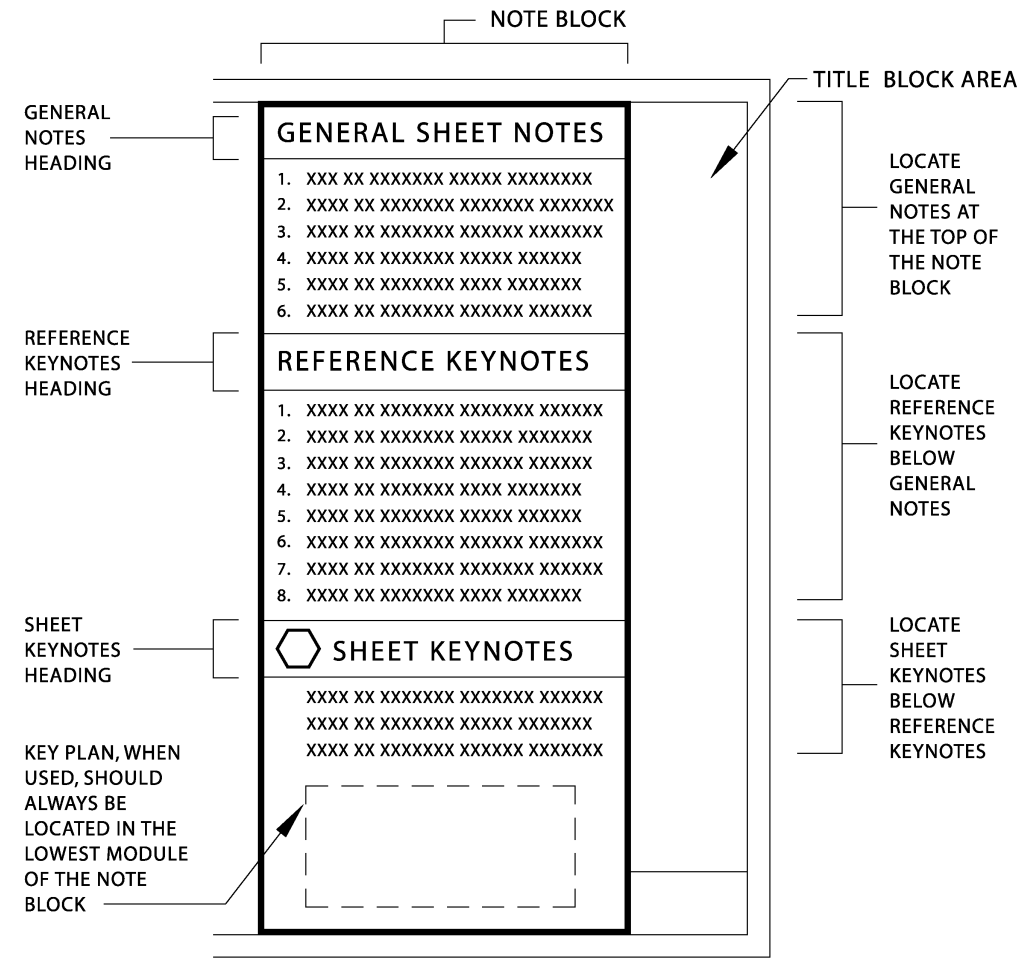


Figure 07.9 Note block hierarchy—order of notes that appear in the note block.

If general sheet notes are not required for a sheet, locate reference keynotes at the top of the note block. Shift sheet keynotes upward, below reference keynotes. Refer to *Figures 07.10* and *07.11*.

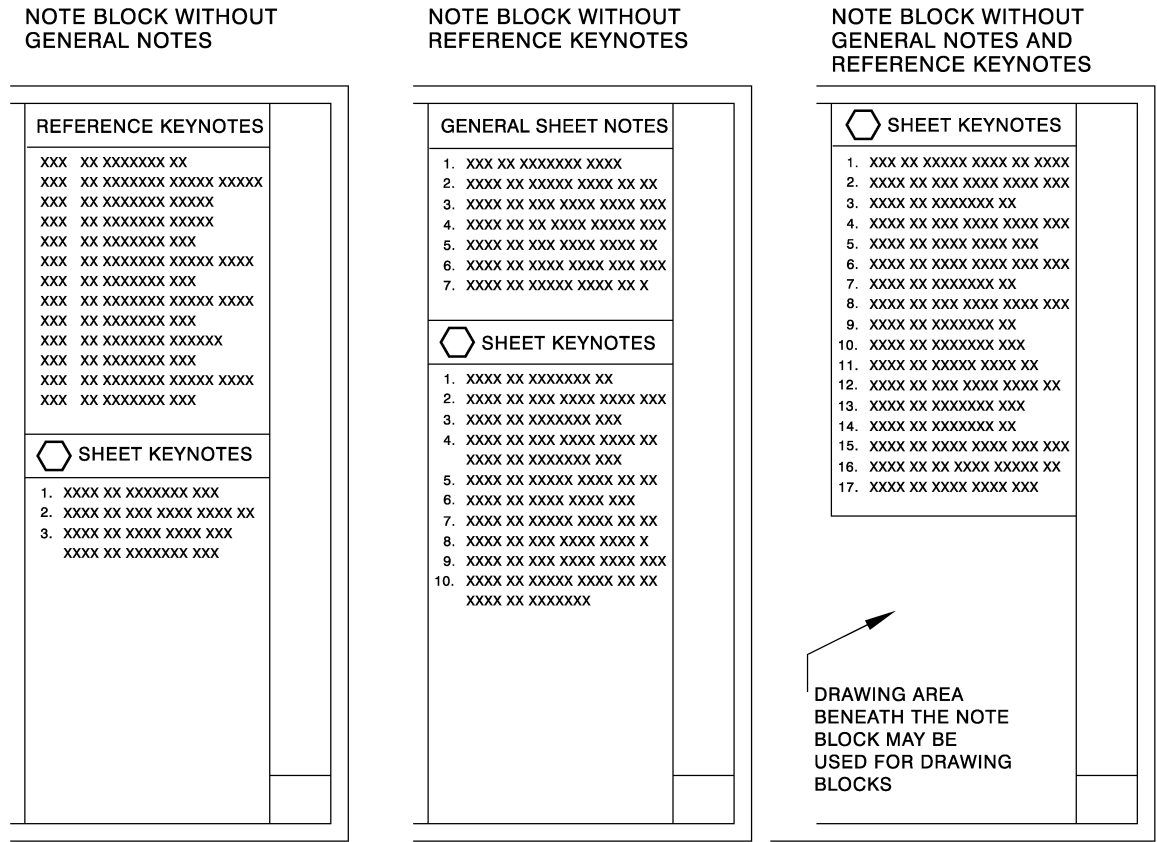


Figure 07.10 Hierarchy of notes in note block.

	GENERAL SHEET NOTES	REFERENCE KEYNOTES	
	1. xxx xx xxxxxxxx 2. xxxx xx xxxxxxxx 3. xxxx xx xxxxxxxx 4. xxxx xx xxxxxxxx 5. xxxx xx xxxxxxxx xxxx xx xxxxxxxx xxxx xx xxxxxxxx xxxx xx xxxxxxxx 6. xxxx xx xxxxxxxx 7. xxxx xx xxxxxxxx	xxx xx xxxxxxxxxx xxx xx xxxxxxxx xx xxx xxx xx xxxxxxxx x xxx xx xxxxxxxx xx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxx xxx xx xxxxxx xx xxxxx xxx xx xxxxxxxx x xxx xx xxxxxxxx xx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxx xx xxxxx xxx xx xxxxxxxx x	
	REFERENCE KEYNOTES	xxx xx xxxxxxxxxx xxx xx xxxxxx xx xxx xxx xx xxxxxxxx x xxx xx xxxxxxxx xx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx xxx xx xxxxxxxx xx xxxxx xxx xx xxxxxxxx x	
	xxx xx xxxxxxxx xxx xxx xx xxxxxxxx xx xxxxx xxx xx xxxxxxxx xxx xxxxx xxx xx xxxxxxxx xx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx	SHEET KEYNOTES	
		xxx xx xxxxxxxx x xxx xx xxxxxx xx xxxxx xxx xx xxxxxxxx xxx xx xxxxxxxx xx xxx xx xxxxxxxxxx xxx xx xxxxxxxxxx	

Figure 07.11 Additional note blocks—an example using full and partial note columns.

Users' Guide

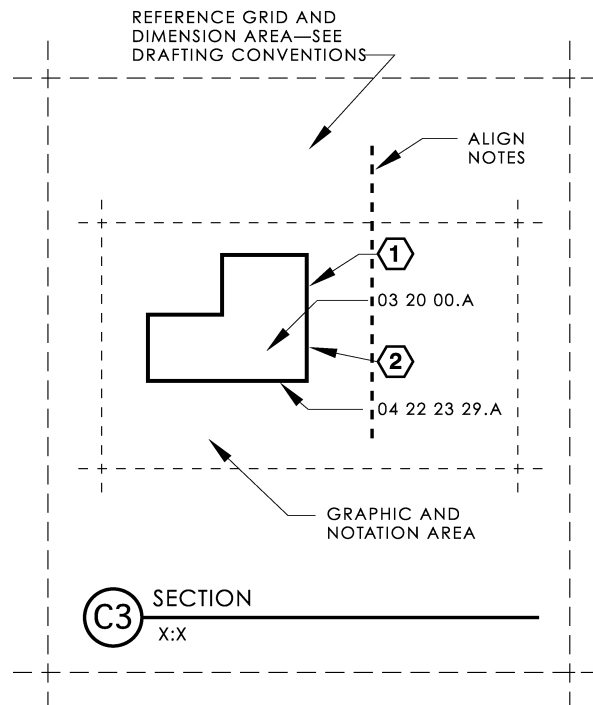


Figure 07.12 Typical UDS drawing block format.

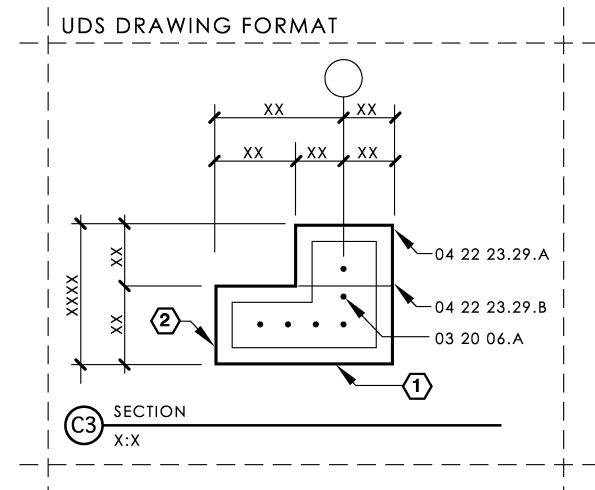
The development and production of drawings requires discipline, organization, and the management of those elements that make up the drawings. Just as an office must “manage” a bank of reference details or a CAD layering scheme, attention must be paid to managing the notes that become part of the drawings.

Similarly, a firm should collect and save examples of good detailing into a library for later customization and reuse on future projects. They should do the same with reference notes—collect and develop them into an “office master.” While most collected reference notes must be customized for a specific project, they provide a point of departure for developing project specific notes. A good set of standard notes can incorporate proper language and note structure while communicating the firm’s “best practice” in terms of project procedures, requirements for the work, and coordination with the other construction documents.

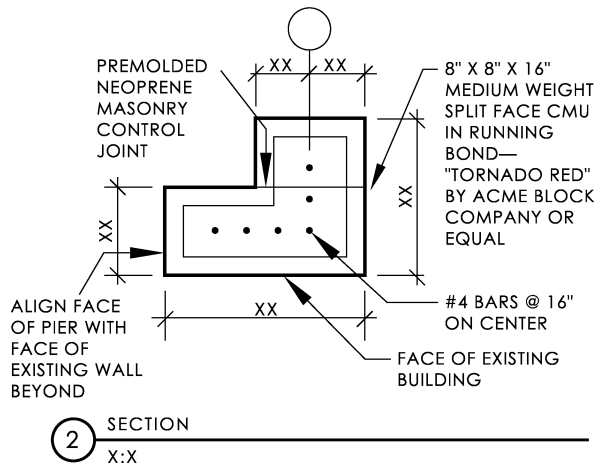
The drawings, and their notes, must be complete and accurate. They must also effectively communicate the project to the drawing user in the simplest, most efficient manner possible. The placement of notes within the drawing block should comply with the drawing block format requirements as described in the *Drafting Conventions Module*. Refer to *Figure 07.12*.

Following are some guidelines for proper development of more efficient notes:

- Generic terminology should be based on a well-known, commonly available source(s) such as CSI’s *Uniform Drawing System Terms and Abbreviations Module*.
- Drawing notes should match the terminology in the specifications. Names of materials and products appearing on the drawings should be identical to the generic names used to identify those products found within the specifications. It is not good practice to repeat proprietary names, model numbers, or other detailed information within drawing notes because these may change during the process of design, bidding, construction, and facilities management. Identify objects and materials on the drawings with generic terminology and a description adequate to distinguish among similar products.



TRADITIONAL DRAWING FORMAT

**Figure 07.13** Benefits of UDS in drawing blocks.

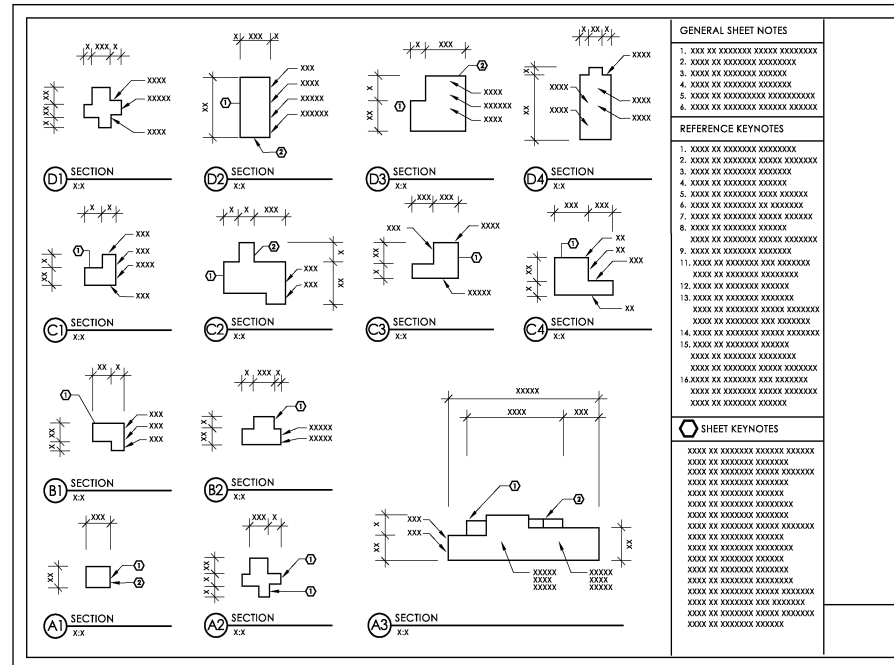
- Text reduction is one of the more obvious benefits of good notes practice. Refer to *Figures 07.13* and *07.14* for illustration of benefits. Developments in drafting technology and CAD systems have made the preparation of notes less burdensome but have also made it easier to draft longer notes—sometimes without regard for efficient communication. Clearly, reference keynotes or sheet keynotes reduce drawing text by eliminating repetitious text and replacing it with a simple symbol and legend. *The Project Resource Manual—CSI Manual of Practice* offers “streamlining” and the “imperative mood” as additional means to reduce and clarify specification language. These same principles apply to drawing notes, as illustrated below:

Indicative mood note language to be avoided: CONTRACTOR SHALL NOT SCALE DRAWINGS

Preferred streamlined note language: DRAWINGS: DO NOT SCALE

- Fonts should be capitalized, proportional, sans-serif, and non-stylized. Do not use italics, underlining, bold, or other highlighting techniques. Refer to the *Drafting Conventions Module*. Refer also to *Figure 07.15*.
- Write notes using complete terminology and avoid the use of abbreviations. Where an abbreviation is essential, the user should coordinate the use of abbreviations throughout the drawings and specifications to ensure consistency and proper use. Refer to the *Terms and Abbreviations Module* for preferred terms and abbreviations of commonly used terms.
- Avoid broad references to the specifications such as PER SPECS or REFER TO SPECIFICATIONS. References to the specifications should provide the reader with a more exact reference location within the project manual: SEE SPECIFICATION SECTION 09 25 13.13.

UDS SHEET FORMAT



TRADITIONAL SHEET FORMAT

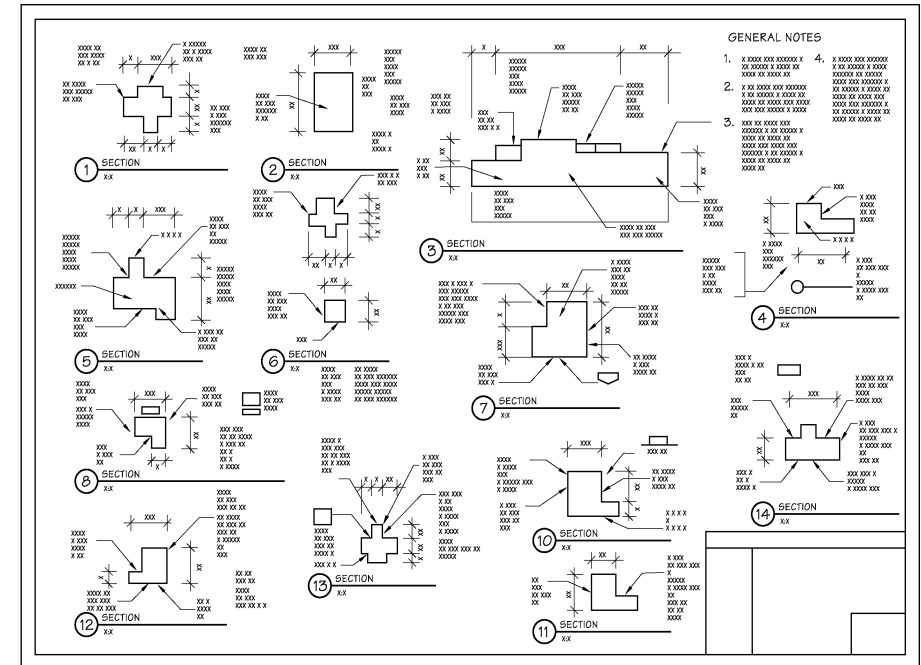


Figure 07.14 Benefits of UDS in sheets.

Linking

UniFormat: *An arrangement of construction information based on physical parts of a facility called systems and assemblies. Refer to CSI's UniFormat—A Uniform Classification of Construction Systems and Assemblies.*

TEXT FORMAT FOR NOTES

FORMAT TEXT FOR NOTES TO BE:

- 2.4mm (3/32") HIGH CAPITAL LETTERS
- SANS SERIF, PROPORTIONAL, NON-STYLIZED FONT
- DO NOT USE ITALICS, UNDERLINING OR BOLD FONTS

ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789

Figure 07.15 *Text format for notes.*

One advantage of using reference keynotes is the opportunity to link project information such as drawings and specifications. Other linkages can be created as reference keynotes from unique descriptors applicable to drawings, specifications, cost estimates, construction schedules, product data, detail libraries, facilities management, and other design and construction documentation. Using embedded information attributes, CAD drawings can store information about each of the products that make up the illustrated assembly along with associated costs, execution requirements, manufacturers, and almost any other information pertinent to the constituent products. The reference keynote provides the common identifier for related specifications, spreadsheets, databases, and word processing files.

Reference keynotes are a useful organizing tool throughout the design and construction process. One example of reference keynotes' usefulness in the early design phases can be found in the development and use of reference detailing. A list of reference details can be developed into a library and identified using **UniFormat™**. Likewise, database tables can be developed that establish the detail's *UniFormat* designation and the listing of its component reference keynotes. As the project's designers consider preliminary selections of systems and assemblies, the reference details they select can establish preliminary product lists, specifications, and cost data through the information joined through the database linkages.

Reference Keynote Office Master:

A comprehensive standard listing of reference keynotes established by the user.

Process

To be effective, reference keynotes should be established and shared among all participating disciplines in uniform ways. This requires a standardized method for managing, producing, and using reference keynotes.

While reference keynotes should be selected and, perhaps, customized for a specific project, it is important that the user establish a standard library of keynotes to maintain consistency among projects and to maximize production efficiency as the drawings are produced. The **reference keynote office master** is a comprehensive standard listing of reference keynotes established by the user. It provides:

- a complete listing of reference keynotes coordinated with items specified by the user and the user's master specification system
- a flexible system of documentation for incorporating new reference keynotes as new or different products are specified by the user (each project should provide opportunities to expand the system as project information is refined and drawn into the user's experience)
- a method for assigning reference keynote suffixes for products listed within each specification system
- a system that is understood, available, shared, and used by all members of the project team (as the reference keynote is the common link among many project activities and documents, it should become the common language of project team members)

A number of resources should be invested into the development of the reference keynote office master. Uniform methods by which the office master becomes an edited, accurate part of a project's construction contract documents should be established. The benefits of a reference keynoting system can include

- increased clarity of project information resulting from greater exchange and coordination of project information by project team members

- more concise project documents as repetitive text is reduced to a set of commonly understood symbols
- more consistent terminology within and among the drawings, specifications, cost estimates, and other project documents
- greater ease of placing and relocating information as lengthy blocks of text are reduced to keynote symbols, resulting in a less crowded drawing (refer to *Figures 07.13* and *07.14*)
- facilitation of reference details using reference keynotes provides simpler drawings that are less resource intensive to maintain, update, and, in the case of CAD documents, store
- more comprehensive quality control opportunities as the reference keynote project list can be used as a checklist to verify:
 - specification sections with the reference keynotes root as noted in the project manual
 - terms in specifications and drawings match
 - specification sections contain referenced products and materials
 - items specified as indicated on the drawings

Code Conventions

U.S. National CAD Standard Version 3.1

**The Construction Specifications Institute
99 Canal Center Plaza
Alexandria, VA 22314-1588**

(800) 689-2900

www.csinet.org

www.nationalcadstandard.org

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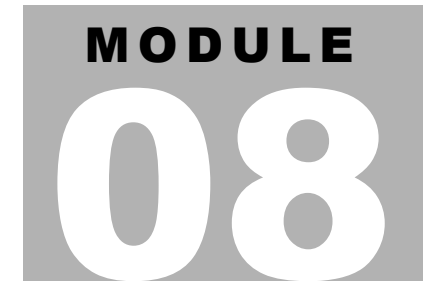
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Introduction

The *Code Conventions Module* establishes guidelines for consistency in identifying necessary regulatory information to be shown in the construction documents. This is needed to facilitate both the design process and the permit application process.

The *Code Conventions Module* will:

- identify the information necessary for code research during design.
- identify the type of general regulatory information that should appear in the construction documents.
- identify the location of the general regulatory information in the drawing set and on specific individual sheets.
- provide standard graphic conventions for incorporation in the drawing portion of the construction documents.
- facilitate and expedite the building permit (plan review) application process.

The *Code Conventions Module* will provide the framework necessary to understand the complexities of the project cycle relative to regulatory requirements. The identification of regulatory issues is integrally tied to all phases of the project cycle, including Planning, Design, Bidding, Construction, and Post Construction (Occupancy and Use of the completed project). The

planning and design phases are especially important as this is when critical regulatory information must be identified and located in the construction documents. Inclusion of this information facilitates the permit application process, as well as identification of the necessary information to be submitted for a plan review.

It is important to note that code issues are only a part of the regulatory issues for which the design professional must maintain compliance. Accordingly, this module includes aspects of regulatory compliance such as zoning, environmental (e.g., EPA), and federal (e.g., ADA), in addition to code compliance. The relevant information is presented as follows:

- Identification of regulatory information in the construction documents.
 - Type of information to be included in the construction documents
 - Location and format of information in the construction documents
- The plan review process.
- Overview of regulatory information.
- The design process.

Identification of Regulatory Information

Building codes include anywhere from 3,300 to 5,000 sections of code requirements. It is very difficult to identify and evaluate compliance with each and every section in the drawing set. This portion of the module identifies some of the key criteria to be included in the construction documents to facilitate the design process, which will expedite the plan review. The efficiency of a plan review, like any other repeated process, may be improved if a consistent system or technique is established. To this end, the design professional must provide the necessary information in the construction documents and present the information so it is readily identifiable. A standardized presentation will expedite the plan review process and, ultimately, the issuance of the building permit.

Local jurisdictions often establish their own policy regarding regulatory items that must be shown in the construction documents. Unique local jurisdictional amendments may also emphasize the importance of certain code criteria over other criteria. However, this section of the module will provide a generic framework regarding:

- what regulatory issues will be provided.
- where this information should be located.
- how it should be presented.

The codes cover myriad requirements. It is often necessary to group these requirements by category to determine the best location for the information as well as how to present it. Included in these categories are specific relationships among regulatory issues. It is important to note these relationships as they may impact the placement of information on the drawings. Additionally, the size and complexity of the project may dictate the placement of the regulatory information. For example, a small stand-alone grocery store will probably not have a dedicated drawing regarding code requirements (such as GI-102 Code Summary), while one may be included in a multistory office building. Therefore, it is necessary to determine which drawing(s) should include this information.

Type of Information

The organization of information related to the determination of regulatory compliance within construction documents is grouped in 12 categories, as follows:

Category Group	Brief Description
1–General	Items related to the overall project, including: owner and project identification; site location and jurisdiction; design professional identification; contractor identification; synopsis of applicable construction regulations; and effective dates.
2–Site	Items related to the project site, including: distances to lot lines; site grading; flood control; environmental impact statements; deed restrictions; and zoning information. Zoning includes: zoning use classification; site coverage data; floor area ratio (FAR) data; parking data; signage data; fire districts; and historical preservation.
3–Building	Items related to the overall building design, including: identification of use groups (occupancy); type of construction; and building height and area. An overview of site-specific structural considerations relative to seismic and wind design are often included.
4–Life Safety-Egress	Items related to means of egress, including: occupant loads; identification of exit access from rooms and spaces; exit travel distance; number and capacity of exits for each floor; stair and door details; and egress and exit lighting.
5–Fire Protection-Passive	Items related to built-in-place (passive) fire protection, including: fire-resistance ratings of various components and assemblies; identification of mixed uses; opening protectives (e.g., fire doors); penetrations; and interior finish.

6–Accessibility	Items related to making sites, facilities, buildings, and elements accessible to and usable by persons with physical disabilities, including: interior and exterior accessible route requirements; detectable warnings and signage; elevator details; clear floor space; and plumbing fixtures.
7–Energy	Items related to overall energy conservation, including: envelope thermal performance; glazing areas and fenestration R-values; mechanical and electrical equipment loads and efficiencies; service water heating details; and air infiltration.
8–Structural	Items related to structural design criteria, including: applicable design loads; structural system description; soil data; material design standards; and special inspections.
9–Fire Protection-Active	Items related to type(s) of fire protection systems (active), including: fire suppression systems; standpipes; fire alarm and detection; smoke control; fire extinguishers; and high-hazard abatement.
10–Plumbing	Items related to plumbing requirements, including: number of plumbing fixtures; water distribution; plumbing riser diagram; water usage data; protection of potable water; cleanout locations; storm water drainage; and piping materials and connections.
11–Mechanical	Items related to mechanical requirements, including: ventilation requirements; combustion air; duct construction and layout; fire damper locations; exhaust and intake locations; and listing and labeling of equipment.
12–Electrical	Items related to electrical requirements, including: equipment listing and installation; wiring methods; single-line diagrams; service load calculations; lighting protection; minimum light levels; and standby/emergency power.

The information on the drawings requires coordination with the requirements indicated within the other construction documents to avoid duplication or contradiction. This information provides either an overview to supplement detailed project information contained elsewhere in the construction documents (e.g., summary of applicable structural design loads), or a means of summarizing information spread throughout the construction documents.

Location and Format of Information

Identification of the necessary information coupled with its presentation on the drawings is key to facilitating the life cycle of the project. This includes both the initial cycle of design, construction, and occupancy as well as subsequent cycles where the project is altered through changes and additions. This information is also key to expediting the plan review phase of the permit application process. It may not be practical to include all of the information related to these 12 categories in one location. Often this information is provided in separate locations related to its discipline because information from the different disciplines is often evaluated by different reviewers. The location of the relevant regulatory information is a function of the complexity of the project. As stated in the *Drawing Set Organization Module*, two levels of sheet identification are used to recognize the wide variance in project complexity. Level 1 offers the simplest identification format and is suitable for all but the most complex projects. Level 2 provides guidance for complex or special types of projects.

In more complex projects or special types of projects where regulatory information must be summarized for a particular discipline, this information would be placed on the **O** sheet type within the discipline. Such summary information might involve the identification of rated assembly penetrations that could appear on the **M-O** sheets. The inclusion of discipline-specific code summary sheets may also be desirable, or even required, when the drawing set will be subdivided by a regulatory agency for review by different discipline specialists.

The information located on the code summary sheets should include only general conceptual information. Specific graphic information should be located elsewhere in the drawing set on the proper sheet type. For example, the code summary would indicate the building fire-rated partitions and their hourly ratings. However, the specifics of the wall location and construction would be located on the floor plan sheets and on either the Type 4 (large-scale sections) or Type 5 (detail) sheets. See *Appendix K* for illustrative examples of graphic information concerning building-specific hourly ratings, to be located elsewhere in the drawing set.

Outline of Regulatory Information Based on Category Group

The following tables include general guidelines for information necessary for use on each sheet. These guidelines are not intended to be comprehensive, but may be used as a basis for establishing a checklist for coordination and completeness of the sheets.

The following outline identifies by category group

- regulatory information to include on the drawings
- location (coordinated with the *Drawing Set Organization Module*)
- presentation format (text and/or graphic)

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
1-General	Project identification <i>Project name and owner identification</i>			
	Project address <i>Street address, city, and state</i>	PM/G-001	PM/GI-001	Text
	Project location map	G-0xx	GI-0xx	Graphic
	Professional design firm(s) identification	G-001	GI-001	Text
	Contractor name(s)	G-001	GI-001	Text
	Design professional name(s)	G-001	GI-001	Text
	Design professional address(es)	G-001	GI-001	Text
	Design professional phone/fax number(s)	G-001	GI-001	Text
	Design professional e-mail/website	G-001	GI-001	Text
	Design professional license number and seal	G-001	GI-001	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
	See Appendix A – Summary of Governing Regulations	G-0xx	GI-0xx	Text
	Listing of applicable codes (titles and edition)	G-0xx	GI-0xx	Text
	Accessibility	G-0xx	GI-0xx	Text
	Building	G-0xx	GI-0xx	Text
	Electrical	G-0xx	GI-0xx	Text
	Energy conservation	G-0xx	GI-0xx	Text
	Fire	G-0xx	GI-0xx	Text
	Fuel/gas	G-0xx	GI-0xx	Text
	Mechanical	G-0xx	GI-0xx	Text
	Plumbing	G-0xx	GI-0xx	Text
	Private sewage disposal	G-0xx	GI-0xx	Text
	Property maintenance	G-0xx	GI-0xx	Text
	Residential	G-0xx	GI-0xx	Text
	Zoning	G-0xx	GI-0xx	Text
	Other	G-0xx	GI-0xx	Text
	Listing of applicable local ordinances and jurisdictions	G-0xx	GI-0xx	Text
	Local amendments	G-0xx	GI-0xx	Text
	Zoning	G-0xx	GI-0xx	Text
	Signage	G-0xx	GI-0xx	Text
	Other	G-0xx	GI-0xx	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
2–Site	Site-Related Design Criteria			
	Location on site (distances to lot lines/existing buildings)	C-1xx	CS-1xx	Graphic
	Site grading/water run-off	C-1xx	CG-1xx	Graphic
	Irrigation	L-1xx	LI-1xx	Graphic
	Erosion control details	C-5xx	CG-5xx	Graphic
	Environmental impact statements	PM	PM	Text
	Zoning drawings	G-0xx	GI-0xx	Text
	Zoning use (allowable/actual)	G-0xx	GI-0xx	Text
	Site coverage (allowable/actual)	G-0xx	GI-0xx	Text
	Building height (allowable/actual)	G-0xx	GI-0xx	Text
	Parking/loading requirements (required/actual)	G-0xx	GI-0xx	Text
	Signage type, area, and height (allowable/actual)	G-0xx	GI-0xx	Text
	Fire districts	G-0xx	GI-0xx	Text
	Historical preservation	G-0xx	GI-0xx	Text
		G-0xx	GI-0xx	Text
3–Building	Building Design Criteria			
	See Appendix B – General Building Summary	G-0xx	GI-0xx	Text
	Use group (occupancy) classification(s)	G-0xx	GI-0xx	Text
	Type of construction	G-0xx	GI-0xx	Text
	Building area (allowable/actual)	G-0xx	GI-0xx	Text
	Building height (allowable/actual)	G-0xx	GI-0xx	Text
	Special use and occupancy (e.g., covered mall, high rise)	G-0xx	GI-0xx	Text
	Seismic design category	G-0xx	GI-0xx	Text
	Design wind speed	G-0xx or PM	GI-0xx	Graphic or Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
4–Life Safety-Egress	Means of Egress Design Criteria			
	See Appendix C – Room-by-Room Egress	G-1xx or G-0xx	GI-0xx or GI-1xx	Graphic or Text
	See Appendix D – Floor-by-Floor Egress	G-1xx or G-0xx	GI-0xx or GI-1xx	Graphic or Text
	Occupant load(s)	A-1xx	GI-0xx or GI-1xx	Graphic or Text
	Building exits per floor (arrangement; required/actual)	G-1xx or G-0xx	GI-0xx or GI-1xx	Graphic or Text
	Exit capacity per floor	G-1xx or G-0xx	GI-0xx or GI-1xx	Graphic or Text
	Travel distance (allowable/actual)	G-1xx or G-0xx	GI-0xx or GI-1xx	Graphic or Text
	Means of egress lighting	E-1xx or PM	EL-1xx	Graphic
	Interior finish classification (allowable/actual)	A-0xx/PM	GI-0xx/PM or AF-0xx	Text
	Corridor, stair, and door details	A-5xx	AE-5xx	Graphic
5–Fire Protection-Passive	Passive Fire Protection Design Criteria <i>Provides the design framework used in conjunction with the building design criteria regarding assemblies required to be fire-resistance rated.</i>			
	See Appendix E – Fire-Resistance Ratings	G-0xx	GI-0xx	Text or Graphic
	Fire-resistance ratings of building elements, including tested design number (required/actual)	Z-5xx	Z-5xx	Graphic
	Firestopping shop drawings, including tested design number	G-1xx	GI-1xx	Graphic
	Mixed use (occupancy) separations	G-1xx	GI-1xx	Graphic
	Fire-resistive assembly location plan	PM	PM	Text
	Firestopping, including tested design number	PM	PM	Text
	Plastics	PM	PM	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
6–Accessibility	Accessibility Design Criteria <i>Provides the design framework for the site and architectural drawing disciplines. Federal, state, and local requirements may impact design considerations.</i>			
	See Appendix F – Accessibility	C-1xx	GI-1xx	Graphic
	Exterior accessible routes, including parking	C-1xx	GI-1xx	Graphic
	Location of public facilities on site	C-1xx	GI-1xx	Graphic
	Accessible entrances	A-1xx	GI-1xx	Graphic
	Interior accessible routes	A-4xx	AE-4xx	Graphic
	Clear floor space/maneuverability clearances	C-1xx	GI-1xx	Graphic
	Detectable warnings and signage (exterior)	A-1xx	AE-1xx	Graphic
	Detectable warnings and signage (interior)	A-4xx	AE-4xx	Graphic
	Toilet and bathing facilities	A-4xx	AE-4xx	Graphic
	Elevator and area of rescue assistance details	A-1xx	AE-1xx	Graphic
	Occupancy-specific accessible features (e.g., assembly, residential dwelling units)	A-1xx	AE-1xx	Graphic

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
7–Energy	Energy Design Criteria <i>Provides the design framework for the architectural and drawing disciplines as well as mechanical and electrical construction documents. Energy-related information is often located in the project manual. Often requires supporting energy envelope calculations.</i>			
	Design conditions (temperatures)	G-0xx	GR-0xx	Text
	Envelope systems analysis	G-0xx	GR-0xx	Text
	Envelope insulation levels	G-0xx	GR-0xx	Text
	Air leakage/infiltration, sealing	G-0xx	GR-0xx	Text
	Glazing type (fenestration) and areas	G-0xx	GR-0xx	Text
	Mechanical equipment sizing, loads, and efficiencies	G-0xx	GR-0xx	Text
	Electrical equipment sizing, loads, and efficiencies	G-0xx	GR-0xx	Text
	Electrical lighting power budget	G-0xx	GR-0xx	Text
	Service water heating sizing, loads, and efficiencies	G-0xx	GR-0xx	Text
	Duct and hot water piping insulation	G-0xx	GR-0xx	Text
	Energy trade-offs	G-0xx	GR-0xx	Text
	Temperature controls	G-0xx	GR-0xx	Text
	Water conservation	G-0xx	GR-0xx	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
8-Structural	Structural Criteria			
	Design dead loads (actual)	S-0xx	S-0xx	Text
	Design live loads (required)	S-0xx	S-0xx	Text
	Design snow loads (required)	S-0xx	S-0xx	Text
	Design wind loads (required)	S-0xx	S-0xx	Text
	Design seismic loads (required)	S-0xx	S-0xx	Text
	Soil data (frost depth; allowable foundation type/loads)	R-0xx	RS-0xx	Text
	Description of structural system	S-0xx	S-0xx	Text
	Structural details	S-5xx	S-5xx	Graphic
	Special inspections	PM	PM	Text
	Identification of applicable material design standards (title/edition)	PM	PM	Text
	Structural shop drawings	Z-0xx	XS-0xx	Graphic

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
9—Fire Protection-Active	Active Fire Protection Criteria <i>Provides the design framework for the fire protection drawing disciplines. Identification of the type of system(s) required versus provided is necessary. This information is often located on shop drawings. Often requires supporting design calculations.</i>			
	Fire suppression <i>Include floor plan identifying the different types of systems (e.g., wet, dry, pre-action, foam), water supply, backflow protection, spacing of fire protection devices, and remote area.</i>	P-1xx	FX-1xx	Graphic
	Fire department connections	P-1xx	FX-1xx	Graphic
	Fire extinguishers	A-1xx	FX-1xx	Graphic
	Standpipes	P-1xx	FX-1xx	Graphic
	Fire alarms, automatic and manual	E-1xx	FA-1xx	Graphic
	Single-station smoke detectors	E-1xx	FA-1xx	Graphic
	Smoke control	M-1xx	FX-1xx	Graphic
	High-hazard abatement	PM	H-1xx	Graphic or Text
	Identification of applicable design standards (title/edition)	PM	PM	Text
	Fire suppression system shop drawings	Z-1xx	ZF-1xx	Graphic

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
10–Plumbing	Plumbing Design Criteria			
	Required vs. provided fixtures and distribution (male vs. female)	G-0xx	GI-0xx	Text
	See Appendix H – Plumbing Fixture Schedule	P-0xx or PM	PL-0xx or PM	Text
	Water distribution sizing criteria	P-6xx	PL-6xx	Graphic
	Plumbing riser diagram	P-5xx	PL-5xx	Graphic
	Drain, waste, and vent system details	P-1xx	PL-1xx	Graphic
	Cleanout locations	P-1xx	PL-1xx	Graphic
	Indirect waste connections	P-1xx	PL-1xx	Graphic
	Water heater location	P-1xx	PL-1xx	Graphic
	Backflow preventors	P-1xx	PL-1xx	Graphic
	Roof storm water drainage	P-6xx	PL-6xx	Text
	Piping hanger schedule	P-5xx	PL-5xx	Graphic
	Penetration details	P-1xx	PL-1xx	Graphic
	Interceptors and separators	P-1xx	PL-1xx	Graphic
	Special systems (gas, air, vacuum, etc.)	PM	PM	Text
	Identification of applicable fixture and pipe standards (title/edition)	PM	PM	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
11–Mechanical	Mechanical Design Criteria			
	Equipment installation and listing	PM	PM	Text
	Specific appliance details (e.g., unit heaters)	M-5xx	MH-5xx	Graphic
	Duct construction	PM	PM	Text
	Piping support	M-5xx	MP-5xx	Graphic or Text
	Ventilation schedule	M-6xx	MH-6xx	Graphic
	See Appendix G – Ventilation Schedule	M-6xx or PM	MH-6xx or PM	Text
	Exhaust and intake locations	M-1xx	MH-1xx	Graphic
	Kitchen exhaust and suppression	M-4xx	MH-4xx	Graphic
	Fire dampers	M-1xx	MH-1xx	Graphic
	Combustion air	M-1xx	MH-1xx	Graphic
	Chimneys, flues, and vents	M-1xx	MH-1xx	Graphic
	Boilers and water schedule	P-6xx	PL-6xx	Text or Graphic
	Fuel/gas piping materials	PM	PM	Text
	Refrigerant piping materials	PM	PM	Text
	Hydronic piping materials	PM	PM	Text
	Controls	M-6xx	MI-6xx	Graphic or Text
	Identification of applicable mechanical standards (title/edition)	PM	PM	Text

Category Group	Regulatory Information	Drawing Location		Suggested Format
		Level 1 Project	Level 2 Project	
12–Electrical	Electrical Design Criteria			
	Equipment installation and listing	PM	PM	Text
	Wiring methods and materials	PM	PM	Text
	Single-line diagram	E-6xx	EP-6xx	Graphic
	Over current protection	E-6xx	EP-6xx	Graphic
	Grounding details	E-5xx	EP-5xx	Graphic
	Service details	E-5xx	EP-5xx	Graphic
	Transformers	E-1xx	EP-1xx	Graphic
	Emergency power/standby systems	E-1xx	EP-1xx	Graphic
	Disconnects	E-1xx	EP-1xx	Graphic
	Identification of electrical equipment standards (title/edition)	PM	PM	Text

The Plan Review Process

An efficient, carefully executed plan review is vital to maintain health, safety, and public welfare. Maintaining these standards, however, requires a combined effort of the local jurisdiction as well as the design professional. To perform a review of the construction documents, the documents must show the necessary information. The design professional's responsibility is to identify what is required and how it is to be shown in the construction documents.

The plan review process can be more effective and efficient if a formal procedure is followed. In addition, a preliminary review involving an informal meeting is always helpful to set the stage for an efficient procedure. Correctly completed application forms and construction documents (including supporting data such as structural calculations) will expedite the process.

The following indicates the general milestones of the regulatory process:

- Construction documents and permit applications received.
- Applicable regulations identified.
- Compliance with regulations verified.
- Construction documents approved.
- Permit issued.
- Project inspected.
- Certificate of Occupancy/Completion issued.

*The **building permit** will typically not be issued until construction documents have been reviewed and approved for regulatory compliance. This includes phased permits.*

The appropriate application forms and construction documents are typically filed on behalf of the owner. For the design professional to evaluate the requirements of the local jurisdiction, it is important to understand the plan review process. With increases in technology, some jurisdictions are employing an electronic code review process. This is intended to expedite the process by enabling the information to be transmitted directly to the reviewer. This process also allows for real-time responses to be transmitted from the reviewer to the design professional. The viability of an electronic review process should be coordinated in advance with the local jurisdiction. Additionally, third-party plan review services, such as those offered by the model code groups, are often used to expedite the process whenever the authority having jurisdiction does not have the expertise or staff to perform such reviews. It is important to note that the final authority to approve the construction documents and issue the permit rests with the local authority.

Depending on the scope and complexity of the project, it may be more expeditious to use a phased series of reviews. This typically takes the form of an early review where the drawings are still in progress but are of sufficient detail for a partial permit such as a foundation permit. This process includes a review of the building occupancy, height and area, fire protection requirements, and preliminary egress considerations. It also includes a review of the foundation drawings, including the applicable structural loading criteria needed to design and detail the foundation. This partial permit, in turn, allows for the excavation and foundation construction to proceed while the final construction documents are being finished. Once completed, the final construction documents would be submitted for a final building review.

The review of shop drawings is another type of phased review. This procedure results in a separate review, often after the **building permit** is issued. Such reviews are necessary because the preparation of construction documents can be fragmented and may not provide some necessary detailed information to ascertain code compliance. Roof truss drawings are a good example. The construction drawings may indicate a certain type of truss, but the detailed drawings are developed by the contractor as part of a separate review package that occurs while the project proceeds.

The flow charts in *Figures 08.1* and *08.2* illustrate the general review process for zoning and building.

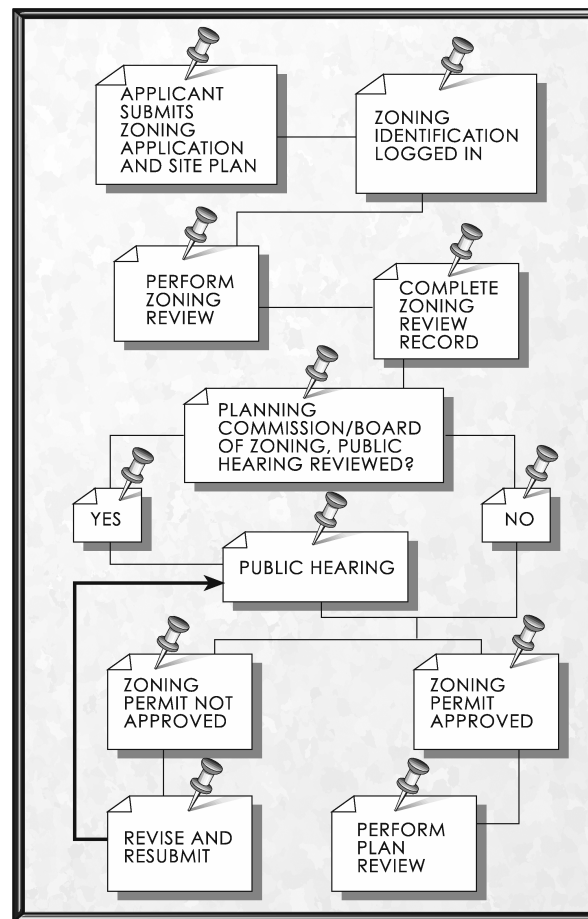


Figure 08.1 The zoning review process.

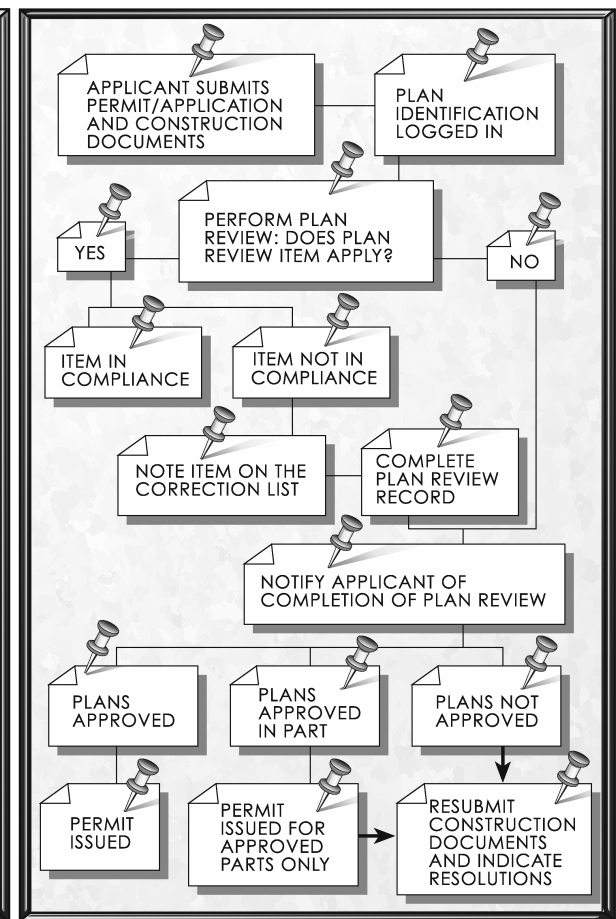


Figure 08.2 The building plan review process.

Often, the process entails the use of a checklist that identifies specific sections in the code. The plan reviewer evaluates each section against the submitted construction documents. This often results in a correction list that identifies the deficiencies noted in the review. Once resolved, the permit can be issued. The following is an example of a partially completed plan review record form along with the correction list.

NOTES: N.R. — Not required
N.A. — Not applicable

ADMINISTRATION (Chapter 1)

_____ Complete construction documents
(107.5, 107.6, 107.7)

_____ Signed/sealed construction documents
(106.1)

BUILDING PLANNING (Chapters 3, 4, 5, 6)

OCCUPANCY CLASSIFICATION (302.0-312.0)

_____ Single Occupancy

_____ Incidental use areas (302.1.1)

_____ Mixed Occupancy

_____ Accessory areas (302.2)

GENERAL BUILDING LIMITATIONS (Chapters 5 & 6)

Apply Case 1 to determine the allowable height and area and permitted types of construction for a building containing a single occupancy or nonseparated mixed occupancies. Apply Case 2 to determine the allowable height and area and permitted types of construction for a building containing separated mixed occupancies.

AREA MODIFICATIONS TO TABLE 503

% of Allowable tabular area (Table 503) _____ **100%**

% Increase for frontage (506.2) _____ **+** _____ %

% Increase for automatic sprinklers (506.3) _____ **+** _____ %

Total percentage factor _____ **=** _____ %

Conversion factor _____
(Total percentage factor/100%)

Frontage (F) (506.2)				
_____ North	_____ East	_____ South	_____ West	
Total Frontage (F) _____ ft		Total Perimeter (P) _____ ft.		
Minimum width open space (W) = _____				
% Tab. area increase (H) = _____ (506.2) $100 \left[\frac{F}{P} - 0.25 \right] \frac{W}{30}$				

CASE 1 — SINGLE OCCUPANCY OR NONSEPARATED USES (302.3.2)

Using Table 503, identify the allowable height and area of the single use group or the most restrictive of the nonseparated mixed use groups. Construction types that provide an allowable tabular area equal to or greater than the adjusted floor area and allowable heights (as modified by Section 504) equal to or greater than the actual building height are permitted.

Actual floor area _____ ft.²

Actual building height _____ feet _____ stories

Adjusted floor area* _____ ft.²

Allowable building height _____ feet _____ stories

*Adjusted floor area = actual floor area/conversion factor

Permitted types of construction _____ Type of construction assumed for review (602.1) _____

[illegible]

Figure 08.3 *Partially completed plan review record form.*

Figure 08.4 Corrections list.

The plan reviewer is responsible for evaluating construction documents with respect to a code and noting the plan's deficiencies or code violations (with the appropriate code sections). It is not the plan reviewer's function to recommend design changes to secure code compliance. However, an informal discussion of the plan examination results, with an interpretation of particular code provisions, will improve the dialogue between the building department and the design professional. Matters of interpretation should be documented as part of the permit process to create a comprehensive record for approval or rejection of the construction documents. Occasionally, matters of interpretation can become contentious. When this occurs, local code officials may seek the opinion of third-party agencies, such as the model code groups. Again, the authority to enforce and interpret the code rests ultimately with the local authority. Matters of dispute are sometimes forwarded to the local board of appeals for resolution. Where boards of appeal do not exist, state boards or agencies may resolve disputes. Final resolution may be through the judicial system.

Plan Review and Inspections

The applicant is legally obligated to correct the situation if the field inspector discovers a code violation, even if the violation is apparent on the approved construction documents. This again points out the need for a competent and thorough plan examination coupled with adequate information on the drawings. To expect, or even anticipate, that code violations will be discovered in the field places an unnecessary burden on the inspector. Resolving field problems often causes construction delays and increased costs. There may also be penalties incurred for some code violations. The time to find nonconformity with the code is in the plan review stage.

A frequently overlooked aspect of a plan review is that of the special inspection. It is both a plan review item as well as an inspection item. The special inspection provisions in the codes identify additional third-party inspections for which the owner is responsible. Inspection of fabricators is an example. The building inspector relies on third-party inspection reports for those items that are not constructed on the site. However, it is during the plan review stage of the project where those items for which special inspections will be performed and the agency responsible must be identified.

Overview of Regulatory Information

Historical Overview

The purpose of codes is to preserve the health, safety, and welfare of the general public. One of the earliest and most rudimentary of building codes was developed in the Babylonian Empire around 2000 B.C. and was attributed to King Hammurabi. The law provided that

If a builder built a house for a man and completed it, that man shall pay him two shekels of silver per say (approximately 12 square feet) of house as his wage. If a builder has built a house for a man and his work is not strong, and if the house he builds falls in and kills the householder, that builder shall be slain. If the child of the householder should be killed, the child of that builder shall be slain. If the slave of the householder should be killed, he shall give slave to the householder. If goods have been destroyed, and because the house was not made strong, and it has fallen in, he shall restore the fallen house out of his own material. If a builder has built a house for a man, and his work is not done properly and a wall shifts, then that builder shall make that wall good with his own silver.

This extreme viewpoint has been tempered by the development of codes. In Rome, in approximately 27 A.D., the governing body enacted regulations for the safety of public places. This was in response to the collapse of an amphitheater, which killed or injured approximately 50,000 people. In London, the Assize of Buildings was promulgated by Mayor Henry Fitz-Elwyne in 1189. This law regulated the construction of party walls. This was followed by the London Building Act in 1666, which followed the great fire of London. In 1871, the most infamous fire in the United States occurred, the Chicago fire. It lasted for almost two days, killed 250 people, and destroyed 17,000 buildings. In 1875, the city enacted a building code and a fire prevention code.

Development of Model Codes in the United States

A model code is a written set of regulations that provides the means for exercising reasonable control over construction and is available for adoption by cities, counties, states, or countries, with such changes as may be desirable or legal for local needs. In 1905, the National Board of Fire Underwriters (now the American Insurance Association) published the National Building Code. Since then four model code agencies have formed. The following are significant milestones in the development of the four model codes

- 1915** Building Officials Conference of America (BOCA) established to provide a forum for the exchange of knowledge and ideas concerning building safety and construction regulations. In 1950, BOCA, now Building Officials and Code Administrators International, Inc., published the *BOCA Basic Building Code* (now called the *BOCA National Building Code*). The BOCA National Codes are used predominately in the midwestern and northeastern United States.
- 1927** Adoption of the *Uniform Building Code* by the Pacific Coast Building Officials Conference, now the International Conference of Building Officials (ICBO). The Uniform Codes are used predominately in the western United States.
- 1945** Publication of the *Standard Building Code* by Southern Building Code Congress International (SBCCI). The Standard Codes are used predominately in the southeastern United States.
- 1995** Publication of the *International Plumbing Code* by the International Code Council, Inc. (ICC). The ICC is an umbrella organization of representatives from BOCA, ICBO, and SBCCI, which was organized in 1994 to develop, maintain, publish, and provide support services for a single set of comprehensive, coordinated model codes. Prior to 1994, the Council of American Building Officials (CABO) served as the umbrella organization of the three model code groups.

2000 Publication of a single set of comprehensive, coordinated codes by the ICC, entitled the *International Codes*, including the following: Building, Electrical, Energy Conservation, Fire, Fuel Gas, Mechanical, Plumbing, Private Sewage Disposal, Property Maintenance, Residential, and Zoning Codes. These codes are intended for adoption across the United States.

The model codes are minimum requirements intended to ensure public safety, health, and welfare. The model code groups share a fundamental tenet: ease the burden of state and local governments through the development and maintenance of standardized regulations. Absent such model codes, it is the responsibility of state and local governments to develop their own regulations. Even with model codes, states make amendments that result in different requirements within the model codes. The enforcement authority rests with the jurisdiction that formally adopts the respective code.

The model codes are developed and maintained through a democratic public hearing and revision procedure that allows all interested parties the opportunity to both propose changes to code provisions and testify regarding such change proposals. Change proposals are either accepted or rejected by vote of the respective organizations' eligible voting members. In the case of the ICC, this includes the eligible voters of BOCA, ICBO, and SBCCI. In recent years the three codes promulgated by BOCA, ICBO, and SBCCI have undergone a three-year revision cycle. With the development of the ICC International Codes, the three groups have individually ceased the development of their respective codes. The International Codes, with the comprehensive inaugural edition in 2000, is slated for a three-year revision cycle. The code development activity between editions typically consists of at least two phases, each phase being a complete code change cycle.

In Canada, the *National Building Code*, which pertains primarily to the needs of health and safety, has received wide use as the basis for provincial codes and municipal bylaws. Liaison with provincial and territorial code authorities is maintained through the Provincial/Territorial Committee on Building Standards.

Referenced Standards

A model code establishes minimum quality and performance criteria for the materials and methods regulated by the code. For many materials and methods, the code relies on referenced standards to provide this criteria. The referenced standards are an enforceable extension of the code. Standards supplement the code by setting forth conditions or requirements that a material or method must meet, thereby providing an acceptable level of safety for building occupants. To comply with the provisions of the model code, a material or method must meet the requirements of the referenced standard. Material referenced standards are often used as the basis by which a product is labeled. This label, which is identified on the product, includes information such as name of the manufacturer, function of the product, and name of the approved agency that conducted the applicable tests.

A standard is a published technical document that represents an industry consensus on how a material or assembly is to be designed, manufactured, tested, or installed so that a specific level of performance is obtained. Standards are primarily developed by industry organizations and professional associations incorporating the views of interested parties. A standard is developed in response to an identified need and typically contains information based on many years of testing and research.

A standard is not intended to be used as primary law but as a secondary authoritative reference. While a model code becomes law when it is adopted by a jurisdiction, a standard only becomes law to the extent to which it is referenced in a model code.

Standards can generally be grouped into four categories:

- Materials
- Design
- Installation
- Testing

The following is an example of each of the four types of standards. The list includes the type of standard, the standard writing organization, and the scope and application of the standard.

- Material:** American National Standards Institute
ANSI A208.1, Particleboard
The standard includes definitions, dimensional tolerances, and physical and mechanical property requirements for different grades of particleboard.
- Design:** International Code Council
ICC A117.1, Accessible and Usable Buildings and Facilities
The standard includes technical design criteria for making sites, facilities, buildings, and elements accessible to those with disabilities.
- Installation:** National Fire Protection Association
NFPA 13, Installation of Sprinkler Systems
The standard includes the installation requirements for automatic fire sprinkler systems.
- Testing:** American Society for Testing and Materials
ASTM E119, Test Methods for Fire Tests of Building Construction and Materials
This standard is a fire-test response standard intended to register the fire performance of a given assembly for a period of fire exposure.

A referenced standard becomes an enforceable part of the code to the extent and scope as referenced in the text of the code itself. The listing of applicable standards, along with their specific edition, title, and the sections that reference the standard are typically included in the code's last chapter, prior to any appendices.

State/Local Codes and Amendments

The model codes were developed to ease the burdens of state and local governments by providing a set of regulations readily available for adoption. Most states have adopted a model code without modifications. Other states and local jurisdictions have adopted a model code with modifications; still others have chosen to develop their own unique set of regulations. When this occurs, the amendments are often centered around the administrative provisions of the code. Typically, this is a response to local administrative procedures, which may be unique to a jurisdiction and, therefore, are not covered in the model code. Technical changes to the model codes may also occur through the amendment process. For example, jurisdictions with limited fire-fighting capabilities may modify the sprinkler requirements in the code to gain the benefits of sprinkler protection in a building that would otherwise not require sprinklers.

Federal Regulations

There are numerous federal agencies, each with a specified mission and rule-making authority. Some of the regulations affect building design and others do not. The design professional must be cognizant of regulations other than those published in the adopted code. The following are examples of regulations that may impact the project.

- **ADA:** In 1990, Congress passed the **Americans with Disabilities Act (ADA)**. This act covers employment discrimination, public transportation, public accommodations, and telecommunications. Of particular interest to design professionals is Title III and the ADA Accessibility Guidelines (ADAAG) developed by the U.S. Architectural and Transportation Barriers Compliance Board (USATBCB – The Access Board). The ADAAG includes building construction requirements for places of public accommodation and commercial facilities relative to making such structures accessible for persons with disabilities. As civil rights legislation, the ADA is enforced through the U.S. Department of Justice in response to civil suits.

- **CPSC:** The Consumer Product Safety Act is an example of federal legislation that impacts building materials viewed as potential hazards to consumers. The **Consumer Product Safety Commission (CPSC)** is an independent regulatory commission consisting of five commissioners. The commission has the power to create standards relative to consumer products, which are intended to abate hazards to consumers. Probably the most recognizable standard to design professionals is CPSC 16 CFR; 1201, Safety Standard for Architectural Glazing, which includes requirements for safety glazing in hazardous locations and is referenced in the codes.
- **EPA:** In 1970, the **Environmental Protection Agency (EPA)** was established, with a mission to protect human health and safeguard the natural environment: air, water, and land. One of the first acts was the Clean Air Act of 1970, which is a comprehensive federal law that regulates emissions from area, stationary, and mobile sources. In addition, EPA issued a new ruling to the Clean Air Act, which provides for National Volatile Organic Compound (VOC) emission standards for architectural coatings.
- **FHAA:** The residential counterpart to the ADA, the **Fair Housing Amendments Act (FHAA)**, enacted in 1988, covers accessibility issues for multiple-family housing of four units or more on a site. In response to this act, the U.S. Department of Housing and Urban Development (HUD) developed the Fair Housing Accessibility Guidelines (FHAG). The FHAA is administered and enforced by HUD.
- **NFIP:** The National Flood Insurance Act of 1968 was enacted by the Housing and Urban Development Act of 1968 to provide flood insurance protection to property owners in flood-prone areas. The **National Flood Insurance Program (NFIP)**, administered by the Federal Emergency Management Agency (FEMA), includes requirements for elevating structures above the base flood elevation and otherwise maintaining the structure as flood resistant. The basis for the flood potential of a given locality is the Flood Insurance Rate Map published by FEMA.
- **OSHA:** Congress established the **Occupational Safety and Health Administration (OSHA)** in 1970. Among OSHA's many missions is to eliminate workplace injuries. This indirectly affects design professionals because OSHA is occasionally asked to inspect and evaluate working conditions at building construction sites to determine whether the construction is progressing safely.

- **USACE:** The **United States Army Corps of Engineers (USACE)** has been in place for over two centuries. Its three broad missions include: Civil, Military, and Support for Others. The Civil works programs involve the planning, design, construction management, operation, and maintenance of water resources projects to abate flood and storm damage. The Support for Others mission includes work done for other federal agencies such as the Department of Energy, EPA, and FEMA.

A listing of additional agencies that may impact regulatory compliance can be found on the web at ARCAT.com.

Zoning Ordinances and Zoning Codes

A zoning ordinance is a system that regulates the use and development of property within a municipality or county. The objectives of zoning are environmental, economic, efficient land use and a well-blended community of buildings where the uses are complementary.

Most zoning ordinances and codes divide the municipality or county into districts. Within each district, certain types of uses are permitted. For example, in a general system of zoning regulation, there might only be five districts: agricultural (**A**), residential (**R**), commercial (**C**), commercial/residential (**CR**), and factory/industrial (**FI**). These districts, in turn, may be further subdivided into divisions (e.g., **R-1**, **C-2**, etc.). By their very names, the districts may or may not indicate what types of land uses are permitted within the boundaries of those districts. This would be a function of the amount of subdividing that is incorporated into the district. For example, an R-1 district may include other uses such as fire station or public park. Besides defining these permitted uses, zoning ordinances control the height, area, and volume of buildings, as well as setbacks and location of open spaces within districts. Zoning ordinances and codes may also include administrative provisions regarding the creation of planning commissions, boards of appeal/adjustment, hearing procedures, and general provisions regarding off-street parking, locations of accessory buildings, and landscaping provisions.

Generally, zoning issues are local. However, there may be state mandates that affect local zoning. Compliance with local zoning ordinances is typically one of the first evaluations that must be performed by the design professional regarding the planning/pre-design and design phases of the project cycle.

The Design Process

Identification of the applicable regulatory issues is an integral part of the planning/predesign and design phase of the project. When determining the viability of a project for a given site or site selection, the zoning ordinances and codes must be reviewed to decide if the project complies with the local authority's planning objectives for development. Federal agencies such as FEMA (e.g., flooding considerations) or the EPA (e.g., environmental emissions) may have specific legislation that governs the project.

The type of project may also impact design considerations. In fact, the project may be beyond the scope and enforceability of the local jurisdiction. For example, projects being designed for the federal government (e.g., post offices, military bases, government offices, Native American jurisdictions) are exempt from local regulations. However, these projects must comply with local zoning requirements. With a common goal of protecting the public safety, the federal government often requires that projects be designed in conformance with applicable local codes, even though the projects are not subject to enforcement by local authorities. Such projects often occur with the local jurisdiction given the opportunity to be involved in the project, but with limited input. Ultimately, the applicable governing authority sets the project regulations.

On the building side of the project, identification of the applicable code(s) and their respective editions must occur as part of the design of the building. This applies to both new construction and additions, alterations, and changes of occupancy relative to existing buildings. Identification of local amendments that affect the design is also important. As is discussed in the Plan Review Process section of this Module, some jurisdictions may use an electronic plan review process, which may impact how the design professional packages and submits the construction documents.

Identification of the applicable regulations may require a review of not only the applicable regulations of the building department but other jurisdictions as well. Coordination among the building department, fire department, water and sewer utilities, and the design professional is crucial to determine if there is any regulatory overlap among departments that may affect the

*In all cases, the design professional is encouraged to **contact the local authority(ies)** in the early design phases of the project to determine local regulatory requirements.*

design. Similarly, the design and enforcement may be governed by multiple agencies such as a board of education (schools), board of health (hospitals), historical preservation, environmental requirements, or local utility.

The final goal in the development of construction documents is the completion of the project coupled with the issuance of the certificate of occupancy (sometimes called the certificate of completion). The issuance of the certificate of occupancy is the last stage of the regulatory process. The first stage in the regulatory process is identification and analysis of applicable regulations. The second stage is implementation of applicable regulations into the construction documents. These two stages lead to an application for permission to construct (referred to as a building permit). One of the most critical, time-sensitive aspects of the process is reviewing the construction documents for code compliance.

Appendix A – Summary of Governing Regulations

Jurisdiction	Local	State	Remarks
Code-Enforcement Jurisdiction			
Zoning Jurisdiction			
Code	Title	Edition	Local Amendment (Y/N)
Building Code	International Building Code	2000	No
Accessibility Code	ANSI A117.1	1998	No
Mechanical Code	International Mechanical Code	2000	No
Electrical Code	International Electrical Code	2000	No
Plumbing Code	International Plumbing Code	2000	No
Fire Prevention Code	International Fire Prevention Code	2000	No
Zoning Code	International Zoning Code	2000	Yes
<i>Insert other applicable ordinances or codes</i>	National Flood Insurance Program	1990	No

Appendix B – General Building Summary

Height and Area								
Building ¹	Occupancy Group (s)	Type of Construction	Sprinkler System ²	Building Area (sq ft)		Building Height (ft/# of stories)		Remarks
				Actual	Allowable	Actual	Allowable	
A								
B								
C								

Mixed Occupancy ³							
Separate Uses		Y or N	Nonseparated Uses		Y or N		
Fire Area	Occ. Groups	Fire Area	Occ. Groups	Fire Area	Occ. Groups	Fire Area	
A		C		E		G	
B		D		F		H	

Special Uses and Occupancy ⁴			
Conditions Applicable	Y or N	Special Use	

1. Fill in Buildings A, B, C, etc. where multiple buildings are created with fire walls. See *Fire Area Key Plan Example 3A* for fire wall locations.

2. Identify type of system (e.g., NFPA 13 or 13R system).

3. See *Fire Area Key Plan Examples 2, 3A, 3B, 3C, and 3D* for mixed occupancy separation location.

4. Identify if a special use or occupancy is present and the type (e.g., covered mall, high rise, atrium, high-hazard materials).

Appendix C – Room-by-Room Egress

Floor Level	Room Name	Room Number	Floor Area (sq ft)	Travel Distance in Room (ft)	Egress Capacity from Room (# occ)		# Means of Egress from Room		Remarks
					Actual	Required	Actual	Required	
Lower level 2									
Lower level 1									
1									
2									
3									
4									
5									

Appendix D – Floor-by-Floor Egress

Floor	Travel Distance (ft)		# Exits		Exit Capacity (# occ)		Remarks
	Actual	Allowable	Actual	Required	Actual	Required	
Lower level 2							
Lower level 1							
1							
2							
3							
4							
5							

Appendix E – Fire-Resistance Ratings

Element	Rating(s)	Design Number(s)	Remarks
Fire Walls			
Exterior Bearing Walls			
Exterior Nonbearing Walls			
Fire Barriers ¹			
Fire Partitions ²			
Smoke Barriers			
Columns			
Floors			
Roof			

1. Exits, shafts, incidental use areas, mixed occupancies
2. Corridors, dwelling/tenant/guestroom separations

1. Table can be expanded to include other categories such as patient rooms, jail cells, etc.

Appendix G – Ventilation Schedule

Location	Floor Area (sq ft)	Occupant Load Rate	Calculated Occupant Load	Outdoor Air Rate (cfm/person unless noted)	Required Outdoor Air (cfm)	Provided Outdoor Air (cfm)	Remarks

Appendix H – Plumbing Fixture Tabulation¹

Fixture	Number Required		Number Provided		Remarks
	Female	Male	Female	Male	
Water Closet					
Urinals					
Lavatories					
Bathtubs/Showers					
Drinking Fountains					
Service Sinks					
Kitchen Sinks					
Clothes Washer					
Connection					

1. Per building or floor, as applicable

Appendix I – Location of Information Based on Category Group

Category Group	Regulatory Information	Location	Remarks
1–General	Project identification		
	Project address		
	<i>Street address, city, and state</i>		
	Project location map		
	Professional design firm(s) identification		
	Contractor name(s)		
	Design professional name(s)		
	Design professional address(es)		
	Design professional phone/fax number(s)		
	Design professional e-mail/website		
	Design professional license number and seal		

Category Group	Regulatory Information	Location	Remarks
	Listing of applicable codes (titles and edition)		
	Accessibility		
	Building		
	Electrical		
	Energy conservation		
	Fire		
	Fuel/gas		
	Mechanical		
	Plumbing		
	Private sewage disposal		
	Property maintenance		
	Residential		
	Zoning		
	Other		
	Listing of applicable local ordinances and jurisdictions		
	Local amendments		
	Zoning		
	Signage		
	Other		

Category Group	Regulatory Information	Location	Remarks
2-Site	Site-Related Design Criteria		
	Location on site (distances to lot lines/ existing buildings)		
	Site grading/water run-off		
	Irrigation		
	Erosion control details		
	Environmental impact statements		
	Zoning drawings		
	Zoning use (allowable/actual)		
	Site coverage (allowable/actual)		
	Building height (allowable/actual)		
	Parking/loading requirements (required/actual)		
	Signage type, area, and height (allowable/actual)		
	Fire districts		
	Historical preservation		
3-Building	Building Design Criteria		
	Use group (occupancy) classification(s)		
	Type of construction		
	Building area (allowable/actual)		
	Building height (allowable/actual)		
	Special use and occupancy (e.g., covered mall, high rise)		
	Seismic design category		
	Design wind speed		

Category Group	Regulatory Information	Location	Remarks
4–Life Safety-Egress	Means of Egress Design Criteria		
	Occupant load(s)		
	Building exits per floor (arrangement; required/actual)		
	Exit capacity per floor		
	Travel distance (allowable/actual)		
	Means of egress lighting		
	Interior finish classification (allowable/actual)		
5–Fire Protection-Passive	Passive Fire Protection Design Criteria		
	Fire resistance ratings of building elements, including tested design number (required/actual)		
	Firestopping shop drawings, including tested design number		
	Mixed use (occupancy) separations		
	Fire resistive assembly location plan		
	Firestopping, including tested design number		
	Plastics		

Category Group	Regulatory Information	Location	Remarks
6-Accessibility	Accessibility Design Criteria		
	Exterior accessible routes, including parking		
	Location of public facilities on site		
	Accessible entrances		
	Interior accessible routes		
	Clear floor space/maneuverability clearances		
	Detectable warnings and signage (exterior)		
	Detectable warnings and signage (interior)		
	Toilet and bathing facilities		
	Elevator and area of rescue assistance details		
	Occupancy-specific accessible feature (e.g., assembly, residential dwelling units)		

Category Group	Regulatory Information	Location	Remarks
7-Energy	Energy Design Criteria		
	Design conditions (temperatures)		
	Envelope systems analysis		
	Envelope insulation levels		
	Air leakage/infiltration, sealing		
	Glazing type (fenestration) and areas		
	Mechanical equipment sizing, loads, and efficiencies		
	Electrical equipment sizing, loads, and efficiencies		
	Electrical lighting power budget		
	Service water heating sizing, loads, and efficiencies		
	Duct and hot water piping insulation		
	Energy trade-offs		
	Temperature controls		
	Water conservation		

Category Group	Regulatory Information	Location	Remarks
8-Structural	Structural Criteria		
	Design dead loads (actual)		
	Design live loads (required)		
	Design snow loads (required)		
	Design wind loads (required)		
	Design seismic loads (required)		
	Soil data (frost depth; allowable foundation type/loads)		
	Description of structural system		
	Structural details		
	Special inspections		
	Identification of applicable material design standards (title/edition)		
	Structural shop drawings		

Category Group	Regulatory Information	Location	Remarks
9–Fire Protection-Active	Active Fire Protection Criteria		
	Fire suppression		
	Fire department connections		
	Fire extinguishers		
	Standpipes		
	Fire alarms, automatic and manual		
	Single-station smoke detectors		
	Smoke control		
	High-hazard abatement		
	Identification of applicable design standards (title/edition)		
	Fire suppression system shop drawings		

Category Group	Regulatory Information	Location	Remarks
10-Plumbing	Plumbing Design Criteria		
	Required vs. provided fixtures and distribution (male vs. female)		
	Water distribution sizing criteria		
	Plumbing riser diagram		
	Drain, waste, and vent system details		
	Cleanout locations		
	Indirect waste connections		
	Water heater location		
	Backflow preventors		
	Roof storm water drainage		
	Piping hanger schedule		
	Penetration details		
	Interceptors and separators		
	Special systems (gas, air, vacuum, etc.)		
	Identification of applicable fixture and pipe standards (title/edition)		

Category Group	Regulatory Information	Location	Remarks
11–Mechanical	Mechanical Design Criteria		
	Equipment installation and listing		
	Specific appliance details (e.g., unit heaters)		
	Duct construction		
	Piping support		
	Ventilation schedule		
	Exhaust and intake locations		
	Kitchen exhaust and suppression		
	Fire dampers		
	Combustion air		
	Chimneys, flues, and vents		
	Boilers and water schedule		
	Fuel/gas piping materials		
	Refrigerant piping materials		
	Hydronic piping materials		
	Controls		
	Identification of applicable mechanical standards (title/edition)		

Category Group	Regulatory Information	Location	Remarks
12-Electrical	Electrical Design Criteria		
	Equipment installation and listing		
	Wiring methods and materials		
	Single-line diagram		
	Over current protection		
	Grounding details		
	Service details		
	Transformers		
	Emergency power/standby systems		
	Disconnects		
	Identification of applicable electrical equipment standards (title/edition)		

Appendix J – Sample Code Summary Sheets

G-001 Index of Sheets
G-002 Symbols and Abbreviations
G-003 Site Location Map
G-004 Site Regulatory Summary Sheet
G-005 Building Regulatory Summary Sheet

A-001 General Architectural Notes
A-002 Egress Plans

F-001 General Fire Protection Notes
F-002 Symbols and Abbreviations
F-003 Fire Area Plans

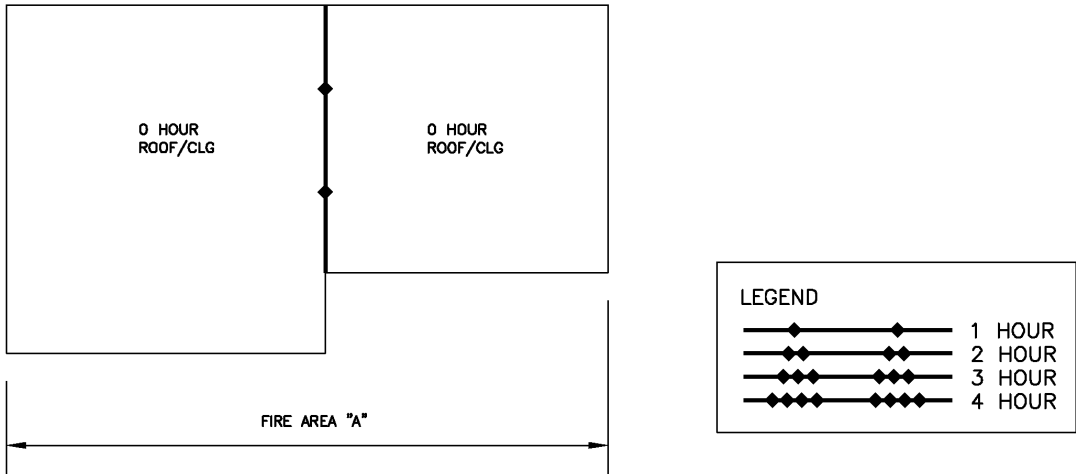
Below is a list of regulatory information that may appear on the Site and Building Regulatory Summary Sheet (**G-004** and **G-005**). This list is not exhaustive, but includes information typically required for most projects. Users of this module must verify specific requirements for each project and with each agency having approval authority over each project.

Category Group 1 - General
Category Group 2 - Site (partial)
 Zoning information
Category Group 3 - Building
Category Group 4 - Life Safety-Egress (partial)
 Occupant load
 Number of exits
 Exit capacity
 Travel distance

Category Group 5 - Fire Protection-Passive (partial)
 Location of mixed use (occupancy) separations
Category Group 6 - Accessibility (partial)
 Interior accessible routes
Category Group 9 - Fire Protection-Active (partial)
 Identification of fire protection systems provided

Appendix K – Fire Area Key Plans

ONE-STORY BUILDING – SINGLE OCCUPANCY
FIRST LEVEL

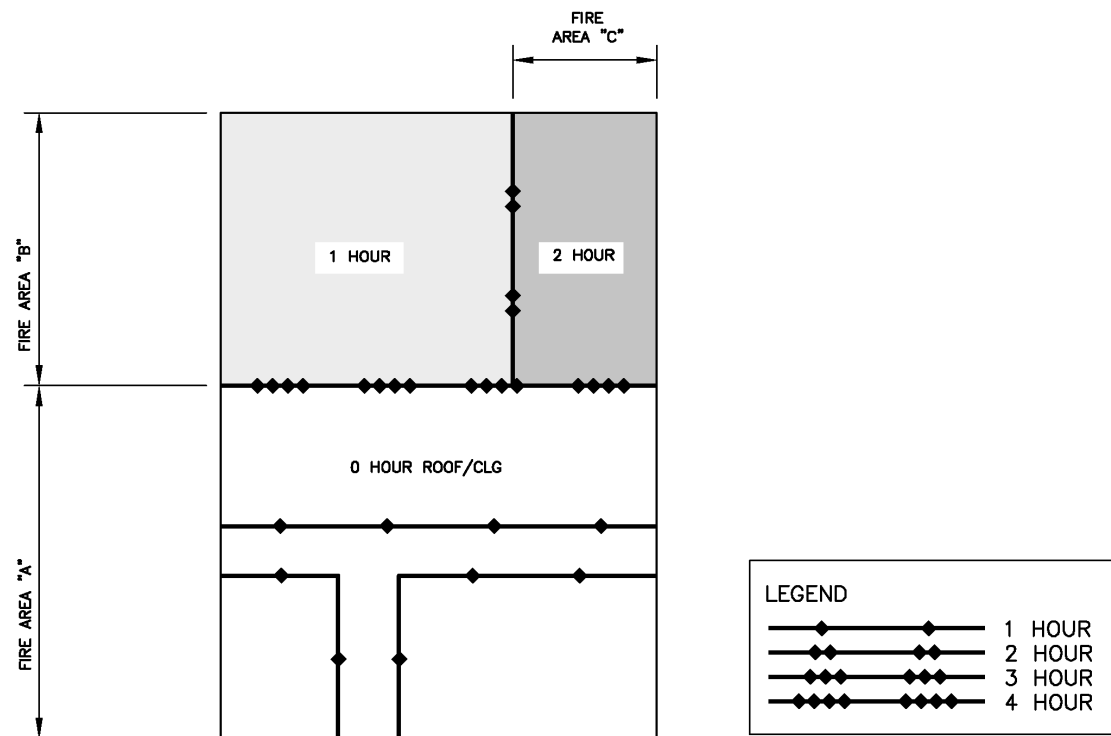


Example 1

Fire Area Key Plans

ONE-STORY BUILDING — MIXED OCCUPANCY

FIRST LEVEL

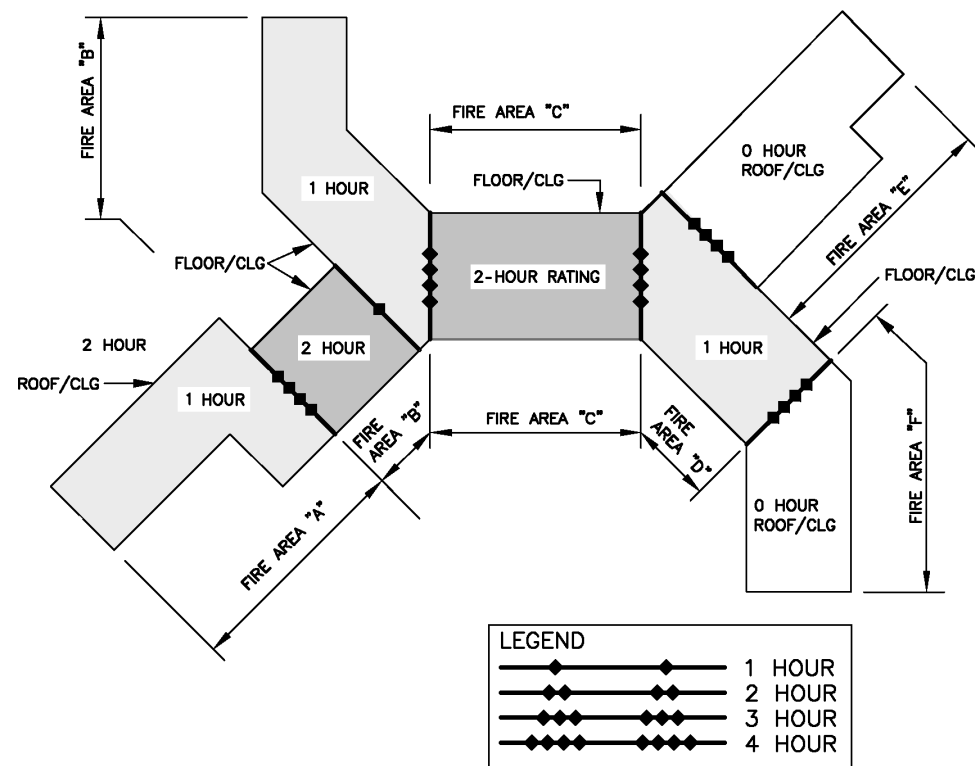


Example 2

Fire Area Key Plans

THREE-STORY BUILDING – MIXED OCCUPANCY

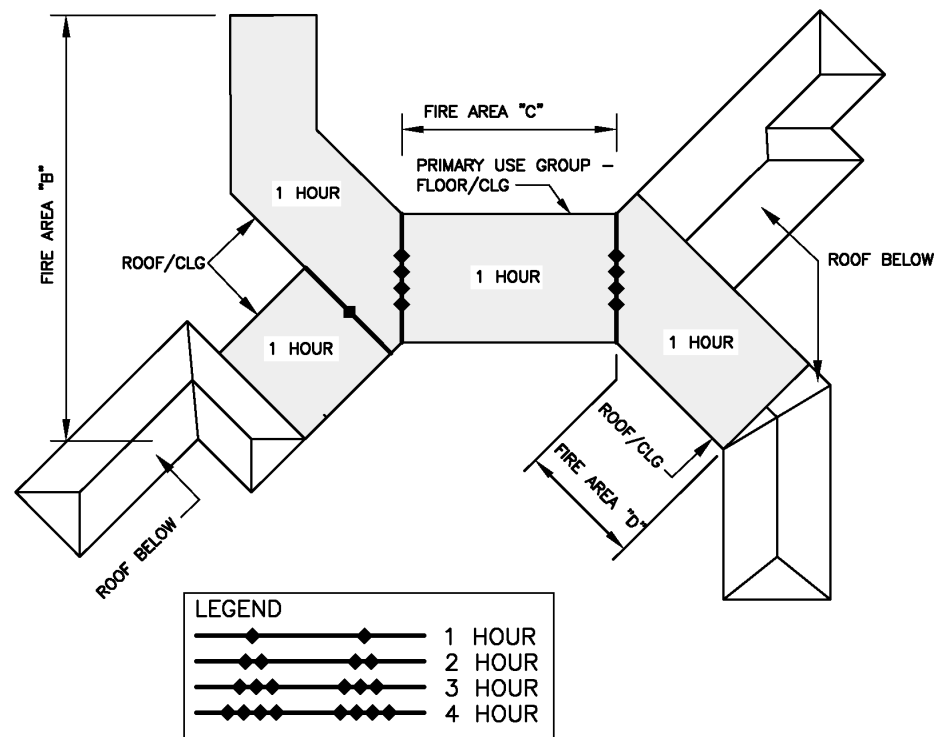
FIRST LEVEL



Example 3A

Fire Area Key Plans

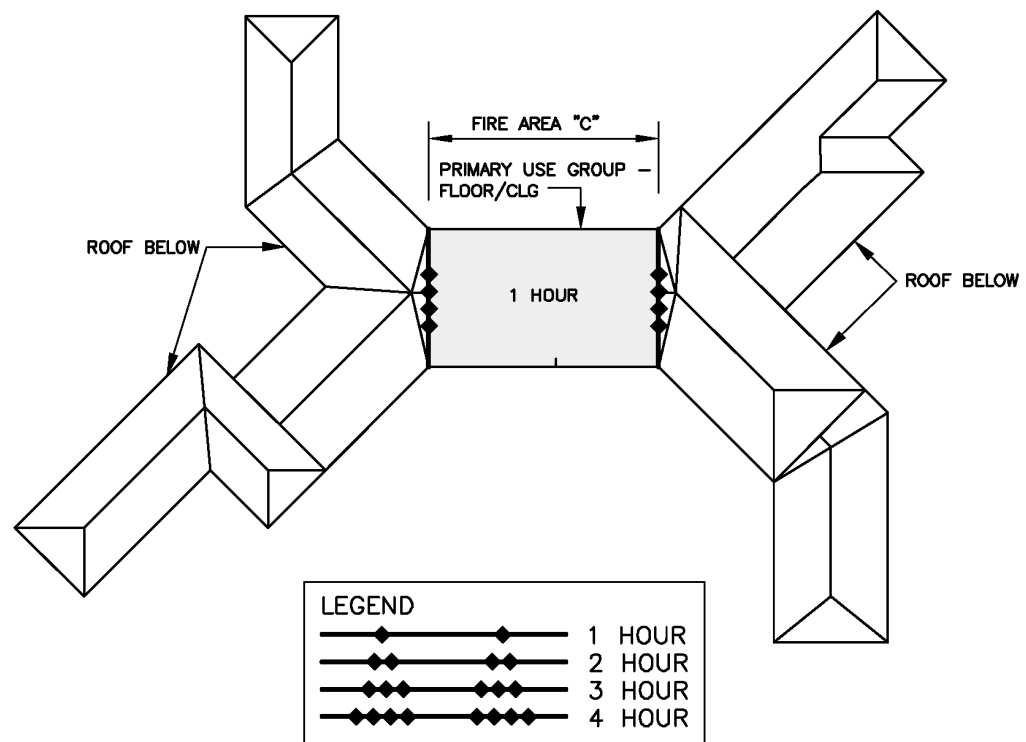
THREE-STORY BUILDING — MIXED OCCUPANCY
SECOND LEVEL



Example 3B

Fire Area Key Plans

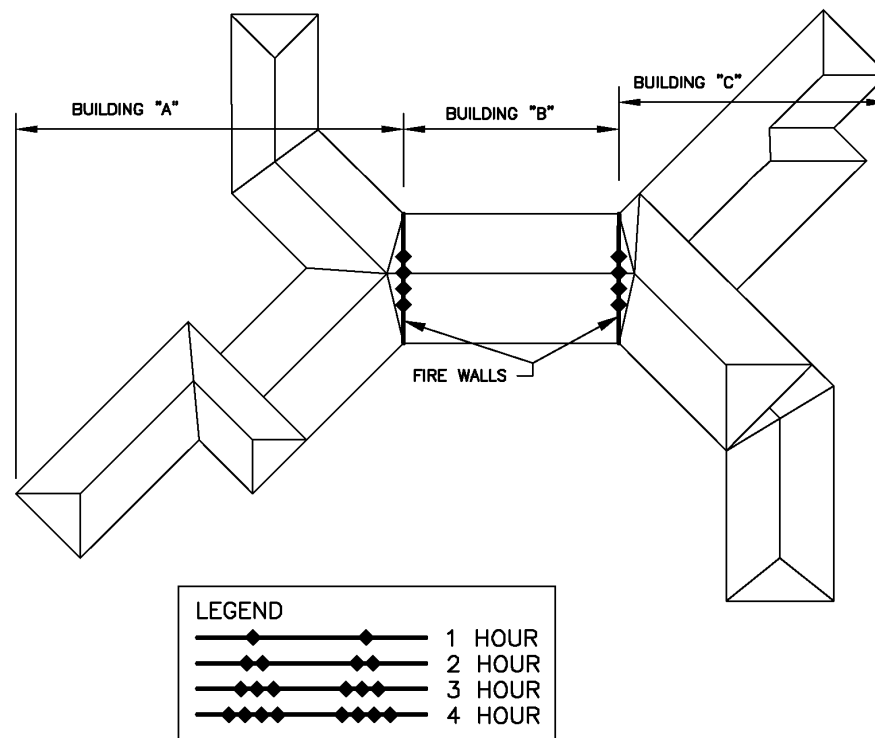
THREE-STORY BUILDING — MIXED OCCUPANCY
THIRD LEVEL



Example 3C

Fire Area Key Plans

ONE-STORY OR MULTILEVEL STORY BUILDING – MIXED OCCUPANCY
ROOF LEVEL



Example 3D

Introduction to Plotting Guidelines

**Developed by the U.S. Coast Guard and
Promulgated by the DOD Tri-Services CADD/GIS
Center**

**Approved by the
NIBS National CAD Standards Project Committee**

The purpose of the NCS Plotting Guidelines is to allow consistent black-and-white and limited color plotting from various color configurations within CADD programs. The guidelines allow consistent color mapping and data translation between MicroStation and AutoCAD. They also allow other CADD vendors and users to develop color mapping to either or both of the above.

In today's environment the prevalence of plot inconsistency is compounded by multiple types of plotting hardware, differing defaults in CADD software, and multiple independent development paths among users.

The NIBS project committee has formed a Task Team to address *Printed Output Standards*. This task team will address a range of issues well beyond the current plotting guidelines. The current NCS plotting guidelines only provide an initial solution for mapping screen elements to plot elements.

The final goal for a national standard is to constantly produce plots in accordance with the originators intentions. This includes line weights, colors, line types/styles, text, and standard sheet sizes regardless of the CADD application used. In order to obtain consistent plots it is necessary to create tables that define the relationships between the drawing in the display and the finished plot. This includes the mapping of drawing elements to plot elements using the proper pen tables, color tables, and character tables. In addition, there must be consistency in the size of the inked areas for standard sheet sizes.

Users of the U.S. National CAD Standard interested in this issue should consider joining the consensus project committee in order to contribute to a more complete solution.

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
1	0.18	0.007	Black	3	0	1
2	0.25	0.010	Black	4	1	2
3	0.35	0.014	Black	2	2	3
4	0.35	0.014	Black	7	2	4
5	0.50	0.020	Black	1	3	5
6	1.00	0.039	Black	5	7	6
7	1.40	0.055	Black	0	10	7
8	0.35	0.014	Halftone	9	2	8
9	2.00	0.079	Black	14	15	9
10	0.18	0.007	Black	10	0	10
11	0.25	0.010	Black	19	1	11
12	0.35	0.014	Black	27	2	12
13	0.50	0.020	Black	35	3	13
14	0.70	0.028	Black	43	5	14
15	1.00	0.039	Black	51	7	15
16	1.40	0.055	Black	59	10	16
17	0.70	0.028	Halftone	67	5	17
18	0.35	0.014	Halftone	75	2	18
19	2.00	0.079	Black	83	15	19
20	0.18	0.007	Rust	6	0	20
21	0.25	0.010	Rust	30	1	21
22	0.35	0.014	Rust	22	2	22
23	0.50	0.020	Rust	46	3	23
24	0.70	0.028	Rust	38	5	24
25	1.00	0.039	Rust	62	7	25
26	1.40	0.055	Rust	54	10	26
27	0.70	0.028	Rust	78	5	27
28	0.35	0.014	Rust	70	2	28
29	2.00	0.079	Rust	94	15	29
30	0.18	0.007	Black	86	0	30
31	0.25	0.010	Black	110	1	31
32	0.35	0.014	Black	102	2	32

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
33	0.50	0.020	Black	126	3	33
34	0.70	0.028	Black	118	5	34
35	1.00	0.039	Black	142	7	35
36	1.40	0.055	Black	134	10	36
37	0.70	0.028	Halftone	158	5	37
38	0.35	0.014	Halftone	150	2	38
39	2.00	0.079	Black	174	15	39
40	0.18	0.007	Gold	166	0	40
41	0.25	0.010	Gold	190	1	41
42	0.35	0.014	Gold	182	2	42
43	0.50	0.020	Gold	206	3	43
44	0.70	0.028	Gold	198	5	44
45	1.00	0.039	Gold	222	7	45
46	1.40	0.055	Gold	214	10	46
47	0.70	0.028	Gold	238	5	47
48	0.35	0.014	Gold	230	2	48
49	2.00	0.079	Gold	251	15	49
50	0.18	0.007	Black	20	0	50
51	0.25	0.010	Black	28	1	51
52	0.35	0.014	Black	36	2	52
53	0.50	0.020	Black	44	3	53
54	0.70	0.028	Black	52	5	54
55	1.00	0.039	Black	60	7	55
56	1.40	0.055	Black	68	10	56
57	0.70	0.028	Halftone	76	5	57
58	0.35	0.014	Halftone	84	2	58
59	2.00	0.079	Black	92	15	59
60	0.18	0.007	Olive	100	0	60
61	0.25	0.010	Olive	108	1	61
62	0.35	0.014	Olive	116	2	62
63	0.50	0.020	Olive	124	3	63
64	0.70	0.028	Olive	132	5	64

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
65	1.00	0.039	Olive	140	7	65
66	1.40	0.055	Olive	148	10	66
67	0.70	0.028	Olive	156	5	67
68	0.35	0.014	Olive	164	2	68
69	2.00	0.079	Olive	172	15	69
70	0.18	0.007	Black	180	0	70
71	0.25	0.010	Black	188	1	71
72	0.35	0.014	Black	196	2	72
73	0.50	0.020	Black	204	3	73
74	0.70	0.028	Black	212	5	74
75	1.00	0.039	Black	220	7	75
76	1.40	0.055	Black	228	10	76
77	0.70	0.028	Halftone	236	5	77
78	0.35	0.014	Halftone	244	2	78
79	2.00	0.079	Black	252	15	79
80	0.18	0.007	Green	11	0	80
81	0.25	0.010	Green	26	1	81
82	0.35	0.014	Green	18	2	82
83	0.50	0.020	Green	42	3	83
84	0.70	0.028	Green	34	5	84
85	1.00	0.039	Green	58	7	85
86	1.40	0.055	Green	50	10	86
87	0.70	0.028	Green	74	5	87
88	0.35	0.014	Green	66	2	88
89	2.00	0.079	Green	90	15	89
90	0.18	0.007	Black	82	0	90
91	0.25	0.010	Black	106	1	91
92	0.35	0.014	Black	98	2	92
93	0.50	0.020	Black	122	3	93
94	0.70	0.028	Black	114	5	94
95	1.00	0.039	Black	138	7	95
96	1.40	0.055	Black	130	10	96

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
97	0.70	0.028	Halftone	154	5	97
98	0.35	0.014	Halftone	146	2	98
99	2.00	0.079	Black	170	15	99
100	0.18	0.007	Forest Green	162	0	100
101	0.25	0.010	Forest Green	186	1	101
102	0.35	0.014	Forest Green	178	2	102
103	0.50	0.020	Forest Green	202	3	103
104	0.70	0.028	Forest Green	194	5	104
105	1.00	0.039	Forest Green	218	7	105
106	1.40	0.055	Forest Green	210	10	106
107	0.70	0.028	Forest Green	234	5	107
108	0.35	0.014	Forest Green	226	2	108
109	2.00	0.079	Forest Green	250	15	109
110	0.18	0.007	Black	242	0	110
111	0.25	0.010	Black	246	1	111
112	0.35	0.014	Black	247	2	112
113	0.50	0.020	Black	16	3	113
114	0.70	0.028	Black	32	5	114
115	1.00	0.039	Black	48	7	115
116	1.40	0.055	Black	64	10	116
117	0.70	0.028	Halftone	80	5	117
118	0.35	0.014	Halftone	96	2	118
119	2.00	0.079	Black	112	15	119
120	0.18	0.007	Teal	12	0	120
121	0.25	0.010	Teal	15	1	121
122	0.35	0.014	Teal	23	2	122
123	0.50	0.020	Teal	31	3	123
124	0.70	0.028	Teal	39	5	124
125	1.00	0.039	Teal	47	7	125
126	1.40	0.055	Teal	55	10	126
127	0.70	0.028	Teal	63	5	127
128	0.35	0.014	Teal	71	2	128

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
129	2.00	0.079	Teal	79	15	129
130	0.18	0.007	Black	87	0	130
131	0.25	0.010	Black	95	1	131
132	0.35	0.014	Black	103	2	132
133	0.50	0.020	Black	111	3	133
134	0.70	0.028	Black	119	5	134
135	1.00	0.039	Black	127	7	135
136	1.40	0.055	Black	135	10	136
137	0.70	0.028	Halftone	143	5	137
138	0.35	0.014	Halftone	151	2	138
139	2.00	0.079	Black	159	15	139
140	0.18	0.007	Cyan	167	0	140
141	0.25	0.010	Cyan	175	1	141
142	0.35	0.014	Cyan	183	2	142
143	0.50	0.020	Cyan	191	3	143
144	0.70	0.028	Cyan	199	5	144
145	1.00	0.039	Cyan	207	7	145
146	1.40	0.055	Cyan	215	10	146
147	0.70	0.028	Cyan	223	5	147
148	0.35	0.014	Cyan	231	2	148
149	2.00	0.079	Cyan	239	15	149
150	0.18	0.007	Black	40	0	150
151	0.25	0.010	Black	72	1	151
152	0.35	0.014	Black	88	2	152
153	0.50	0.020	Black	104	3	153
154	0.70	0.028	Black	136	5	154
155	1.00	0.039	Black	152	7	155
156	1.40	0.055	Black	184	10	156
157	0.70	0.028	Halftone	216	5	157
158	0.35	0.014	Halftone	232	2	158
159	2.00	0.079	Black	248	15	159
160	0.18	0.007	Blue	17	0	160

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
161	0.25	0.010	Blue	25	1	161
162	0.35	0.014	Blue	33	2	162
163	0.50	0.020	Blue	41	3	163
164	0.70	0.028	Blue	49	5	164
165	1.00	0.039	Blue	57	7	165
166	1.40	0.055	Blue	65	10	166
167	0.70	0.028	Blue	73	5	167
168	0.35	0.014	Blue	81	2	168
169	2.00	0.079	Blue	89	15	169
170	0.18	0.007	Black	97	0	170
171	0.25	0.010	Black	105	1	171
172	0.35	0.014	Black	113	2	172
173	0.50	0.020	Black	121	3	173
174	0.70	0.028	Black	129	5	174
175	1.00	0.039	Black	137	7	175
176	1.40	0.055	Black	145	10	176
177	0.70	0.028	Halftone	153	5	177
178	0.35	0.014	Halftone	161	2	178
179	2.00	0.079	Black	169	15	179
180	0.18	0.007	Navy	177	0	180
181	0.25	0.010	Navy	185	1	181
182	0.35	0.014	Navy	193	2	182
183	0.50	0.020	Navy	201	3	183
184	0.70	0.028	Navy	209	5	184
185	1.00	0.039	Navy	217	7	185
186	1.40	0.055	Navy	225	10	186
187	0.70	0.028	Navy	233	5	187
188	0.35	0.014	Navy	241	2	188
189	2.00	0.079	Navy	249	15	189
190	0.18	0.007	Black	245	0	190
191	0.25	0.010	Black	128	1	191
192	0.35	0.014	Black	144	2	192

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
193	0.50	0.020	Black	160	3	193
194	0.70	0.028	Black	176	5	194
195	1.00	0.039	Black	192	7	195
196	1.40	0.055	Black	208	10	196
197	0.70	0.028	Halftone	224	5	197
198	0.35	0.014	Halftone	240	2	198
199	2.00	0.079	Black	254	15	199
200	0.18	0.007	Purple	13	0	200
201	0.25	0.010	Purple	29	1	201
202	0.35	0.014	Purple	21	2	202
203	0.50	0.020	Purple	45	3	203
204	0.70	0.028	Purple	37	5	204
205	1.00	0.039	Purple	61	7	205
206	1.40	0.055	Purple	53	10	206
207	0.70	0.028	Purple	77	5	207
208	0.35	0.014	Purple	69	2	208
209	2.00	0.079	Purple	93	15	209
210	0.18	0.007	Black	85	0	210
211	0.25	0.010	Black	109	1	211
212	0.35	0.014	Black	101	2	212
213	0.50	0.020	Black	125	3	213
214	0.70	0.028	Black	117	5	214
215	1.00	0.039	Black	141	7	215
216	1.40	0.055	Black	133	10	216
217	0.70	0.028	Halftone	157	5	217
218	0.35	0.014	Halftone	149	2	218
219	2.00	0.079	Black	173	15	219
220	0.18	0.007	Magenta	165	0	220
221	0.25	0.010	Magenta	189	1	221
222	0.35	0.014	Magenta	181	2	222
223	0.50	0.020	Magenta	205	3	223
224	0.70	0.028	Magenta	197	5	224

NCS Color #	Pen Plotter pen mm	Laser/Elec InkJet in.	Plot Color	MicroStation Color #	MicroStation line weight	AutoCAD Color #
225	1.00	0.039	Magenta	221	7	225
226	1.40	0.055	Magenta	213	10	226
227	0.70	0.028	Magenta	237	5	227
228	0.35	0.014	Magenta	229	2	228
229	2.00	0.079	Magenta	253	15	229
230	0.18	0.007	Black	91	0	230
231	0.25	0.010	Black	99	1	231
232	0.35	0.014	Black	107	2	232
233	0.50	0.020	Black	115	3	233
234	0.70	0.028	Black	123	5	234
235	1.00	0.039	Black	131	7	235
236	1.40	0.055	Black	139	10	236
237	0.70	0.028	Halftone	147	5	237
238	0.35	0.014	Halftone	155	2	238
239	2.00	0.079	Black	163	15	239
240	0.18	0.007	Red	171	0	240
241	0.25	0.010	Red	179	1	241
242	0.35	0.014	Red	187	2	242
243	0.50	0.020	Red	195	3	243
244	0.70	0.028	Red	203	5	244
245	1.00	0.039	Red	211	7	245
246	1.40	0.055	Red	219	10	246
247	0.70	0.028	Red	227	5	247
248	0.35	0.014	Red	235	2	248
249	2.00	0.079	Red	243	15	249
250	0.25	0.010	Halftone	8	1	250
251	0.35	0.014	Halftone	200	2	251
252	0.50	0.020	Halftone	168	3	252
253	0.70	0.028	Halftone	120	5	253
254	1.00	0.039	Halftone	56	7	254
255	2.00	0.079	Halftone	24	15	255

Appendices

Introduction and Amendments to Industry Publications

Published by the National Institute of Building Sciences

CAD Layer Guidelines

Published by the American Institute of Architects

Uniform Drawing System (UDS)—Modules 1–8

Published by the Construction Specifications Institute

Tri-Service Plotting Guidelines

Published by Tri-Service and the Coast Guard

Statement of Substantial Conformance

U.S. National CAD Standard Version 3.0/3.1

In accordance with NCS Administration Sections 5 and 7, the undersigned hereby states that, to the best of their knowledge and belief, the electronic CAD sheet files for the project described herein substantially conform to the requirements of the National CAD Standard, Version 3.0, except as specifically indicated below. For those NCS specifications that are optional or recommended but not required, the options implemented for this project are listed below.

This form shall be placed as part of the data of the first CAD sheet file (generally the first G series file) and shall accompany the transmission of the project data set whenever the data set is transmitted to another party.

Project Name: _____

Project Number: _____

Project Address: _____

Firm Name: _____

Address: _____

Phone / Email: _____

Layer Guidelines **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Drawing Set Organization **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Sheet Organization **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Schedules **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Plotting Guidelines **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Drafting Conventions **Full Conformance** **Non-conformance** **(circle one)**

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Terms and Abbreviations Full Conformance Non-conformance (circle one)

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Symbols Full Conformance Non-conformance (circle one)

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Notations Full Conformance Non-conformance (circle one)

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Code Conventions Full Conformance Non-conformance (circle one)

If the work is in partial conformance to the specified requirements of this section, describe any variations from prescribed format. Attach illustrations or examples.

Please use additional sheets if necessary

Project Manager: _____

Signature: _____

Date: _____

Optional and Recommended NCS Items

OPTIONAL

Minor Groups, AIA CAD Layer Guidelines, CLG-8
Status Field, AIA CAD Layer Guidelines, CLG-9
Discipline Designators, Level 2, UDS-01.14
Abbreviated Sheet Identification, UDS-01.14
Replicate the floor name within each discipline, UDS-01.18
Production Data Area (Plotting), UDS-02.22
Schedule Format next to the item indicated, UDS-03.5
Column Identifier Options, UDS-03.15
Schedule dividing-lines and border-lines, UDS-03.47
Reference Grid System, UDS-04.5
Abbreviations, entire section UDS-05
Multiple view Elevation Indicator, UDS-06.8, fifth group
Room Identifier with Finish Types, UDS-06.9, second group
Reference Keynotes, UDS-07.9 thru UDS-07.11
Reference Keynotes (symbols only) figure 07.5a
Reference Keynotes (symbols with descriptive text) figure 07.5b
Sheet Keynotes, UDS-07.12

RECOMMENDED

Use of NCS during schematic design or design development, UDS-01.9
File Naming, UDS-01.19 thru UDS-01.28
File Management, UDS-01.29 thru UDS-01.31
Code Conventions Module, entire section UDS-08

(see next page)

RECOMMENDED (continued)

Tri-Service Plotting Guidelines, entire section

(Note: After the NCS3.0 ballot the CADD/GIS Technology Center requested that the Plotting Guidelines be removed from the Standard because they are obsolete. This will be one of the first items of business for the next project committee.)

Memorandum of Understanding

Memorandum of Understanding (27 February 1997 Revision)

Goal:

Develop a National CADD Standard (herein referred to as the Standard) based on the contributions of multiple organizations

Guiding Principles:

- Retain the identity of the contributing organizations to the Standard while preserving the fact that the National Institute of Building Sciences (NIBS) Facilities Information Council is the coordinator of the Standard.
- Retain the rights of the contributing organizations to copyright their sections of the Standard while retaining the intent to encourage as wide a distribution of the Standard as possible throughout the design and construction industry and its suppliers. Distribution methods of the copyrighted information will be agreed to by the contributing organizations and priced as outlined below.
- Structure the Standard in such a way to allow each contributing organization to sell their contributions as stand alone documents. Publication schedules for stand-alone documents shall be solely under the control of contributing organizations.
- Each contributing organization shall submit their contribution to a consensus process based on that determined by Facilities Information Council bylaws. This process is intended to ensure coordination, continuity, completeness and absence of redundancy or conflict in the Standard. NIBS shall form a project committee to provide a consensus review of the Standard. The chairman of the Project Committee shall be from one of the contributing organizations. A steering committee, if established, shall be composed of a minimum of one representative of each of the contributing organizations.

- Each contributing organization shall have the right to distribute the entire National CADD Standard.
- The sale price of the National CADD Standard shall not be greater than the sum of the individual parts.
- Pricing of the publications should permit the publishers and contributing organizations to cover their expenses and to see a reasonable return on investment.
- Each organization shall develop a process for maintaining their part of the National CADD Standard. Review comments shall be collected by the National Institute of Building Sciences Facilities Information Council and distributed to the participating organizations within 30 days of receipt.

Responsibilities:

The following chart is provided as the basis for each contributing organization's responsibilities to the Standard. The dates specified are goals of this agreement:

Section	Responsibility					
	CSI	AIA	TSCtr	Other	NIBS	Std.
Layering and Model File Naming	Assist	Develop & Publish	Assist	N/A	Consensus	1997
Drawing Set Organization and Sheet File Naming	Develop & Publish	Review	Assist	N/A	Consensus	1997
Sheet Organization	Develop & Publish	Assist	Assist	N/A	Consensus	1997
Schedules (finish, etc.)	Develop & Publish	Review	Review	N/A	Consensus	1997
Plotting guidelines (Color, Line Weights, and Pen Assignments)	Review	Review	Assist & Publish	Coast Guard Develop	Consensus	1997
Drafting Conventions including Notations, Symbols, Diagrams, Scale, and Line Types	Develop & Publish	Assist	Develop	Coast Guard & SMACNA Develop	Consensus	1998
Attributes	Review	Review	Develop & Publish	IAI, Vendors, trade associations, Develop & Publish	Consensus	TBD

This document is not intended to be legally binding or set forth any agreements beyond its intended scope of forming the basis of agreement to work together in the best of the U.S. Building and Construction community and the nation.

Members of NCS Project Committees

NCS Version 3.0 Project Committee

Chair: David A. Jordani, FAIA; Jordani Consulting Group
Vice-Chair: John Patrick McCaffrey, CSI, CCS, AIA; Construction Specifier
Ronald A. Agnew; HDR Engineering, Inc.
Jerrold Anderson; MHTN Architects, Inc.
John H. Anderson, AIA, CSI; Dietz & Company Architects Inc.
Ramon V. Baez; Intel / Jacobs Facilities
Ronald E. Baker; HDR Architecture, Inc.
William Bambeck; Christian Ideas Co.
David Barisa; Anderson Brown Higley Associates
Gary L. Beimers, CDT, CSI; McGraw-Hill Construction Information Group
David M. Benjamin; New York State Office of General Services
David P. Benscoter; HDR Architecture, Inc.
Kenneth J. Bentz; Intel Corp.
Kevin Black; Simon Property Group
James Boggs; Intel Corp.
David M. Bono; The Dewolff Partnership
Janine Boyer-Richards; Boyer Richards Services
Mark Brazee; Pahl-Pahl-Pahl Architects
Laurence W. Bunch; Corley Redfoot Zack
Chuck F. Burgess, P.E.; Environmental & Civil Engineering Services

Kit Burns; BLRB Architects
Mark S. Bushhouse; Williams & Associates, Architects
R. Mark Butler; HDR Architects, Inc.
Roderick K. Butler; Glover/Resnick & Associates, Inc.
Mark A. Carter; NJRA Architects
Milton Costello, P.E. C.C.S.; Consulting Engineer
Cathleen Curtin, AIA; Construction Specification Institute
Scott DeGaro; Trudeau/Architects
Dale H. Durham; Durham & Associates, Inc.
Steve Dyrstad; HDR Architecture, Inc.
David Fawcett; ELS Architecture
Jim Fletcher, Jr.; AEC CADCON, Inc.
Russell Freier; HDR Engineering, Inc.
Joe Y. Fuchida; Fuchida Associates, Architects
Steven Fuchs; Obelisk Architects
Alphonse Gavila; Intel Corp.
Debbi L. Gottlieb, AIA; Dietz & Company Architects
Charles A. Graham, Jr.; Fluor Daniel
Charles R. Green; Wilson Company
David R. Hague; NFPA
Dennis J. Hall, AIA, FCSI; Hall Architects
William Steven Harvey; William Steven Harvey Design
Michael A. Hayes; CH2M Hill
James D. Hillhouse; Hillhouse & Associates
David H. Horner; CADD/GIS Technology Center
Edward L. Huell, Jr.; CADD/GIS Technology Center
Steve Hutsell; U.S. Army Corps of Engineers
James G. Jackson; Autodesk, Inc.
Raymond Jenkins; Torti Gallas and Partners
Gregory L. Jordan; Dewberry & Davis, LLC
John P. Kiernan; U.S. Coast Guard
Mark W. Kiker; DMJMH+N, Inc.
Stephen B. Lafferty, AIA; O'Keefe Architects
Gary W. LaRose, CSI CCS; Dean And Dean Associates Architects, P.A.
Paul LaNigro; Jacobs
David E. Lorenzini; Architectural Resources Company

W. Edward Lowe; Burgess & Niple
Craig M. Lucas; International Academy of Design & Technology
Peg Manuel; WJA
Barrie Mathews; Softco Engineering Systems Inc.
John Patrick McCaffrey; CSI, CCS, AIA
Fred Miller; GSA
Richard Morse; Data CAD LLC
Roger Morse; Morse Associates
Jeff Moths; Forrer Business Interiors, Inc.
Dean Mueller; Lucien Lagrange & Associate, LTD
James L. Mulligan, Jr.; HDR Architecture
Guillermo A. Navas; SMACNA
Reginald Nora; Intel Corp.
E. Scott Okes, RA, CCCA; Dewberry & Davis
Gregory A. Olsen; HDR Architecture, Inc.
Robert R. Oswald; Patrick Architectural
Larry Pace; Duke Energy
Dennis Patnode; HDR
Robin J. Peter; Intel Corp.
Eric C. Quinn; Washington State Parks & Recreation Commission
Michael R. Rader; FKP Architects, Inc.
Robert C. Reide; HDR Engineering, Inc.
Rachel Rogerson; Spectrum + Bennion
Brad Schiffer; TAXIS, Architects/Planners
Eva Schocken; Dietz & Company Architects
Stephen R. Scott; Haden Inc.
Sephen Shatter; Multnomah County, Oregon
Alexander (Sandy) Shaw, National Institute of Building Sciences
Joel S. Shelton; Intel Corp.
Douglas C. Sholl; HDR
John L. Smart; Lindsey & Ritter, Inc.
Bradley A. Smith; EDAW, Inc.
Cheryl A. Smith; Cope Linder Associates
Dana K. (Deke) Smith; Army Research Laboratory
Haden D. Smith, AIA; Gunn & Smith Architects
Roydan B. Soder; Intel Corporation

Stephen Spangler; CADD/GIS Technology Center
Carl Staats, HDR Architecture, Inc.
Susan E. Stancik; A. Morton Thomas & Associates
Joseph A. Stypka, AIA, CSI, CCS; Murphy/Jahn
Michael Tardif; American Institute of Architects
Brett V. Taute; Multnomah County, Oregon
Nancy Tromble; Johnson Controls, IFM
Jens Henry Vange; Architectural Alliance
Jack Vest, AIA, CSI, CCS, CCA; Consulting Engineers
James R. Waller; Naval Facilities Engineering Command
Curt L. Wardlow; Burns & McDonnell
James Wedding; Jones & Boyd Inc.
Daniel Wells; MHTN Architects, Inc.
Scott Wikstrom; Roof Spec Inc.
James (Toby) Wilson; CADD/GIS Technology Center
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Michael Wright; SUNY Buffalo, Facilities Plan & Design
Robert Yandow; Axiom International

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Vice-Chair: John Patrick McCaffrey, CSI, CCS, AIA; Construction Specifier
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 William Bambeck; Christian Ideas Co.
 David Barisa; Anderson Brown Higley Associates
 Gary L. Beimers, CDT, CSI; McGraw-Hill Construction Information Group
 Javier Bersabe; Thornton-Tomasetti Group
 Kevin Black; Simon Property Group
 David M. Bono; The Dewolff Partnership
 Janine Boyer-Richards; Boyer Richards Services
 Mark Brazee; Pahl-Pahl-Pahl Architects
 Laurence W. Bunch; Corley Redfoot Zack
 Kevin J. Busacker; Leo A. Daly Company
 John P. Cooney; E-B-L Engineers Inc.
 Milton Costello, P.E. C.C.S.; Consulting Engineer
 Cathleen Curtin, AIA; Construction Specification Institute
 Scott DeGaro; Trudeau/Architects
 Vijay Duggal; Port Authority of NY & NJ
 Dale H. Durham; Durham & Associates, Inc.
 Dagmar Epsten; The Epsten Group
 Kristine K. Fallon, FAIA; Kristine Fallon Associates, Inc.
 Joe Y. Fuchida; Fuchida Associates, Architects
 Paul Gold, AIA; Autodesk, Inc.
 Debbi L. Gottlieb, AIA; Dietz & Company Architects
 Charles R. Green; Wilson Company
 Dennis J. Hall, AIA, FCSI; Hall Architects
 John R. Harrington, P.E.; The Austin Company
 Michael A. Hayes; CH2M Hill
 Paul D. Herold; U.S. Coast Guard
 James G. Jackson; HDR Architecture, Inc.
 Gary L. Joaquin; GLV & Associates
 Richard S. Johnson; Frankfurt-Short-Bruza

Raymond Karenas, AIA, CSI; McClier Corporation
Thomas M. Kennedy; The California State University
Kevin Knippa, AIA; Avatech Solution
Stephen B. Lafferty, AIA; O'Keefe Architects
Gary W. LaRose, CSI CCS; Dean And Dean Associates Architects, P.A.
Tom Liebel, AIA; Design Collective, Inc.
David Lorenzini, FCSI, CCS; Architectural Resources Co.
W. Edward Lowe; Burgess & Niple
Craig M. Lucas; International Academy of Design & Technology
Leonard Martin; Peter Basso Associates, Inc.
Barrie Mathews; Softco Engineering Systems Inc.
Jean A. McGinn; Headquarters U.S. Army Corps of Engineers
Maria Minassian; Khatib & Alami Consolidated Engineers Co.
Jeffrey H. Morgan; Dietz & Company Architects
Richard Morse; Data CAD LLC
Roger Morse; Morse Associates
Jeff Moths; Forrer Business Interiors, Inc.
Dean Mueller; Lucien Lagrange & Associate, LTD
Guillermo A. Navas; SMACNA
E. Scott Okes, RA, CCCA; Dewberry & Davis
Robert R. Oswald; Patrick Architectural
John R. Potter; Hart Freeland Roberts
W. John Powell, AIA; PEI Partnership Architects
Victor M. Prebor; Lunz Prebor Fowler Architects
Rob Rafferty; Rafferty Rafferty Tollenfson Architects
William Rakatansky; Freeman White Inc.
Abdul-Raouf Rifai; Khatib & Alami Consolidated Engineers Co.
Brad Schiffer; TAXIS, Architects/Planners
Eva Schocken; Dietz & Company Architects
Robert Schulz; California State University
Neil Sego; Schmidt Associates
Alexander (Sandy) Shaw, National Institute of Building Sciences
Kevin M. Shertz; American Institute of Architects
Dana K. (Deke) Smith; Army Research Laboratory
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Ron Smith, AIA; Dick & Fritsche Design Group
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Anamaria Tusa; Thornton-Tomasetti Engineers
Lynn L. Twyeffort; Sandia National Labs
Casey Upshaw; Flad & Associates
Jens Henry Vange; Architectural Alliance
Jack Vest, AIA, CSI, CCS, CCA; Consulting Engineers
James Wedding; Jones & Boyd Inc.
William Max Wells, Jr., CCS, RA; Little & Associates - Architects
Scott Wikstrom; Roof Spec Inc.
James (Toby) Wilson; CADD/GIS Technology Center
Michael Wright; SUNY Buffalo, Facilities Plan & Design

NCS Version 1.0 Project Committee

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Benjamin Adams; Social Security Administration

Norman Arendt; Mead & Hunt Inc.

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John J. Clements, AIA; Plans & Programs Division, Facilities Department

David Commeree; Architects BBL

Wilbur A. Conyers; Boyle Engineering Corp.

Kenneth R. Crellen; Emory University

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Vijay Duggal

Herbert R. Duncan; The Methodist Hospital

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Roger N. Fish; Roger N. Fish, Architect

Guillermo Flores, Jr., P.E.; Architectural Consultants, Inc.

Hal Foster; NYC Human Resources Administration

Brad E. Gee; ManTech TIS Corp.

Charles R. Green, CSI, CDT; The Construction Specifications Institute

Dennis J. Hall, CSI, CCS, CCCA, AIA; The Construction Specifications Institute

Michael L. Herman; J. Albert Paquette & Associates, Inc.

Paul D. Herold; U.S. Coast Guard

Michelle Hogg; A.M. Kinney, Inc.

Donald M. Holmes; Clapp & Holmes
Helen B. Jeffery; RTKL Associates, Inc.
Arthur Kjos; Clark Kjos Architects
Gary W. LaRose, CSI, CCS; The Construction Specifications Institute
Lisa W. Lamkin; Brown Reynolds Watford Architects
David E. Lorenzini, FCSI, CCS; Architectural Resources Company
Barrie Mathews; Softco Engineering Systems Inc.
John P. McCaffrey, CSI, CCS, AIA; The Construction Specifications Institute
Jean A. McGinn; HQUSACE CEMP-ES
Jim Miller; Ziger Snead Architects
Roger G. Morse, AIA; Morse Associates
Dean Mueller; Lucien Lagrange & Associates
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Stella Wattles-Samples; CADStar Enterprises
Brad Schiffer; TAXIS
Michael Schley, AIA; FM Systems
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Richard See; Visio Corporation
Shaun Severin; Carollo Engineers
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Gary W. Smith; J. Hyatt Hammond Associates, Inc.
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Michael Tardif, Assoc. AIA; The American Institute of Architects
Darin Unze; Sebesta Blomberg & Associates
William K. (Casey) Upshaw, AIA; Flad & Associates
Claudia Veihl; Thistlethwaite Architectural Group
Jack Vest, P.E., CSI, CCS, CCA; The Construction Specifications Institute
John R. Weber, AIA; Architect of the Capitol
Fred R. Williamson III; Williamsons
Scott J. Windley; US Architectural Transportation Barriers Compliance Board
Kevin Wyatt; Randall Paulson Architects

NIBS Consensus Process

(Used by NCS Project Committees for Versions 1.0, 2.0, & 3.0)

The Consensus Process of the National Institute of Building Sciences

Section 1. General. The consensus process shall be followed for projects when directed by the Institute Board of Directors.

Section 2. Project Committee. A project committee shall be established when the FIC Board of Direction and the NIBS Board of Directors have determined that a building community consensus is required.

2.1 A project committee shall consist of an unlimited number of FIC Board of Direction or Institute Members. Institute Members desiring participation shall apply in writing in response to project announcements and will become active or reviewer members, as they prefer. The FIC Board of Direction shall establish a closing date for membership on the project committee.

2.2 To establish balance or obtain needed special expertise as determined by the FIC Board Of Direction, individuals shall be invited by the FIC Board Of Direction Chairman to serve as appointed members (active or reviewer) of the project committee.

2.3 Timely notice shall be given of each project committee formation, stating its mission and purpose and offering membership to all interested members of the Institute.

2.4 Project committee chairman shall be appointed by and serve at the discretion of the FIC Board Of Direction Chairman following consultation with the President and upon receiving the concurrence of the Chairman of the NIBS Board of Directors.

2.5 The vice-chairman of a project committee shall be elected by the committee membership. When necessary, the vice-chairman shall assume the duties of the chairman and shall perform such other duties as may be assigned by the chairman.

2.6 The secretary of a project committee shall be elected by the committee membership and shall perform duties normally incident to the office, including the preparation and keeping of minutes of committee meetings and other records as may be required by the chairman, and shall perform such other duties as may be assigned by the chairman.

2.7 The project committee chairman may appoint a steering committee to advise and assist in the development of policies and programs for work; provide assistance in the administration of committee activities; assure coordination of the work of the project committee with associated work of other project committees; and generally serve as an oversight group to evaluate the actions and findings of the project committee and its project subcommittees in the execution of the project assignment. A steering committee must be reasonably balanced and representative of the interests involved in the project.

2.8 An active member of a project committee who has two absences from any series of three consecutive meetings shall be automatically classified as a reviewer member. An active or reviewer member who has failed to vote on any written ballot shall no longer be a member of the project committee.

2.9 Upon due notification, the FIC Board Of Direction may terminate a project committee for any of the following reasons:

2.9.1 Completion of its assignment.

2.9.2 Unavailability of funds to carry on the work.

2.9.3 The need for the work ceases to exist.

2.9.4 Inactivity.

2.9.5 Serious noncompliance with the Rules.

2.9.6 By instructions of the Board of Directors.

2.9.7 For such other reasons deemed appropriate.

2.10 A project committee shall:

2.10.1 Perform all work assigned by the FIC BOARD OF DIRECTON in conformity with the project scope.

2.10.2 Conduct its business in strict compliance with these Rules.

2.10.3 Keep accurate records of committee proceedings.

2.10.4 Submit all final reports to the FIC BOARD OF DIRECTON for review as to compliance and conformity with procedures and policies.

2.10.5 Maintain the privacy of all reports, resolutions and other written documents until final approval and release of such information for public use is authorized by the Board of Directors.

Section 3. Project Subcommittees.

3.1 A subcommittee chairman and members of a project subcommittee shall be selected from the project committee membership and shall be appointed by and serve at the discretion of the chairman of the project committee.

3.2 Selection for project subcommittee membership shall be based on the expertise and professional experience of the individual members to deal with a specific work assignment. All findings and/or recommendations emanating from the subcommittee are subject to the review and approval of the project committee to which it reports. Subcommittee meetings do not require a quorum and subcommittee reports are not normally balloted.

Section 4. Definitions.

4.1 "Active members" of project committees are those Institute members who responded to a call for participation in a project committee by indicating that they would be able to attend project committee meetings and take an active part in discussion and voting at the meetings.

4.2 "Reviewer members" are those Institute members of project committees who indicate an interest in participation in the project committee, but are not able to attend meetings and take an active part in project committee deliberations, but agree to review, comment and vote by ballot on project committee reports and documents. A review member attending the first meeting of the project committee shall upon receipt of a written request within ten (10) days after the first meeting, be reclassified as an active member.

4.3 "Appointed members" are individuals who are not Institute members but who have accepted an invitation to serve on a project committee in an active or reviewer status.

4.4 The term "consensus" used throughout these Rules is the prevailing judgment rendered by a body of people representative of a broad cross-section of impacted or involved interests, balanced so that no single interest can dominate the proceedings and acting under due process to develop a solution to a specific problem or issue.

4.5 Terms used in these Rules such as "balance," "balanced committee," and other similar wording shall all mean that the membership of each and all committees, unless otherwise noted

herein, shall consist of individuals representing the broad interests of the Institute. Balanced shall not be construed to necessarily require a complete constituency or a numerical proportioning of all the interest groups represented in the Institute.

4.6 Institute Members are categorized in one of the following twelve (12) classifications based on their primary trade, occupational or business affiliation. Representatives of trade and professional associations, and societies are categorized in the interest classification they primarily represent. Consultants, private attorneys and other similar individuals are classified in categories they predominantly serve. The purpose of the "interest classifications" is to insure an appropriate and balanced representation of the various interests of the building community in the makeup of project committees.

Consumer and General Interest - Consumers, users, academia, media, and public interest groups.

Architects - Architects and related professionals in private practice.

Engineers - Engineers and related professionals in private practice.

Federal Government - Officials and representatives of federal government agencies.

State and Local Government - Officials and representatives of state and local government including code officials.

Building Construction - Building construction contractors, subcontractors and utilities.

Labor Organizations - Building trade unions.

Housing - Builders, developers and housing producers.

Building Materials and Products - Producers, manufacturers and distributors of materials and products used in the building process.

Standards - Standards writing or producing organizations.

Real Estate, Finance and Insurance - Owners, real estate financial and insurance organizations.

Research, Testing and Other Services - Research organizations, testing laboratories, and other service organizations.

Section 5. Meeting Notices. Written notices of all meetings of project committees shall be mailed not less than thirty days prior to the scheduled dates of such meetings, and shall give the place, time and other necessary information. Agenda and supporting documents shall be mailed at least 15 days prior to the meeting. Chairmen may call special meetings for specific purposes.

Section 6. Open Meetings. All meetings of project committees and project subcommittees shall be open to visitors.

Section 7. Visitors.

7.1 Visitors who are not members of the Institute may participate in meeting discussion with the permission of the chairman, but are not eligible to make or second motions or to vote. Members in good standing of the Institute, who are not active committee members, are eligible to participate in meeting discussions and to make motions or to second motions, but are not eligible to vote.

7.2 The chairman shall identify and introduce all visitors, determine their membership status, advise them of their rights and privileges, and instruct the secretary to enter their names and business affiliation into the minutes of the meeting.

Section 8. Meeting Quorums.

8.1 Meetings of any project committee will be considered duly constituted and officially ready for business when one third of active committee members are present.

8.2 Meetings of project subcommittees do not require a quorum.

8.3 Any scheduled meeting of a project committee that does not have a quorum of its members present, may be opened at the option of the chairman for purposes of discussion, but shall not be allowed to take any official action. If a quorum is not present at a meeting, actions may be taken subject to confirmation by letter ballot.

Section 9. Voting Privileges.

9.1 All project committee members shall be entitled to ballot on documents and draft reports.

9.2 Only active members are entitled to vote at project committee meetings. Two or more active members representing a single organization or agency shall have one vote at project committee meetings.

9.3 An active member may appoint an alternate who is entitled to full participation and voting privileges in the absence of the active member. Alternates shall be Institute Members.

9.4 At project committee meetings, the project committee chairman shall identify eligible voters at the start of a meeting. Proxies are not permitted.

Section 10. Approval of Report. Final reports shall require approval by written ballot.

10.1 In each ballot of a project committee two thirds majority of the total votes cast, excluding abstentions, shall be considered a consensus and shall constitute due and proper procedure to validate the action of the committee. Not less than a majority of those entitled to ballot, including abstentions, must be involved in the vote.

10.2 A project committee report may be revised and resubmitted, with ballot, to the project committee for as many iterations as needed to obtain approval.

10.3 The project committee chairman shall establish a date for return of written ballot. A minimum of 30 days shall be provided for members to review and ballot the final report.

10.4 When balloting to approve a report, project committee members shall cast their votes in one of the following categories:

- Accepted
- Accepted with comment
- Abstain
- Negative

10.5 A negative vote must be substantiated to be valid. This provision shall be stated on the ballot.

10.6 All comments submitted with a negative vote or an accepted-with-comment vote will be reviewed at a meeting of the project committee, unless the steering committee finds the comments to be editorial, and in turn notifies the project committee of the decision and provides copies of the comments. Should a committee member, other than the submitter, disagree with the decision of the steering committee, and state in writing the reason for such disagreement, the comments will be reviewed at a meeting of the project committee.

10.7 At a meeting of the project committee all comments submitted shall be evaluated, categorized, and disposed as follows:

Persuasive - relevant and of such substance as to require incorporation into the original report.

Non-Persuasive - relevant but not of such substance as to affect the original report.

Not-Relevant - not consistent with the intent or subject matter of the report.

Editorial - changes in grammar, punctuation or format and revisions will be made.

10.8 The project committee chairman shall notify all who submit comments with a ballot of the project committee's disposition of the comments. A voter who disagrees with the disposition of the voter's comment may appeal directly to the project committee chairman for reconsideration. The project committee chairman and steering committee, if any, shall evaluate the appeal and re-categorize the comment, if warranted.

10.9 A decision by the project chairman or steering committee, if any, to reject the appeal may be appealed to the chairman of the FIC Board of Direction for review and adjudication by the Committee. However, the FIC Board of Direction will only consider appeals related to the Rules and Procedures or NIBS policy. Technical issues are the sole responsibility of the project committee.

10.10 Project committee members who cast negative votes with comments found to be persuasive and incorporated into the original report may change their vote to accepted or accepted-with-comment.

Section 11. Minority Opinions. Minority opinions may be filed as an appendix to all NIBS reports adhering to the following general guidance.

11.1 Minority opinions may be submitted only by project committee members who have cast an accepted-with-comment or a negative vote.

11.2 Only those submitting comments held to be persuasive or non-persuasive by the project committee will be entitled to file a minority opinion to be considered for publication. A minority opinion will not be published without the expressed written consent of the author.

11.3 Minority opinions shall address only the substance of comments submitted with a ballot.

11.4 The content of the minority opinion shall be as follows:

11.4.1 Identify the subject and state the objection.

11.4.2 Explain the rationale for the objection.

11.4.3 State alternates that are recommended.

11.4.4 Sign the statement.

11.5 Minority opinions may be submitted on separate issues contained within a single report but each must be prepared separately.

11.6 Minority opinions on a single issue may be combined and signed jointly.

11.7 Minority opinions must be prepared to meet the deadline for submittal of the original report.

11.8 The format of a minority opinion submitted is subject to change and the content subject to editorial review without change in intent to assure one style in the report.

11.9 The project committee chairman and steering committee, if any, shall evaluate minority opinions for adherence to these Rules and authorize publication. If publication is rejected, the decision may be appealed to the chairman of the FIC Board of Direction for review and adjudication by the FIC Board of Direction.

Section 12. Records. The secretary of each project committee or Institute staff shall, where applicable, organize and keep accurate records of all written matter, including but not necessarily limited to the following:

12.1 Minutes of all scheduled meetings;

12.2 Voting records of all actions taken;

12.3 Attendance at meetings including visitors;

12.4 Letter ballots;

12.5 Correspondence, including meeting notices;

12.6 Reports, resolutions and all other written matter;

12.7 Financial reports, including budgets and expenditures;

12.8 Memoranda giving information on significant verbal communications, including instructions from the FIC Board of Direction; and

12.9 All such other records as may from time to time be requested by the Chairman, and on request, all records may be open for inspection by (a) members of the Committee; (b) authorized staff of NIBS; (c) all members of the NIBS Board of Directors and the Board of Direction; and (d) by such other individuals as may from time to time be expressly authorized by the chairman of the FIC Board of Direction.

NCS Rules of Governance–September 2003

(To be used with Version 3.1 and later)

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PART I – ORGANIZATION

1.1 Purpose

The purpose of this document is to establish Rules of Governance for the U.S. National CAD Standard Project Committee (hereinafter the Project Committee), a voluntary membership organization of the National Institute of Building Sciences (NIBS) operating under the oversight of the NIBS Consultative Council.

1.2 The U.S. National CAD Standard

1.2a The purpose of the U.S. National CAD Standard for Architecture, Engineering and Construction (NCS) is to advance the art and science of design, construction, management, operation and maintenance of the vertical and horizontal built environment by providing a means of organizing and classifying electronic design data and thereby fostering streamlined communication among owners, designers, material suppliers, constructors, and facility managers.

1.2b The NCS is jointly published by the NIBS, the American Institute of Architects (the AIA), and the Construction Specifications Institute (CSI) in accordance with the terms of an Agreement for Publication and Distribution of the NCS (the “publication agreement”) signed by the parties. NIBS is the publisher of record of the NCS and owns the copyright in the compilation. The AIA and CSI own the copyright in their respective constituent publications. NIBS is authorized by the Agreement to act on behalf of the AIA and CSI with respect to the intellectual property rights embodied in the NCS.

1.3 Scope and Limit of Responsibility

The Project Committee is responsible for the development of the content and subject matter of the NCS. The authority to manage the business affairs of the NCS is reserved solely to the parties to the publication agreement. In the execution of its duties, the Project Committee has no authority to exceed the resources made available to the Project Committee by NIBS in accordance with the terms of the publication agreement.

1.4 Establishment and Authority

1.4a The Project Committee derives its authority from and shall report to the NIBS Consultative Council, through the chair of the Project Committee. The Consultative Council is comprised of elected NIBS members, the chairs of NIBS' councils and committees, and a chair who is a member of the NIBS Board of Directors. The Consultative Council may dissolve the Project Committee at any time and upon due notice for any of the following reasons:

- completion of its assignment
- lack of funds to carry out the work
- the need for the project ceases to exist
- inactivity
- failure of the Project Committee to comply with these Rules of Governance and the Bylaws of NIBS
- upon instruction received from the NIBS Board of Directors
- other reasons deemed appropriate by the Consultative Council

1.4b Any governance authority with respect to the development of the content of the NCS not vested in the NIBS Board of Directors or the Consultative Council by the NIBS Bylaws (www.nibs.org) and not specifically vested in the Steering Committee or the officers of the Project Committee by these Rules of Governance is reserved to the Project Committee as a whole (see NCS Organization Chart appended). The Project Committee may delegate any such authority to the Steering Committee or a task team as it so chooses upon approval of a majority of Project Committee members whose effective date of membership is 84 or more calendar days prior to the date that a ballot for such delegation of authority is issued.

1.4c These Rules of Governance shall become effective upon approval of 2/3 of current Project Committee members and approval by the Consultative Council and the NIBS Board of Directors.

1.5 Amendment or Delegation of Authority

1.5a This paragraph and its sub-paragraphs describe how these Rules of Governance may be amended in the future, or how the Project Committee may delegate its authority to the Steering

Committee or a task team. Amendment of the NCS itself is addressed in Part II, “NCS Development and Revision Process.”

1.5b Amendments to these Rules of Governance shall require the approval of 2/3 of Project Committee members whose effective date of membership is 84 or more calendar days prior to the date the proposed amendment(s) are issued for ballot.

1.5c Proposals to amend these Rules of Governance or to delegate any authority of the Project Committee to the Steering Committee or a task team shall be submitted by written petition to the Steering Committee authored by not fewer than 10 Project Committee members, of whom no more than 2 may be employees or representatives of a single company. The Steering Committee may also draft and submit proposed amendments to the Project Committee upon the approval of 2/3 of the Steering Committee members.

1.5d The Steering Committee shall vote to endorse or not endorse any such petition within 35 calendar days of receipt of the petition. The ballot for any such petition shall be submitted to the Project Committee for a vote within 56 calendar days of the Steering Committee’s action on the petition. If the Steering Committee takes no action with respect to a petition, the ballot shall be submitted to the Project Committee for a vote within 91 calendar days of receipt of the petition.

1.5e Proposals to amend these Rules of Governance may not be combined on the same ballot with proposals to delegate any authority of the Project Committee to the Steering Committee or a task team, nor shall either type of proposal be combined with any ballot to amend the NCS itself.

1.5f The ballot period for proposed amendments to these Rules of Governance or to delegate any authority of the Project Committee to the Steering Committee or a task team shall be not less than 35 calendar days.

1.5g Amendments to these Rules of Governance approved by the Project Committee, the Consultative Council and Board of Directors shall become effective on a date to be determined by the Steering Committee but no later than the start of the next NCS revision cycle that begins after the closing date for the Rules of Governance amendment ballot.

1.5h If amendments to these Rules of Governance are not approved by either the Consultative Council or the Board of Directors, the Steering Committee shall give notice of such disapproval to the Project Committee within 14 calendar days of such action, accompanied by an explanation of the reason or reasons for disapproval.

1.5i Any delegation of authority of the Project Committee to the Steering Committee or a task team shall become effective within 28 calendar days of the closing date of the ballot distributed for that purpose.

1.6 Contributing Organizations

Contributing organizations are those organizations having an ownership interest in the intellectual property embodied in the NCS. The founding contributing organizations are NIBS, the AIA, and CSI. Other organizations may become contributing organizations upon the incorporation of intellectual property owned by such organizations into the NCS by approval of the Project Committee through its ballot process, and upon mutually satisfactory amendment and signature of the Agreement for Publication and Distribution of the NCS by any new contributing organization(s) and the parties to the original Agreement.

1.7 NCS Business Management Group

The NCS Business Management Group (the “Business Management Group”) is comprised of one staff member of each of the contributing organizations having an ownership interest in the NCS. The members of the Business Management Group have the limited authority to act as authorized agents of their organizations with respect to the management of the business affairs of the NCS in accordance with the terms of the Agreement for Publication and Distribution of the NCS.

1.8 Project Committee Membership

1.8a Membership on the Project Committee is open to individuals who have knowledge of and interest in the subject matter of the NCS, including but not limited to: architects; engineers and constructors of all construction disciplines; material suppliers; construction product manufacturers; construction industry publishers; academic faculty; building owners; facility managers and operators; building users; and employees or representatives of building industry trade associations, code and standards organizations, labor organizations, professional societies, software developers, federal, state, or local government agencies, and consumer or public interest groups. The members of the Business Management Group or their designated alternates may serve as non-voting ex-officio members of the Project Committee. All other employees of the contributing organizations are not eligible to serve as volunteer or ex-officio members of the Project Committee.

1.8b Persons interested in serving on the Project Committee shall complete a Project Committee Membership Application Form and return the form to NIBS as indicated on the form. Membership shall become effective upon confirmation of receipt of the form by NIBS. Confirmation of membership shall be issued to the applicant by NIBS within 14 calendar days of receipt of the Membership Application Form.

1.8c Project Committee members shall legally obtain and have in their possession a copy of the most recent version of the NCS for the purpose of conducting the work of the Project Committee and shall provide verification of ownership with the membership application.

1.8d Project Committee members, or their sponsoring companies or organizations, shall bear the full cost of participation on the Project Committee, including purchase of the most recent version of the NCS and travel and lodging costs to attend Project Committee meetings.

1.8e Membership on the Project Committee shall continue indefinitely until such time as the member becomes inactive or chooses to resign by written notice to NIBS. Members who fail to submit a vote on any written ballot shall be considered inactive and no longer a member of the Project Committee. Persons removed from the Project Committee due to inactivity may be reinstated upon completion and submission of a new Membership Application Form.

1.8f Project Committee members shall be eligible to vote on any ballot that is issued 84 or more calendar days after the effective date of membership.

1.9 Project Committee Officers

1.9a The chair of the Project Committee shall be appointed by and serve at the discretion of the chair of the NIBS Consultative Council in consultation with the President of NIBS and with the concurrence of the chair of the NIBS Board of Directors, for a term concurrent with each revision cycle and expiring upon the start of the subsequent revision cycle. The chair of the Consultative Council shall consider nominations for Project Committee chair made by a nominating committee of not fewer than 5 and no more than 9 Project Committee members. Members of the nominating committee shall be appointed by and serve at the discretion of the Steering Committee.

1.9b The vice-chair of the Project Committee shall be elected by majority vote of the Project Committee immediately prior to or at the beginning of each revision cycle of the NCS for a term concurrent with that revision cycle and expiring upon the start of the subsequent revision cycle.

When necessary, the vice-chair shall assume the duties of the chair and shall perform such other duties as may be assigned by the chair.

1.9c The secretary of the Project Committee shall be elected by majority vote of the Project Committee immediately prior to or at the beginning of each revision cycle of the NCS for a term concurrent with that revision cycle and expiring upon the start of the subsequent revision cycle.

1.10 Steering Committee

1.10a The chair of the Project Committee shall appoint a Steering Committee to consist of the Project Committee chair, vice-chair, secretary, and no fewer than 5 and no more than 9 additional Project Committee members, who shall serve at the discretion of the Project Committee chair. The chair of the Project Committee shall chair the Steering Committee. The members of the Business Management Group shall serve as non-voting ex-officio members of the Steering Committee.

1.10b The Steering Committee shall develop policies and procedures to carry out the project, assist in the administration of Project Committee activities, coordinate the work of the project with other NIBS project committees, and generally serve as the governing body of the Project Committee in accordance with these Rules of Governance. The scope of responsibility of the Steering Committee shall include, but not necessarily be limited to, the format of application forms, ballot submittal forms, and ballots; methods of Project Committee communication, collaboration, and balloting; Project Committee timelines, schedules, and revision cycles; meeting venues and media; and any other responsibilities defined elsewhere in these Rules of Governance.

1.10c The Steering Committee shall be representative of the interests involved in the project. The Project Committee chair may accomplish this objective by appointing to the Steering Committee the chairs of standing and ad-hoc task teams or by some such other method as may be satisfactory to the Consultative Council and the Project Committee.

1.11 Task Teams

1.11a Task teams shall be established by and serve at the discretion of the Steering Committee. The Steering Committee may establish task teams at any time and shall determine the appropriate number of members for each task team at the time of formation. The Steering Committee may remove task team members due to inactivity and appoint new task team members to fill vacancies

at any time. Project Committee members may serve concurrently on the Steering Committee and no more than 3 task teams. The members of the Business Management Group or their designated alternates may serve as non-voting ex-officio members of all task teams.

1.11b The Steering Committee shall notify the Project Committee of the formation of task teams and provide for a period of not less than 28 calendar days during which Project Committee members may volunteer to serve on a task team by completing and submitting a Task Team Application Form (see Appendix). The Steering Committee shall appoint task team chairs and task team members on the basis of their professional experience and knowledge of the specific task. The chairs of task teams may appoint to their task teams in an advisory, non-voting capacity persons who are not members of the Project Committee but who have particular expertise in the subject matter within the realm of the task team's responsibility. Such appointments shall be subject to the approval of the Steering Committee.

1.11c Standing task teams shall have as their primary responsibility oversight of a particular subset of the existing content of the NCS. The term of individual standing task team members shall be concurrent with and expire upon the completion of each revision cycle of the NCS. There shall be no limit to the number of consecutive terms a Project Committee member may serve on a standing task team. The Steering Committee may re-appoint standing task team members who have performed their duties satisfactorily without requiring the submission of a new Task Team Application Form.

1.11d Ad hoc task teams shall be formed to investigate, explore or address specific matters. The Steering Committee shall provide each ad-hoc task team with a specific charge, timetable, and expected deliverable. Typical deliverables may include, but are not necessarily limited to, a report to the Project Committee, recommendations for addition of new or removal of existing modules of the NCS, or development of a new module of the NCS to be submitted to the Project Committee for incorporation into the NCS by ballot.

PART II – NCS DEVELOPMENT AND REVISION PROCESS

2.1 Overview

2.1a The NCS development and review process described herein is anticipated to occur on a six-month revision cycle. The actual length of revision cycles will be established at the sole discretion of the Steering Committee. A short revision cycle is intended to help foster continued revision of the NCS, and to help keep the number of ballot items on any one ballot to a reasonable number, thus enabling Project Committee members to give each ballot item due consideration. A short revision cycle also assures Project Committee members who are unable to submit ballot items by a submittal deadline that the next submittal period is only several months away.

2.1b It is not intended that all issues related to the NCS be proposed, developed, and submitted for ballot in a six month time frame. Substantial tasks such as research of new technologies, development of new modules of the NCS, or deletion of existing modules, which will be the responsibility of ad-hoc task teams, may require more time and effort. Once such work is ready for the consideration of the Project Committee, it will be submitted in accordance with this development and revision process.

2.2 Revision Cycle

2.2a At the start of each revision cycle, the Steering Committee shall distribute to the Project Committee a schedule for that revision cycle, indicating calendar dates and length of time for each period. The revision cycle periods are listed below and shall be of the length of time indicated in parentheses as follows:

- Ballot Item Submission Period (56 calendar days); see Article 2.7
- Ballot Item Review Period (28 calendar days); see Article 2.8
- Ballot Item Comment Period (minimum of 28 calendar days); see Article 2.10
- Comment Review and Summary Period (14 calendar days); see Article 2.11
- Ballot Review and Discussion Meeting (2 calendar days); see Article 2.12

- Ballot Preparation and Distribution Period (maximum of 21 calendar days); see Article 2.13
- Ballot Voting Period (minimum of 28 calendar days); see Article 2.14
- Ballot Results Preparation, Certification, and Distribution Period (7 calendar days); see Article 2.15

2.2b The Steering Committee may at any time and upon 35 calendar days notice to the Project Committee, convene a meeting of the Project Committee to discuss and debate significant issues, identify subject areas in need of investigation or research, develop a list of desired ballot items, assign tasks to task teams, or otherwise conduct the work of the Project Committee and further the development of the NCS.

2.3 NCS Content: Fundamental Concepts vs. Prescribed Data

2.3a The content of the NCS can be classified in one of two general categories: fundamental concepts of data organization and classification, and prescribed data that conform to those concepts. Examples of fundamental concepts include, but are not necessarily limited to, layer name format, drawing set organization, sheet identification format, file naming format, sheet layout format, schedule layout format, drafting conventions, methodology and guidelines for terms and abbreviations, and organization and classification of symbols. Examples of prescribed data include, but are not necessarily limited to, lists of layer names, the list of discipline designators, the table of standard sheet sizes, examples of sheet identification, typical schedules, the list of terms and abbreviations, and the list and graphical depiction of symbols.

2.3b In general, changes to fundamental concepts substantially affect the body of prescribed data, or substantially alter implementation of the NCS. Changes to the prescribed data generally affect only the discrete data in question. For example, a change in the required layer name format would necessitate a complete revision of all prescribed layer names, while adding, deleting or modifying individual layer names affects only the layer names in question.

2.3c In order to assure the marketplace of the stability of the NCS, the Project Committee shall consider whether ballot items are related to fundamental concepts or are limited to prescribed data.

2.4 NCS Content: Existing vs. New

2.4a The integrity of the NCS and its value to the built environment community rests, in part, on the knowledge that the existing content will not change arbitrarily with each revision cycle. The Project Committee has the power and authority to change any of the existing content of the NCS, including deleting entire modules, in order to keep pace with evolving technology or industry practices. The Project Committee also has the power and authority to add entirely new content.

2.4b In order to assure the marketplace of the stability of the NCS, the Project Committee shall consider whether ballot items are related to existing content or new content in the submission, review, debate, and balloting of all individual ballot items.

2.5 Ballot Item Submittal Forms

Standing task teams shall prepare and submit to the Steering Committee for approval Ballot Item Submittal Forms suitable for ballot items within the scope of their responsibility. If a particular format is required for submission, the Ballot Item Submittal Form shall clearly indicate the required format, or direct the author to the page or section of the NCS where the required format is indicated. All Ballot Item Submittal Forms shall be made available to all Project Committee members at the start of each revision cycle. The forms also shall be designed to record and capture, at a minimum, the following:

- the name of the author(s) and the their sponsoring organization(s);
- the date of submittal;
- the NCS module affected;
- the NCS page and paragraph number affected;
- the exact text and/or graphical depiction of the proposed amendment, addition to, or deletion from the NCS;
- documentation of related continuity issues—other parts of the NCS that would have to change, for reasons of consistency and continuity, upon approval of the ballot item;
- whether the proposed ballot item is new content or adds to, deletes from, or amends existing content;

- whether the proposed ballot item is related to a fundamental concept or to prescribed data;
- whether approval of the ballot item is conditional upon approval of another ballot item on the same ballot;
- a brief supporting commentary or explanation for the ballot item by the author(s);
- the disposition of the submittal by the task team (approved or disapproved);
- the date of disposition by the task team.

2.6 Ballot Item Scope

Each ballot item shall be limited to a single topic of the NCS. For example, if an author proposes to add a new discipline designator and submit a list of new layer names, new symbols, and new terms and abbreviations for that discipline, the author will prepare separate ballot items according to the topic or affected NCS module.

2.7 Ballot Item Submission Period

2.7a Any one or more Project Committee members, including ex-officio members, may propose to add to, delete from, or modify the NCS by preparing and submitting to the appropriate standing task team a Ballot Item Submittal Form.

2.7b Ballot items may be submitted at any time. In order to be considered for a revision cycle ballot, the ballot item must be submitted no later than the last day of the submission period. Early submissions are encouraged to allow sufficient time for revision and resubmission, if necessary.

2.7c Proposed ballot items which are not clearly within the responsibility of a standing task team shall be submitted to the Steering Committee, which may, at its sole discretion, act as the reviewing task team for that ballot item or refer the ballot item to a standing task team of its choosing for review.

2.8 Ballot Item Review Period

2.8a Standing task teams shall review and either approve or reject proposed ballot items. Task teams may conduct deliberations via e-mail or other electronic means, but shall meet regularly as

needed in person, via teleconference, via video conference, or some combination thereof to discuss, debate, and dispose of all ballot item submittals in a timely manner.

2.8b Standing task teams shall act promptly on all ballot item submittals, and must act on all submittals received by the close of a Ballot Submission Period. Ballot item submittals or re-submittals received after the close of a Ballot Submission Period shall be reviewed and acted upon by the responsible task team for the next revision cycle.

2.8c Standing task teams shall review all ballot item submittals for both conformance to the ballot item submittal requirements and the merits of the issue proposed in the submittal. The task team may, at its sole discretion, exercise its expert judgment in determining whether the proposed change in the NCS is appropriate to, is consistent with the purpose of, and enhances the body of knowledge embodied in the NCS; whether the proposed ballot item is related to fundamental concepts or prescribed data; and whether the ballot item modifies existing content or adds new content. Task teams shall endeavor to assist and cooperate with ballot item submittal authors to put proposed ballot items into proper form, though the primary responsibility for properly preparing ballot items shall rest with the authors.

2.8d Standing task teams shall forward promptly to the Steering Committee for inclusion in an upcoming ballot all ballot item submittals approved by 2/3 of the task team members.

2.8e Standing task teams shall return to the authors all ballot item submittals rejected by the task team, accompanied by a written explanation of the reasons for disapproval. The task team may advise the authors how to revise the submittal to increase the likelihood of approval upon resubmission. Such advice, however, shall not be construed as a guarantee of approval upon resubmission.

2.8f Ballot item submittals may be submitted for a task team's consideration no more than three times in any one revision cycle.

2.8g All ballot item submittals approved by a task team shall be made available for review and comment by all Project Committee members by the start of the Ballot Item Comment Period.

2.8h All ballot item submittals rejected by a task team, accompanied by the written explanation of the reasons for disapproval, shall be made available separately for review and comment by all Project Committee members by the start of the Ballot Item Comment Period.

2.9 Ballot Items by Petition

2.9a Ballot item submittals that have been rejected by a task team may be forwarded to the Steering Committee for inclusion in an upcoming ballot by petition authored by no fewer than 10 eligible Project Committee members, of whom no more than 2 may be employees or representatives of a single company.

2.9b Ballot items may be submitted by petition at any time. All ballot items submitted by petition must be received by the Steering Committee no later than 7 days prior to the close of the Ballot Submission Period in order to be included in the ballot for that revision cycle.

2.9c All ballot items submitted by petition shall be made available for review and comment by all Project Committee members in their original, unaltered form by the start of the Ballot Item Review and Comment Period.

2.9d The Steering Committee shall review all ballot items submitted by petition for conformance to the ballot item submittal requirements, but may not exercise its judgment with respect to the merits of the issue proposed in the submittal. The Steering Committee may, at its sole discretion, disapprove any ballot item submitted by petition that does not conform to the ballot item submittal requirements or whose intent or proposed impact on the NCS is unclear.

2.9e Ballot items submitted by petition that are not approved shall be returned promptly to the authors by the Steering Committee accompanied by a written explanation of the reasons for disapproval. The Steering Committee may advise the authors how to revise the submittal to increase the likelihood of approval upon resubmission. Such advice, however, shall not be construed as a guarantee of approval upon resubmission. Revisions require the concurrence of ten original authors.

2.9f The action of the Steering Committee with respect to any ballot items submitted by petition shall be made available for examination and review by all Project Committee members by the start of the Ballot Item Review and Comment Period.

2.9g Task teams that have disapproved a ballot item that is later submitted by petition may append a brief opposing commentary to the ballot item submittal.

2.10 Ballot Item Comment Period

Project Committee members may review and comment in writing on any ballot item approved by a task team or submitted by petition. The ballot item comment period shall be a minimum of 28 calendar days.

2.11 Comment Review and Summary Period

2.11a Standing task teams shall review the comments of Project Committee members for ballot items within their jurisdiction and prepare a written summary of the comments, both pro and con, to accompany the ballot item on the ballot. The Steering Committee shall perform or delegate this task with respect to ballot items received by petition.

2.11b Following comment review, standing task teams may confer with the authors of any ballot item and by mutual agreement modify a proposed ballot item in consideration of the comments made by Project Committee members.

2.12 Ballot Review and Discussion Meeting

2.12a The Project Committee shall meet to review, discuss, and debate all ballot items and comment summaries. The Project Committee may also review, discuss, and debate rejected ballot item submittals, though such discussion shall be for the limited purpose of airing issues related to rejected ballot items, after which the authors may consider re-submission in a subsequent revision cycle.

2.12b Following the review and discussion meeting, standing task teams may confer with the authors of any ballot item and by mutual agreement modify a proposed ballot item in consideration of the comments made by Project Committee members. The written summary of comments to accompany each ballot item shall be amended by the Standing Task Teams to provide a summary explanation of the modifications made to any ballot item.

2.13 Ballot Preparation and Distribution Period

2.13a The Steering Committee shall direct and oversee the compilation of all ballot items and ballot item comment summaries by the task teams. The compiled ballot shall be made available to the Project Committee no more than 21 calendar days following the Project Committee Ballot Review and Discussion Meeting.

2.13b The Steering Committee shall provide a list of eligible voters, including their contact information, to the Project Committee prior to the Ballot Voting period.

2.14 Ballot Voting Period

The ballot voting period shall begin no more than 21 calendar days after the Project Committee Ballot Review and Discussion Meeting and shall be at least 28 calendar days in length.

2.15 Ballot Results Preparation, Certification, and Distribution Period

2.15a Ballot results shall be tallied by NIBS and reported to the Steering Committee. The report shall include verification of the eligibility of voters and a tally of votes for each ballot item.

2.15b The Steering Committee shall certify the ballot results prepared by NIBS. The Steering Committee shall review the report of eligibility of voters and may nullify any ballot submitted by any individual not eligible to vote on that ballot in accordance with these Rules of Governance.

2.15c Following certification of the ballot results, the Steering Committee shall review the scope of revisions to the NCS resulting from the ballot and all previous ballots since the last major revision, and together with the NCS Business Management Group shall determine whether all revisions to date constitute a “major revision” of the NCS, necessitating publishing of a new version, or whether the latest ballot results may be issued as an “interim upgrade,” for which a self-contained update should be issued. The Steering Committee is encouraged to seek the advice and guidance of the Project Committee in making this determination.

2.16 Publication

2.16a NIBS shall publish new versions of the NCS within 182 calendar days of the certification of the ballot results by the Steering Committee, or shall provide written notice to the Project Committee explaining why additional time is needed.

2.16b NIBS shall publish self-contained updates within 91 calendar days of the certification of the ballot results by the Steering Committee, or shall provide written notice to the Project Committee explaining why additional time is needed. Posting of interim updates as self-contained

downloadable files on the NCS Web site, with notification of their availability to Project Committee members and registered customers, shall be deemed as satisfying this requirement for publication.

PART III – LOGISTICS

3.1 Ballot quorum

3.1a The results of a ballot to amend the NCS shall be valid only if ballots are cast by a minimum of 2/3 of eligible Project Committee members.

3.1b Individual ballot items shall be approved and become effective upon approval of 2/3 of non-abstention ballots cast.

3.2 Meeting Quorum

3.2a The quorum for any meeting of the Project Committee during which any vote is taken shall be 1/2 of the eligible Project Committee members.

3.2b The quorum for any meeting of the Steering Committee, standing task teams, or ad-hoc task teams during which any vote is taken shall be 2/3 of the eligible members of the committee or task team.

3.2c A meeting shall be considered to have a quorum whether the members attend in person at a single location, attend in person at multiple locations, or participate individually by remote means, provided that participants attending at multiple locations or participating individually by remote means have full access to all documents and information presented, are able to participate fully in the meeting, and are able to cast votes on any matter brought to the floor for consideration.

3.3 Notice

Any requirement for notice as specified herein shall be deemed satisfactory if made by e-mail to all Project Committee members and to all persons to whom notice is due, or by some other electronic means that is available to all persons to whom notice is due.

3.4 Posting

Any requirement for making documents or information available as specified herein shall be deemed satisfactory if such documents are posted to a Web site accessible to all persons entitled to such access and accompanied by proper notice of the posting to all such persons, or by some other electronic means that is available to all persons entitled to such access.

3.5 Records

The Project Committee, the Steering Committee and every task team, shall organize, keep accurate records of, and make available to the entire Project Committee all written matter generated by the committee or task team, and will work with assigned staff as appropriate in the fulfillment of their responsibilities. The Secretary of the Project Committee, and the secretary of each task team, who shall be appointed by the chair of each task team, shall be responsible for fulfilling this obligation. The records to be maintained shall include, but not necessarily be limited to: agendas and minutes of all scheduled meetings; voting records of all ballots or other actions taken; attendance at all meetings, including visitors; correspondence, including meeting notices; reports and resolutions; and memoranda summarizing significant verbal communications, including instructions from the Consultative Council or the Board of Directors. All such records shall be available and open for inspection by members of the Project Committee; authorized staff of the contributing organizations; members of the Consultative Council and the Board of Directors; and any other persons as may from time to time be expressly authorized by the chair of the Consultative Council or the Board of Directors.

3.6 Meetings

3.6a The chair of the Project Committee shall give notice of and prepare and distribute an agenda for all upcoming Project Committee meetings a minimum of 35 calendar days in advance of any meeting.

3.6b The chairs of the Steering Committee and all standing and ad-hoc task teams shall give notice of and prepare and distribute an agenda to the entire Project Committee for all upcoming meetings a minimum of 7 calendar days in advance of any meeting.

3.6c Meetings of the Steering Committee shall be open to the public. Provisions shall be made to enable Project Committee members to participate by remote means. The chair of the Steering Committee may, at the chair's sole discretion, limit discussion at the meeting to Steering

Committee members. Only Steering Committee members will be permitted to vote on matters brought before the Committee.

3.6d Standing or ad-hoc task team meetings shall be open to the public. Provisions shall be made to enable Project Committee members to participate by remote means. The chair of the task team may, at the chair's sole discretion, limit discussion at the meetings to task team members. Only task team members will be permitted to vote on matters brought before the task team.

3.6e It is contemplated that discussion may take place among the Steering Committee or standing or ad-hoc task teams via e-mail listserv or other electronic means. Any Project Committee member who desires to have access to any listserv or other electronic means of communication established for any committee or task team of the Project Committee shall be provided with such access upon request.

3.6f All documents circulated among the members of any subcommittee or task team of the Project Committee shall be made available to all Project Committee members at the same time and via the same means they are made available to the members of the respective task team.

END OF RULES OF GOVERNANCE

Facility Information Council Board

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Implementation

Implementation of U.S. National CAD Standard

We are very interested in understanding the degree to which purchasers of the NCS are actually implementing the Standard. We would greatly appreciate your taking the time to complete the following form and returning it to us. You are also encouraged to join the project committee and participate in the continued development of our national standard. You can complete an application online at www.nationalcadstandard.org

Please mail or fax completed form to:

**Alexander Shaw
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1090 Vermont Avenue, NW, Suite 700
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Appendix H

Implementation of U.S. National CAD Standard

Name _____

Firm _____

Address _____

Telephone (_____) _____ E-mail _____

Modules included in NCS Version 3.0/3.1

Layer Guidelines ___ All

Partial: please specify _____

Drawing Set Organization ___ All

Partial: please specify

Sheet Organization ___ All

Partial: please specify _____

Schedules ___ All

Partial: please specify _____

Plotting Guidelines ___ All

Partial: please specify _____

Modules included in NCS Version 3.0/3.1

Drafting Conventions ___ All

Partial: please specify _____

Terms and Abbreviations ___ All

Partial: please specify _____

Symbols ___ All

Partial: please specify _____

Notations ___ All

Partial: please specify _____

Code Conventions ___ All

Partial: please specify _____

Comments/Problems: _____
