Designation: E 1663 – 03

An American National Standard

Standard Classification for Serviceability of an Office Facility for Typical Office Information Technology[1,2]

This standard is issued under the fixed designation E 1663; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This classification covers pairs of scales for classifying an aspect of the serviceability of an office facility, that is, the capability of an office facility to meet certain possible requirements for performance to support typical office equipment for information technology.

1.2 Within that aspect of serviceability, each pair of scales, shown in Figs. 1-6, are for classifying one topic of serviceability. Each paragraph in an Occupant Requirement Scale (see Figs. 1-6) summarizes one level of serviceability on that topic, which occupants might require. The matching entry in the Facility Rating Scale (see Figs. 1-6) is a translation of the requirement into a description of certain features of a facility which, taken in combination, indicate that the facility is likely to meet that level of required serviceability.

1.3 The entries in the Facility Rating Scale (see Figs. 1-6) are indicative and not comprehensive. They are for quick scanning to estimate approximately, quickly, and economically, how well an office facility is likely to meet the needs of one or another type of occupant group over time. The entries are not for measuring, knowing, or evaluating how an office facility is performing.

1.4 This classification can be used to estimate the level of serviceability of an existing facility. It can also be used to estimate the serviceability of a facility that has been planned but not yet built, such as one for which single-line drawings and outline specifications have been prepared.

1.5 This classification indicates what would cause a facility to be rated at a certain level of serviceability but does not state how to conduct a serviceability rating nor how to assign a serviceability score. That information is found in Practice E 1334. The scales in this classification are complimentary to, and compatible with, Practices E 1334 and E 1679. Each requires the other.

2. Referenced Documents

2.1 *ASTM Standards:*

E 631 Terminology of Building Constructions

E 1334 Practice for Rating Serviceability of a Building or Building-Related Facility

E 1679 Practice for Setting Requirements for Serviceability of a Building or Building-Related Facility

2.2 *ISO Document:*[3]

ISO 6240 International Standard, Performance Standards in Building—Contents and Presentation

2.3 *Other Document:*

ANSI/TIA/EIA-569–A Commercial Building Standards for Telecommunications Pathways and Spaces[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *facility*—a physical setting used to serve a specific purpose.

3.1.1.1 *Discussion*—A facility may be within a building, a whole building, or a building with its site and surrounding environment; or it may be a construction that is not a building. The term encompasses both the physical object and its use (See Terminology E 631).

3.1.2 *facility serviceability*—the capability of a facility to perform the function(s) for which it is designed, used, or required to be used.

3.1.2.1 *Discussion*—The scope of this performance is of the facility as a system, including its subsystems, components and materials and their interactions, such as acoustical, hydrothermal, air purity, and economic; and of the relative importance of each performance requirement (see Terminology E 631).

3.1.3 *office*—a place, such as a room, suite, or building, in which business, clerical, or professional activities are conducted (see Terminology E 631).

3.1.4 For standard definitions of additional terms applicable to this classification, see Terminology E 631.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *conduit capacity*—a conduit is considered full when the internal area occupied by cable has reached 50 % of the

[1] This classification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.25 on Whole Buildings and Facilities.

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[2] Portions of this document are based on material originally prepared by the International Centre for Facilities (ICF) and © 1993 by ICF and Minister of Public Works and Government Services Canada. Their cooperation in the development of this standard is acknowledged.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

cross-sectional area of the conduit. Therefore, when additional future capacity is required, it must be part of the original 50 % permissible area.

3.2.2 *dedicated circuit*—an electric power supply circuit with its own circuit breaker and only one outlet box, so that its full capacity is dedicated to only one piece of electrical equipment.

3.2.2.1 *Discussion*—Dedicated circuits often are installed with an orange plug receptacle, so they can easily be recognized. A dedicated circuit may or may not be connected to an uninterruptible power supply (UPS); in most buildings, an orange plug receptacle does not normally indicate UPS.

3.2.3 *isolated circuit*—a dedicated electric power supply circuit with an isolated ground, separate from the ground of other circuits at its main panel.

3.2.4 *local area network (LAN)*—connecting computers in a single building or part of a building.

3.2.5 *uninterruptible power supply (UPS)*—a source of electrical power that is protected from dropping below standard voltage for even milliseconds, so that computer operation is effectively continuous.

3.2.5.1 *Discussion*—A UPS is typically provided from batteries that are always connected to the circuit. A UPS typically provides power long enough to either shut down computers in an orderly way if outside power fails, or to start a standby generator. A UPS system of many large batteries may be used to protect a group of electrical circuits. Small UPS systems, capable of protecting a single personal computer and its accessory equipment, weigh only a few kilos and may be plugged into conventional electric power outlets at an office workstation.

4. Significance and Use

4.1 Each Facility Rating Scale (see Figs. 1-6) in this classification provides a means to estimate the level of serviceability of a building or facility for one topic of serviceability and to compare that level against the level of any other building or facility.

4.2 This classification can be used for comparing how well different buildings or facilities meet a particular requirement for serviceability. It is applicable despite differences such as location, structure, mechanical systems, age, and building shape. Further information may be found in ISO 6240.

4.3 This classification can be used to estimate the amount of variance of serviceability from target or from requirement, for a single office facility, or within a group of office facilities.

4.4 This classification can be used to estimate the following:

4.4.1 Serviceability of an existing facility for uses other than its present use.

4.4.2 Serviceability (potential) of a facility that has been planned but not yet built.

4.4.3 Serviceability (potential) of a facility for which remodeling has been planned.

4.5 Use of this classification does not result in building evaluation or diagnosis. Building evaluation or diagnosis generally requires a special expertise in building engineering or technology and the use of instruments, tools, or measurements.

4.6 This classification applies only to facilities that are building constructions, or parts thereof. (While this classification may be useful in rating the serviceability of facilities that are not building constructions, such facilities are outside the scope of this classification.)

4.7 This classification is not intended for, and is not suitable for, use for regulatory purposes, nor for fire hazard assessment nor for fire risk assessment.

5. Basis of Classification

5.1 The scales in Figs. 1-6 contain the basis for classification.

5.2 Instructions for the use of this classification are contained in Practices E 1334 and E 1679.

6. Keywords

6.1 building; computers; data cables; facility; facility occupants; function; local area network (LAN); office; performance; phone cables; rating; rating scale; requirements; serviceability; typical office information technology; uninterruptible power supply (UPS)

A.5. Typical Office Information Technology

Scale A.5.1. Office computers and related equipment

Occupant Requirement Scale		Facility Rating Scale
9 ❑ ○ **LOCATION OF WORKPLACES**: Must be able to locate or relocate many densely-equipped workplaces anywhere on the office floor. ○ **QUALITY WORKPLACE ENVIRONMENT**: Must be able to maintain the highest quality environment for work with electronic equipment, including VDUs. ○ **ELECTRONIC EQUIPMENT AT THE WORKSTATION**: All staff to have a PC or larger computer workstation. Most staff also have other electronic equipment which cause heat or noise or other effects, such as a laser printer.		9 ❑ ○ **Zones for high density of equipment**: Any location on the floorplate is suitable for an area or room with much office machinery, e.g. word-processing, computer-aided drafting. ○ **HVAC services**: Services are provided to an enhanced level, or can be at minimal effort and fitup cost. Exhaust air from areas with office machines is not recirculated within the building. ○ **Illumination**: There are dimmer switches on lights. In open office areas, general lighting is by fixtures that shine upward to the ceiling, not fixtures in the ceiling that shine down. Each luminaire can be individually switched by occupants. ○ **Acoustic control**: There is acoustic control in the ceiling, floor and vertical surfaces, so machine noise does not disturb people nearby.
7 ❑ ○ **LOCATION OF WORKPLACES**: Must be able to locate or relocate many densely-equipped workplaces anywhere on the office floor. ○ **QUALITY WORKPLACE ENVIRONMENT**: Must be able to maintain a basic quality environment for work with electronic equipment, including VDUs. ○ **ELECTRONIC EQUIPMENT AT THE WORKSTATION**: At least one PC with VDU now at all or almost all individual workplaces. The majority but less than three quarters of staff also have other electronic equipment which cause heat or noise or other effects, such as a laser printer.	8 ❑ 6 ❑	7 ❑ ○ **Zones for high density of equipment**: Up to two-thirds of the floorplate is suitable for an area or room with much office machinery, e.g. word-processing, computer-aided drafting. ○ **HVAC services**: Services to high-density areas, or where there are many printers, are provided to a basic level at minimal effort and fitup cost, or an enhanced level is possible at moderate effort and fitup cost, e.g. exhaust air is not recirculated within the building. ○ **Illumination**: In open office areas, general lighting is by fixtures that shine upward to the ceiling, not fixtures in the ceiling that shine down. Groups of luminaires can be switched at control points on the floor. ○ **Acoustic control**: There is acoustic control so that intermittent machine noise does not disturb people nearby and sufficient absorption to keep overall sound levels within recommended targets.
5 ❑ ○ **LOCATION OF WORKPLACES**: Operations now require some densely-equipped workplaces. Can tolerate limited building-imposed constraints on where such areas can be located. ○ **QUALITY WORKPLACE ENVIRONMENT**: Need to maintain a basic quality environment for work with electronic equipment, including VDUs. ○ **ELECTRONIC EQUIPMENT AT THE WORKSTATION**: Assume one VDU at all or most individual workplaces now or in a year or two. Assume that many have or will have other electronic equipment which cause heat or noise or other effects, such as a laser printer, but it will be possible to cluster such added equipment.	4 ❑	5 ❑ ○ **Zones for high density of equipment**: Limited parts of the floorplate are suitable for a room with much office machinery, e.g. word-processing, drafting. ○ **HVAC services**: Services exist to target level for typical open office, or capable of fitup to target at moderate effort and cost. Air exhausted from the high-density area (CAD, word-processing, etc.) is mixed with air that is available for recirculation from other office areas. ○ **Illumination**: There are low-glare lenses or parabolic grilles on the ceiling light fixtures. Lights for a whole floor or large area are switched as a group. ○ **Acoustic control**: Sound absorption of the ceiling, etc. is typical for the building.

Scale A.5.1. continued on next page

FIG. 1 Scale A.5.1 for Office Computers and Related Equipment

A.5. Typical Office Information Technology

Scale A.5.1. Office computers and related equipment(continued)

Occupant Requirement Scale		Facility Rating Scale
3 ❑ ○ **LOCATION OF WORKPLACES**: Operations require only a very few workplaces densely equipped with electronic equipment. ○ **QUALITY WORKPLACE ENVIRONMENT**: Can tolerate some features of the work environment that are of marginal quality. ○ **ELECTRONIC EQUIPMENT AT THE WORKSTATION**: Electronic equipment is not used for extended periods.		3 ❑ ○ **Zones for high density of equipment**: No high density zone is possible, e.g. word-processing must occur in typical open office areas, and very difficult or expensive to accommodate multiple CAD stations. ○ **HVAC services**: Services are barely adequate with upgrade to basic level at substantial effort and cost, e.g. local switching of lights. Exhaust air is mixed with makeup air and recirculated within the building. ○ **Illumination**: Ceiling fluorescent light fixtures have plastic lenses that give bright glare, not just when sitting under them, but also when looking towards the ceiling while seated three or four fixtures away. ○ **Acoustic control**: Ceiling and wall surfaces are mostly hard, acoustically reflective.
	2 ❑	
1 ❑ ○ **LOCATION OF WORKPLACES**: No densely-equipped workplaces, or only a very few, or used only occasionally.		1 ❑ ○ **Zones for high density of equipment**: No high density zone is possible, e.g. word-processing must be spread out in the open office. ○ **HVAC services**: Services are inadequate with upgrade not feasible, e.g. many glare sources, poor air supply, and no added exhaust. ○ **Illumination**: Bare fluorescent tubes exist (no lenses or grid) and traditional ballasts. ○ **Acoustic control**: All surfaces are reflective.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes on Requirements or Ratings*

FIG. 1 Scale A.5.1 for Office Computers and Related Equipment *(continued)*

A.5. Typical Office Information Technology

Scale A.5.2. Power at workplace

Occupant Requirement Scale		Facility Rating Scale
9 ❑ ○ **LOCATION OF AVAILABLE POWER**: Operations require power supplied unobtrusively and easily to any workstation on any part of the floor. ○ **PLUG-IN POINTS AT WORKSTATION**: Each workplace requires up to 8 plug-in points (4 duplex outlets), with 2 or more dedicated for computers, and 1 of these an isolated circuit. ○ **PROTECTION FROM POWER FLUCTUATION**: Require UPS system now, and future capacity.		9 ❑ ○ **Power distribution**: In open plan, distribution is through the furniture system, or raised access floor, or a pre-wired modular furniture partition. ○ **Plug-in points per workplace**: There are 8 electrical plug-in points per workplace (4 duplex). Of the circuits feeding the plug-in points, at least 1 is dedicated for computer equipment, and one is isolated. ○ **Uninterruptible power supply (ups)**: An existing UPS system is installed in the building. Suitable space exists for additional UPS equipment, if needed.
7 ❑ ○ **LOCATION OF AVAILABLE POWER**: Operations require power supplied to any workstation on any part of the floor. ○ **PLUG-IN POINTS AT WORKSTATION**: Each workplace requires up to 6 plug-in points (3 duplex outlets), of which 1 is dedicated for computer equipment. ○ **PROTECTION FROM POWER FLUCTUATION**: No immediate need for UPS system but foresee a need in the near future.	8 ❑	7 ❑ ○ **Power distribution**: Distribution is from the ceiling by power pole, with locations governed by the ceiling grid dimensions and fixtures, or from ducts in the floor which are not more than half full in any location, and which have access points on a grid 1.4 m x 1 m (5 ft x 3 ft) or less. All power cables in ceiling are in conduit or cable trays, and separated from data cables; in floor all power cables are in separate ducts from data cables. ○ **Plug-in points per workplace**: There are 6 electrical plug-in points per workplace (3 duplex). Of the circuits feeding the plug-in points, at least 1 is dedicated for computer equipment. ○ **Uninterruptible power supply (ups)**: No existing UPS system is installed in the building. Spare space exists in the building, suitable for UPS equipment, and well located near vertical risers for power.
5 ❑ ○ **LOCATION OF AVAILABLE POWER**: Operations require power supplied to any workstation on any part of the floor. ○ **PLUG-IN POINTS AT WORKSTATION**: Each workplace requires up to 4 plug-in points (2 duplex outlets). Some workstations need dedicated circuits for computers. ○ **PROTECTION FROM POWER FLUCTUATION**: No immediate need for UPS system but foresee a possible need in the future.	6 ❑	5 ❑ ○ **Power distribution**: Distribution is from the ceiling by power pole, with positions governed by ceiling grid dimensions and fixtures, or from ducts in the floor which have sufficient spare capacity that pulling additional cables is never a problem, and which have access points on a grid 1.5 m x 1.5 m (5 ft x 5 ft) or less. If cables are in ceiling, some are in conduit or cable trays. ○ **Plug-in points per workplace**: There are 4 electrical plug-in points per workplace (2 duplex). Some dedicated circuits are available for specific workstations, but not all. ○ **Uninterruptible power supply (ups)**: No existing UPS system is installed in the building. Space could be made available in the building for UPS equipment, e.g. by giving up basement storage space.
	4 ❑	

Scale A.5.2. continued on next page

FIG. 2 Scale A.5.2 for Power at the Workplace

A.5. Typical Office Information Technology

Scale A.5.2. Power at workplace (continued)

Occupant Requirement Scale		Facility Rating Scale
3 ❑	○ **LOCATION OF AVAILABLE POWER:** Operations require power supplied to workstations on most parts of the floor. ○ **PLUG-IN POINTS AT WORKSTATION:** Each workplace requires up to 2 plug-in points (1 duplex outlet). ○ **PROTECTION FROM POWER FLUCTUATION:** Local spike protectors are sufficient protection for computer equipment. No foreseeable need for UPS system.	3 ❑ ○ **Power distribution**: Distribution is from the ceiling by power pole, with positions governed by ceiling grid dimensions and fixtures. There are no cable trays. If there are floor ducts for cables, they are full in some parts of the building. ○ **Plug-in points per workplace**: There are 2 electrical plug-in points per workplace (1 duplex). Circuit capacity permits an additional 2 points by using a multi-circuit spike protector. ○ **Uninterruptible power supply (ups)**: No existing UPS system in the building. No space in the building is suitable for UPS equipment.
2 ❑		
1 ❑	○ **LOCATION OF AVAILABLE POWER:** Operations require power supplied to most workstations on most parts of the floor. ○ **PLUG-IN POINTS AT WORKSTATION:** Most workplaces require up to 2 plug-in points (1 duplex outlet). ○ **PROTECTION FROM POWER FLUCTUATION:** Minimal use of computers, so no need for local spike protectors or UPS system.	1 ❑ ○ **Power distribution**: It is difficult to run cables, and outlets are poorly located, e.g. horizontal distribution is through in-floor ducts that are mostly full, or by surface conduit, or by poke-through from the ceiling below. There is no accessible ceiling space, or, space is insufficient for cable trays. ○ **Plug-in points per workplace**: There are 2 electrical plug-in points per individual workstation (1 duplex). A multi-circuit spike protector cannot be added. ○ **Uninterruptible power supply (ups)**: No existing UPS system in the building. No space in the building is suitable for UPS equipment.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes on Requirements or Ratings*

FIG. 2 Scale A.5.2 for Power at the Workplace *(continued)*

A.5. Typical Office Information Technology

Scale A.5.3. Building power

Occupant Requirement Scale		Facility Rating Scale
9 ❑ O **POWER FOR EQUIPMENT AT WORKSTATION**: Operations require power for one personal computer and one laser printer or other major electronic machine per person, plus normal desk equipment, e.g. calculator. O **POWER FOR FUTURE EQUIPMENT**: Operations require 50% added capacity, over present demand, for future needs. O **RELIABILITY AND QUALITY OF SUPPLY**: Need a very reliable power supply, of good quality.		9 ❑ O **Present capacity**: Building power, transformers and switches, etc. and vertical power risers, provide for one personal computer and one laser printer, or equivalent, per person, equivalent to 43 w/m2 (4 w/sf) occupant load, and the additional cooling load for that occupant load. O **Potential increase**: A future increase up to half of present capacity for occupant on-floor demand, plus consequent additional cooling load, can be accommodated. Ample space is available in risers. O **Reliability and quality of supply**: The external supply is very reliable e.g. less than one outage per year. The supply is subject to only slight surges.
7 ❑ O **POWER FOR EQUIPMENT AT WORKSTATION**: Operations require power for one personal computer per person, plus other normal desk equipment, e.g. calculator. O **POWER FOR FUTURE EQUIPMENT**: Operations require 25% added capacity over present demand, for future needs. O **RELIABILITY AND QUALITY OF SUPPLY**: Need a reliable power supply, mainly free of surges.	8 ❑	7 ❑ O **Present capacity**: Building power, transformers and switches, etc. and vertical power risers, provide for one personal computer per person, and one large laser printer or equivalent per 5 people, equivalent to 32 w/m2 (3 w/sf) occupant load, and the additional cooling load for that occupant load. O **Potential increase**: A future increase up to one third of present capacity for occupant on-floor demand, plus consequent additional cooling load, can be accommodated. Sufficient space is available in risers. O **Reliability and quality of supply**: The external supply is mostly reliable, e.g. one or two outages in a year. The power supply is subject to occasional surges at predictable times, e.g. late afternoon.
5 ❑ O **POWER FOR EQUIPMENT AT WORKSTATION**: Operations require power for one personal computer per person, plus other normal desk equipment, e.g. calculator. O **POWER FOR FUTURE EQUIPMENT**: Operations require 10% added capacity over present demand, for future needs. O **RELIABILITY AND QUALITY OF SUPPLY**: Need a reliable power supply, mainly free of surges.	6 ❑ 4 ❑	5 ❑ O **Present capacity**: Building power, transformers and switches, etc. and vertical power risers, provide for one personal computer per person, equivalent to 22 w/m2 (2 w/sf) occupant load, and the additional cooling load for that occupant load. O **Potential increase**: A future increase up to one quarter of present capacity for occupant on-floor demand, and consequent additional cooling load, can be accommodated. Riser capacity can be increased at moderate cost. O **Reliability and quality of supply**: The external supply is mostly reliable, e.g. one or two outages in a year. The power supply is subject to occasional surges at anytime, but most often in early morning or late afternoon.

Scale A.5.3. continued on next page

FIG. 3 Scale A.5.3 for Building Power

A.5. Typical Office Information Technology

Scale A.5.3. Building power (continued)

Occupant Requirement Scale		Facility Rating Scale
3 ❑ ○ **POWER FOR EQUIPMENT AT WORKSTATION**: Minimal power requirements. Operations require power for one personal computer per two persons. ○ **POWER FOR FUTURE EQUIPMENT**: Operations require only minor capacity for future needs. ○ **RELIABILITY AND QUALITY OF SUPPLY**: Reliability and quality of power supply are not critical.		3 ❑ ○ **Present capacity**: Building power is below occupant load target of one computer per workstation, e.g. provides for up to one personal computer per two persons, and the additional cooling load for that occupant load. ○ **Potential increase**: A minor increase of capacity can be accommodated, e.g. 5% of present occupant on-floor demand, and consequent additional cooling load. ○ **Reliability and quality of supply**: The external supply is unreliable, e.g. a history of several outages in a year. The power supply is subject to surges at the start and end of the working day.
1 ❑ ○ **POWER FOR EQUIPMENT AT WORKSTATION**: There is no requirement at this level. ○ **POWER FOR FUTURE EQUIPMENT**: There is no requirement at this level. ○ **RELIABILITY AND QUALITY OF SUPPLY**: There is no requirement at this level.	2 ❑	1 ❑ ○ **Present capacity**: Building power is insufficient, e.g. transformers and switches. Vertical power risers do not provide for occupant load of one personal computer per two persons, nor provide for the resultant cooling load. ○ **Potential increase**: Any future increase cannot be accommodated in occupant on-floor demand, or increased cooling load. ○ **Reliability and quality of supply**: The external supply is unreliable, e.g. a history of several outages in a year. The power supply is subject to surges at the start and end of the working day.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes on Requirements or Ratings*

FIG. 3 Scale A.5.3 for Building Power *(continued)*

A.5. Typical office information technology

Scale A.5.4. Telecommunications Core

Occupant Requirement Scale		Facility Rating Scale
9 ❑	O **QUANTITY AND LOCATION OF CABLING**: Horizontal cable pathways must accommodate at least six cables per user, and deliver them to any location on the floor. O **ACCESS TO CABLE DISTRIBUTION SYSTEM**: Need to rearrange cable outlets during peak periods, without disruption to the office, e.g. at any time, 7 days/week, and 24 hours/day. Require over-design of 25% to minimize need for frequent access to cable distribution systems. O **TELECOMMUNICATIONS ROOM**: Spaces are needed on each floor for cable connections to hubs, routers and the like, and to riser cabling. Need length of cable run from a telecom room to most distant workstation not to exceed 100 m (328 ft.). O **BACKBONE CABLING**: Sufficient high speed riser cabling is required to support multiple occurrences of the fastest available backbone electronics at each floor. Sufficient voice riser cabling is needed to support two telephones per user. O **HIGH SPEED SERVICE PROVIDERS**: In addition to at least one telephone service provider, access is required to several providers of high speed telecommunications and Internet Service Providers (ISPs). Sufficient space must be available for their cable entry, demarcation, and equipment. Capability for satellite and fixed microwave wireless links is required, and installation of these links may be required.	9 ❑ O **Horizontal Distribution**: Horizontal distribution of data and phone cables is by overhead lay-in trays or in raised access floor. Unused installed cabling and unused pathway capacity each totals about 50% of respective capacities. Distribution to any location on the floor is quick and easy and does not disrupt nearby workers. Part of the cabling nearest the users may pass through furniture systems or fixed-position walls. If all or part of distribution is through furniture systems, then furniture systems enable quick plug-in of bridle to connect/disconnect near the point of entry to the furniture system. O **Avoidance of electromagnetic interference**: Cable paths avoid possible sources of electromagnetic interference such as circuits that feed more than one branch circuit, or run at higher voltages. Cables to provide power to motors, or lighting fixtures, including task lighting and desktop tools such as pencil sharpeners, are at least 300 mm (12 in) from electrical data cables, whether crossing or parallel. In addition, critical circuits are in conduit or employ screened or shielded cable or optical fiber. O **Telecommunications rooms**: There is at least one telecommunications room (closet) on each floor. Additional closets are provided when the floor area to be served exceeds 1000 m^2 (10,765 ft^2). or the horizontal distribution distance to the most distant work location exceeds 90 m (295 ft). Total area is about 1.5% of the floor space served, but at least 15 m^2 (161 ft^2).
8 ❑		O **Risers**: Multiple fiber feeds are present and ready to use at connectors in each telecommunications room. Sufficient copper riser cable is present and ready for use in each room to accommodate two four-pair voice cables per person. Unused installed capacity and empty ducts or sleeves amount to about 50% of total. Vertical pathways can be provided to rooftop satellite antennas or fixed wireless equipment if required, with provision for associated electronics and antenna positions. O **Entrance room**: Sufficient space is present for entrance and demarcation of cabling, and associated electronics, for more than two providers of telephone and high speed services, including such services as telephone trunks, fiber telephone and data trunks, T1 and T3 services. A separate space for a separate backup entrance is provided. O **Equipment room**: Dedicated space is present for at least two telephone switches, each to serve a portion of the building, and each with access to the entrance room and risers. Each is sized at least 0.1% of the usable floor area of the building, but not less than 20 m^2 (215 ft^2). Each is in a separate room from the entrance room.
7 ❑	O **QUANTITY AND LOCATION OF CABLING**: Horizontal cable pathways must accommodate at least four cables per user, and deliver them to any location on the floor. O **ACCESS TO CABLE DISTRIBUTION SYSTEM**: Need to rearrange cable outlets weekly during peak periods, without disruption to the office. Require over-design of 15% to minimize need for frequent access to cable distribution systems.	7 ❑ O **Horizontal Distribution**: Horizontal distribution of data and phone cables is by overhead lay-in trays or in raised access floor. Unused installed cabling and unused pathway capacity each totals about 25% of respective capacities. Distribution is convenient to any location on the floor. Part of the cabling nearest the users may pass through furniture systems or fixed-position walls. If all or part of distribution is through furniture systems, then furniture system enables connect/disconnect near the point of entry to the furniture system. O **Avoidance of electromagnetic interference:** Cable paths are kept at least 100 mm (4 in) from possible sources of electromagnetic interference such as circuits that feed more than one branch circuit, or run at higher voltages, or electric motors, or lighting fixtures, including task lighting and desktop tools such as pencil sharpeners. In addition, critical circuits are in conduit or employ screened or shielded cable or optical fiber.

FIG. 4 Scale for A.5.4 for Telecommunications Core

A.5. Typical office information technology

Scale A.5.4. Telecommunications Core

Occupant Requirement Scale		Facility Rating Scale
7 continued O **TELECOMMUNICATIONS ROOM**: Space is needed on each floor for cable connections to hubs, routers and the like, and to riser cabling. O **BACKBONE CABLING**: Sufficient high speed riser cabling is required to support one occurrence of the fastest available backbone electronics at each floor. Sufficient voice riser cabling is needed to support more than one telephone per user. O **HIGH SPEED SERVICE PROVIDERS**: In addition to at least one telephone service provider, access is required to at least one provider of high speed telecommunications and Internet Service Provider (ISPs). Sufficient space must be available for their cable entry, demarcation, and equipment. Satellite and fixed microwave wireless links may be required.	6 ❑	7 continued O **Telecommunications rooms**: There is at least one telecommunications room (closet) on each floor. Additional closets can be provided when the floor area to be served exceeds 1000 m^2 (10,765 ft^2), or the horizontal distribution distance to the work area exceeds 90 m (295 ft). Total area is about 1.3% of the floor space served, but at least 13 m^2 (140 ft^2). O **Risers:** Multiple fiber feeds are present and ready to use at connectors in each telecommunications room. Sufficient copper riser cable is present and ready for use in each room to accommodate two four-pair voice cables per person. Unused installed capacity and empty ducts or sleeves amount to about 25% of total capacity. O **Entrance room:** Sufficient space is present for entrance and demarcation of cabling, and associated electronics, for at least two providers of telephone and high speed services, including such services as telephone trunks, fiber telephone and data trunks, T1 and T3 services. O **Equipment room:** Dedicated space is present for a telephone switch, to serve the entire building, sized at least 0.1% of the usable floor area of the building, but not less than 20 m^2 (215 ft^2). The space has access to the entrance room and risers. If it is in the same room as the entrance room, it is separated from other functions by secure barrier, such as heavily woven wire fence material.
5 ❑ O **QUANTITY AND LOCATION OF CABLING**: Horizontal cable pathways must accommodate at least two cables per user, and deliver them to any location on the floor. O **ACCESS TO CABLE DISTRIBUTION SYSTEM**: Need to rearrange location of cable outlets for about one-third of workstations each year. without disruption to the office, e.g. by scheduling re-arrangements during weekend downtime. O **TELECOMMUNICATIONS ROOM**: Space is needed on each floor for cable connections to hubs, routers and the like, and to riser cabling. O **BACKBONE CABLING**: Sufficient high speed riser cabling is required to support one occurrence of the fastest available backbone electronics at each floor. Sufficient voice riser cabling is needed to support one telephone per user. O **HIGH SPEED SERVICE PROVIDERS**: Beyond one telephone service provider, no access is required to providers of high speed telecommunications and Internet Service Providers (ISPs). Sufficient space must be available for the telephone service provider's cable entry, demarcation, and equipment. Satellite and fixed microwave wireless links are not required.	4 ❑	5 ❑ O **Horizontal Distribution**: Horizontal distribution of data and phone cables is by overhead lay-in trays or in raised access floor. Unused installed cabling and unused pathway capacity totals about 25% of capacity. Distribution is possible to almost any location on the floor. Part of the cabling nearest the users may pass through furniture systems or fixed-position walls. If all or part of distribution is through furniture systems, then furniture panels allow spliced connect/disconnect near the point of entry to the furniture system. O **Avoidance of electromagnetic interference:** Cable paths are shielded from possible sources of electromagnetic interference such as circuits that feed more than one branch circuit, or run at higher voltages, or motors, or task lighting fixtures, by steel conduit or steel shielding. In addition, critical circuits employ screened or shielded cable or optical fiber. O **Telecommunications rooms**: There is at least one telecommunications room (closet) on each floor. Additional closets can be provided when the floor area to be served exceeds 1000 m^2 (10,765 ft^2), or the horizontal distribution distance to the work area exceeds 90 m (295 ft). Total area is about 1.0% of the floor space served, but at least 10 m^2 (108 ft^2). O **Risers:** One fiber feed is present and ready to use at connectors in each telecommunications room. Sufficient copper riser cable is present and ready for use in each room to accommodate one four-pair voice cable per person. Unused installed capacity and empty ducts or sleeves amount to about 10 to 15% of total capacity. O **Entrance room:** Sufficient space is present for entrance and demarcation of cabling, and associated electronics, for at least one provider of telephone and high speed services, including such services as telephone trunks, fiber telephone and data trunks, T1 and T3 services. O **Equipment room:** Dedicated space is present for a telephone switch, in with the entrance room and risers.

FIG. 4 Scale for A.5.4 for Telecommunications Core *(continued)*

A.5. Typical office information technology

Scale A.5.4. Telecommunications Core

Occupant Requirement Scale		Facility Rating Scale
3 ❑	**O QUANTITY AND LOCATION OF CABLING**: Horizontal cable pathways may accommodate less than one cable per user, and may not be able to deliver them to some locations on the floor. **O ACCESS TO CABLE DISTRIBUTION SYSTEM**: Frequent access to cable distribution systems is not required. **O TELECOMMUNICATIONS ROOM**: Space for passive equipment as needed but space for active equipment is not required. **O BACKBONE CABLING**: Sufficient high speed riser cabling is required to support ad hoc backbone electronics, at speeds no faster than typical workstations. Sufficient voice riser cabling is needed to support one telephone per user. **O HIGH SPEED SERVICE PROVIDERS**: Beyond one telephone service provider, no access is required to providers of high speed telecommunications and Internet Service Providers (ISPs). Sufficient space must be available for the telephone service provider's cable entry, demarcation, and equipment. Satellite and fixed microwave wireless links are not required.	3 ❑ O **Horizontal Distribution**: Horizontal distribution of data and phone cables is by overhead lay-in trays or in raised access floor. There is little, if any unused installed cabling or unused pathway capacity. Distribution is possible to most locations on the floor. O **Avoidance of electromagnetic interference:** Cable paths do not run parallel and adjacent to possible sources of electromagnetic interference such as circuits that feed more than one branch circuit, or run at higher voltages, or large motors, or lighting fixtures. O **Telecommunications rooms**: There may not be a telecommunications room (closet) on each floor. If one exists, total area is less than the recommended 1.0% of the floor space served, or 10 m^2 (108 ft^2), whichever is greater. O **Risers:** Risers, if any, may be antiquated or inadequate. O **Entrance room:** Space may be inadequate for entrance and demarcation of cabling and associated electronics, even for a single provider of telephone and high speed services. O **Equipment room:** Dedicated space is not present for a telephone switch.
2 ❑		
1 ❑	**O QUANTITY AND LOCATION OI CABLING:** Minimal need for cabling for data or phone. **O ACCESS TO CABLE DISTRIBUTION SYSTEM:** Can tolerate surface mounted cables. Can tolerate disruption to office in the event that cables must be provided or altered. **O TELECOMMUNICATIONS ROOM**: Not required. **O BACKBONE CABLING:** Not required. **O HIGH SPEED SERVICE PROVIDERS:** Not required.	1 ❑ O **Horizontal Distribution:** None present. O **Avoidance of electromagnetic interference:** None present. O **Telecommunications rooms**: None present. O **Risers**: None present. O **Entrance room:** None present. O **Equipment room:** None present.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes*

FIG. 4 Scale for A.5.4 for Telecommunications Core

FIG. 4 Scale for A.5.4 for Telecommunications Core *(continued)*

A5. Typical Office Information Technology

Scale A.5.5. Cable plant

Occupant Requirement Scale		Facility Rating Scale
9 ❑ ○ **ACCESS TO LOCAL AREA NETWORKS:** The horizontal cabling must permit each person access to two or more Fast Ethernet class (CD-ROM transfer in under 1 minute) LAN connections, plus one or more Gigabit Ethernet class (CD-ROM transfer in under 10 seconds) LAN connection. ○ **VOICE CONNECTIONS.** Horizontal cabling must exceed minimum standards, permitting two or more voice lines per person or per work location.		9 ❑ ○ **Gigabit class cables.** Each person or each work location has at least one Gigabit-capable (four pair UTP [Unshielded Twisted Pair] cable labeled Category 5e or higher) or fiber optic cable and outlet. ○ **Fast Ethernet class cables.** Each person or each work location has at least two Fast Ethernet-capable (four pair UTP cable labeled Category 5e or higher) cables and outlets. ○ **Voice cables.** Each person or each work location has at least two voice grade (four pair UTP cable labeled Category 3 or higher) cable and outlet.
	8 ❑	
7 ❑ ○ **ACCESS TO LOCAL AREA NETWORKS:** The horizontal cabling must permit each person access to two or more Fast Ethernet class (CD-ROM transfer in under 1 minute) LAN connections. ○ **VOICE CONNECTIONS.** Horizontal cabling must comply fully with standards permitting at least one voice line per person or per work location.		7 ❑ ○ **Gigabit class cables.** None present, so not applicable at this level. ○ **Fast Ethernet class cables.** At each work location, at least two Fast Ethernet-capable four pair UTP cable labeled Category 5e or higher cables and outlets. ○ **Voice cables.** At each work location, at least one voice grade four pair UTP cable labeled Category 3 or higher) cable and outlet.
	6 ❑	
5 ❑ ○ **ACCESS TO LOCAL AREA NETWORK:** The horizontal cabling must permit each person access to one Fast Ethernet class (CD-ROM transfer in under 20 minutes) LAN connection. ○ **VOICE CONNECTIONS:** Horizontal cabling must comply fully with standards permitting at least one voice line per person.		5 ❑ ○ **Gigabit class cables.** None present, so not applicable at this level. ○ **Fast Ethernet class cables.** At each work location, one Ethernet-capable (four pair UTP cable labeled Category 3 or higher) cables and outlets. ○ **Voice cables.** At each work location, one voice grade four pair UTP cable labeled Category 3 or higher cable and outlet.
	4 ❑	
3 ❑ ○ **ACCESS TO LOCAL AREA NETWORK:** LAN cabling not needed at all work locations. ○ **VOICE CONNECTIONS.** Each person will have a telephone.		3 ❑ ○ **Gigabit class cables.** None present, so not applicable at this level. ○ **Fast Ethernet class cables.** Some work locations are provided with one or more Ethernet-capable (four pair UTP cable labeled Category 3 or higher) cables and outlets. ○ **Voice cables.** At each work location, one voice grade (four pair UTP cable which is not marked or certified) and outlet.
	2 ❑	
1 ❑ ○ **ACCESS TO LOCAL AREA NETWORK:** Few people in this organization need to connect their computers to any network. ○ **VOICE CONNECTIONS:** Not every person or work location has a telephone		1 ❑ ○ **Gigabit class cables.** None present, so not applicable at this level. ○ **Fast Ethernet class cables.** Few, if any, work locations are provided with Ethernet-capable (four pair UTP cable labeled Category 3 or higher) cables and outlets. ○ **Voice cables.** Where present, voice cabling is not marked or certified to any current performance standard.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes*

FIG. 5 Scale for A.5.5 for Cable Plant

A.5. Typical Office Information Technology

Scale A.5.6. Cooling

Occupant Requirement Scale		Facility Rating Scale
9 ❑ ○ **COOLING CAPACITY FOR INCREASED ELECTRICAL LOADS:** Require cooling capacity in the HVAC system to cope with up to 75% increase in electrical loads due to information technology.		9 ❑ ○ **Increased capacity**: The cooling capacity can be increased easily in response to a 75% increase in electrical loads from office information technology, e.g. the system design is suitable and space exists.
	8 ❑	
7 ❑ ○ **COOLING CAPACITY FOR INCREASED ELECTRICAL LOADS:** Require cooling capacity in the HVAC system to cope with up to 50% increase in electrical loads due to information technology.		7 ❑ ○ **Increased capacity**: The cooling capacity can be increased in response to a 50% increase in electrical loads from office information technology, e.g. the system design is suitable and space exists.
	6 ❑	
5 ❑ ○ **COOLING CAPACITY FOR INCREASED ELECTRICAL LOADS:** Require cooling capacity in the HVAC system to cope with up to 15% increase in electrical loads due to information technology.		5 ❑ ○ **Increased capacity**: The cooling capacity can be increased in response to a 15% increase in electrical loads from office information technology, e.g. the system design is suitable and space exists.
	4 ❑	
3 ❑ ○ **COOLING CAPACITY FOR INCREASED ELECTRICAL LOADS:** Minimal need for increased cooling capacity in the HVAC system to cope with electrical loads due to information technology.		3 ❑ ○ **Increased capacity**: The cooling capacity cannot be increased in response to an increase in electrical loads from office information technology. The system may have a 5% spare capacity at off-peak periods.
	2 ❑	
1 ❑ ○ **COOLING CAPACITY FOR INCREASED ELECTRICAL LOADS**: No need for additional cooling due to electrical loads due to information technology.		1 ❑ ○ **Increased capacity**: The cooling capacity is marginal for loads without office information technology, and cannot respond to increased loads.

❑ Exceptionally important. ❑ Important. ❑ Minor Importance.	
Minimum Threshold level =	❑ NA ❑ NR ❑ Zero ❑ DP

NOTES *Space for handwritten notes on Requirements or Ratings*

FIG. 6 Scale A.5.6 for Cooling