

# ASHRAE Research: Improving the Quality of Life

The American Society of Heating, Refrigerating and Air-Conditioning Engineers is the world's foremost technical society in the fields of heating, ventilation, air conditioning, and refrigeration. Its members worldwide are individuals who share ideas, identify needs, support research, and write the industry's standards for testing and practice. The result is that engineers are better able to keep indoor environments safe and productive while protecting and preserving the outdoors for generations to come.

One of the ways that ASHRAE supports its members' and industry's need for information is through ASHRAE Research. Thousands of individuals and companies support ASHRAE Research

annually, enabling ASHRAE to report new data about material properties and building physics and to promote the application of innovative technologies.

Chapters in the ASHRAE Handbook are updated through the experience of members of ASHRAE Technical Committees and through results of ASHRAE Research reported at ASHRAE meetings and published in ASHRAE special publications and in *ASHRAE Transactions*.

For information about ASHRAE Research or to become a member, contact ASHRAE, 1791 Tullie Circle, Atlanta, GA 30329; telephone: 404-636-8400; [www.ashrae.org](http://www.ashrae.org).

## Preface

The 2007 *ASHRAE Handbook—HVAC Applications* covers a broad range of facilities and topics, and is written to help engineers design and use equipment and systems described in other Handbook volumes. ASHRAE Technical Committees have revised nearly every chapter for current requirements and techniques. An accompanying CD-ROM contains all the volume's chapters in both I-P and SI units.

This edition includes *three* new chapters, described as follows:

- Chapter 56, Room Air Distribution, intended to help HVAC designers apply air distribution systems to occupied spaces, has information on air distribution strategies, and tools and guidelines for applications and system design.
- Chapter 57, Integrated Building Design, describes this process and the activities that support collaboration among design participants, and identifies major milestones for project delivery.
- Chapter 58, Chemical, Biological, Radiological, and Explosive Incidents, describes these types of events, their effects on buildings, occupants, and equipment, and offers general guidelines on how to deal with them.

Some of the revisions and additions to the remainder of the volume are as follows:

- Chapter 6, Educational Facilities, rewritten and expanded, now has comprehensive design criteria for preschools through universities, plus detailed content on applying dedicated outside air systems (DOAS), displacement ventilation, and other strategies.
- Chapter 7, Health Care Facilities, updated throughout for current guidelines and standards, has new content on pharmacies, including sterile compounding areas.
- Chapter 8, Justice Facilities, has new sections on jails, prisons, family courts, courthouses, and forensic labs.
- Chapter 9, Automobiles and Mass Transit (formerly entitled Surface Transportation), has been extensively revised, with updates on refrigerant phaseouts and new technology, plus detailed content on system components, including many new illustrations.
- Chapter 16, Clean Spaces, has new content on differential pressurization control between rooms, air locks, aseptic pharmaceutical processing areas, and improving the sustainability of these facilities.
- Chapter 17, Data Processing and Electronic Office Areas, has been completely rewritten to reflect current technology.
- Chapter 21, Museums, Galleries, Archives, and Libraries, retitled, now covers galleries and has a major new table listing relevant gaseous pollutants, their sources, and at-risk materials.
- Chapter 31, Kitchen Ventilation, has been updated extensively with recent research results on hood capture and containment, makeup air configurations, and grease particle capture, plus new text on residential applications.
- Chapter 32, Geothermal Energy, has new sections on pumps and piping for ground-coupled heat pumps, standing-column

groundwater heat pump systems, plus a new residential vertical design example.

- Chapter 34, Thermal Storage, has new sections on sensible energy change storage, chilled-water and low-temperature fluid applications, hydronic design for open systems, and using building thermal mass.
- Chapter 35, Energy Use and Management, reorganized to facilitate its use in program planning, has much rewritten content, especially the section on analyzing energy data.
- Chapter 36, Owning and Operating Costs, has been extensively updated, with new data on equipment service life, energy costs, and other factors.
- Chapter 38, Operation and Maintenance Management, revised throughout, has a new section on detecting and diagnosing equipment faults, plus new tables on equipment fault frequencies.
- Chapter 44, Building Air Intake and Exhaust Design, has revisions to dilution calculations, the parameters involved, and methods surrounding their use.
- Chapter 48, Water Treatment, has new information on research results for nonchemical treatment methods.
- Chapter 45, Control of Gaseous Indoor Air Contaminants, has new information on air cleaner configurations, and filter housing and adsorber module integrity.
- Chapter 46, Design and Application of Controls, has been completely reorganized, with many new or modified diagrams and revised sections.
- Chapter 47, Sound and Vibration Control, has been substantially rewritten, including many procedures and examples.
- Chapter 49, Service Water Heating, updated with added discussion of equipment sizing methods, also has new sections on distribution piping heat loss, hot-water delivery delays, and computing system energy use.

This volume is published, both as a bound print volume and in electronic format on a CD-ROM, in two editions: one using inch-pound (I-P) units of measurement, the other using the International System of Units (SI).

Corrections to the 2004, 2005, and 2006 Handbook volumes can be found on the ASHRAE Web site at <http://www.ashrae.org> and in the Additions and Corrections section of this volume. Corrections for this volume will be listed in subsequent volumes and on the ASHRAE Web site.

Reader comments are enthusiastically invited. To suggest improvements for a chapter, **please comment using the form on the ASHRAE Web site** or write to Handbook Editor, ASHRAE, 1791 Tullie Circle, Atlanta, GA 30329, or fax 678-539-2187, or e-mail [mowen@ashrae.org](mailto:mowen@ashrae.org).

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