

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.

The chapters in ASHRAE Handbooks 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.

The 2002 *ASHRAE Handbook*

The Refrigeration volume covers the refrigeration equipment and systems used for applications other than human comfort. This book includes information on cooling, freezing, and storing food; industrial applications of refrigeration; and low-temperature refrigeration. Although this Handbook is primarily a reference for the practicing engineer, it is also useful for anyone involved in the cooling and storage of food products.

The ASHRAE technical committees that prepare chapters strive not only to provide new information, but also to clarify existing information, delete obsolete materials, and reorganize chapters to make the Handbook more understandable and easier to use. In this volume, some of the changes and additions that have been made are as follows:

- Chapter 2, System Practices for Halocarbon Refrigerants, has new tables listing suction, discharge, liquid, and defrost line capacities for R-404A, R-407C, R-410A, and R-507.
- Chapter 5, Refrigerant System Chemistry, has new material on copper plating, selected refrigerant atmospheric lifetimes, ozone depletion, and greenhouse warming potentials, as well as updates on research and phaseout schedules.
- Chapter 6, Control of Moisture and Other Contaminants in Refrigerant Systems, has new guidance on location and orientation of loose-filled driers, and contains a new section on decontamination of large chillers.
- Chapter 7, Lubricants in Refrigerant Systems, describes new research on predicting the solubility of HFC refrigerants in pentaerythritol esters and on oil entrainment in vertical refrigerant piping, and has added information on chemical stability of lubricants, plus new figures showing density and viscosity for several refrigerant-lubricant mixtures.
- Chapter 8, Thermal Properties of Foods, adds new values for specific heat and latent heat of fusion for more than 200 food products.
- Chapter 10, Commodity Storage Requirements, has an expanded table of storage requirements for fresh vegetables, fruits, and melons with information on ethylene sensitivity and production plus recommendations for controlled-atmosphere storage.
- Chapter 13, Refrigerated Facility Design, contains added information on product stacking arrangement, envelope construction, defrosting, condensate handling, freezer doorways, unit coolers, and refrigerants.
- Chapter 17, Poultry Products, has a new section on airflow in processing plants, including renovation considerations, and new figures showing equipment layouts and workflow/airflow patterns.
- Chapter 21, Deciduous Tree and Vine Fruit, largely revised, has new tables on controlled-atmosphere storage, and new sections on sulfur dioxide fumigation of table grapes.
- Chapter 23, Vegetables, substantially revised, has new information on in-transit preservation, including shipping, packaging, loading, handling, product compatibilities, and controlled- and modified-atmosphere storage.

- Chapter 25, Beverages, has new information on breweries, including wort cooling, fermenting and stock cellars, hop storage, and CO₂ handling.
- Chapter 27, Bakery Products, contains revised information on continuous mix equipment and on CO₂ injection in the mixing process, plus a new section on frozen pre-proofed bakery products.
- Chapter 28, Chocolates, Candies, Nuts, Dried Fruits, and Dried Vegetables, has added information on manufacturing of chocolate products and on the candy cooling process.
- Chapter 29, Cargo Containers, Rail Cars, Trailers, and Trucks, has updated and expanded information on design, testing, application, and operations of these vehicle types.
- Chapter 34, Ice Rinks, has revised information on system capacities, condensation, defogging, equipment selection, heat recovery, and snow melt pits. The chapter includes new information on bobsled-luge tracks and surface pebbling for curling.
- Chapter 41, Absorption Cooling, Heating, and Refrigeration Equipment, contains revised sections on fluid flow control and ammonia-water absorption equipment, and new sections on industrial units, power production with waste-heat-activated cooling, and information sources.
- Chapter 42, Forced-Circulation Air Coolers, updated throughout, includes new information on defrost cycles and controls.
- Chapter 45, Refrigerant-Control Devices, contains revised information on control switches, electric expansion valves, and relief devices, plus new sections or information on discharge bypass valves, suction line heat exchangers, thermistors, thermocouples, resistance temperature detectors, and control sensors.
- Chapter 47, Retail Food Store Refrigeration and Equipment, extensively revised, has updated information on store operations, regulations, display case heat transfer and airflow, case condensate and relative humidity, secondary coolant systems, liquid-cooled self-contained systems, defrost control, and refrigerants.
- Chapter 50, Codes and Standards, has been updated and now contains expanded organization contact information, including web addresses.

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

Look for corrections to the 1999, 2000, and 2001 Handbooks on the Internet at <http://www.ashrae.org>. Any changes in this volume will be reported in the 2003 *ASHRAE Handbook* and on the ASHRAE web site.

If you have suggestions for improving a chapter or you would like more information on how you can help revise a chapter, e-mail mowen@ashrae.org; write to Handbook Editor, ASHRAE, 1791 Tullie Circle, Atlanta, GA 30329; or fax 404-321-5478.

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