SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Consensus is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Manager of Standards of ASHRAE should be contacted for:

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard,
d. permission to reprint portions of the Standard.

CONTENTS

ANSI/ASHRAE Standard 15-2004, Safety Standard for Refrigeration Systems

NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at http://www.ashrae.org.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

ANSI/ASHRAE 15-2004 is the newest version of one of ASHRAE's oldest standards. This version is a republication of ANSI/ASHRAE 15-2001, including addendum a. The reader is referred to that addendum as well as Appendix J of this standard for changes that have been made since the original publication of ANSI/ASHRAE 15-2001. Among those changes were changes to the treatment of flammable refrigerants, including correction of an omission in the 2001 standard. In addition, changes were made to the requirements for pressure vessel protection and references were updated.

This standard is directed toward the safety of persons and property on or near the premises where refrigeration facilities are located. It includes specifications for fabrication of tight systems but does not address the effects of refrigerant emissions on the environment. For information on the environmental effects of refrigerant emissions, see ASHRAE Guideline 3-1996, Reducing Emission of Halogenated Refrigerants in Refrigeration and Air-Conditioning Equipment and Systems.

While the user must be familiar with the entire document, the following major topic grouping allows quicker location of information. The subtopics included in these major groupings are:

GENERAL: Purpose, Scope, Definitions, Occupancy Classification, Refrigerating System Classification, Refrigerant Classification, Precedence with Conflicting Requirements, Listed Equipment.

RESTRICTIONS: Restrictions on Refrigerant Use, Installation Restrictions.

DESIGN AND CONSTRUCTION: Materials, System Design Pressure, Refrigerant-Containing Pressure Vessels, Pressure Relief Protection, Setting of Pressure-Relief Devices, Marking of Pressure-Relief Devices and Fusible Plugs, Pressure Vessel Protection, Positive Displacement Compressor Protection, Pressure-Limiting Devices, Refrigerant Piping, Valves, Fittings and Related Parts, Components Other than Pressure Vessels and Piping, Service Provisions, Fabrication, Factory Tests, and Nameplate.

OPERATION AND TESTING: Field Tests, General Requirements.

In the text of the standard, superscripts indicate the references included in Appendices D and E.

As discussed above, the user is referred to addendum a of ANSI/ASHRAE 15-2001 for changes that have been made since the original publication of ANSI/ASHRAE 15-2001. Some of those changes are:

- *Section 7 – Changes were made to the requirements for flammable refrigerants.*
- *Section 9 – The requirements for pressure vessel protection were revised.*

The hazards of refrigerants are related to their physical and chemical characteristics as well as to the pressures and temperatures occurring in refrigerating and air-conditioning systems. Personal injury and property damage from inadequate precautions may occur from:

- *Rupture of a part or an explosion with risk from flying debris or from structural collapse.*
- *Release of refrigerant from a fracture, due to a leaking seal, or from incorrect operation.*
- *Fire resulting from or intensified by burning or deflagration of escaping refrigerant or lubricant.*

Personal injury from accidental release of refrigerants may also occur from:

- *Suffocation from heavier-than-air refrigerants in inadequately ventilated spaces.*
- *Narcotic and cardiac sensitization effects.*
- *Toxic effects of vapor or the decomposition products due to vapor contact with flames or hot surfaces.*
- *Corrosive attack on the eyes, skin, or other tissue.*
- *Freezing of tissue by contact with liquid.*

While ANSI/ASHRAE 15-2004 is written as a self-standing document, it includes references to other standards. One of those standards is ANSI/ASHRAE 34, which prescribes the Refrigerant Classification System and Table 1 quantities that are important to the use of this standard. Changes to ANSI/ASHRAE 15 are closely coordinated with those to ANSI/ASHRAE 34.

Table 1 shows the amount of refrigerant in a given space that, when exceeded, requires a machinery room. When a refrigerant is not classified in ANSI/ASHRAE 34 or its addenda or shown in Table 1, it is the responsibility of the owner of a refrigerating system to make this judgement. For blends, Appendix A is offered to aid in determining allowable concentrations.

Care should be taken to avoid stagnant pockets of refrigerant vapors by proper location of ventilation inlet and exhaust openings (all commonly used refrigerants except ammonia [R-717] and water [R-718] are heavier than air). All machinery rooms are required to have detectors that will activate on alarm and mechanical ventilation at a value not greater than the corresponding TLV-TWV (or toxicity measure consistent therewith). Informative Appendix I provides guidance on integrating the requirements of this standard with occupational health and safety programs.

A short publishing history of this code traces the origins of these safety provisions. In 1919, the American Society of Refrigerating Engineers (ASRE) proposed a Tentative Code for the Regulation of Refrigerating Machines and Refriger-