ADDENDA

ANSI/ASHRAE Addendum c to
ANSI/ASHRAE Standard 15-2013

Safety Standard for Refrigeration Systems

Approved by the ASHRAE Standards Committee on June 29, 2016; by the ASHRAE Technology Council on June 29, 2016; and by the American National Standards Institute on June 30, 2016.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

© 2016 ASHRAE ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

ASHRAE Standing Standard Project Committee 15
Cognizant TCs: 101, Custom Engineered Refrigeration Systems,
and 9.1, Large Building Air-Conditioning Systems
SPLS Liaison: Roger Hedrick

Dennis Dorman*, *Chair*
Martin Timm, *Vice-Chair*
Gregory A. Scrivener*, Secretary
Wayne K. Borrowman*
Els Baert
Jim Caylor*
Danny Halel*
Scott MacBain*
Douglas T. Reindl*
Brian J. Rodgers*
Jeffrey M. Shapiro*
Eric M. Smith*
Russell C. Tharp*
John I. Vucci*
Larry D. Burns
Rakesh Goel
Tim Halsor
Alexander Hillbrand
Glenn C. Hourahan
Hung M. Pham
Douglas K. Tucker
James T. Vershaw
Wei Wang

** Denotes members of voting status when the document was approved for publication*

ASHRAE STANDARDS COMMITTEE 2016–2017

Rita M. Harrold, *Chair*
Steven J. Emmerich, *Vice-Chair*
James D. Aswegan
Niels Bidstrup
Donald M. Brundage
Waller S. Clements
Drury B. Crawley
John F. Dunlap,
James W. Earley, Jr.
Keith I. Emerson
Julie M. Ferguson
Michael W. Gallagher
Walter T. Grondzik
Vinod P. Gupta
Susanna S. Hanson
Roger L. Hedrick
Rick M. Heiden
Srinivas Katipamula
Arsen K. Melikov
R. Lee Millies, Jr.
Cyrus H. Nasseri
David Robin
Peter Simmonds
Dennis A. Stanke
Wayne H. Stoppelmoor, Jr.
Jack H. Zarour
William F. Walter, *BOD ExO*
Patricia Graef, *CO*

Stephanie C. Reiniche, *Senior Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of 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 Senior 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, or
d. permission to reprint portions of the Standard.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

ASHRAE is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ANSI is a registered trademark of the American National Standards Institute.

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

(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

Addendum c gives requirements for carbon dioxide (CO_2) refrigeration systems and modifies the requirements for machinery rooms. The addendum modifies a definition in and adds new definitions to Section 3. In addition, the addendum eliminates Section 8.12(d) and completely revises Section 9.2.6.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum c to Standard 15-2013

Add the following new definitions to Section 3.

transcritical system: a refrigeration system in which evaporation occurs in the subcritical region and heat rejection can occur at a pressure exceeding the critical pressure of the refrigerant.

gas cooler: a heat exchanger designed to remove heat from a transcritical system.

intermediate pressure stage: a pressure stage that is sometimes present on carbon dioxide (R-744) transcritical systems that operates between the highside and lowside pressure stages, is regulated by a flash gas bypass valve, and includes flash gas tanks and gas coolers, where provided.

flash gas tank: a tank provided to separate vapor from liquid on the supply side of an evaporator. The feed to a flash gas tank is supercritical gas exiting a gas cooler that has been throttled to its subcritical region.

flash gas bypass valve: a device that regulates the removal of gas from the flash gas tank for compression.

Revise the following definition in Section 3.

highside: ~~those portions of the refrigerating system that are subject to approximate condensing pressure.~~A portion or stage of a refrigerating system that is subject to condenser or gas cooler pressure.

Delete Section 8.12(d).

~~d. The refrigerating machinery room shall have a door that opens directly to the outdoors or through a vestibule equipped with self-closing, tight-fitting doors.~~

Revise Section 9.2.6 as follows.

~~**9.2.6** When a refrigerating system utilizes carbon dioxide (R-744) as a heat transfer fluid, the minimum design pressure for system components shall comply with the following.~~

~~**9.2.6.1** In a circuit without a compressor, the design pressure shall be at least 20% higher than the saturation pressure corresponding to the warmest location in the circuit.~~

~~**9.2.6.2** In a cascade refrigerating system, the highside design pressure shall be at least 20% higher than the maximum pressure developed by a pressure-imposing element, and the lowside pressure shall be at least 20% higher than the saturation pressure corresponding to the warmest location in the circuit.~~

9.2.6 Components of refrigerating systems that utilize carbon dioxide (R-744) as a heat transfer fluid shall comply with the minimum design pressure requirements in Sections 9.2.6.1 through 9.2.6.4. The pressure at maximum operating conditions referenced by Sections 9.2.6.1 through 9.6.2.3 shall be the highest pressure experienced during the following conditions:

a. Startup
b. Full-load operation at the warmest heat rejection design condition
c. Defrost, for systems designed with defrost capability

9.2.6.1 For circuits without compressor, the design pressure shall be not less than 120% of the circuit pressure at maximum operating conditions.

9.2.6.2 Cascade refrigerating systems shall comply with all of the following:

a. The highside design pressure shall be not less than 120% of the maximum pressure developed by a pressure-imposing element.
b. The lowside design pressure shall be not less than 120% of the pressure at maximum operating conditions, corresponding to the warmest location in the circuit.

9.2.6.3 Transcritical refrigerating systems shall comply with all of the following:

a. The highside design pressure shall be not less than 110% of the maximum pressure developed by a pressure-imposing element.
b. The lowside design pressure shall be not less than 120% of the pressure at maximum operating conditions.
c. The intermediate pressure stage, where present, shall have a design pressure that is not less than 120% of the pressure at maximum operating conditions.

9.2.6.4 Where the design pressure calculated in Sections 9.2.6.1 through 9.2.6.3 will be exceeded in the event of refrigerant warming to ambient temperature during normal standstill or emergency standstill conditions, one of the following means shall be provided to maintain pressure at or below the design pressure:

a. A pressure-relieving connection that will relieve excess pressure to a lower pressure part of the system
b. A pressure-relief valve in accordance with Section 9.7.8

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

© ASHRAE (www.ashrae.org). For personal use only. Additional reproduction, distribution,
or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

ASHRAE · 1791 Tullie Circle NE · Atlanta, GA 30329 · www.ashrae.org

About ASHRAE

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration, and sustainability. Through research, Standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today.

For more information or to become a member of ASHRAE, visit www.ashrae.org.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, on CD-ROM, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous version. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

IMPORTANT NOTICES ABOUT THIS STANDARD

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.

7/16