



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.

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FOREWORD

Addendum c gives requirements for carbon dioxide (CO₂) 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 ~~striketrough~~ (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 9.2.6.3 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

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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.

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