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ADDENDA

ANSI/ASHRAE Addendum g to
ANSI/ASHRAE Standard 147-2019

Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems

Approved by ASHRAE and the American National Standards Institute on April 24, 2026.

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. Instructions for how to submit a change can be found on the ASHRAE® website (www.ashrae.org/continuous-maintenance).

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FOREWORD

Addendum g makes additions and changes to the standard to improve its usability and readability and makes adjustments as required to comply with the new title, purpose, and scope as approved in Addendum f.

Informative 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 g to Standard 147-2019

Revise Section 3 as shown below.

joint, brazed: a gas-tight joint obtained by joining metal parts with metallic mixtures or alloys that melt at liquidus temperatures higher than ~~800~~ 840°F (~~426~~ 450°C) but less than the melting solidus temperatures of the joined parts.

joint, soldered: a gas-tight joint obtained by joining metal parts with metallic mixtures or alloys that melt at liquidus temperatures between 400°F and ~~800°F~~ 840°F (204°C and ~~426~~ 450°C).

pressure, design: ~~the maximum allowable working pressure for which a specific part of a system is designed to operate under normal or abnormal conditions, as defined in a relevant standard such as UL 1995, *Heating and Cooling Equipment*~~[1]. the maximum gage pressure for which a specific part of a refrigerating system is designed.

pressure, high: as applied to ~~refrigeration~~ refrigerating systems, this term refers to gage pressure at room temperature (74°F [23.3°C]) that is typically more that 100 psig (689 kPa gage). Common high-pressure refrigerants include ~~R-22, R-502,~~ R-404A, R-407A, R-407C, R-410A, R-32, R-454B, and R-507A.

pressure, low: as applied to ~~refrigeration~~ refrigerating systems, this term refers to absolute pressure at room temperature (74°F [23.3°C]) that is below absolute ambient pressure. Low-pressure refrigerants include ~~R-11, R-113 and R-123~~ R-514A, and R-1336mzz(Z).

pressure, medium: as applied to ~~refrigeration~~ refrigerating systems, this term refers to gage pressure at room temperature (74°F [23.3°C]) that is greater than atmospheric pressure but typically less that 100 psig (689 kPa gage). Common medium-pressure refrigerants include ~~R-12, R-500,~~ R-134a, R-513A, R-513B, R-1234ze(E), and R-245fa.

vacuum, deep (high vacuum): a vacuum of ~~1000 µm Hg (130Pa)~~ 500 µHg (0.02 in. of mercury) or less of absolute pressure.

Revise Section 4.5.1 as shown below.

4.5.1 Minimized Connections~~.~~

4.5.1.1 Systems shall be designed in such a manner as to minimize the number of fittings and connections. ~~Tapered pipe threads shall not be used for fittings in refrigerant circuits unless the threads are back welded or sealed by equally effective means. Single-flare copper fittings shall not be used on cooling-only refrigeration systems or refrigeration systems whose normal design is less than 40°F (4.4°C) saturated suction temperature. Where flare fittings are used, they shall be tightened to manufacturer's torque specifications.~~

4.5.1.2 Tapered Pipe Threads. Tapered pipe threads shall not be used for fittings in refrigerant circuits unless the threads are welded or sealed by equally effective means.

4.5.1.3 Single-Flare Fittings. Single-flare fittings shall not be used on cooling-only refrigeration systems or refrigeration systems whose normal design is less than 40°F (4.4°C) saturated suction temperature. Where flare fittings are used, they shall be tightened to manufacturer's torque specifications.

Revise Section 4.6, item c, as shown below.

4.6 Isolation Valves.

[. . .]

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c. The valve meets the requirements of Section 6.2.~~1~~ for type 1 equipment.

Revise Section 4.9.1 as shown below.

4.9.1 Subatmospheric Pressure. Purging devices shall be provided for Equipment Types 7, 8, and 10 that have any portion of the system that operates at subatmospheric pressure. New equipment designs shall specify purging devices that release less than one unit mass of refrigerant per unit mass of air as tested by AHRI Standard 580, *Non-Condensable Gas Purge Equipment for Use with Low Pressure Centrifugal Liquid Chillers* [5].

Revise Section 5 as shown below.

5. PRODUCT DEVELOPMENT

This section of the standard describes compliance requirements for products during their development and evaluation phases.

5.2 Refrigerant Handling. The ~~laboratory~~ development or evaluation facility shall be equipped with a recovery/recycling system and storage capacity for a holding charge recovered from any individual test ~~unit in the laboratory~~. When servicing of a recovery/recycling unit is required, refrigerant in the unit shall be recovered and recycled or reclaimed ~~in the same manner as that from test systems~~.

5.2.1 Recovery. Upon test completion ~~of tests~~, the refrigerant shall be recovered from ~~an experimental~~ the system~~.It is recognized that sometimes the recovered refrigerant must first be put into a container to determine or confirm charge levels, but ultimately all refrigerant shall be recovered~~ into appropriate storage devices as required under Section 10. Refrigerant that is known to be contaminated (for example, with a motor burnout) shall be recovered into proper containers and recycled, reclaimed, or disposed of as described in Section 9.

5.2.2 Inventory Record. A refrigerant inventory record shall be maintained to account for virgin material received into the ~~laboratory~~ development or evaluation facility and material shipped for reclaim or destruction. This inventory must include the types and quantities of refrigerant received and shipped for reclamation or destruction and the dates of receipt and shipment.

Revise Section 6 as shown below.

Table 6-1 Equipment Manufacture Leak Threshold Limits

Equipment Type	Description	Leak Rate Measurement Threshold	Leak Location Method Threshold
Type 1	Component	0.1 oz/year (2.8 g/year)	0.1 oz/year/joint (2.8 g/year/joint)
Type 2	Small assembly	0.5 oz/year (14.2 g/year)	0.1 oz/year/joint (2.8 g/year/joint)
Type 3	Large assembly	1.0 oz/year (28.3 g/year)	0.1 oz/year/joint (2.8 g/year/joint)
Type 4	Appliance	1.0 oz/year (28.3 g/year)	0.1 oz/year/joint (2.8 g/year/joint)
Type 5	Small packaged	3.0 oz/year (85.0 g/year)	0.1 oz/year/joint (2.8 g/year/joint)
Type 7	Large packaged	Greater of 15 oz/year (425 g/year) or 0.25% of the charge	0.1 oz/year/joint (2.8 g/year/joint)
Type 8	Large assembled	Greater of 15 oz/year (425 g/year) or 0.25% of the charge	0.1 oz/year/joint (2.8 g/year/joint)

6.4 Evacuation. Systems shall be evacuated to 500 μHg (~~65Pa~~ 0.020 in. of mercury) or less and held long enough to remove detrimental moisture as defined by the manufacturer.

Revise Section 7 as shown below.

7.1.1 General. All piping, tubing, and connections shall be installed as required by Section 4.5 and ANSI/ASHRAE Standard 15.

7.1.2.2 All tubes and fittings shall be thoroughly cleaned prior to assembly. Both the outside of copper tube and the inside of fittings must be bright and clean before brazing. Braze filler metal selection shall be consistent with the types of materials being joined and as specified in the installation manual. ~~Solder filler material with a melting point less than 800°F (426°C) shall not be used with copper-to-copper or copper-to-steel joints. Solder filler material with a melting point less than 715°F (379°C) shall not be used with copper-to-aluminum or aluminum-to-aluminum joints.~~

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7.1.2.7 ~~The~~ Any brazing ~~process~~ shall be purged with inert gas to prevent oxidation, which can cause plugged driers, filters, and strainers; dirty oil; and compressor failure.

7.2 Field Leak Testing. Equipment Types 6, 8, 9, and 10 shall be leak tested as an Equipment Type 8 per Section 6.2.~~1~~ to ensure system integrity and minimize refrigerant leakage.

Revise Section 8 as shown below.

8.1.5 Oil Removal. Before oil is removed from a compressor, the oil sump heater, if present, ~~(if the compressor is so equipped)~~ shall be turned on, and the oil sump refrigerant pressure shall be ~~repetitively~~ reduced ~~by~~ via ~~safe and correct~~ recovery or ~~by~~ pumpdown to 0 psig (0 kPa gage) or below until such time that the oil sump pressure does not noticeably rise within ten minutes of terminating the pressure reduction

Add the following normative definition to Section 11.

22. ISO. 2017. ISO 17025:2017, *General Requirements for the Competence of Testing and Calibration Laboratories*, 3rd ed. Geneva, Switzerland: International Organization for Standardization.

Add the following informative reference to Informative Appendix C.

INFORMATIVE APPENDIX C
INFORMATIVE REFERENCES

CX.AWS. 2020. A3.0M/A3.0:2020, *Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*, 13th ed. Miami, FL: American Welding Society.

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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.

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.

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