Proposed Addendum g to Standard 147-2019, Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems

First Public Review (August 2024)
(Draft shows Proposed Changes to Current Standard)
BSR/ASHRAE Addendum g to ANSI/ASHRAE Standard 147-2019, Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems

First Public Review Draft

(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

This addendum makes additions and changes to the standard. These changes are necessary to improve the usage and readability of the standard and make adjustments as required to comply with the new TPS as approved in addendum f.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and strikethrough (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum g to Standard 147-2019

Revise Section 3 definitions, as shown below

**joint, brazed:** a gas-tight joint obtained by joining metal parts with alloys that melt at temperatures higher than 800°F (426°C) but less than the melting temperatures of the joined parts.

**joint, soldered:** a gas-tight joint obtained by joining metal parts with metallic mixtures or alloys that melt at temperatures between 400°F and 800°F (204°C and 426°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. 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 than 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 than 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 inHg) or less of absolute pressure.

Revise Section 4 as shown below to break up Section 4.1 into multiple sub sections.

4.5.1 **Minimized Connections.** 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.
4.5.2 **Tapered pipe threads.** Tapered pipe threads shall not be used for fittings in refrigerant circuits unless the threads are back welded or sealed by equally effective means.

4.5.3 **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.

4.6. **Isolation Valves** section c: The valve meets the requirements of Section 6.2.4 for type 1 equipment.

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*.

---

**Revise Section 5 as shown below**

5. **PRODUCT DEVELOPMENT**

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

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 testing 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

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Description</th>
<th>Leak Rate Measurement Threshold</th>
<th>Leak Location Method Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Component</td>
<td>0.1 oz/year (2.8 g/year)</td>
<td>0.1 oz/year/joint (2.8 g/year/joint)</td>
</tr>
<tr>
<td>Type 2</td>
<td>Small assembly</td>
<td>0.5 oz/year (14.2 g/year)</td>
<td>0.1 oz/year/joint (2.8 g/year/joint)</td>
</tr>
<tr>
<td>Type 3</td>
<td>Large assembly</td>
<td>1.0 oz/year (28.3 g/year)</td>
<td>0.1 oz/year/joint (2.8 g/year/joint)</td>
</tr>
<tr>
<td>Type 4</td>
<td>Appliance</td>
<td>1.0 oz/year (28.3 g/year)</td>
<td>0.1 oz/year/joint (2.8 g/year/joint)</td>
</tr>
</tbody>
</table>
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 (65 Pa 0.020 inHg)) 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 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.

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 6.2.4 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.

_Revise Section 11 as shown below to add a normative reference_