ANSI/ASHRAE Addendum I to
ANSI/ASHRAE Standard 15-2019

Safety Standard for
Refrigeration Systems

Approved by ASHRAE and the American National Standards Institute on August 31, 2022.

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Addendum I modifies portions of ASHRAE Standard 15 to incorporate requirements for commercial refrigeration applications with the use of A2L, A2, and A3 refrigerants. The text is developed in response to CMP0004-001, in conjunction with proposed product safety standard UL/CSA 60335-2-89, as well as research performed in collaboration with AHRI, ASHRAE, the U.S. DOE, and California Energy Commission.

The use of flammable refrigerants for commercial refrigeration applications in many of the new requirements concentrated in Section 7.7 is very similar to that of the existing requirements for A2L refrigerants for human comfort applications found mostly in Section 7.6. A2L requirements for human comfort were published in Addendum d to Standard 15-2016. Notably, several of the Section 7.7 requirements refer back to Section 7.6.

**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 I to Standard 15-2019

Modify Section 7 as shown. The remainder of Section 7 remains unchanged.

### 7.4 Location in a Machinery Room or Outdoors.

All components containing refrigerant shall be located either in a machinery room or outdoors, where the quantity of refrigerant needed exceeds the limits defined by Sections 7.2 and 7.3 or where direct-fired absorption equipment is used.

**Exceptions to 7.4:**

1. **Listed self-contained** self-contained systems are permitted outside of a machinery room, provided that such systems are not located in public hallways or lobbies and are limited to the following occupancies and refrigerant quantities:

### 7.5 Additional Restrictions

#### 7.5.1 All Occupancies. Sections 7.5.1.1 through 7.5.1.9 apply to all occupancies.

#### 7.5.1.9 Addition of Doors to Open Refrigerated Display Cases Containing Flammable Refrigerants

It is acceptable for doors to be added to open display cases containing flammable refrigerants only when in accordance with all of the following:

a. The owner or the owner’s authorized agent shall be notified prior to addition of one or more doors, and the addition of a door shall not be made where the owner objects to the change.

b. Flammable refrigerant charge sizes shall not exceed the limits for closed refrigerated display cases as defined by UL 60335-2-89/CSA C22.2 No. 60335-2-89. All construction, testing, and marking requirements for a new installation of closed cases, as defined in UL/CSA 60335-2-89, shall also apply.

c. Validation of safety and suitability of the addition of doors through one of the following:

   1. Written instructions of the original equipment manufacturer and approval of the AHJ

   2. Evaluation of the system by a registered design professional and approval of the AHJ

   3. Evaluation by an approved nationally recognized testing laboratory

### 7.5.2 Applications for Human Comfort Restrictions by Refrigerant Safety Group

#### 7.5.2.1 Refrigeration Systems for Human Comfort.

Group A2, A3, B1, B2L, B2, and B3 refrigerants shall not be used in high-probability systems for human comfort. Use of Group A2L refrigerants shall be in accordance with Section 7.6.

**Exceptions to 7.5.2.1:**

1. These restrictions do not apply to unit systems having refrigerant quantities less than
Refrigeration Systems Other than Human Comfort. High-probability systems for other than human comfort applications shall not use Class B refrigerants. Use of Group A2 refrigerants shall be in accordance with Section 7.7. Use of Group A2 refrigerants shall be in accordance with Section 7.8. Use of Group A3 refrigerants shall be in accordance with Section 7.5.3.

Exception to 7.5.2.2: These restrictions do not apply to industrial occupancies.

7.5.3 Higher-Flammability Refrigerants. Group A3 and B3 refrigerants shall not be used except where approved by the AHJ.

Exceptions to 7.5.3:
1. This restriction does not apply to laboratories with more than 100 ft² (9.3 m²) of space per person.
2. This restriction does not apply to industrial occupancies.
3. This restriction does not apply to listed self-contained systems containing no more than 0.331 lb (150 g) of Group A3 refrigerant, provided that the equipment is installed in accordance with the listing and the manufacturer’s installation instructions.
4. This restriction does not apply to equipment listed to UL 60335-2-89/CSA C22.2 No. 60335-2-89 containing no more than 0.459 × \(LFL\) (lb), where \(LFL\) is in pounds per 1000 ft² \((13 \times \text{LFL} \text{[kg]})\) of Group A3 refrigerant, provided that the equipment is installed in accordance with the listing and the manufacturer’s installation instructions. Refrigeration systems containing more than 0.141 × \(LFL\) (lb) \((4 \times \text{LFL} \text{[kg]})\) in an independent circuit shall not be installed within 20 ft (6 m) of an open flame.
5. This restriction does not apply to equipment listed to UL 60335-2-40/CSA C22.2 No. 60335-2-40 containing no more than 0.106 × \(LFL\) (lb) \((3 \times \text{LFL} \text{[kg]})\) of Group A3 refrigerant, provided that the equipment is installed in accordance with the listing and the manufacturer’s installation instructions.
6. This restriction does not apply to refrigeration systems located in machinery rooms or outdoors.

[...]

7.7 Group A2L Refrigerants for Refrigeration Systems Other than Human Comfort. High-probability systems using Group A2L refrigerants for other than human comfort applications shall comply with Sections 7.7.1 through 7.7.5.

7.7.1 Refrigerant Charge Limits. Refrigerant charge shall be limited as follows:

a. Refrigeration systems containing more than 0.141 × \(LFL\) (lb) \((4 \times \text{LFL} \text{[kg]})\) in an independent circuit shall not be installed within 20 ft (6 m) of an open flame.

b. Refrigeration systems shall contain a releasable refrigerant charge no more than 9.2 × \(LFL\) (lb), where \(LFL\) is in pounds per 1000 ft² \((260 \times \text{LFL} \text{[kg]})\) of Group A2L refrigerant per independent circuit.

Exceptions to 7.7.1:
1. This restriction does not apply to laboratories with more than 100 ft² (9.3 m²) of space per person.
2. This restriction does not apply to industrial occupancies.
3. This restriction does not apply to systems located in machinery rooms or outdoors.

7.7.2 Refrigerant Concentration Limits

7.7.2.1 Occupied spaces shall comply with Section 7.2.

7.7.2.2 Unoccupied spaces with refrigerant-containing equipment, including but not limited to piping or tubing, shall comply with Section 7.2 except as permitted by Section 7.7.5.

7.7.3 Listing and Installation Requirements. Refrigeration systems shall be listed to UL 60335-2-89/CSA C22.2 No. 60335-2-89 and shall be installed in accordance with listing and the manufacturer’s instructions.

Exception to 7.7.3: These requirements do not apply to industrial occupancies.

7.7.3.1 The nameplate required by Section 9.15 shall include a symbol indicating that a flammable refrigerant is used, as specified by the product listing.

7.7.3.2 A label indicating a flammable refrigerant is used shall be placed adjacent to service ports and other locations where service involving components containing refrigerant is performed, as specified by the product listing.
7.7.3.3 A refrigerant detector shall be provided in accordance with Section 7.7.6 except where either of the following apply:

a. When the refrigerant charge of any independent circuit is less than or equal to 0.459 × LFL (lb), where LFL is in pounds per 1000 ft³ (13 × LFL [kg], where LFL is in kg/m³)

or

b. When the complete discharge of refrigerant from any independent circuit will not exceed 50% of the RCL of the space, and the lowest point from which leak refrigerant will disperse into the space is greater than or equal to 14.5 ft (4.4 m)

7.7.3.4 When a refrigerant detector required by Section 7.7.3.3 senses a rise in refrigerant concentration above the value specified in Section 7.6.5(b), the actions of Section 7.6.2.4 shall be taken.

7.7.4 Ignition Sources Located in Ductwork. Any duct serving the space shall comply with Section 7.6.3.

7.7.5 Compressors and Pressure Vessels Located Indoors. For refrigeration compressors and pressure vessels located in an indoor space that is accessible only during service and maintenance, it shall be permissible to exceed maximum refrigerant charge calculated in accordance with Section 7.2, provided a mechanical ventilation system is used to prevent exceeding the RCL and all of the following provisions are met:

a. The releasable refrigerant charge of the largest independent refrigerating circuit shall not exceed 9.2 × LFL (lb) (260 × LFL [kg]). Releasable charges greater than 9.2 × LFL (lb) (260 × LFL [kg]) shall comply with the machinery room requirements of Section 8.13.

b. A mechanical ventilation system shall be provided that will mix air with leaked refrigerant and remove it from the space where the equipment is located. The space shall be provided with an exhaust fan. The exhaust fan shall remove air from the space where the equipment is located in accordance with Section 8.13.11.4.

c. The space and mechanical ventilation system is in compliance with Section 7.6.4(b) and Sections 7.6.4(d) through 7.6.4(f).

d. Electric motors driving fans shall not be placed inside the exhaust ducts; fan rotating elements shall be nonferrous or nonsparking, or the casing shall consist of or be lined with such material.

7.8 Group A2 Refrigerants for Refrigeration Systems Other than Human Comfort. High-probability systems using Group A2 refrigerants for other than human comfort applications shall comply with this section. Refrigeration systems using Group A2 refrigerants shall be limited to listed self-contained systems containing no more than 0.459 × LFL (lb), where LFL is in pounds per 1000 ft³ (13 × LFL [kg], where LFL is in kg/m³), provided that the system is installed in accordance with the listing and the manufacturer’s installation instructions. Refrigeration systems containing more than 0.141 × LFL (lb), (4 × LFL [kg]) in an independent circuit shall not be installed within 20 ft (6 m) of an open flame.

Exceptions to 7.8:

1. This restriction does not apply to laboratories with more than 100 ft² (9.3 m²) of space per person.
2. This restriction does not apply industrial occupancies.
3. This restriction does not apply to systems located in machinery rooms or outdoors.

[...]

Modify Section 14 as shown. The remainder of Section 14 remains unchanged. (Note: Normative Appendix B, “Normative References,” was redesignated as Section 14 by Addendum f to Standard 15-2019, which can be downloaded at www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda.)

14. NORMATIVE REFERENCES

[...]


Modify Informative Appendix B as shown. The remainder of Informative Appendix B remains unchanged. (Note: Informative Appendix A, “Informative References,” was redesignated as Informative Appendix B, “Informative References,” by Addendum f to Standard 15-2019, which can be downloaded at www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda.)

[...]

18. See Section 14, “Normative References.”
19. See Section 14, “Normative References.”
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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