BSR/ASHRAE Addendum m
to ANSI/ASHRAE Standard 15-2019

Second Public Review Draft

Proposed Addendum m to
Standard 15-2019, Safety Standard
for Refrigeration Systems

Second Public Review (February 2022)
(Draft shows Proposed Independent Substantive
Changes to Previous Public Review Draft)

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092
Second Public Review Draft (Independent Substantive Change)

(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 proposed addendum to ANSI/ASHRAE Standard 15-2019 modifies allowances for the use of mechanical ventilation to expand this mitigation strategy for human comfort applications using A2L refrigerants. Presently, Section 7.6.4 restricts the use of mechanical ventilation solely to systems that have compressors and pressure vessels located indoors. This allowance, and requirements if the allowance is used, in ANSI/ASHRAE Standard 15-2019 matches the allowance/requirements in the current third edition of UL 60335-2-40/CSA C22.2 No. 60335-2-40 product safety standard (Refer to Annex GG.4). Notably, this same domestic product safety standard allows the use of mechanical ventilation in other human comfort applications – those with compressors and pressure vessels located outdoors (Refer to Annex GG.8). Further, the international version of the product safety standard (IEC 60335-2-40, 6th edition) has the same requirements/allowances as the North American version.

This proposed addendum rectifies the difference by largely harmonizing ANSI/ASHRAE Standard 15 with the allowance for broader application of ventilation, and requirements if the allowance is used, in UL 60335-2-40/CSA C22.2 No. 60335-2-40, 3rd edition. This proposal would allow for mechanical ventilation in ANSI/ASHRAE Standard 15 when meeting stringent requirements for either continuous operation or operation initiated by a refrigerant detector, using an approach similar to the product safety standard. This proposed approach begins with a “simplified table method” for determining required ventilation rates, but also has a detailed calculation method.

The first publication public review draft received twenty comments. This independent substantive change second public review draft implements most of the submitted comments.

Note: This public review draft of addendum m makes proposed independent substantive changes to the previous public review draft. These substantive changes to the previous public review draft and related changes to Standard 15-2019 are indicated by blue-colored text with double-underlining (for additions) and red-colored text with strikethrough (for deletions), except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard shown in blue or red text 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 m to Standard 15-2019

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

7. RESTRICTIONS ON REFRIGERANT USE

[ ... ]

Note to Reviewers: Addendum g to Standard 15-2019 also proposes changes to Section 7.3, “Volume Calculations.” To avoid potential conflicts, all changes to Section 7.3 have been removed from draft Addendum m. Red font with both underline and strikethrough is text added by the 1st PPR draft (underline), but removed by the 2nd PPR-ISC draft (strikethrough). All existing text in Section 7.3 of Standard 15-2019 is unchanged (blank font without strikethrough).

7.3 Volume Calculations…

7.3.1 Nonconnecting Spaces…

[ ... ]

7.3.2 Ventilated Spaces. Where a refrigerating system, or a part thereof, is located within an air handler, in an air distribution duct system, or in an occupied space served by a mechanical ventilation system, the entire
air distribution systems shall be analyzed to determine the worst-case distribution of leaked refrigerant. The worst case or the smallest volume in which the leaked refrigerant disperses shall be used to determine the refrigerant quantity limit in the system, subject to the following criteria.

7.3.2* Spaces with Passive Dispersion. For refrigeration systems not having a refrigerant detector in accordance with Section 7.6.5 nor having continuous air circulation, where leaked refrigerant can disperse into a space or connected spaces through an air distribution system or part thereof, the entire air distribution system shall be analyzed to determine the worst-case distribution of leaked refrigerant. The effective dispersal volume used in calculating the refrigerant charge limit shall be the worst case or the smallest volume in which the leaked refrigerant disperses, subject to the following criteria.

7.3.2.1 Closures. Closures in the air distribution system, such as dampers, shall be evaluated as part of the analysis as follows: considered. If where one or more spaces of several arranged in parallel can be closed off from the source of the refrigerant leak, their the volumes of such space(s) shall not be used in the calculation.

7.3.3* Spaces with Active Air Circulation. For refrigeration systems having a refrigerant detector in accordance with Section 7.6.5 or having continuous air circulation, where leaked refrigerant can disperse into a space or connected spaces through an air distribution system, or part thereof, the effective dispersal volume used in calculating the refrigerant charge limit shall be the volume of all spaces served by the refrigeration system and volume of the ductwork.

7.3.4* Connected Spaces with Active Ventilation. For refrigeration systems using Group A2L refrigerant, where two or more spaces are connected by a mechanical ventilation system meeting the requirements of Section 7.6.4 that can be used to disperse leaking refrigerant, the effective dispersal volume used in calculating the refrigerant charge limit shall be the cumulative volume of such connected spaces, including the volume of any transfer air ductwork.

7.6.4* Mechanical Ventilation. Where Section 7.3.4 is used for calculation of effective dispersal volume, mechanical ventilation shall comply with this section. Where a ventilated enclosure is provided to control a refrigerant leak, the equipment refrigeration system and ventilated enclosure shall be listed and installed in accordance with UL 60335-2-4018 / CSA C22.2 No. 60335-2-4019, and shall not be required to comply with this section.

a. Mechanical ventilation shall be provided that will remove leaked refrigerant from the space where refrigerant leaking from the equipment refrigeration system is expected to accumulate. The space shall be provided with an exhaust or transfer fan. Fans used to exhaust air from the space or transfer air to another a separate indoor space shall comply with the following equation:

b.* Mechanical ventilation shall be permitted to be continuous or activated by a refrigerant detector. Building fire and smoke systems may shall be permitted to override this function.

1. Continuous Ventilation. Where continuous ventilation is provided, ventilation function shall be continuously verified per Section 7.6.4(b)(3).

2. Refrigerant Detector Activated Ventilation. Where ventilation is activated by a refrigerant detector, the refrigerant detector shall be in accordance with Section 7.6.5. Upon refrigerant detector activation, the mechanical ventilation shall be started activated and shall continue to operate for at least five minutes after the refrigerant detector has sensed a drop in the refrigerant concentration below the setpoint value. For mechanical ventilation systems used sole for refrigerant safety mitigation ventilation function of refrigerant detector activated ventilation shall be verified in accordance with Section 7.6.4(b)(3) by a monthly self-test.
c. While the ventilation system is operating, makeup air shall be provided, and the volume of makeup air shall not exceed the volume of air being exhausted or transferred out of the space. Openings for makeup air shall be positioned to facilitate mixing of makeup air with leaked refrigerant. Inlets for exhaust air and inlets used to mechanically transfer air to another a separate indoor location space shall be located such that the bottom of the inlet is within 12 in. (30 cm) of the lowest elevation in the space where leaked refrigerant would be expected to accumulate:

   […]

i. The discharge air openings of the ventilation system shall be located so as to prevent recirculation of exhaust air back into the space.

   […]

Modify Informative Appendix A as follows. The remainder of Informative Appendix A remains unchanged.

(This appendix 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.)

INFORMATIVE APPENDIX A—EXPLANATORY MATERIAL

Sections of the standard with associated explanatory information in this appendix are marked with an asterisk “*” after the section number, and the associated appendix information is located in a corresponding section number preceded by “A”.

   […]

A7.6.4 Equation. The user should note that in the question, LFL is specified as pounds per cubic foot (kilogram per cubic meter for SI), while ANSI/ASHRAE Standard 34, Designation and Safety Classification of Refrigerants, specifies LFL in Table 4-1 and Table 4-2 as pounds per 1000 cubic feet [lb/1000 ft³] (grams per cubic meter [g/m³] for SI). Appropriate conversion is necessary. The user should refer to the most current addenda to ANSI/ASHRAE Standard 34 for the most current values of LFL.

   […]