



**BSR/ASHRAE Addendum d
to ANSI/ASHRAE Standard 15-2022**

First Public Review Draft

**Proposed Addendum d to
Standard 15-2022, Safety Standard
for Refrigeration Systems**

**First Public Review (May 2024)
(Draft shows Proposed Changes to Current Standard)**

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FOREWORD

This proposed addendum to ANSI/ASHRAE Standard 15-2022 addresses changes of refrigerant to existing refrigeration systems, whether for changes within the same refrigerant safety group or to a different refrigerant safety group. The modifications apply to Sections 5.3, 7.7.3, 7.6.2, Informative Appendix A, and a new Informative Appendix H that provides guidelines for retrofit of certain types of refrigeration systems.

This proposed change clarifies requirements for refrigeration systems retrofitted or recommissioned with a new refrigerant designation. When the new refrigerant is classified (by ASHRAE Standard 34) in a different safety group than the original refrigerant, the equipment must meet the requirements of this standard for a new installation, with some provisions to address the listing requirements. For example, changing from safety group A1 to safety group A2L, A2, or A3 will require modifications such as refrigerant leak detection and mitigation (where applicable), as specified in UL/CSA 60335-2-89 2nd edition (2021) or UL/CSA 60335-2-40 4th edition (2022). The change of refrigerant to a new safety group will be required to be evaluated by a National Recognized Testing Laboratory (NRTL) or be approved by the Authority Having Jurisdiction (AHJ).

Note: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~striking through~~ (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 d to Standard 15-2022

Modify Section 5 as follows. The remainder of Section 5 remains unchanged.

5. REFRIGERATING SYSTEM CLASSIFICATION

[...]

5.3 Changing Refrigerant. [...]

[...]

5.3.3* Where the replacement *refrigerant* is classified into the same safety group, requirements that were applicable to the existing system *shall* continue to apply.

5.3.4* Where the replacement *refrigerant* is classified into a different safety group, existing listing mark(s) shall be removed and the retrofitted refrigeration system shall comply with the requirements of this standard for a new installation, and written instructions provided by one of the following:

- a. The original equipment manufacturer.
- b. A registered design professional.
- c. A nationally recognized testing laboratory.

~~the~~ The change of refrigerant shall require a field evaluation by a nationally recognized testing laboratory or AHJ approval.

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

7. RESTRICTIONS ON REFRIGERANT USE

[...]

7.6 Group A2L Refrigerants for Human Comfort.

{Note to reviewers: see published *Addendum e* to Standard 15-2022 for changes to Section 7.6. The section title changes to “High-Probability Air Conditioners, Heat Pumps, and Dehumidifiers Using Group A2L Refrigerants”.}

[...]

7.6.2 Listing and Installation Requirements. Refrigeration systems *shall be listed* in accordance with UL 484¹¹ or UL 60335-2-40⁵/CSA C22.2 No. 60335-2-40⁶. The *refrigeration system shall be installed* in accordance with Sections 7.6.2.1 through 7.6.2.5, the listing, the *manufacturer’s* instructions, and any markings on the equipment restricting the installation.

Exceptions to 7.6.2:

1. These requirements do not apply to *industrial occupancies*.
2. Where changing *refrigerant* in accordance with Section 5.3, the existing *refrigeration system shall not be required, after the change of refrigerant, to be listed* in accordance with UL 484¹¹ or UL 60335-2-40⁵/CSA C22.2 No. 60335-2-40⁶.

[...]

7.7 Group A2L Refrigerants for Refrigeration Systems Other Than Human Comfort.

{**Note to reviewers:** see published *Addendum e* to Standard 15-2022 for changes to Section 7.7. The section title changes to “High-Probability Commercial Refrigeration Systems using Group A2L Refrigerants”.}

[...]

7.7.3 Listing and Installation Requirements. Refrigeration systems *shall be listed* to UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸ and *shall be installed* in accordance with the listing and the *manufacturer’s* instructions.

Exceptions to 7.7.3:

1. These requirements do not apply to *industrial occupancies*.
2. Where changing *refrigerant* in accordance with Section 5.3, the existing *refrigeration system shall not be required, after the change of refrigerant, to be listed* in accordance with UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸.

[...]

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

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.

Section 5.3.3

Informative Appendix H contains guidelines for conducting a change of refrigerant within the same safety group as part of a retrofit. Section H1 contains guidelines to field retrofit commercial refrigeration equipment. Guidelines for other equipment may be added in a future edition.

Section 5.3.4

Informative Appendix H1 contains guidelines for conducting a change of refrigerant within the same safety group as part of a retrofit. Sections H2 and H3 contains guidelines to field retrofit commercial refrigeration equipment. Guidelines for other equipment may be added in a future edition.

Add Informative Appendix H as follows.

INFORMATIVE APPENDIX H
CHANGE OF REFRIGERANT

H1. Guidelines to Field Retrofit Commercial Refrigeration Equipment within the Same Refrigerant Safety Group. Per Sections 5.3.2 and 5.3.3, where changing the *refrigerant* within the same safety group either the OEM, registered design professional, or *NRTL may* develop technical instructions for the field retrofit of the commercial refrigeration equipment or the *refrigeration system*.

H2. Guidelines to Field Retrofit Commercial Refrigeration Equipment from Refrigerant Safety Group A1 to Refrigerant Safety Group A2L. Per Sections 5.3.2 and 5.3.4, where changing the *refrigerant* to a different safety group, either the OEM **or a** registered design professional will collaborate with the *NRTL* to develop the written technical instructions for the field retrofit of the commercial refrigeration equipment or the *refrigeration system*. Examples of typical requirements for a field retrofit of commercial refrigeration equipment from an A1 to an A2L *refrigerant* include:

- a. As applicable, demonstration of compliance to Annex CC of UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸ with the same or a similar equipment model.
- b. Evaluate the pressure requirements of the field retrofit *refrigerant relative to the original refrigerant*.
- c. Evaluate the oil requirements for the field retrofit *refrigerant relative to the original refrigerant*.
- d. Evaluate the sensor and *refrigerant detection system* requirements of the applicable product safety standard.
- e. Evaluate the mitigation requirements of the applicable product safety standard.
- f. Safety shut-off valves triggered by a leak detection system are installed and functional.
- g. The maximum releasable charge from any independent *refrigerant* circuit is less than $9.2 \times LFL$ (lb) where *LFL* is in pounds per 1000 ft³ ($260 \times LFL$ [kg] where *LFL* is in kilograms per m³).
- h. All electrical components inside of the display cases and walk-in coolers/freezers (WICFs) are acceptable for use with safety group A2L *refrigerants* or have been replaced with new ones that are in accordance with the applicable product safety standard.
- i. The *manufacturer(s)* of the display cases have lab testing that show where the optimal leak sensor location is for each different type of merchandiser (i.e., a glass-door reach-in freezer may be different than an open multi-deck dairy case).
- j. The releasable charge for any isolated portion of the commercial refrigeration system *shall* comply with the limits established in UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸, as applicable. Testing can be conducted on similar products (with test data).
- k. If an existing compressor is reused, determine whether the compressor's OEM has evaluated suitability for the new safety group A2L *refrigerant*.
- l. Evaluate components for compatibility to the field retrofit *refrigerant*, oils, additives, and replace the components with OEM recommended components for the field retrofit *refrigerant* (e.g. replacing seals and filters).
- m. New marking instructions. Marking the ANSI/ASHRAE Standard 34 *refrigerant* designation (e.g., R-454C) and safety group (e.g., A2L) on all partial units (e.g., compressor rack, condenser, display case, walk-in unit cooler).
- n. Marking the total *refrigerant* charge for the *refrigeration system* on the partial unit containing the compressor or compressors.

H3. Guidelines to Field Retrofit Commercial Refrigeration Equipment from Refrigerant Safety Group A1 to Refrigerant Safety Group A2 or A3.

Per Sections 5.3.2 and 5.3.4, where changing the *refrigerant* to a different safety group, either the OEM **or a** registered design professional will collaborate with the *NRTL* to develop the written technical instructions for the field retrofit of the commercial refrigeration equipment or the *refrigeration system*. Examples of typical requirements for a field retrofit of commercial refrigeration equipment from an A1 to an A2 or A3 *refrigerant* include:

- a. The field retrofit must comply with the applicable product safety standard(s), i.e., UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸, including refrigerant charge limits and equipment location restrictions.
- b. As applicable, demonstration of compliance to Annex CC of UL 60335-2-89⁷/CSA C22.2 No. 60335-2-89⁸ with the same or a similar equipment model.
- c. Evaluate the pressure requirements of the field retrofit *refrigerant relative to the original refrigerant*.
- d. Evaluate the oil requirements for the field retrofit *refrigerant relative to the original refrigerant*.
- e. Evaluate the sensor and *refrigerant detection system* requirements of the applicable product safety standard.
- f. Evaluate the mitigation requirements of the applicable product safety standard.
- g. The maximum releasable charge from any independent *refrigerant* circuit is less than $0.141 \times LFL$ (lb) where *LFL* is in pounds per 1000 ft³ ($4.0 \times LFL$ [kg] where *LFL* is in kilograms per m³).

- h. All electrical components inside of the display cases and walk-in coolers/freezers (WICFs) are acceptable for use with safety group A2 or A3 refrigerants or have been replaced with new ones that are in accordance with the applicable product safety standard.
- i. The manufacturer(s) of the display cases have lab testing that show where the optimal leak sensor location is for each different type of merchandiser (i.e., a glass-door reach-in freezer may be different than an open multi-deck dairy case).
- j. If an existing compressor is reused, determine whether the compressor's OEM has evaluated suitability for the new safety group A2 or A3 refrigerant.
- k. Evaluate components for compatibility to the field retrofit refrigerant, oils, additives, and replace the components with OEM recommended components for the field retrofit refrigerant (e.g. replacing seals and filters).
- l. New marking instructions. Marking the ANSI/ASHRAE Standard 34 refrigerant designation (e.g., R-290) and safety group (e.g., A3) on all partial units (e.g., compressor rack, condenser, display case, walk- in unit cooler).
- m. Marking the total refrigerant charge for the refrigeration system on the partial unit containing the compressor or compressors.