BSR/ASHRAE Addendum h
to ANSI/ASHRAE Standard 15-2024

First Public Review Draft

Proposed Addendum h to Standard 15-2024, Safety Standard for Refrigeration Systems

First Public Review (month 2025)
(Draft shows Proposed Changes to Current Standard)

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092

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FOREWORD

This proposed addendum makes changes to several sub-sections in Section 7 of the standard. The proposed revisions make use of defined terms where appropriate, amend section titles to better reflect their content, and use mandatory language in normative sections.

This proposed addendum also re-arranges some sections to better convey the intent of the standard. Requirements related to refrigerant retrofit or lubricant conversion are consolidated from Section 5.3 and 7.5.1.8 to new Section 7.9. Requirements related to refrigerant purity and the reuse of refrigerant are moved from Sections 7.5.1.3 through 7.5.1.8 to new Section 7.10.

This addendum makes two sets of substantive changes to the standard. The proposed new Section 7.9.2 imposes requirements for lubricant conversion. These requirements are similar to requirements for refrigerant retrofit and address the scenario when a lubricant change may necessitate material compatibility analyses to avoid system breakdowns and refrigerant leaks.

The proposed new Section 7.10.2 allows the reuse of recovered refrigerant in refrigeration systems belonging to the same owner, whereas the existing language restricts the reuse of recovered refrigerant to the same refrigeration system. This expanded allowance complies with US EPA's regulations and is expected to not reduce the safety of building occupants and service technicians, nor negatively affect safe operation of the refrigeration system. The proposed new Section 7.10.3 removes the restriction that recycled refrigerant can only be reused in refrigeration systems marked with the refrigerant designation and lubricant matching the original refrigeration system from which the refrigerant was removed. This is because refrigerant retrofit (the scenario where refrigerant in a refrigeration system is changed) is comprehensively addressed in Section 7.9.1 and therefore this restriction was superfluous.

Contamination of refrigerant by mixing with other refrigerants, lubricant, or non-condensable gases, moisture, and acids may lead to an increase in refrigerant leaks due to their effect on seals, gaskets, and O-rings used in the refrigeration system. Where substantive changes to the standard are proposed, the safety of building occupants and service technicians due to the above effects were considered.

Other changes in the language of new Section 7.10 after moving requirements from Sections 7.5.1.3 through 7.5.1.8 eliminate repetition of requirements or clarify the intent of the standard by citing related sections.

Note: 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 h to Standard 15-2024

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

5. REFRIGERATION SYSTEM CLASSIFICATION

[…]

*{Note to reviewers: Proposed Addendum **d** to Standard 15–2022 would change Section 5.3, is currently in the process of resolving public comments, and likely to have another public review as proposed Addendum **d** to Standard 15-2024. In this proposed addendum, this section is being moved in its entirety to new Section 7.9 but with no other changes that would conflict with proposed Addendum **d**.}*

~~**5.3 Changing Refrigerant**. Changes of *refrigerant* in an existing *refrigeration system* to a *refrigerant* with a different *refrigerant designation shall* only be allowed where in accordance with Sections 5.3.1 through 5.3.4.~~

~~**5.3.1*** The owner or the owner's authorized agent *shall* be notified prior to making a change of *refrigerant*, and the change of *refrigerant shall not* be made where the owner objects to the change.~~

~~**5.3.2** The change of *refrigerant shall* be in accordance with one of the following:~~

~~a. Written instructions of the original equipment *manufacturer*~~

~~b. An evaluation of the system by a registered design professional or by a *nationally recognized testing laboratory* that validates safety and suitability of the replacement *refrigerant*~~

~~c. Approval of the authority having jurisdiction (AHJ)~~

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

~~**5.3.4** Where the replacement *refrigerant* is classified into a different safety group, the *refrigeration system shall* comply with the requirements of this standard for a new installation, and the change of *refrigerant shall* require AHJ approval~~.

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

7. RESTRICTIONS ON REFRIGERANT USE

[…]

7.2* Volume Calculations

[…]

7.2.2 Effective Dispersal Volume by Refrigerant ~~Groups~~ Safety Group

[…]

7.3 Refrigerant Charge Limits.

[…]

{Note to reviewers: Proposed Addendum g to Standard 15–2024 may change item b of Section 7.3.3 to use a new defined term, that separate change is not reflected in this proposed addendum.}

7.3.3 Industrial Occupancies and Refrigerated Rooms. *Industrial occupancies* and refrigerated rooms *shall* comply with the following conditions:

a. Spaces containing the *machinery* ~~are~~ *shall* be separated from other *occupancies* by tight construction with tight-fitting doors.

b. Access ~~is~~ *shall* be restricted to authorized personnel.

c. *Refrigerant detectors* ~~are~~ *shall* be installed with the sensing location and alarm level as required in refrigeration *machinery rooms* in accordance with Section 8.9.5.

d. Surfaces exceeding 800°F (~~426.7~~427°C), or open flames, ~~are not~~ *shall not* be permitted where any Group A2, A3, B2, or B3 *refrigerant* is used.

e. Surfaces exceeding 1290°F (700°C), or open flames, ~~are not~~ *shall not* be permitted where any Group A2L or B2L *refrigerant* is used.

f. Where loss of the *releasable refrigerant charge* of Group A2, A3, B2, or B3 *refrigerant* would result in an average *refrigerant* concentration that exceeds 25% of the *lower flammability limit* (*LFL*), ~~electrical equipment in~~ the space *shall* be classified as ~~is~~ Class I, Division 2, in accordance with *National Electric Code*® (NFPA 70). [4]

g. *Refrigerant*-containing parts in *refrigeration systems* exceeding 100 *hp* (74.6 kW) *compressor* drive power, except *evaporators* used for refrigeration or dehumidification, *condensers* used for heating, control and *pressure relief valves* for either, *low-probability pumps*, and connecting *piping*, ~~are~~ *shall* be located either in a *machinery room* or outdoors.

[…]

7.5 Additional Restrictions.

[…]

{Note to reviewers: Section 7.5.1 addresses many disparate topics. Section 7.5.1.1 is a refrigerant quantity-based restriction and Section 7.5.1.2 is a location-based restriction on refrigerant use. Section 7.5.1.9 is a restriction on a change in the construction of a refrigeration system. Finally, Sections 7.5.1.3 through 7.5.1.7 are restrictions on refrigerant use based on their purity or prior use.

In this proposed addendum, sub-sections 7.5.1.3 through 7.5.1.7 are being moved in their entirety to new Section 7.10, whereas sub-section 7.5.1.8 is being consolidated with new Section 7.9.}

7.5.1 All Occupancies. Sections 7.5.1.1 through ~~7.5.1.9~~ 7.5.1.3 apply to all occupancies.

7.5.1.1 Flammable Refrigerants.

[…]

7.5.1.2 Corridors and Lobbies.

[…]

~~**7.5.1.3 Refrigerant Type and Purity.** *Refrigerants shall* be of a type *specified* by the equipment *manufacturer* unless converted in accordance with Section 7.5.1.8. *Refrigerants* used in new equipment *shall* conform to AHRI 700[10] in purity unless otherwise *specified* by the equipment *manufacturer*.~~

~~**7.5.1.4 Recovered Refrigerants.** *Recovered refrigerants shall not* be reused except in the *refrigeration system* from which they were removed, or as provided in Sections 7.5.1.5 or 7.5.1.6. When contamination is evident by discoloration, odor, acid test results, or *refrigeration system* history, *recovered refrigerants shall* be reclaimed in accordance with Section 7.5.1.6 before reuse.~~

~~**7.5.1.5 Recycled Refrigerants**. *Recycled refrigerants shall not* be reused except in *refrigeration systems* using the same *refrigerant* and lubricant designation and belonging to the same owner as the *refrigeration systems* from which they were removed. When contamination is evident by discoloration, odor, acid test results, or *refrigeration system* history, *recycled refrigerants shall* be reclaimed in accordance with Section 7.5.1.6.~~

~~**Exception to 7.5.1.5**: Drying is not required in order to use *recycled refrigerants* where water is the *refrigerant*, is used as an absorbent, or is a deliberate additive.~~

~~**7.5.1.6 Reclaimed Refrigerants**. Used *refrigerants shall not* be reused in a different owner's equipment unless tested and found to meet the requirements of AHRI 700.[10] Contaminated *refrigerants shall not* be used unless reclaimed and found to meet the requirements of AHRI 700.~~

~~**7.5.1.7 Mixing of Refrigerants**. *Refrigerants* with different *refrigerant designations shall* only be mixed in a *refrigeration system* in accordance with both of the following:~~

~~a. The addition of a second *refrigerant* is allowed by the equipment *manufacturer* and is in accordance with the *manufacturer's* written instructions.~~

~~b. The resulting mixture does not change the *refrigerant* safety group.~~

~~**7.5.1.8 Refrigerant or Lubricant Conversion**. The type of *refrigerant* or lubricant in a *refrigeration system shall not* be changed without evaluation for suitability, notification to the AHJ and the user, due observance of safety requirements, and replacement or addition of signs and identification as required in Section 10.1.2.~~

~~7.5.1.9~~7.5.1.3 **Addition of Doors to Open Refrigerated Display Cases Containing Flammable Refrigerants**.

[…]

7.6* High-Probability Air Conditioners, Heat Pumps, and Dehumidifiers Using Group A2L Refrigerants.

[…]

7.6.3 Ignition Sources Located in Ductwork

7.6.3.1 Open-flame-producing devices *shall not* be permanently installed in the ~~ductwork~~ *air ducts* that serve~~s~~ the space.

7.6.3.2 Unclassified electrical devices *shall not* be located within the ~~ductwork~~ *air ducts* that serve~~s~~ the space.

7.6.3.3* Refrigeration Systems with Ductwork. Devices containing hot surfaces exceeding 1290 °F

(700 °C) *shall not* be located in the ~~ductwork~~ *air ducts* that serve~~s~~ the space unless there is an average airflow velocity not less than 200 ft/min (1.0 m/s) across the heating device(s) and there is proof of airflow before the heating device(s) is energized. Average airflow velocity *shall* be determined by volumetric airflow rate divided by *air duct* flow area.

[…]

7.7* High-Probability Commercial Refrigeration Systems Using Group A2L Refrigerants.

[…]

7.7.4 Ignition Sources Located in Ductwork. Any ~~ductwork~~ *air ducts* serving the space *shall* comply with Section 7.6.3.

[…]

7.9 Refrigerant or Lubricant Conversion.

7.9.1 Refrigerant Conversion. Changes of *refrigerant* in an existing *refrigeration system* to a *refrigerant* with a different *refrigerant designation shall* only be allowed where in accordance with Sections 7.9.1.1 through 7.9.1.5.

7.9.1.1* The owner or the owner's authorized agent *shall* be notified prior to making a change of *refrigerant*, and the change of *refrigerant shall not* be made where the owner objects to the change.

7.9.1.2 The change of *refrigerant shall* be in accordance with one of the following:

a. Written instructions of the original equipment *manufacturer*

b. An evaluation of the *refrigeration system* by a registered design professional or by a *nationally recognized testing laboratory* that validates safety and suitability of the replacement *refrigerant*

c. Approval of the authority having jurisdiction (AHJ)

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

7.9.1.4 Where the replacement *refrigerant* is classified into a different safety group, the *refrigeration system shall* comply with the requirements of this standard for a new installation, and the change of *refrigerant shall* require AHJ approval.

7.9.1.5 Replacement or addition of signs and identification *shall* be in accordance with Section 10.1.2.

7.9.2* Lubricant Conversion. The lubricant type in a *refrigeration system shall* only be changed after notification to the owner or owner's authorized agent and in accordance with one of the following:

a. Written instructions of the original equipment *manufacturer*.

b. Evaluation of the suitability of the lubricant for use in the *refrigeration system* by a registered design professional or by a *nationally recognized testing laboratory*.

7.9.2.1 Replacement or addition of signs and identification *shall* be in accordance with Section 10.1.2.

7.10 Refrigerant Use. *Refrigerants shall* be as *specified* by the equipment *manufacturer* unless converted in accordance with Section 7.9.

7.10.1 Refrigerant Purity. *Refrigerants* charged into a new *refrigeration system shall* conform to AHRI 700 [10] in purity unless otherwise *specified* by the original equipment *manufacturer*.

7.10.2* Recovered Refrigerants. *Recovered refrigerants shall* be permitted to be reused in *refrigeration systems* belonging to the same owner as the *refrigeration systems* from which they were removed. When contamination is evident by discoloration, odor, acid test results, or *refrigeration system* history, *recovered refrigerants shall* be reclaimed in accordance with Section 7.10.4 before reuse.

7.10.3 Recycled Refrigerants. *Recycled refrigerants shall* be permitted to be reused in *refrigeration systems* belonging to the same owner as the *refrigeration systems* from which they were removed. When contamination is evident by discoloration, odor, acid test results, or *refrigeration system* history, *recycled refrigerants shall* be reclaimed in accordance with Section 7.10.4 before reuse.

Exception to 7.10.3: Drying is not required in order to use *recycled refrigerants* where water is the *refrigerant*, is used as an absorbent, or is a deliberate additive.

7.10.4* Reclaimed Refrigerants. Used *refrigerants shall not* be reused in a different owner's equipment unless reclaimed to meet the requirements of AHRI 700 [10]. Contaminated *refrigerants*, as indicated in Sections 7.10.2 and 7.10.3, *shall not* be reused unless reclaimed to meet the requirements of AHRI 700.

7.10.5 Mixing of Refrigerants. *Refrigerants* with different *refrigerant designations shall* only be mixed in a *refrigeration system* in accordance with both of the following:

a. The addition of a second *refrigerant* is allowed by the equipment *manufacturer* and is in accordance with the *manufacturer's* written instructions.

b. The resulting mixture does not change the *refrigerant* safety group.

Modify Section 10 as follows. The remainder of Section 10 remains unchanged.

10. GENERAL REQUIREMENTS.

10.1 Signs and Identification.

[…]

10.1.2 Changes in Refrigerant or Lubricant. When the ~~kind of~~ *refrigerant designation* or lubricant type is changed as provided in Section ~~7.5.1.8~~ 7.9, the signs required by Sections 10.1.1 and 9.12.1.8 *shall* be replaced, or added if not present, to identify the *refrigerant* and lubricant used.

[…]

Modify Informative Appendix A as follows. The remainder of the appendix 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 ~~5.3.1~~ 7.9.1.1

The intent of notifying the owner or owner's agent is to ensure that the owner of the building is aware of the change and can address any consequences to the building or *occupancy* that might be tied to the change of *refrigerant*. The owner notification can be made by the designer, contractor, installer, or any other party involved in the proposed *refrigerant* change.

[…]

Section 7.9.2

Alkylbenzene (AB), mineral oil (MO), polyalkylene glycol (PAG), polyol ester (POE), and polyvinylether (PVE) are examples of lubricant types. Changing from one brand to another brand of lubricant or a change in the viscosity grade of the lubricant are not considered a change in the lubricant type.

The US Environmental Protection Agency prescribes additional requirements for changing the lubricant in a *refrigeration system* at 40 CFR §82.156 [68].

[…]

Section 7.10.2

Where the *refrigeration system* from which *refrigerant* is removed and the *refrigeration system* to which the used *refrigerant* is being charged use different lubricant types, recycling of *refrigerant* is recommended. In such cases, recycling will reduce or remove residual lubricant, which reduces lubricant cross-contamination.

[…]

Section 7.10.4

The US Environmental Protection Agency requires *reclaimed refrigerant* to meet purity specifications in AHRI 700, according to the definition of *reclaimed refrigerant* at 40 CFR §82.152 [68].

[…]

Modify Informative Appendix B as follows. The remainder of the appendix remains unchanged.

INFORMATIVE APPENDIX B
INFORMATIVE REFERENCES

[…]

68. GPO. 2023. 40 CFR 82.150–169, *Recycling and Emissions Reduction*. Washington, DC: U.S. Government Publishing Office.