


The major ASHRAE standards dealing with refrigerants are:

1. Standard 34, Designation and Safety Classification of Refrigerants
2. Standard 15, Safety Standard for Refrigeration Systems
3. Standard 147, Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment.

ASHRAE safety standards 15 and 34 covered the flammability and toxicity requirements.

Standard 34 Overview by Tom Watson, P.E. President ASHRAE



ANSI/ASHRAE Standard 34-2010
(Supersedes ANSI/ASHRAE Standard 34-2007)
Includes ANSI/ASHRAE Addenda listed in Appendix H

ASHRAE STANDARD


Designation and Safety Classification of Refrigerants

See Appendix H for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site (www.ashrae.org) or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE Web site (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

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Safety Group

| | | | |
|------------------------|---------------------|-----------------|------|
| INCREASED FLAMMABILITY | HIGHER FLAMMABILITY | A3 | B3 |
| | LOWER FLAMMABILITY | A2 | B2 |
| | | A2L* | B2L* |
| NO FLAME PROPAGATION | A1 | B1 | |
| | LOWER TOXICITY | HIGHER TOXICITY | |

INCREASING TOXICITY ➔

*A2L and B2L are lower flammability refrigerant
a maximum burning velocity of ≤ 10 cm/s (3.9 in/s)

➤ Toxicity Classification Based on

- chronic (long term) measure
 - Class A has PEL > 400 PPM
 - Class B has PEL < 400 PPM
 - PEL = Permissible Exposure Limit

➤ Flammability Classification Based on

- ASTM E 681 with electrically activated match
- Class 1 - no flame propagation
- Class 2 - LFL > 0.10 kg/m³ and $hc < 19$ MJ/kg
- Class 2L – Cl 2 w/ burning velocity < 10 cm / sec
- Class 3 - LFL < 0.10 kg/m³ or $hc > 19$ MJ/kg

➤ ASHRAE 34 defined Class 2L

- Years of work to differentiate Class 2L from Class 2/3
- Single criteria: Flame speed < 10 cm/s
- Refrigerants that fall into new category include:

A2L

B2L

R-32, R143a

R-717 (Ammonia)

R-1234yf

- Change in flammability rating does not alter toxicity rating
- Approved by Standards Committee in Feb 2010

Source:

- “International Refrigerant Standards and their Influence on the Global HVAC Industry and Refrigerant Replacement” : [/www.unep.org/ozonaction/Portals/105/documents/virtualexpo/crh2013-WatsonTom%20\(ASHRAE\).pdf](http://www.unep.org/ozonaction/Portals/105/documents/virtualexpo/crh2013-WatsonTom%20(ASHRAE).pdf)