

**ANSI/ASHRAE Addenda x, y, aa, ab, ac, ad, and ae to
ANSI/ASHRAE Standard 34-2007**



ASHRAE STANDARD

Designation and Safety Classification of Refrigerants

These addenda were approved by the ASHRAE Standards Committee on January 24, 2009; by the ASHRAE Board of Directors on January 28, 2009; and by the American National Standards Institute on January 29, 2009.

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ISSN 1041-2336



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and Air-Conditioning Engineers, Inc.**
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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

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- b. participation in the next review of the Standard,
- c. offering constructive criticism for improving the Standard, or
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FOREWORD

This addendum adds new refrigerant 433B to Table 2 and Table D2.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum x to Standard 34-2007

Add the following to Table 2 in the columns indicated:

Table 2—Data and Safety Classifications for Refrigerant Blends

Refrigerant Number = 433B

Composition (Mass %) = R-1270/290 (5.0/95.0)¹

OEL = 950

Safety Group = A3

RCL = 4500 ppm v/v; 8.1 g/m³; 0.51 Mcf

Highly Toxic or Toxic Under Code Classification = Neither

Add the following to Table D2 in the columns indicated:

TABLE D2—Data for Refrigerant Blends

Refrigerant Number = 433B

Composition (Mass %) = R-1270/290 (5.0/95.0)¹

Average Molecular Mass = 44.0

Bubble Point (°C) = -42.7

Dew Point (°C) = -42.5

Bubble Point (°F) = -44.9

Dew Point (°F) = -44.5

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FOREWORD

This addendum adds new refrigerant 433C to Table 2 and Table D2.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum y to Standard 34-2007

Add the following to Table 2 in the columns indicated:

TABLE 2—Data and Safety Classifications for Refrigerant Blends

Refrigerant Number = 433C

Composition (Mass %) = R-1270/290 (25.0/75.0)¹

OEL = 790

Safety Group = A3

RCL = 3600 ppm v/v; 6.6 g/m³; 0.41 Mcf

Highly Toxic or Toxic Under Code Classification = Neither

Add the following to Table D2 in the columns indicated:

TABLE D2—Data for Refrigerant Blends

Refrigerant Number = 433C

Composition (Mass %) = R-1270/290 (25.0/75.0)¹

Average Molecular Mass = 43.6

Bubble Point (°C) = -44.3

Dew Point (°C) = -43.9

Bubble Point (°F) = -47.7

Dew Point (°F) = -47.0

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FOREWORD

This addendum extends the rules for numbering refrigerants to include butane- and butene-based refrigerants. The rules being added are consistent with industry and academic nomenclature conventions.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum aa to Standard 34-2007

Revise clauses 4.1 and add new clause 4.1.11 as follows:

4.1 The identifying numbers assigned to the hydrocarbons and halocarbons of the methane, ethane, propane, butane, butene, and cyclobutane series are such that the chemical composition of the compounds can be explicitly determined from the refrigerant numbers, and vice versa, without ambiguity. The molecular structure can be similarly determined for the methane, ethane, and most of the propane, butane, butene, and cyclobutane series from only the identification number.

4.1.11 Extension to Compounds of Four Carbon Atoms. Compounds are coded according to the above stated rules with the designation number followed by a set of letters indicating structure. The number of unsaturated linkages is given in the fourth digit from the right. When the number for a digit place exceeds 9, it is set off by dashes. Linear compounds are lettered starting at one end, cyclic compounds from a side group, or, if none, from a carbon in the ring as described in

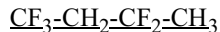
4.1.9. Carbon atoms with two hydrogen or halogens are lettered as in 4.1.9. Carbon atoms with three hydrogen or halogen atom substituents are lettered as given below:

<u>CCl₃</u>	≡	<u>j</u>
<u>CCl₂F</u>	≡	<u>k</u>
<u>CClF₂</u>	≡	<u>l</u>
<u>CF₃</u>	≡	<u>m</u>
<u>CHCl₂</u>	≡	<u>n</u>
<u>CH₂Cl</u>	≡	<u>o</u>
<u>CHF₂</u>	≡	<u>p</u>
<u>CH₂F</u>	≡	<u>q</u>
<u>CHClF</u>	≡	<u>r</u>
<u>CH₃</u>	≡	<u>s</u>
<u>C</u>	≡	<u>t</u>

Only as many letters are used as required to completely define the compound when taken with the empirical structure given by the numerical designation. It is understood that no branching occurs in the remaining structure. After the starting point, a side group(s) is (are) given its (their) letter(s) before the backbone substituent (if any). When two or more lettering sequences may be applied, that with the fewest letters and first alphabetical sequence is used.

Add the following clause to Informative Appendix A

A4. FOUR CARBON EXAMPLE: HFC-365MFC



The CF₃ end has priority—it has the greatest summed mole weight of substituted atoms. Per 4.1.11, this terminal CF₃ indicates the first suffix shall be m. The next carbon is CH₂, so per 4.1.9, the second suffix is f. The third carbon is CF₂, so again per 4.1.9 the third suffix is c. At this point all of the substituted atoms have been accounted for, so no other letters are necessary.

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FOREWORD

This addendum modifies the chemical names for R-E170, R-600a, R-601a, R-610, R-630, and R-631 in Table 1 to conform to IUPAC nomenclature.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striking through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ab to Standard 34-2007

Make the following additions to Table 1:

Refrigerant Number	Chemical Name
E170	<u>methoxymethane</u> (dimethyl ether)
600a	<u>2-methylpropane</u> (isobutane)
601a	<u>2-methylbutane</u> (isopentane)
610	<u>ethoxyethane</u> (ethyl ether)
630	<u>methanamine</u> (methylamine)
631	<u>ethanamine</u> (ethylamine)

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FOREWORD

This addendum modifies the requirements for submitting compact disks and hard copies of refrigerant applications.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strike through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ac to Standard 34-2007

Make the following revisions to clause 9.9.5:

9.9.5 Quantity. ~~Thirty-five bound copies shall be provided for committee and administrative use plus one unbound set for further reproduction by ASHRAE if needed. In addition, 35 compact disks with the application in electronic format shall be provided. In addition, a maximum of 35 bound copies may be required for committee and administrative use (contact ASHRAE Manager of Standards for exact number of hard copies required).~~ The electronic format shall be an true electronically searchable PDF file of minimal size. A scanned PDF file ~~with large memory requirements~~ is ~~not~~ acceptable ~~except~~ for figures and other inserts. Committee members may request only the compact disk, thereby reducing the number of bound paper copies required.

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FOREWORD

This addendum modifies the data requirements for determining the anesthetic or central nervous system effects of a refrigerant.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and

~~striking through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ad to Standard 34-2007

Make the following revisions to clause 7.1.1.c:

Anesthetic of Central Nervous System effects: 50% of the ten-minute EC₅₀ in mice or rats for loss of righting ability in a rotating apparatus, or 80% of NOEL, in mice or rats for loss of righting ability in a rotating apparatus, whichever is higher. If not determined, 50% of the LOEL for signs of any anesthetic or CNS effect in rats during acute toxicity studies. If neither has been determined, 80% of the NOEL for signs of anesthesia or CNS effect in rats during an acute, subchronic, or chronic toxicity study in which clinical signs are documented.

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FOREWORD

This addendum specifies the temperature for leak/recharge testing to be consistent with the original intent of the committee. Only the sentence modified is shown. The remainder of the section remains unchanged. Note that B2.5 was previously modified in Addendum 34l.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum ae to Standard 34-2007

Make the following revisions to clause B2.5:

B2.5 Leak/Recharge Testing ...A vapor leak at a rate of 2% by mass of the starting charge per hour shall be created and maintained at 23.0 ± 3.0°C (73.4 ± 5.4°F)~~ambient temperature~~ until 20% of the starting charge has been leaked...

(Remainder unchanged)

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FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES**

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.