ADDENDA

ANSI/ASHRAE Addendum r to
ANSI/ASHRAE Standard 34-2016

Designation and Safety Classification of Refrigerants

Approved by the ASHRAE Standards Committee on January 12, 2019; by the ASHRAE Technology Council on January 16, 2019; and by the American National Standards Institute on January 17, 2019.

This addendum was approved 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. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

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FOREWORD

Addendum r corrects language to allow for proper naming of molecules containing iodine.

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

Addendum r to Standard 34-2016

Modify Section 3 as shown.

3. DEFINITIONS OF TERMS

halocarbon: as used in this standard, a hydrocarbon derivative containing one or more of the halogens bromine, chlorine, ~~or~~ fluorine, or iodine; hydrogen also may be present.

Modify Section 4 as shown.

4. NUMBERING OF REFRIGERANTS

[. . .]

4.1.5 In those instances where bromine (Br) is present in place of part or all of the chlorine, the same rules apply, except that the uppercase letter "B" after the designation for the parent chlorofluoro compound shows the presence of bromine. The number following the letter "B" shows the number of bromine atoms present.

4.1.6 In those instances where iodine (I) is present in place of part or all of the chlorine, the same rules apply, except that the uppercase letter "I" after the designation for the parent chlorofluoro compound shows the presence of iodine. The number following the letter "I" shows the number of iodine atoms present.

4.1.6~~**5**~~**7** The number of chlorine (Cl) atoms in the compound is found by subtracting the sum of fluorine (F), bromine (Br), iodine (I) and hydrogen (H) atoms from the total number of atoms that can be connected to the carbon (C) atoms. For saturated refrigerants, this number is $2n + 2$, where n is the number of carbon atoms. The number is $2n$ for monounsaturated and cyclic-saturated refrigerants.

4.1.7~~**6**~~**8** The carbon atoms shall be numbered sequentially, in order of appearance, with the number "1" assigned to the end carbon with the greatest number of hydrogen substituents (i.e., number of halogenated atoms substituted for hydrogen on the alkane end carbon atoms). In the case where both end carbons of a saturated compound contain the same number of (but different) halogen atoms, the number "1" shall be assigned to the end carbon, defined as having the largest number of bromine, then chlorine, then fluorine, and then iodine atoms. If the compound is an olefin, then the end carbon nearest to the double bond will be assigned the number "1," as the presence of a double bond in the backbone of the molecule has priority over substituent groups on the molecule.

4.1.8~~**7**~~**9** In the case of isomers in the ethane series, each has the same number, with the most symmetrical one indicated by the number alone. As the isomers become more and more unsymmetrical, successive lowercase letters (e.g., "a," "b," or "c") are appended. Symmetry is determined by first summing the atomic mass of the halogen and hydrogen atoms attached to each carbon atom. One sum is subtracted from the other; the smaller the absolute value of the difference, the more symmetrical the isomer. For an example of this system, see Informative Appendix A.

4.1.9~~**8**~~**10** In the case of isomers of the propene series, each has the same number, with the isomers distinguished by two appended lowercase letters. The first appended letter indicates the substitution on the central carbon atom (C2):

—Cl	x
—F	y
—H	z

The second letter designates the substitution on the terminal methylene carbon as defined for the methylene carbon of the propane, consistent with the methodology described in Section 4.1.9:

=CCl2	a
=CClF	b
=CF2	c
=CHCl	d
=CHF	e
=CH2	f

In the case where stereoisomers can exist, the opposed (Entgegen or trans) isomer will be identified by the suffix (E) and the same side (Zusamen or cis) isomer will be identified by the suffix (Z). An example of this system is given in Informative Appendix A, Table A-3.

4.1.10~~**9**~~**11** In the case of isomers of the propene series, each has the same number, with the isomers distinguished by two appended lowercase letters. The first appended letter indicates the substitution on the central carbon atom (C2):

—Cl	x
—F	y
—H	z

The second letter designates the substitution on the terminal methylene carbon as defined for the methylene carbon of the propane, consistent with the methodology described in Section 4.1.9~~9~~10:

=CCl2	a
=CClF	b
=CF2	c
=CHCl	d
=CHF	e
=CH2	f

In the case where stereoisomers can exist, the opposed (Entgegen or trans) isomer will be identified by the suffix (E) and the same side (Zusamen or cis) isomer will be identified

by the suffix (Z). An example of this system is given in Informative Appendix A, Table A-3.

4.1.~~11~~12 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 nine, 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 Section 4.1.~~9~~10. Carbon atoms with two hydrogens or halogens are lettered as in Section 4.1.~~9~~10. Carbon atoms with three hydrogen or halogen atom substituents are lettered as shown below:

–CCl3	j
–CCl2F	k
–CClF2	l
–CF3	m
–CHCl2	n
–CH2Cl	o
–CHF2	p
–CH2F	q
–CHClF	r
–CH3	s

Only as many letters are used as are 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, side groups are given their letters 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.

4.1.~~12~~13 Bromine or iodine containing, propane-series isomers cannot be uniquely designated by this system.

Modify Section 5 as shown.

5. DESIGNATION

[. . .]

5.2 Identification. Refrigerants shall be identified in accordance with Section 5.2.1, 5.2.2, or 5.2.3. Section 5.2.1 shall be used in technical publications (for international uniformity and to preserve archival consistency), on equipment nameplates, and in specifications. Section 5.2.2 can be used for single component halocarbon refrigerants, where distinction between the presence or absence of chlorine, ~~or~~ bromine or iodine is pertinent. Composition designation may be appropriate for nontechnical, public, and regulatory communications addressing compounds having environmental impact, such as ozone depletion or global warming potential. Section 5.2.3 can be used, under the same circumstances as Section 5.2.2, for blends (both azeotropic and zeotropic). Section 5.2.1 shall be used for miscellaneous organic and inorganic compounds.

[. . .]

5.2.2 Composition Designating Prefixes. The identifying number, as determined by Section 4, shall be prefixed by the letter "C" for carbon and preceded by "B," "C," ~~or~~ "F", or "I" - or a combination thereof in this sequence—to signify the presence of bromine, chlorine, ~~or~~ fluorine, or iodine respectively. Compounds that also contain hydrogen shall be further preceded by the letter "H" to signify the increased deterioration potential before reaching the stratosphere[6]. The compositional designating prefixes for ether shall substitute an "E" for "C," such that "HFE," "HCFE," and "CFE" refer to hydrofluoroethers, hydrochlorofluoroethers, and chlorofluoroethers, respectively.

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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.

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ASHRAE · 1791 Tullie Circle NE · Atlanta, GA 30329 · www.ashrae.org

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