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AMENDMENT 2

Refrigerants — Designation and safety classification

AMENDMENT 2

Fluides frigorigènes — Désignation et classification de sécurité

AMENDEMENT 2

PROOF/ÉPREUVE

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 86, *Refrigeration and air-conditioning*, Subcommittee SC 8, *Refrigerants and refrigeration lubricants*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Refrigerants — Designation and safety classification

AMENDMENT 2

3.1.36

Replace Note 1 to entry with the following:

Note 1 to entry: Acute toxicity exposure limit, oxygen deprivation limit and flammable concentration limit are refrigerant concentration limits that are determined in accordance with this document.

3.2

Delete the following text:

RCL_M	RCL expressed as grams per cubic metre
RCL_{ppm}	RCL expressed as parts per million by volume

4.1

Replace the text with the following:

An identifying number shall be assigned to each refrigerant. Assigned numbers and safety classifications are shown in Tables 5, 6 and 7. Tables E.4, E.5 and E.6 provide designations for refrigerants for which insufficient data are available for safety classification or determination of refrigerant concentration limits.

4.4.1

Replace the text with the following:

Zeotropes shall be assigned an identifying number in the 400 series. In order to differentiate among the different zeotropes having the same components but in different proportions, an upper-case letter (A, B, C, etc.) is added after the number. The numbers and letters shall be assigned considering harmonization as presented in Clause 9.

4.4.2

Replace the text with the following:

Azeotropes shall be assigned an identifying number in the 500 series. In order to differentiate among the different azeotropes having the same components but in different proportions, an upper-case letter (A, B, C, etc.) is added after the number. The numbers and letters shall be assigned considering harmonization as presented in Clause 9.

5.2

Replace the text with the following:

The compositional designating prefixes for ethers shall substitute an "E" for "C" (carbon), such that HFE, HCFE, and CFE refer to hydrofluoroether, hydrochlorofluoroether, and chlorofluoroether, respectively. E in the identifying number shall be omitted when composition-designating prefixes are used. The composition designating prefixes for halogenated olefins shall be either:

— CFC, HCFC, or HFC to refer to chlorofluorocarbon, hydrochlorofluorocarbon, or hydrofluorocarbon, respectively; or

— with substitution of an O for the carbon C, as CFO, HCFO, HCO or HFO, to refer to chlorofluoro- olefin, hydrochlorofluoro- olefin, hydrochloro-olefin or hydrofluoro-olefin, respectively.

Clause 8

Replace the title with the following:

8 Refrigerant concentration limits

8.1

Replace the text with the following:

Determination of the refrigerant concentration limits shall assume full vaporization and uniform mixing; no removal by dissolution, reaction or decomposition in the volume to which it is released. Safety factors are included for consideration of temporary local concentrations or uncertainties in the test data.

8.1.1.1

Replace the text with the following:

The ATEL shall be the lowest of the toxic concentration factors (TCF) 8.1.1.2 to 8.1.1.5. For blends, where available, the blend toxicity data shall be used for the individual parameter values in 8.1.1.1 to 8.1.1.5 and when toxicity data for the blends are not available, shall be calculated according to the following formula:

$$\frac{1}{C}=\frac{X_1}{C_1}+\frac{X_2}{C_2}+\ldots+\frac{X_n}{C_n}$$

where

x_n is the mole fraction of component n of the blend;

C_n is the TCF for component n in accordance with ISO 10298.

NOTE See Annex D for a sample calculation of ATEL and Annex E for a list of values related to calculation of refrigerant concentration limits.

8.2.1.1

Replace the text with the following:

Data for calculations: the data used to calculate the refrigerant concentration limits shall be taken from peer reviewed scientific publications, published safety assessments by governmental agencies or expert panels or scientific and engineering studies. Applications submitting scientific and engineering studies under Annex F, for toxicity data shall indicate the extent of compliance with good laboratory practices (GLP) in effect when the studies were performed, for example Reference [6]. The information shall be supplied in English. Submissions shall include a description of the experimental and analytical methods used and summarize the qualifications of the person or persons providing the evaluation.

8.3

Replace the text with the following:

Identify contaminants and impurities, including isomeric and decomposition impurities, from manufacturing, transport, and storage known to increase the flammability or toxicity within the precision of the refrigerant concentration limits. Also identify limits for those impurities (see AHRI Standard 700).

8.4

Add the following sentence at the end of the subclause:

Updated refrigerant tables are provided at: http://standards.iso.org/iso/817/ed-3/en.

Table 5

Modify as follows:

— Delete RCL column.

— Add column with LFL in kg/m^3.

— Delete “or RCL” from footnote [d].

Table 6

Modify as follows:

— Delete RCL column.

— Add column with LFL in kg/m^3.

— Add column for LFL in v/v% for WCF.

— Add column for LFL kg/m^3 for WCF.

— Add column for LFL in v/v% for WCFF.

— Add column with LFL in kg/m^3 for WCFF.

— Delete “or RCL” from footnote [d].

Table 7

Modify as follows:

— Delete RCL column.

— Add column with LFL in kg/m^3.

— Add column for LFL in v/v% for WCF.

— Add column for LFL kg/m^3 for WCF.

— Add column for LFL in v/v% for WCFF.

— Add column with LFL in kg/m^3 for WCFF.

— Delete “or RCL” from footnote [f].

Clause 9

Add new Clause 9 as follows:

9 Harmonization process

9.1 The following process shall be applied to avoid that the same refrigerant number is used for different refrigerants in ASHRAE 34 and ISO 817.

9.2 The manager of ISO 817's maintenance agency (MA) shall inform the secretary of ASHRAE SSPC34 of a new application and assign a unique identifying number in sequence with chronological receipt of applications.

9.3 The manager of ISO 817's maintenance agency shall check and inform the MA if the new application has been assigned a refrigerant number in ASHRAE 34.

9.4 If ASHRAE 34 did not assign a refrigerant number, then the refrigerant number shall be assigned following this document.

9.5 If ASHRAE 34 assigned a refrigerant number, then this number shall be used for the designation of the application in ISO 817's maintenance agency. The safety group classification of this document applies

9.6 For applications that have not been submitted to ASHRAE 34, the manager of ISO 817's maintenance agency shall check if the proposed designation number is not used in ASHRAE 34.

9.7 In case a designation number is used in ASHRAE 34 and no application has been submitted to ISO 817's maintenance agency, then the refrigerant number shall be listed, and a note shall be added as follows:

“This number has not been assigned a safety group classification according to this document.”

Annex D

Modify the title to the following:

Calculation of ATEL for blends

Clause D.1

Modify the title to the following:

Calculation of ATEL for blends

Clause D.5

Delete Clause D.5

Annex E

Modify the title to the following:

Data used to determine safety classification and refrigerant concentration limits and data for unclassified refrigerants

Modify the text to the following:

For data used to determine safety classification and refrigerant concentration limits, see Tables E.1 to E.3.

For data for unclassified refrigerants, see Tables E.4 to E.6.

Updated refrigerant tables are provided at: http://standards.iso.org/iso/817/ed-3/en.

Table E.1

Modify title to the following:

Table E.1 — ATEL, ODL and FCL values single-compound refrigerants[a] (ppm volume fraction)

Modify as follows:

— Delete RCL column.

— Delete RCL Source column.

— Delete FCL column.

Table E.2

Modify as follows:

— Add column for burning velocity (S_u) at 23 °C – 50 % RH.

— Add column for burning velocity (S_u) at 27 °C dew point.

— Add new NOTE as follows:

NOTE Test temperature is at the minimum for the test apparatus to maintain the humidity.

Table E.3

Modify as follows:

— Add LFL in kg/m^3 for nominal, WCF and WCFF.

— Add LFL in kg/m^3 for $ETFL_{60}$ for nominal, WCF and WCFF.

Tables E.4, E.5 and E.6

Modify as follows:

— Delete RCL column.

— Delete LFL ppm by volume.

— Add LFL v/v%.

— Add column with LFL kg/m^3.

— Add column for LFL in v/v% for WCF.

— Add column for LFL kg/m^3 for WCF.

— Add column for LFL in v/v% for WCFF.

— Add column with LFL in kg/m^3 for WCFF.

Clause F.1

Modify to the following:

> This annex identifies requirements to apply for designations, safety classifications and refrigerant concentration limits for refrigerants, including blends, in addenda or revisions to this document.

Clause F.4

Modify to the following:

> The cover shall identify the applicant and primary contact, the refrigerant in accordance with F.6.1, and requested action. Requested actions may include assignment or revision of a designation, safety classification, refrigerant concentration limits, or (for blends) formulation tolerance. Commercial and trade names for refrigerants shall not be used on the cover.

Clause F.7

Modify to the following:

> Applications for refrigerants shall include the data identified in F.7.1, F.7.2 and F.7.3. The sources for these data shall be identified, and the applicant shall provide copies if requested by the MA. See F.2.6 regarding blend components.

