

ERRATA SHEET FOR ANSI/ASHRAE STANDARD 34-2010
Designation and Safety Classification of Refrigerants

February 8, 2024

The corrections listed in this errata sheet apply to ANSI/ASHRAE Standard 34-2010. The first printing is identified on the outside back cover as “Product Code: 86019 9/10”. **Shaded** items have been added since the previous errata sheet dated December 17, 2012 was distributed.

Page Erratum

- 13 Section 9.4.2, Data Certification.** In the indented paragraph, change “ANSI/ASHRAE Standard 34-2007” to “ANSI/ASHRAE Standard 34-2010”.
- 15 Section 9.9.8, Substantiation.** Change the last sentence from “The quantity shall be as indicated in Section 9.8.5” to “The quantity shall be as indicated in Section 9.9.5.”
- 19 Table 2, Data and Safety Classification for Refrigerant Blends.** Change the OEL value for R-432A from 710 ppm to 700 ppm.
- 21 Table 3, Flammability Classifications.** In the third column, WCFF of a Refrigerant Blend, Class 3, change “Flame propagation when tested at 60.0°C (212°F) and 101.3 kPa (14.7 psia)” to “Flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia)”.
- 28 Informative Appendix D – Refrigerant Data.** In the introductory paragraph, second sentence, change the word “azeotropic” to “zeotropic”.
- 29 Table D1.** Add the missing entry and data for R-227ea to Table D1 (previously published as Addendum s to 34-2004) as shown:
- Refrigerant Number: 227ea
Chemical Name: 1,1,1,2,3,3,3-heptafluoropropane
Chemical Formula: CF₃CHFCF₃
Molecular Mass: 170.0
Normal Boiling Point: -15.6 °C / 3.9°F
- 30 Table D2.** Change Composition (Mass %) for refrigerant number 421A from “R-125/134a (58.0/45.0)” to “R-125/134a (58.0/42.0)”.
- 35 Informative Appendix G – Calculation of RCL and ATEL for Blends.** The Example is corrected as shown on the following page:
(Note: Additions are shown in underline and deletions are shown in ~~strikethrough~~.)

Example:

ATEL Calculation for R-410A (50/50 wt% R-32/R-125)

R-410A composition expressed in mole fraction is (0.698 mole fraction R-32/0.302 mole fraction R-125).

Mortality Indicator (a) of R-410A

$$\frac{1}{\frac{0.698}{215,000 \text{ ppm}} + \frac{0.302}{218,000 \text{ ppm}}}$$

where $(a)_{R-32}$ = the LC_{50} of R-32 or 760,000 ppm $\cdot$ 0.283 = 215,000 ppm and $(a)_{R-125}$ = the LC_{50} of R-125 or 769,000 ppm $\cdot$ 0.283 = 218,000 ppm.

$(a)_{R-410A}$ = **216,000 ppm as the R-410A mortality indicator.**

Cardiac Sensitization Indicator (b) of R-410A

$$\frac{1}{\frac{0.698}{200,000 \text{ ppm}} + \frac{0.302}{75,000 \text{ ppm}}}$$

where $(b)_{R-32}$ = Cardiac Sensitization Indicator NOEL for R-32 or 200,000 ppm and $(b)_{R-125}$ = Cardiac Sensitization Indicator NOEL for R-125 or 75,000 ppm (NOEL).

$(b)_{R-410A}$ = ~~133,000 ppm~~ **166,000 ppm as the R-410A cardiac sensitization indicator.**

Anesthetic Effect Indicator (c) of R-410A

$$\frac{1}{\frac{0.698}{200,000 \text{ ppm}} + \frac{0.302}{567,000 \text{ ppm}}}$$

where $(c)_{R-32}$ = Anesthetic Effect Indicator NOEL for R-32 or 250,000 ppm $\cdot$ 0.8 = 200,000 ppm and $(c)_{R-125}$ = Anesthetic Effect Indicator NOEL for R-125 or 709,000 ppm $\cdot$ 0.8 = 567,000 ppm.

$(c)_{R-410A}$ = **249,000 ppm as the R-410A anesthetic indicator.**

Note: EC_{50} was not used because there was no value for R-32 or R-125, and LOEL was not used because the values for R-32 and R-125 affected more than half (10/10 and $>5/10$) of the animals. Had legitimate EC_{50} , LOEL, or NOEL values been available, it would have been possible to use a EC_{50} for one blend component, a LOEL for a second, and a NOEL for a third, etc.

There are no pertinent escape-impairing or permanent injury effect indicators (d) known for R-410A. ~~Therefore, the ATEL for R-410A is set on the Cardiac Sensitization Effect (b), 133,000 ppm, which is the~~ The lowest toxicity endpoint of acute TCFs in Section 7.1.1 (a) through (c) for the blend is set on the Cardiac Sensitization Effect (b), 166,000 ppm. Rounding to two significant figures gives ~~130,000 ppm~~ 170,000 ppm as the ATEL of R-410A.

RCL for R-410A

~~Since the blend is nonflammable and the ATEL is less than the oxygen deprivation level of 140,000 ppm, the RCL is also 130,000 ppm.~~

The RCL shall be the lowest of the quantities calculated in accordance with 7.1.1, Acute-Toxicity Exposure Limit (ATEL), 7.1.2 Oxygen Depletion Limit (ODL) or 7.1.3 Flammability Concentration Limit (FCL). Since the R-410A blend is nonflammable and the ATEL is 170,000 ppm, which is greater than the ODL of 140,000 ppm, the RCL is 140,000 ppm.