

**INTERPRETATION IC 15-2013-4 OF
ANSI/ASHRAE STANDARD 15-2013
SAFETY STANDARD FOR REFRIGERATION SYSTEMS**

Date Approved: January 29, 2017

Request from: Patrick J. Grant, PE and Ean W. Saltzman, BAE Systems, Inc., Facilities Engineering, 80 M St., S.E., Suite 200, Washington, DC 20003.

Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE Standard 15-2013, Section 7.2, regarding refrigerant concentration calculations.

Background: The refrigerant concentration as described in Section 7.2 “shall not exceed” the ANSI/ASHRAE Standard 34 Refrigerant Concentration Limits (RCLs). The total leaked refrigerant mass divided by the volume of the occupied, contaminated room (plus uncontaminated spaces connected by “permanent openings or HVAC ducts” per Section 7.3) is held at or below the RCL. Subsequent to a leak, the refrigerant concentration in the occupied, contaminated room into which the leak occurs could exceed the RCL. Concentrations equalize between the contaminated room and connected uncontaminated spaces at a rate determined by the rate of refrigerant transfer. Standard 34 RCLs are carefully selected to “reduce the risks of acute toxicity, asphyxiation, and flammability hazards”, and exceeding an RCL elevates the risk. RCLs are sometimes controlled by Acute Toxicity Exposure Limit (ATEL), which can be associated with a time duration. One source suggests that a 30 minute maximum exposure at the RCL would not be inconsistent with underlying assumptions in Standard 15.

Interpretation #1: Refrigerant concentration above the RCL at any time in the occupied, contaminated room increases risk beyond the intent of Standard 34 and is not permissible. Refrigerant transfer rate between the contaminated room and connected uncontaminated spaces must be sufficient to offset the introduction of leaked refrigerant and prevent exceeding the RCL.

Question #1: Is Interpretation #1 correct?

Answer #1: No.

Comments: Refer to ASHRAE 34 Section 7.1.

Interpretation #2: Temporary excursions of refrigerant concentration in the occupied, contaminated room above the RCL could be permissible as long as the time-weighted-average concentration over a period of 30 minutes (or some other period) is at or below the RCL.

Question #2: Is Interpretation #2 correct?

Answer #2: No.

Comments: ASHRAE 15 has no time related refrigerant concentration requirements. ASHRAE 15 only restricts the system charge quantity allowed in an occupied space. The calculation in Section 7.2 is completed assuming the full system charge is dispersed in the space.