
HALOGUARD™ II GUIDE SPECIFICATIONS

ASHRAE 15-1994 REFRIGERANT VAPOR DETECTION SYSTEM

Section 8.13.2 Paragraph 2 Refrigerating Machinery Room, General Requirements. - Each machinery room shall contain a detector, located in an area where refrigerant from a leak will concentrate, which shall actuate an alarm and mechanical ventilation in accordance with 8.13.4 at a value not greater than the corresponding TLV-TWA (or toxicity measure consistent therewith).

Exception: For ammonia refer to 8.14(g).

Section 8.12.6 Combustion Equipment - ...Combustion Equipment shall not be installed in the same machinery room with refrigerants-containing equipment except under one of the following conditions:

(a) combustion air is ducted from outside the machinery room and sealed in such a manner to prevent any refrigerant leakage from entering the combustion chamber, or

(b) a refrigerant vapor detector is employed to automatically shut down the combustion process in the event of refrigerant leakage.

Section 1 - GENERAL

1.0 RELATED DOCUMENTS

1.1 Contractor shall become familiar with requirements for Refrigerant Monitoring and Equipment Work specified in Section 15XXX, Ventilation Work specified in section 15XXX and Electrical Work specified in Division 16. Installation practices shall conform to Division 15 general mechanical and Division 16 general electrical practices and following material and installation specification.

1.2 Refrigerant gas detection system supplier /installer shall be familiar with standard practices of safety and installation for refrigerant gas monitor systems. (Unlisted gas detection supplier shall provide a list of last 12 similar projects.) Acceptable suppliers:

--Thermal Gas Systems, Inc. 770-667-3865

System shall be "package Equipment" as defined in Section 15XXX

System shall meet or exceed the latest ASHRAE standard 1994 requirement Canadian Standard B52-1995 and EPA standard CFR. System shall incorporate all latest revisions to bring up to current standards.

PART 2 - PRODUCTS

2.0 **GENERAL:** Refrigerant Monitor Specification - Paragraphs 2.1 through 2.4 details the specification for Refrigerant Monitoring System.

2.1 Gas monitor shall continuously measure and display the specified gas concentration. Shall be capable of detecting presence of any CFC, HCFC, or HFC refrigerant regardless of which refrigerant is selected (i.e. R-11, R-12, R-22, R-123, R-134a, etc. or other). System shall be capable of indicating, alarming, shutting down equipment, and automation/ventilation interface. Where combustion equipment is employed, monitoring system shall automatically shut down the combustion process in event of refrigerant leakage if other acceptable conditions are not specified.

2.2 Monitor shall be capable of applying multiple sensor technology; CMOS(refrigerants), and/or electrochemical (Oxygen (O₂)) within one system.

2.3 Multiple sensors shall be employed where more than one type refrigerant is in use. Multiple chiller applications shall carefully consider whether mechanical room size and layout can adequately be monitored to comply with regulations with a single point or a multiple point system.

2.4 System Configuration - System shall conform to the design specifications as follows.

2.4.1 Description - Multi-sensor/Multi-gas monitor shall consist of controller and remote sensors. Controller shall activate an alarm and mechanical equipment room ventilation at less than the TLV-TWA.

2.4.2 Controller Configuration - The controller shall be wall mount type for continuous monitoring.

2.4.2.1 Enclosure Type - The enclosure shall be NEMA 12/13, IP65 design type.

2.4.2.2 Enclosure shall be no more than 12 inches in any dimension.

2.4.2.3 Mounting Points shall be integral to enclosure.

2.4.2.4 Controls - All adjustments shall be accessible from front panel. Functions shall include LCD display of Refrigerant Concentration and type; Power ON/OFF, High Alarm, Low Alarm, Off Scale Alarm, Fault and Reset condition LED's, NO/NC relays and optional analog output. Relay termination strip shall be in isolated junction box, rigidly attached to control enclosure.

2.4.2.5 Sensors - Controller shall be capable of monitoring up to six (6) points using CMOS sensor, or Oxygen sensor, in any combination.

2.4.2.6 There shall be no other gas inlet or outlet such as zero or compensation gas inlet.

2.4.2.7 Operating Temperature - 0°F to 120°F non-condensing

2.4.3 Sensor Configuration - (Depending on sensor type, use appropriate section.) Sensors shall be located in an area where refrigerants from a leak will concentrate (ASHRAE -15 1994).

2.4.3.1a **CMOS sensors** shall be able to transmit gas concentration up to 300 ft. from controller.

2.4.3.1b Sensitivity - 10% Full Scale

2.4.3.1c Operating Temperature - -20°F to +120°F non-condensing

2.4.3.2a **Oxygen Sensor** shall employ a long-life galvanic cell with electrolyte and shall be able to transmit percent oxygen value up to 300 ft. from controller.

2.4.3.2b Sensitivity - Range of 0 - 25% Oxygen. Accuracy +/-1/2%.

2.4.3.2c Operating Temperature - 40°F to 110°F non-condensing

2.4.4 Controller Requirements

2.4.4.1 Display - A 2 line LCD display shall be provided for display of sensor location, gas type and concentration, sensor type, alarm type (Malfunction codes are not permitted. All error codes are to be plain language), malfunction, set-up information, diagnostics and calibration.

2.4.4.2 Alarm Set Points - Three (3) levels of alarm shall be provided for each sensor (High, Low and Off Scale). Alarm set points for each sensor shall be independently adjustable. At least two (2) alarm levels shall be user adjustable at value less than full scale. Relays shall be user selectable Latching or Non-latching.

A third, non-user adjustable alarm shall be provide at greater than the full scale value. This (Offscale) Alarm shall be capable of initiating combustion process shutdown and provide remote notification to prevent persons from entering a highly contaminated space without breathing apparatus.

2.4.4.3 Visual Alarm Indication - LED shall energize for each level of alarm, fault or malfunction.

2.4.4.4 Relay Outputs - Alarm set point signal shall activate relay. Four (4) dry contacts shall be provided to initiate output signal for three (3) level alarms and malfunction, at local panel, interface with both the DDC or BMS and the machine room ventilation system. Contact ratings 3 amps at 120 VAC, Single pole double throw, Form C.

2.4.4.5 TWA Integration (Optional) - (Calculates an 8 hr. time weighted average (TWA); required for R-123 and Ammonia.) Shall display 8 hr TWA exposure on LCD and activate low alarm LED and relay if preprogrammed TLV-TWA ppm value is exceeded.

2.4.4.6 AutoCalibration - System shall automatically re-zero to compensate for changes. Any alarm condition or malfunction, shall override automatic re-zero.

2.4.4.7 Audible Alarm (Optional) - An audible alarm (110dB) shall energize when alarm condition or fault condition occurs. Audible alarm shall pulse at variable frequency to indicate type of alarm.

2.4.4.8 Visual Indication (Optional) - An amber strobe light alarm shall energize when high alarm or offscale alarm condition occurs.

2.4.4.9 Analog Output Signal (Optional) - The system shall be capable of supplying a 0 - 5 VDC or 0 - 10 VDC analog signal, proportional to gas concentration, for interface with DDC or BMS.

2.4.5 Power Requirements - System shall operate on 115 - 230 VAC, 50Hz/60Hz.

2.4.6 Multi-channel Capability - The system shall be capable of adding up to six (6) sampling points, in any combination of technology (CMOS,electrochemical O₂).

2.4.6.1 System shall be capable of allowing user to add additional sensors in the field.

2.4.6.2 System shall be capable of monitoring multiple refrigerants (CFC's, HCFC's and HFC's) or oxygen with one controller.

2.4.6.3 The scanner must be integral to the controller. Scanning time

between channels, shall be adjustable 0 to 10 seconds.

2.4.6.4 Scanner Operation - Manual override push button shall be provided to hold and display any sensor reading for two minutes.

2.5 Maintenance - System shall require no periodic adjustments other than checking against a clean air source, every 6 to 12 months..