International Standard ISO 5149:1993(E)

Mechanical refrigerating systems used for cooling and heating – Safety requirements

This Standard was first published in 1993 and applies to all types of refrigerating systems including heat pumps and absorption systems except for systems using air or water as the refrigerant.

It applies to new systems, refit and modifications of existing systems or conversions to another refrigerant and it states that at all times care should be taken to minimise the discharge of refrigerant to the atmosphere.

It specifies that refrigerant concentration in each machinery room shall be monitored at one or more points by a refrigerant detector.

The detector shall, in addition to other functions, initiate a supervised alarm so that emergency action can be initiated.

The refrigerant leak alarm system shall be powered by an independent emergency system (i.e. battery) installed in accordance with IEC 335-2-24.

Special care shall be taken to avoid stagnant pockets of heavier than air refrigerant at low levels or in the case of roof top units care must be taken to ensure that no refrigerant leaking can enter the building (The use of detectors would meet these requirements).

Some of the Group 2 and all Group3 gases are flammable. In quantities >2.5 kg of Group 3 and 25 kg of flammable Group 2 (Ammonia special case) all electrical equipment shall comply with requirements for hazardous areas.

Ammonia has special machinery room requirements:

- Electricity supply shall be automatically disconnected by switches activated by leak detectors.
- Mechanical ventilation shall be activated automatically by a leak detector

except in permanently manned machinery room where manual switching is permissible.

NH3 or all flammable detectors must function at less than 25% LEL.

Direct systems in most occupancy buildings (ABCD) are a major safety matter. In the case of Group 1 refrigerants they may be used if the refrigerant change could not exceed the practical limit (0.3 kg for R22) if the total charge escaped into the human occupied space. If volume of smallest space times the refrigerant charge > practical limit you should not use direct systems. (Suppliers of direct systems draw attention to the need for mechanical ventilation and / or leak detectors in such installations so as to increase the air volume or prevent the practical limit being exceeded.