SCIENTIFIC LETTER

Measures to control exposure to flammable refrigerant in household type refrigerators and freezers in the medical laboratory

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Flammable refrigerant remains a commonly used chemical product in household type refrigerators and freezers used in the medical laboratory (1,pp.17.1-17.13). The medical laboratory must provide relevant exposure control measures to laboratory personnel when flammable refrigerant is used in the refrigeration system for storage of reagents, consumables and specimens. The main objective of this paper is to enhance the medical laboratory's awareness of requirements relating to provision of relevant exposure control measures for flammable refrigerant in refrigeration systems to laboratory personnel. Selected organisations were identified to provide relevant information to support communication of hazard information to laboratory personnel: the American Society of Heating, Refrigerating and Air-Conditioning-Engineers (ASHRAE) (2,pp.742743), the International Electrotechnical Commission (IEC) (3,p.1741;4,p.1178), the International of Electrical and Electronics Engineers (3,p.1481), the International Organization for Standardization (ISO) (3,p.1896;4,p.881), and the United Nations Economic Commission for Europe (5,p.2391).

Definitions

The following definitions should be noted by the medical laboratory:

Refrigerant

Defined by the ISO as 'fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure of the fluid and rejects it at a higher temperature and a higher pressure of the fluid usually involving changes of the phase of the fluid' (Item 3.1.36 of ISO 817:2014).

Coolant

Defined by the ISO as 'heat absorbing medium or process' (Item 3.1.2 of ISO 224491:2020).

Secondary coolant

Defined by the ASHRAE as 'any liquid used for transmission of heat, without a change in state. Examples of secondary coolants include glycol and brine' (1,p.50.10).

Exposure and control measures

The exposure control measures relating to hazard information communication should include conveying relevant information by: marking, defined by the ISO and the IEC as 'symbols, pictograms, warnings, logos, or inscriptions on the consumer product, label or packaging to identify its type, which can also include short textual messages' (Item 3.12 of ISO/IEC Guide 14:2018); the safety data sheet, defined by the ISO as 'technical bulletin providing detailed hazard and precautionary information' (Item 3.25 of ISO 15190:2020); and the instructions for use, defined by the ISO and the IEC as 'information provided by the supplier of a product to the user, containing all the necessary provisions to convey the actions to be performed for the safe and efficient use of the product' (Item 3.9 of ISO/IEC Guide 14:2018).

Table 1. An action list for the medical laboratory to ensure the relevant exposure control measures for flammable refrigerant in refrigeration systems are identified and displayed for hazard communication.

Areas	Action list	References
Marking	The medical laboratory to ensure flammable refrigerants in refrigerators and freezers are identified and properly labelled.	Subclause 8.2.1 b) of ISO 15190:2020
	The medical laboratory to ensure the symbol ISO 7010-W021 (2011-05) is used by the manufacturer to indicate the flammability hazard.	Clause 5 of ISO 7010:2019
	The medical laboratory to ensure compressiontype appliances that use flammable refrigerants are marked with the symbol ISO 7010-W021 (2011-05).	Clause 7 of IEC 603352-24:2020
	The symbol ISO 7010-W021 (2011-05): 	Clause 5 of ISO 7010:2019
Safety data sheet	The medical laboratory to ensure the pictogram GHS02 used by the manufacturer to indicate the flammability hazard in the safety data sheet is noted.	Annex A.3 of ISO 11014:2009
	The pictogram GHS02: 	(6, p. 375)
Instructions for use	The medical laboratory to ensure relevant safetyrelated information provided in the equipment instructions for use is noted.	Subclause 7.11.2 of IEC/IEEE 820791:2019
	The medical laboratory to ensure the instructions for use and safety notifications are reviewed to ensure correct usage.	Subclause 13.1 of ISO 15190:2020
Communication requirements	The medical laboratory to ensure the symbol ISO 7010-W021 (2011-05) is displayed at perpendicular height of ≥ 15 mm.	Subclause 5.2 of IEC 610102011:2019

Marking

The medical laboratory is to ensure that: hazardous products in use, including flammable refrigerants in household type refrigerators and freezers, are identified and properly labelled [Subclause 8.2.1 b) of ISO 15190:2020]. The symbol ISO 7010 -W021 (2011-05) should be used as the marking by the manufacturer to indicate the flammability hazard when household type refrigerators and freezers contain flammable refrigerant. In addition, the pictogram GHS02 should be used by the manufacturer to display the flammability hazard in the relevant section of the safety data sheet (6,p.375).

Instructions for use

Relevant safety related-information must be provided in the equipment instructions for use supplied by the manufacturer to support hazard communication (Subclause 7.11.2 of IEC/ IEEE 82079-1:2019). The medical laboratory must ensure that the equipment instructions for use are read thoroughly by laboratory personnel.

Communication requirements

The medical laboratory must ensure the symbol ISO 7010-W021 (2011-05) is displayed at a reasonable location to assist in alerting laboratory personnel to the specific hazard; together with the provision of information in standardised supplementary safety information panel by the manufacturers, if provided (Subclause 6.3 of ISO 3864-2:2016), and standardised information on symbols in the globally harmonised system of classification suitable for use in the safety data sheet, if provided (Annex A.3 of ISO 11014:2009).

The medical laboratory must do what is reasonably practicable to ensure the relevant exposure control measures for flammable refrigerant in refrigeration systems are identified and displayed unambiguously for hazard communication to laboratory personnel.

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