HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee 61C: Safety of refrigeration appliances for household and commercial use, of technical committee 61: Safety of household and similar electrical appliances

The text of this interpretation sheet is based on the following documents:

ISH	Report on voting
61C/562/ISH	61C/571/RVISH

Full information on the voting for the approval of this interpretation sheet can be found in the report on voting indicated in the above table.

SC 61C interpretation sheet on: Pressure relief devices used in transcritical refrigeration systems

Introduction

Requirements for refrigeration systems that use transcritical refrigerants such as CO_2 (R 744) were introduced into the standard in 2010; however at the time few manufacturers saw transcritical refrigerants as a future progression. It is only recently that commercial refrigerating appliances using such systems are being developed and as a result some clarification of the standard is required due to practicalities of technology being applied.

There is a requirement in 22.103 that appliances employing **a transcritical refrigeration system** shall include a **pressure relief device** in the high pressure side of the refrigeration system. The intent of this device is to prevent the pressure of the system exceeding the **design pressure** should a malfunction occur, such as a failure of the gas cooler fan motor.

A pressure test is carried out on the system with the **pressure relief device** rendered inoperative to ensure that the high side of the system and components can withstand at least 3 times the **design pressure** or as a minimum the high side pressure specified in IEC 60335-2-34, which in the case of R 744 (CO_2) is 420 bar (42 MPa).

The **pressure relief device** is defined in 3.111 as a “pressure sensing device intended to reduce pressure automatically when pressures within the refrigeration system exceed the setting pressure of the device”.

As per the text of 22.103 the operating pressure of the pressure relief device shall be no higher than the **design pressure** of the high pressure side. The component test parameters for several different types of **pressure relief device** such as mechanical, electrical and those of the burst disc type are listed in the addition of 24.1.4.

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Withdrawn

Questions

On the basis that the **pressure relief device** can maintain the **design pressure** by either venting refrigerant from the refrigeration system or by automatically shutting down the pressure generating element (the compressor),

1) How to apply the second paragraph of 22.103 where the pressure is controlled by automatically shutting down the pressure generating element (the compressor).

2) Subclause 24.101 specifies requirements to ensure that the discharge capacity of the pressure relief device is adequate and which can be verified by calculation or by a test. In the case of an electrical pressure relief device that automatically shuts down the compressor instead of externally venting refrigerant is this clause relevant?

Relevant text from IEC 60335-2-89:

The second paragraph of 22.103 states in regard to the mounting of the pressure relief device: "*The **pressure relief device** shall be mounted so that the refrigerant released from the system cannot cause any harm to the user of the appliance. The aperture shall be located so that it is unlikely to be obstructed in normal use.*"

Subclause 24.101 states:

24.101 The discharge capacity of the **pressure relief device** shall be such that it is able to release an adequate amount of refrigerant so that the pressure during the release of the refrigerant does not increase beyond the pressure setting of the **pressure relief device,** even if the compressor is operating.

Compliance is checked by validation of the manufacturer's calculations or by an appropriate test.

ANSWERS

1) The second paragraph of 22.103 is not relevant where the pressure is controlled by automatically shutting down the pressure generating element (the compressor) since the pressure is not controlled by releasing refrigerant from the system.

2) Subclause 24.101 is not relevant to a pressure relief device that senses pressure and shuts down the compressor automatically if the system high side pressure exceeds the high side design pressure since such a device does not have a discharge capacity.

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Withdrawn

APPAREILS ÉLECTRODOMESTIQUES ET ANALOGUES – SÉCURITÉ –

Partie 2-89: Règles particulières pour les appareils de réfrigération à usage commercial avec une unité de fluide frigorigène ou un compresseur incorporés ou à distance

FEUILLE D'INTERPRÉTATION 1

La présente feuille d'interprétation a été établie par le sous-comité 61C: Sécurité des appareils domestiques de réfrigération à usage domestique et commercial du comité d'études 61: Sécurité des appareils électrodomestiques et analogues.

Le texte de cette feuille d'interprétation est issue des documents suivants:

ISH	Rapport de vote
61C/562/ISH	61C/571/RVISH

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette feuille d'interprétation.

SC 61C feuille d'interprétation sur les: Soupapes de sécurité utilisées dans les systèmes de réfrigération transcritique

Introduction

Les exigences relatives aux systèmes de réfrigération utilisant des fluides frigorigènes transcritiques tels que le CO_2 (R 744) ont été introduites dans la norme en 2010; toutefois à l'époque, peu de fabricants considéraient les fluides frigorigènes transcritiques comme une avancée à venir. Ce n'est que récemment que les appareils de réfrigération à usage commercial utilisant de tels systèmes ont été élaborés et de, de ce fait, il en résulte la nécessité de clarifier la norme du fait des aspects pratiques des technologies appliquées.

Une exigence figurant dans le 22.103 stipule que les appareils utilisant **un système de réfrigération transcritique** doivent inclure une **soupape de sécurité** du côté haute pression du système de réfrigération. Cet appareil a pour but d'empêcher la pression du système de dépasser la **pression de calcul**, dans le cas d'un dysfonctionnement, tel qu'une défaillance du moteur de ventilateur refroidisseur de gaz.

Un essai de pression est effectué sur le système dont la **soupape de sécurité** est rendue inopérante pour s'assurer que le côté haute pression du système et des composants peut résister à au moins 3 fois la **pression de calcul** ou au minimum à la haute pression spécifiée dans l'IEC 60335-2-34, qui, dans le cas de R 744 (CO_2), est de 420 bar (42 MPa).

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