SLOVENSKI STANDARD

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Hladilni sistemi in toplotne ļ rpalke - Varnostnotehniļ ne in okoljevarstvene zahteve - 3. del: Mesto postavitve in zaġļ ita oseb

Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site and personal protection

Kälteanlagen und Wärmepumpen - Sicherheitstechnische und umweltrelevante Anforderungen - Teil 3: Aufstellungsort und Schutz von Personen

Systèmes de réfrigération et pompes à chaleur - Exigences de sécurité et d'environnement - Partie 3: Installation in situ et protection des personnes

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EUROPEAN STANDARD

NORME EUROPÉENNE

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February 2008

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English Version

Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site and personal protection

Systèmes de réfrigération et pompes à chaleur - Exigences de sécurité et d'environnement - Partie 3: Installation in situ et protection des personnes

Kälteanlagen und Wärmepumpen - Sicherheitstechnische und umweltrelevante Anforderungen - Teil 3: Aufstellungsort und Schutz von Personen

This European Standard was approved by CEN on 13 October 2007.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 378-3:2008) has been prepared by Technical Committee CEN/TC 182 “Refrigerating systems, safety and environmental requirements”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2008, and conflicting national standards shall be withdrawn at the latest by August 2008.

This document supersedes EN 378-3:2000.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

EN 378 consists of the following parts under the general title *Refrigerating systems and heat pumps — Safety and environmental requirements:*

— *Part 1: Basic requirements, definitions, classification and selection criteria*

— *Part 2: Design, construction, testing, marking and documentation*

— *Part 3: Installation site and personal protection*

— *Part 4: Operation, maintenance, repair and recovery*

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Introduction

The introduction of EN 378-1:2008 is applicable.

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1 Scope

1.1 The scope of EN 378-1:2008 is applicable.

1.2 This part three is applicable to the installation site (plant space, services and necessary personal protective equipment). It specifies requirements on the site for safety, which may be needed because of, but not directly connected with, the refrigerating system and its ancillary components.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 378-1:2008, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

EN 378-2:2008, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

EN 1363 (all parts), *Fire resistance tests*

EN 1364 (all parts), *Fire resistance tests for non-load bearing elements*

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EN 1365 (all parts), *Fire resistance tests for load bearing elements*

EN 1366-1, *Fire resistance tests on service installations — Part 1: Ducts*

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EN 1366-2, *Fire resistance tests on service installations — Part 2: Fire dampers*

EN 1507:2006, *Ventilation for buildings — Sheet metal air ducts with rectangular section — Requirements for strength and leakage*

EN 1634 (all parts), *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware*

EN 12236, *Ventilation for buildings — Ductwork hangers and supports — Requirements for strength*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — General requirements (IEC 60204-1:2005, modified)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

EN ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

IEC 60364 (all parts), *Low-voltage electrical installations*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 378-1:2008 apply.

4 Location of refrigerating equipment

4.1 General

Refrigerating equipment may be sited outside the building in the open air or in a designated machinery room or in occupied areas or in unoccupied areas not designated as a machinery room.

4.2 Refrigerating equipment located outside in the open air

Refrigerating equipment sited in the open shall be positioned to avoid refrigerant leaking into the building or otherwise endanger people. If sited on the roof the refrigerant shall not be able to flow across the roof into any ventilation fresh air opening, doorway, trap door or similar opening in the event of a leak. A shelter provided for refrigerating equipment sited in the open air shall be provided with natural or forced ventilation. Refrigerating equipment located in the open air shall be sited to avoid refrigerant leakage into adjacent buildings or other danger to people.

NOTE A room, where at least one of the longest walls is open to the outside air by means of louvres with 75 % free area and covering at least 80 % of the wall area (or the equivalent if more than one wall is to outside), is considered as being in the open air.

4.3 Refrigerating equipment located inside in a machinery room

When a machinery room is chosen for the location of all the refrigeration equipment or for the high pressure side of the system, it shall meet the requirements of 5.1 to 5.15. Where the charge of a refrigerant is above the practical limits specified in EN 378-1 the refrigerating system shall only be permitted in a special machinery room. Refrigerating systems with limited safety devices as specified in Clause 6 of EN 378-2:2008 and indicated in the flow chart, shall only be permitted in special machinery rooms.

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NOTE 1 Additional requirements may be needed for refrigerating systems containing B2, B3, A2, and A3 refrigerants as specified in 5.17.

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NOTE 2 Where housing around refrigerating equipment is sufficiently large for people to enter then the housing should be considered as a machinery room and requirements for such rooms apply.

4.4 Refrigerating equipment located in an occupied space

The requirements shall be as specified in EN 378-1:2008.

4.5 Refrigerating equipment located in an unoccupied space not designated a machinery room

If the area is sealed from any occupied space, the requirements shall be as those for a machinery room. If the space cannot be sealed from any occupied space then the refrigerating machinery shall be considered as located in the occupied space and requirements for such spaces shall apply.

4.6 Refrigerating equipment located within a ventilated enclosure

The ventilated enclosure containing the refrigerating system shall have a ventilation duct as specified by the manufacturer. The duct shall be no greater in length and shall have no more bends than the maximum number specified by the manufacturer. The room in which the ventilated enclosure is installed shall be at least ten times the volume of the enclosure and shall have sufficient make up air to replace any exhausted air. The ventilation form the enclosure shall be to the outside air or to a room having a minimum volume specified in EN 378-1 for an occupied space.

5 Machinery rooms

5.1 General

When required by this European Standard, machinery rooms or special machinery rooms shall be provided for accommodating parts of refrigerating systems, especially those of the high pressure side, and the compressors, for reasons of safety.

NOTE Housings kept tight and vented can also serve as machinery rooms.

The following principles apply to machinery rooms and special machinery rooms when accommodating refrigerating systems:

a) machinery rooms may serve for accommodating refrigerating equipment but need not serve exclusively for this equipment;

b) refrigerant gas escaping from machinery rooms shall be prevented from entering neighbouring rooms, staircases, courts, gangways or building draining systems and the escaping gas shall be vented without risk;

c) it shall be possible to leave the machinery room immediately in case of danger;

d) air supply for combustion engines, boilers or air compressors shall be drawn from a place, where there is no refrigerant gas. If such equipment is installed in a special machinery room, the air shall be supplied from outside the room;

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e) flammable materials, other than refrigerants and oil needed for servicing, shall not be stored in the machinery room;

f) remote switch for stopping the refrigerating system shall be provided outside and near the machinery room door;

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g) mechanical ventilation shall be provided. Mechanical ventilation shall be provided with independent emergency control located outside the machinery room and near the machinery room door;

h) exterior openings shall not be under emergency exit staircases;

i) all piping and ducting passing through walls, ceilings and floors of machinery rooms shall be tightly sealed;

j) adequate fire fighting equipment have to be available;

k) alarms and detectors as required by Clauses 7 and 8 have to be available.

For special machinery rooms a), d) and e) do not apply.

5.2 Occupation of machinery rooms

If machinery rooms are occupied for significant periods, e.g. used as a building maintenance workspace, they shall be considered as occupied spaces under occupancy class “C” “Occupancy with authorised access only". If the building owner or user ensures that access is permitted by instructed personnel doing the necessary maintenance to the machinery room or general plant and / or a competent personnel doing maintenance on the refrigerating system then the machinery room shall be considered unoccupied.

Special machinery rooms are always considered as unoccupied.

NOTE 1 In accordance with the part 4, when occupied for maintenance or repair, a duly authorized person, familiar with the use of the emergency protective equipment and emergency procedures, should be available near to the machinery room during such occupation in case of an emergency.

NOTE 2 Refrigerating systems containing R744 may require dedicated machinery rooms.

5.3 Venting

Refrigerant shall be prevented from entering neighbouring rooms, staircases, courts, gangways or building drainage systems and the escaping gas shall be vented outdoors.

There shall be no airflow to or from an occupied space through a machinery room unless the air is ducted and sealed to prevent any refrigerant leakage from entering the air stream.

5.4 Emergency

Provision shall be made to facilitate immediate exit from the machinery room in the event of an emergency.

At least one of the emergency exits shall open directly to the open air, or it shall lead to an emergency exit passageway.

The doors in the emergency exits shall be such that they can be opened manually from the inside (anti-panic system).

5.5 Combustion equipment

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Where refrigerating equipment and combustion equipment or air compressors are located in the same machinery room, the air supply for the combustion equipment or air compressors shall be ducted from outside in such a manner that refrigerant cannot enter the air supply.

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5.6 Open flame

Naked flames shall not be permitted in machinery rooms or special machinery rooms, except for welding, brazing or similar activity provided the refrigerant concentration is monitored and adequate ventilation is ensured. Such open flames shall not be left unattended.

NOTE If the refrigerant in the refrigerating machinery is R744, then an open flame may be permitted.

5.7 Storage

Machinery rooms shall not be used for storage with the exception of necessary compressor oil. Any refrigerants, flammable or toxic materials shall be stored as required by national regulations.

5.8 Remote emergency switch

A remote switch for stopping the refrigerating system shall be provided outside the room, near to the machinery room door. A similar acting switch shall be located at a suitable location inside the room. The switches shall meet the requirements for emergency switches in accordance with EN ISO 13850 and EN 60204-1.

5.9 Exterior openings of the machinery rooms

Exterior openings shall not be situated near within 2 m of the building emergency exit staircases or other building openings, e.g. windows, doors, ventilation inlets.

5.10 Piping and ducting

All piping and ventilation ducting, which passes through walls, ceiling and floors of machinery rooms, shall be sealed where it passes through the walls ceiling or floors. The sealing shall have at least equivalent fire resisting properties as the walls, ceiling or floor.

NOTE 1 Discharge pipes from relief devices, safety valves and fusible plugs may diffuse the charge into the air by adequate means but away from any air intake to the building or discharge into an adequate quantity of a suitable absorbing material.

NOTE 2 Relief devices for refrigerants in group A1 may discharge into the machinery room provided the system charge is less than the limits set in Annex C of EN 378-1:2008.

5.11 Normal lighting

Fixed luminaries shall be selected and positioned in spaces containing refrigerating equipment to provide adequate illumination for safe operation. The illumination level and location shall be as required by National regulations. Filament light fittings shall be protected by “splash safe “covers (EN 50014 IPX 4) in machinery rooms containing R717 refrigerating systems.

5.12 Emergency lighting

A fixed emergency lighting system shall be provided, adequate to allow operation of controls and evacuation of personnel, when normal lighting fails. The illumination level and location shall be as required by national regulations.

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5.13 Warning notice and access

Machinery rooms or special machinery rooms shall be clearly marked as such on the entrances to the room, together with warning notices indicating that unauthorized persons shall not enter and that smoking, naked light or flames are prohibited. The notices shall also state that, in the event of an emergency, only authorized persons conversant with emergency procedures shall decide whether to enter the machinery room.

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Additionally, warning notices shall be displayed prohibiting unauthorized operation of the system.

5.14 Dimensions and accessibility

The dimensions of the machinery room shall allow easy installation and sufficient room for service, maintenance, operation, repair and disassembly of the refrigerating equipment including sufficient space for persons wearing personal protection equipment. If necessary, catwalks and fixed ladders shall be provided in order to avoid standing or walking on piping, fittings, their supports and supporting structures and on components during the operation, maintenance, inspection and repair of the refrigerating system. There shall be clear headroom of at least 2,1 m below equipment situated over gangways and permanent work places. The requirements for work staging shall be according to EN ISO 14122-2.

NOTE Headroom is defined by 2,1 m above the walking surface.

5.15 Doors, walls and ducts

5.15.1 Doors and openings

Machinery rooms shall have doors opening outward and sufficient in number to ensure freedom for persons to escape in an emergency.

Note the number of persons in the room is determined by its use.