



SLOVENSKI STANDARD
SIST EN 441-2:2000

01-december-2000

Refrigerated display cabinets - Part 2: General mechanical and physical requirements

Refrigerated display cabinets - Part 2: General mechanical and physical requirements

Verkaufskühlmöbel - Teil 2: Allgemeine mechanische und physikalische Anforderungen

Meubles frigorifiques de vente - Partie 2: Exigences mécaniques et physiques générales
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EUROPEAN STANDARD

EN 441-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1994

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Descriptors: Refrigerators, furniture, commerce, specifications, manufacturing, thermal insulation, refrigerating system, dimensions, defrosting, condensation, electricity consumption, tests, inspection, marking, name plates

English version

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This European Standard was approved by CEN on 1994-10-14. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 44 "Household refrigerating appliances", the secretariat of which is held by UNI.

This European Standard shall be given the status of National Standard, either by publication of an identical text or by endorsement, at the latest by april 1995, and conflicting National Standards shall be withdrawn at the latest by april 1995.

This European is part of a series:

- Part 1: Refrigerated display cabinets - Terms and definitions
- Part 2: Refrigerated display cabinets - General mechanical and physical requirements
- Part 3: Refrigerated display cabinets - Linear dimensions, areas and volumes
- Part 4: Refrigerated display cabinets - General test conditions
- Part 6: Refrigerated display cabinets - Classification according to temperature
- Part 7: Refrigerated display cabinets - Defrosting test
- Part 8: Refrigerated display cabinets - Water vapour condensation test
- Part 9: Refrigerated display cabinets - Electrical energy consumption test
- Part 10: Refrigerated display cabinets - Test for the absence of odour and taste
- Part 11: Refrigerated display cabinets - Installation, maintenance and user's guide

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

1.1 This standard specifies terminology, general mechanical and physical requirements, test conditions as well as installation, maintenance and user's guide for refrigerated display cabinets for the sale and/or display of food products.

This Standard does not cover refrigerated vending machines or cabinets intended for use in catering or similar non retail applications.

1.2 This part of EN 441 defines the requirements for construction, selection and use of materials, components and the performance of refrigerated display cabinets. It specifies the references to other parts of EN 441 which define in detail the conditions and test methods for these requirements. Finally it specifies the requirements for marking and the list of characteristics to be declared by the manufacturer.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 378-1 Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: General requirements
- prEN 378-4 Refrigerating systems and heat pumps - Safety and environmental requirements - Part 4: Selection of refrigerants
- prEN 378-5 Refrigerating systems and heat pumps - Safety and environmental requirements - Part 5: Design, construction and materials
- prEN 378-10 Refrigerating systems and heat pumps - Part 10: Operation, documentation and instruction - Safety and environmental requirements
- EN 441-1 Refrigerated display cabinets - Part 1: Terms and definitions
- EN 441-3 Refrigerated display cabinets - Part 3: Linear dimensions, areas and volumes
- EN 441-4 Refrigerated display cabinets - Part 4: General test conditions
- prEN 441-5 Refrigerated display cabinets - Part 5: Temperature test
- EN 441-6 Refrigerated display cabinets - Part 6: Classification according to temperatures
- EN 441-7 Refrigerated display cabinets - Part 7: Defrosting test
- EN 441-8 Refrigerated display cabinets - Part 8: Water vapour condensation test
- EN 441-9 Refrigerated display cabinets - Part 9 : Electrical energy consumption test

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EN 441-10	Refrigerated display cabinets - Part 10: Test for the absence of odour and taste
EN 60335-1	Safety of household and similar electrical appliances - Part 1: General requirements
EN 60335-2-24	Safety of household and similar electrical appliances - Part 2: Particular requirements for refrigerators and food freezers
ISO 817	Organic refrigerants - Number designation

3 Construction

3.1 General

3.1.1 Strength and rigidity

The cabinet and its parts shall be constructed with adequate strength and rigidity for normal conditions of handling, transport and use and attention shall be given to the following points :

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(supported by iTeh)
- interior fittings, including shelves, baskets, rails, etc, and their supports, shall be sufficiently strong for the duty required ;
 - where sliding shelves, baskets, trays or drawers are fitted they shall retain their shape and ease of movement when fully loaded;
 - any fitments which are provided with stops to prevent accidental removal shall be self-supporting when fully loaded and withdrawn to the limit of the stops.

3.1.2 Guarding

Any part (for example, defrost and drip tray heaters) which might in normal circumstances constitute an accident hazard shall, as far as it is reasonably practicable, be effectively guarded when the cabinet and associated refrigerating system are installed and operating.

The instructions for use and cleaning (see 6.3 c)) shall draw attention to any possible hazards that are not effectively guarded.

3.1.3 Pipes and connections

Pipes and connections to moving or resiliently mounted parts shall be arranged so as to not foul or transmit harmful vibrations to other parts. All other pipes and connections shall be securely anchored and sufficient free length and/or vibration eliminators shall be provided to prevent failure due to fatigue. Where necessary, pipes and valves shall be adequately thermally insulated.

3.1.4 Glass breakage

Where lighting tubes, glass panels and/or mirrors are used, the risk of chipping or splintering shall be minimised.

3.1.5 Sharp edges

There shall be no sharp edges or corners liable to cause injury under normal conditions of use.

3.1.6 Condensate drainage

Where drains, drip trays or re-evaporation receptacles are fitted, they shall have ample capacity and shall be easily accessible for cleaning.

Any condensate or defrost water receptacle, or group of receptacles, requiring to be emptied manually shall have a capacity equivalent to at least 48 h of normal operation in the appropriate climate class for which the cabinet is intended.

3.1.7 Doors and lids

Door fasteners and hinges under normal conditions of use shall be smooth and positive in action and designed to function properly without undue wear.

When any doors or lids, provided to ensure an air seal to the refrigerated space are closed, there shall be no undue leakage of ambient air into the interior.

The doors or lids shall not open of their own accord.

The gasket shall be made from a material whose characteristics are compatible with the operating conditions (especially temperatures). If the fastening device is mechanical, a stop or other means shall be provided to prevent the gasket from being excessively deformed.

The effectiveness of doors or lids provided to ensure a seal shall be tested as follows:

insert a strip of paper 50 mm wide, 0,08 mm thick and of a suitable length at any point of the seal. With the door or lid closed normally on it the strip of paper shall not slide freely.

NOTE 1 : Attention is drawn to the fact that some cabinets having doors provided to ensure an air seal are fitted with decompression valves which allow air to penetrate for a short period of time so that any drop in pressure created inside the cabinet may be compensated. No test is required for such valves.

NOTE 2 : The most unfavourable points may be found by inspecting the contact of the seal with the cabinet closed and lighted from the inside.

3.1.8 Joints and seams

All construction joints and seams within the net volume shall prevent the accumulation of potentially contaminating substances.

All construction joints and seams within the net volume shall permit the easy removal of any deposits of potentially contaminating substances.

3.1.9 Sneeze guard

For cabinets designed for display and sale of unpacked food products, the front facade shall constitute a guard against risks of contamination emanating from consumers through handling, coughing, etc...

For this, the sum of vertical dimension A and horizontal dimension B shown in fig. 1 shall be not less than 1500 mm.

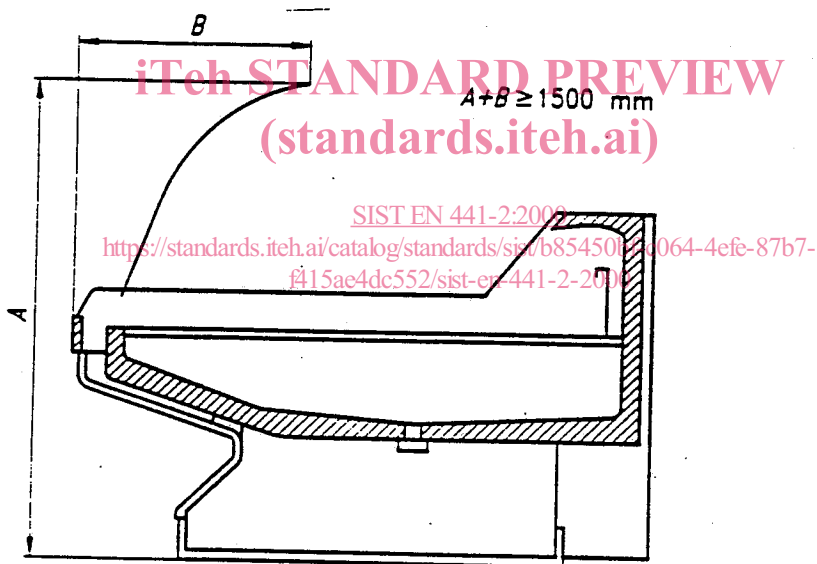


Figure 1 : Dimensions for the sneeze guard

3.2 Materials

3.2.1 General

The materials shall be durable and shall not favour the development of mould or emit odours when tested in accordance with EN 441-10.

Under normal conditions of use, materials in contact with food products shall be resistant to moisture and shall neither be toxic nor contaminate food.

3.2.2 Wear resistance

Internal and external finishes shall be resistant to wear and capable of being cleaned effectively and hygienically. Finishes shall not crack, chip, flake, rub off or soften under normal conditions of use or during cleaning.

3.2.3 Corrosion resistance

Metal parts, used in the construction of cabinets, shall have resistance to corrosion appropriate to their location and function.

3.3 Thermal insulation

3.3.1 Efficiency

The thermal insulation shall be efficient and permanently fixed. In particular the insulating material shall not be subject to shrinkage and shall not allow under normal working conditions an accumulation of moisture. No running water shall appear externally when the refrigerated display cabinet is subjected to the water condensation test specified in EN 441-8.

3.3.2 Vapour barrier

Suitable means shall be used to prevent deterioration of the thermal insulation by the ingress of moisture.

3.3.3 Containment of insulation material

Where the insulation space is vented to the inside, it shall be ensured that particles of the insulation material cannot escape into the food display compartment. For fibrous insulation materials, it shall not be possible to insert a rigid probe of 1 mm diameter through any aperture which allows access to the insulating material, the probe being applied with negligible force.

3.4 Refrigerating system

3.4.1 Design and construction

The design and construction of all parts of the refrigerating system subject to internal pressure shall take into account the maximum working pressure to which they will be subjected when the cabinet is in operation or at rest.

For refrigerated display cabinets with integral condensing unit or components thereof which are charged with refrigerant prior to transportation, the maximum ambient temperature during transit shall be taken into account. All refrigerant containing components shall be in accordance with prEN 378-5.