SLOVENSKI STANDARD
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Refrigerated display cabinets - Part 4: General test conditions

Refrigerated display cabinets - Part 4: General test conditions

Verkaufskühlmöbel - Teil 4: Allgemeine Prüfbedingungen

Meubles frigorifiques de vente - Partie 4: Conditions générales d'essai

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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of an identical text or by endorsement, at the latest by april 1995, and conflicting National Standards shall be withdrawn at the latest by april 1995.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 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 specifies general conditions for testing of refrigerated display cabinets.

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 441-3	Refrigerated display cabinets - Part 3: Linear dimensions, areas and volumes
prEN 441-5	Refrigerated display cabinets - Part 5: Temperature test
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
EN 441-10	Refrigerated display cabinets - Part 10: Test for the absence of odour and taste
ISO 817	Organic refrigerants - Number designation
ISO/R 916	Testing of refrigerating systems

3 General test conditions

3.1 General

General test conditions deal with the measurement of the following characteristics:

- temperature (see prEN 441-5);
- defrosting (see EN 441-7);
- water vapour condensation (see EN 441-8);
- electrical energy consumption (see EN 441-9);

- physical dimensions (see EN 441-3);

- absence of odour and taste (see EN 441-10).

The five first measurements are made in the test room (see 4.1).

NOTE: The four first measurements are preferably made simultaneously.

3.2 Cabinet selection

Each refrigerated display cabinet intended to be tested shall, if not a prototype, be selected from stock or routine production and shall be representative as to contruction and adjustment.

3.3 Cabinet installation

The cabinet, including all components required for normal operation, shall be assembled, set up and sited as it would be installed in service as far as practicable and in accordance with the manufacturer's instructions. All permanently located accessories required for normal use shall be in their respective places.

3.4 Cabinet location in the test room

Cabinets intended to be placed against a wall shall be either so positioned or with the back at a distance from the wall as specified by the manufacturer.

4 Testing equipment

4.1 Test room

4.1.1 Liquid refrigerant inlet condition

The liquid refrigerant temperature at the cabinet inlet shall not be more than 10°C above the specified test room temperature. During the test no "flash gas" condition shall occur.

4.1.2 Power supply

The tolerance on power supply shall be ± 2% for voltage and ± 1 % for frequency in relation to the nominal values which are given on the marking plate or otherwise stated.

4.1.3 Air movement

Air movement shall be provided. The air movement shall be, as far as practicable, parallel to the plane of the cabinet display opening and to the longitudinal axis. With the refrigerated display cabinet switched off, the air velocity at any point along the line shown in figure 1 shall be $(0,2^{\ 0}_{-0,1})$ m/s.

dimensions in millimetres

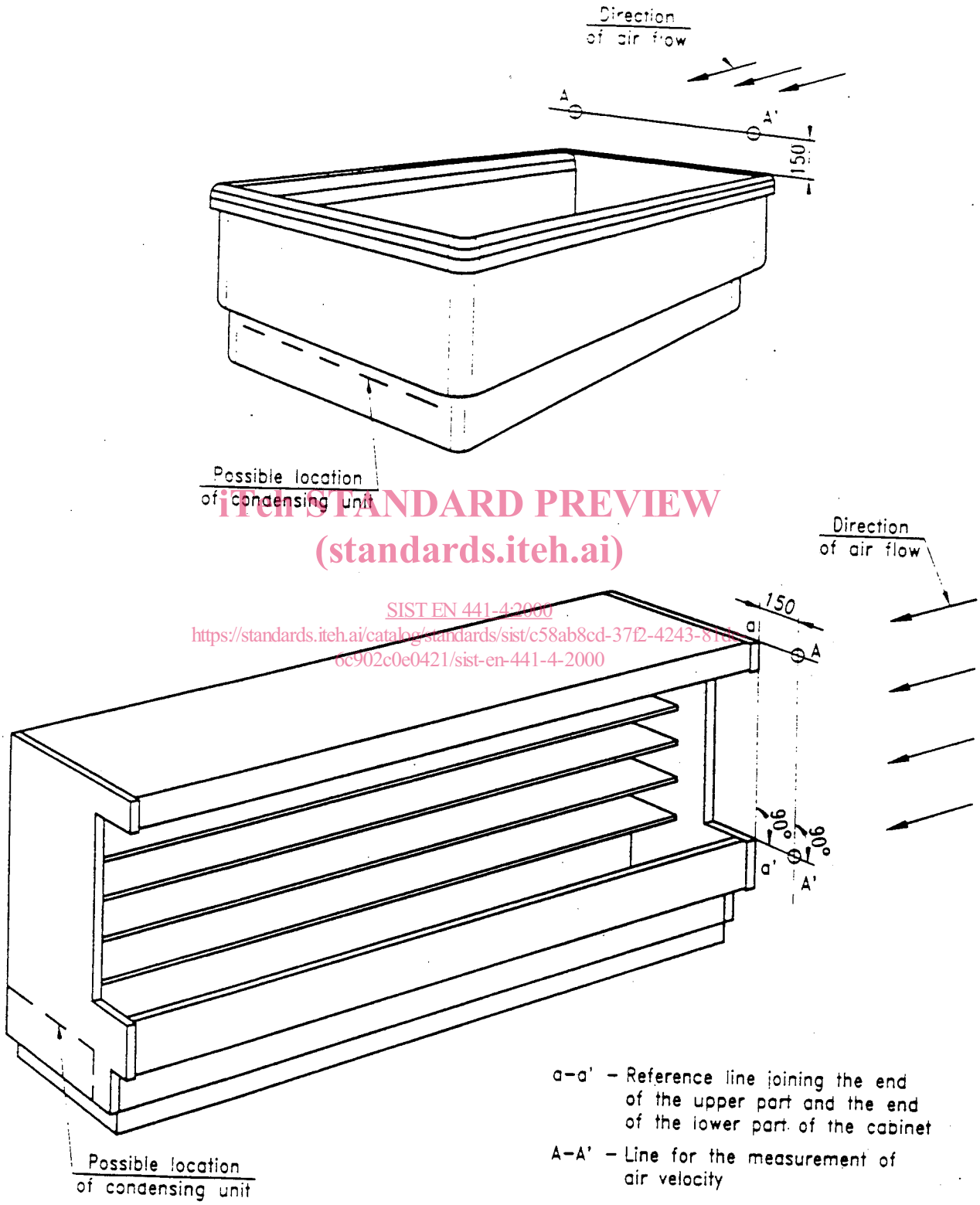

Figure 1: Air movement

For closed refrigerated cabinets the direction of air flow shall be such that the air enters the cabinet when the door(s) is (are) open.

4.1.4 Radiant heat

The walls and ceiling and any partitions of rooms intended for the testing of refrigerated display cabinets shall be painted in light grey with emissivity between 0,9 and 1 at 25° C.

The surface temperatures of walls and ceiling and partitions shall be maintained within ± 2°C of the ambient air temperature measured at the same level.
Fluorescent lighting shall be installed to maintain 600 ± 100 lux measured at a height of 1 m above the floor level and lit continuously during the test period.

NOTE: Light grey, for example, in accordance with NCS 2706-G90Y or in accordance with RAL 7032

4.1.5 Temperature gradient

The temperature gradient shall be measured before the cabinet for test is put into operation. The test room temperature may vary from floor to ceiling but the vertical temperature gradient shall not exceed 2 °C/m and there shall not be a difference of more than 6 °C between the temperature measured at the floor and at the ceiling.

4.1.6 Climate measuring point

The point for measurement of ambient temperature and relative humidity shall be midway along the length of the cabinet and in accordance with figures 2 to 5.

The point for measurement of cabinets with an integral condensing unit shall be on the opposite side to the location of the unit.

However, in the case of typical island site cabinets not fitted with integral condensing unit, temperatures shall be taken at both sides (see figure 3).

Temperatures at the measuring points shall correspond to those of the climate class of the test room (see 4.1.7).

4.1.7 Test room standard climates

Tests shall be carried out in one of the following climates:

Table 1 - Climate classes

Test room climate class	Dry bulb temperature °C	Relative humidity %	Dew point °C
1	16	80	12
2	22	65	15
3	25	60	17
4	30	55	20
5	40	40	24
6	27	70	21

4.1.8 Tolerance of climate classes

The test room shall be capable of maintaining values of temperature and humidity within ± 1°C of the temperature and ± 5 units of the relative humidity percentage figures at the specified measuring points.

Exception : Test room climate class 3 : ± 3 units of the relative humidity.