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SIST EN 441-8:2000

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EUROPEAN STANDARD

EN 441-8

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1994

ICS 97.040.30

Descriptors: Refrigerators, furniture, commerce, physical tests, condensation, water vapour, testing conditions

English version

**Refrigerated display cabinets - Part 8: Water vapour condensation test**

Meubles frigorifiques de vente Partie 8: Verkaufskühlmöbel - Teil 8: Prüfung der  
Essai de condensation de vapeur d'eau Wasserdampfkondensation

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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of an identical text or by endorsement, at the latest by april 1995, and conflicting National Standards shall be withdrawn at the latest by april 1995.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

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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 specifies the procedure to determine the extent of condensation of water on the external surfaces of refrigerated display cabinets, when tested under specified ambient conditions.

## 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 441-4 Refrigerated display cabinets - Part 4: General test conditions
- prEN 441-5 Refrigerated display cabinets - Part 5: Temperature test

## 3 Test procedure

### 3.1 Test room standard climates

For ambient temperature and relative humidity see EN 441-4, 4.1.7 and table 1.

### 3.2 Test conditions

Locate and load the cabinet as for the temperature test (see EN 441-4 and prEN 441-5), operate it in accordance with the manufacturers' instructions at the conditions appropriate to the test room climate class for which it is intended and then operate it for at least 24 h after stable operating conditions have been reached (see EN 441-4, 5.4) or during the operating period of cabinets intended to be switched off at night (see prEN 441-5, 3.2).

NOTE: The temperature test may be carried out at the same time

If anti-condensation heaters are provided which can be switched on and off by the user they shall not be switched on. If, however, running water appears externally when the cabinet is subjected to the water vapour condensation test, the test shall be repeated with the anti-condensation heaters switched on.

### 3.3 Test period

After stable operating conditions have been attained (see EN 441-4, 5.4), or during the operating period of cabinets intended to be switched off at night (see EN 441-5, 3.2), all external surfaces of the cabinet shall be carefully wiped dry with a clean cloth and the test continued for a period of 24 h. If the cabinet is fitted with automatic defrosting equipment this test period shall be selected during the period when condensation is most likely to occur.

## 4 Test results

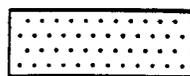
The cabinet shall be considered satisfactory if the test report shows that during the test period there is no evidence of condensed water vapour having been in direct contact with, or having dripped on to, any test packages and depending on the method used to detect water vapour condensation, the following results have been obtained:

- a) all cabinet surfaces, whether adjacent or otherwise, remain free of moisture by the provision of insulation, ventilation or heating to maintain a temperature above dew point for the climate class specified (see EN 441-4, 4.1.7 and table 1);
- b) internal surfaces wherever practical remain free of moisture collection or ice gather;
- c) mirrors which may periodically mist during defrost clear by evaporation on the return to refrigeration cycle.

## 5 Expression of results

During the test period, external surface areas exhibiting fog, droplets or running water shall be outlined and designated with the letters F, D and R respectively.

A coded sketch shall be made showing the maximum area and degree of condensation appearing during the test on all surfaces; the code shown in figure 1 shall be used.



F : Mist



D : Droplets



R : Running water

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Figure 1 - Condensation code

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## 6 Test report

The test report shall clearly state:

- a) the manufacturer's name or trade mark or both;
- b) the model and serial number of the cabinet as well as the description of its internal fittings;
- c) the test room climate class for which the cabinet is intended and in which the test has been made;
- d) the method of temperature control, defrost process, defrost termination, setting parameters and sensor locations;
- e) whether the test was made with or without night-covers;
- f) whether any manual switch provided for anti-condensation heaters was switched off;
- g) the duration of the period of observation;
- h) coded sketches as defined in clause 5.