

**SLOVENSKI STANDARD
SIST EN ISO 8561:2000****01-december-2000**

Household frost-free refrigerating appliances - Refrigerators, refrigerator-freezers, frozen food storage cabinets and food freezers cooled by internal forced air circulation - Characteristics and test methods (ISO 8561:1995)

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Haushalts-Frost-Free-Kühlgeräte - Kühschränke, Kühl-Gefriergeräte, Gefriergeräte und Tiefkühlgeräte gekühlt durch Zwangsumluft - Eigenschaften und Prüfverfahren (ISO 8561:1995)

Appareils de réfrigération ménagers à air pulsé - Réfrigérateurs, réfrigérateurs-congérateurs, conservateurs de denrées congelées et congélateurs à air pulsé intérieur - Caractéristiques et méthodes d'essai (ISO 8561:1995)

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English version

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storage cabinets and food freezers cooled by
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European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

Foreword

The text of the International Standard ISO 8561:1995 has been prepared by Technical Committee ISO/TC 86 "Refrigeration" in collaboration with CEN/TC 44 "Household refrigerating appliances and commercial refrigerated cabinets".

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of an identical text or by endorsement, at the latest by May 1996, and conflicting national standards shall be withdrawn at the latest by May 1996.

According to 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.

Endorsement notice

The text of the International Standard ISO 8561:1995 has been approved by CEN as a European Standard without any modification.

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NOTE: Normative references to international publications are listed in annex ZA (normative).

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Annex ZA (normative)**Normative references to international publications
with their relevant European publications**

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.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN</u> | <u>Year</u> |
|--------------------|-------------|---|-----------|-------------|
| ISO 534 | 1988 | Paper and board - Determination of thickness and Apparent bulk density or apprent sheet density | EN 20534 | 1993 |

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INTERNATIONAL
STANDARD

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First edition
1995-11-15

**Household frost-free refrigerating
appliances — Refrigerators,
refrigerator-freezers, frozen food storage
cabinets and food freezers cooled by
internal forced air circulation —
Characteristics and test methods**

SIST EN ISO 8561:2000

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Appareils de réfrigération ménagers à air pulsé — Réfrigérateurs, réfrigérateurs-congérateurs, conservateurs de denrées congelées et congélateurs à air pulsé intérieur — Caractéristiques et méthodes d'essai



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8561 was prepared by Technical Committee ISO/TC 86, *Refrigeration*, Subcommittee SC 5, *Construction and testing of household refrigerators*.

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Annexes A and B of this International Standard are for information only.

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Household frost-free refrigerating appliances — Refrigerators, refrigerator-freezers, frozen food storage cabinets and food freezers cooled by internal forced air circulation — Characteristics and test methods

1 Scope

This International Standard specifies the essential characteristics for household frozen food storage cabinets and food freezers cooled by internal forced air circulation and for household refrigerators with or without cellar, ice-making or frozen food storage compartments, and of refrigerator-freezers with or without cellar compartment and with at least the food freezer and or frozen food storage compartment(s) cooled by internal forced air circulation, which are wholly factory assembled, and lays down the methods of test for the checking of these characteristics.

Appliances with one refrigerating system in which there are compartments, some cooled by forced air circulation and others by natural convection, shall be tested in accordance with this International Standard.

Compartments cooled by natural convection but having a separate independent refrigerating system shall be tested in accordance with the applicable referenced standard.

However, all compartments are automatically defrosted with automatic disposal of the defrost water.

This International Standard does not apply to household refrigerators (which are covered in ISO 7371), refrigerator-freezers (which are covered in ISO 8187) or frozen food storage cabinets and food freezers (which are covered in ISO 5155) not cooled by internal forced air circulation.

The tests described in this International Standard are type tests. When it is necessary to verify the performance of a refrigerating appliance of a given type in relation to this International Standard, all the tests

described should in principle be applied to one and the same unit.

These tests can also be made individually for the study of a particular characteristic.

Where no test method is specified, the particular requirement concerned is to be considered as a recommendation.

The electrical and mechanical safety requirements applicable to household refrigerating appliances are specified in IEC 335-2-24. This International Standard does not apply to household frost-free refrigerating appliances operating on energy sources other than electricity.

Additional safety requirements applicable to the refrigerating systems of household refrigerating appliances are given in ISO 5149.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 534:1988, *Paper and board — Determination of thickness and apparent bulk density or apparent sheet density.*

ISO 817:—¹⁾, *Refrigerants — Number designation*.

ISO 5149:1993, *Mechanical refrigerating systems used for cooling and heating — Safety requirements*.

IEC 335-2-24:1992, *Safety of household and similar electrical appliances — Part 2: Particular requirements for refrigerators, food freezers and ice-makers*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 household frost-free appliance: Insulated cabinet of suitable volume and equipment for household use, cooled by one or more energy-consuming means, in which all compartments are automatically defrosted with automatic disposal of the defrost water, and at least one compartment is cooled by a frost-free system (see 3.1.5).

3.1.1 household frost-free refrigerator (hereinafter referred to as "refrigerator"): Frost-free appliance having one or more compartments intended for the preservation of food, one at least of which is suitable for the storage of fresh food.

3.1.2 household frost-free refrigerator-freezer (hereinafter referred to as "refrigerator-freezer"): Frost-free appliance having two or more compartments.

At least one compartment (the fresh food storage compartment) is suitable for the storage of fresh food, and at least one compartment (the food freezer compartment) is suitable for freezing fresh food and for the storage of frozen food under "three star" storage conditions (see 3.2.5.4).

3.1.2.1 household refrigerator-freezer type I: A refrigerator-freezer having a single temperature control device for regulating the temperatures of the fresh food storage and food freezer compartments.²⁾

3.1.2.2 household refrigerator-freezer type II: A refrigerator-freezer having the means for separate regulation of the temperatures of the fresh food storage and food freezer compartments.²⁾

3.1.3 household frost-free frozen food storage cabinet (hereinafter referred to as "frozen food storage cabinet"): Frost-free appliance having one or more compartments which is (are) suitable for the storage of frozen food under "three star" storage conditions (see 3.2.5.4).³⁾

3.1.4 household frost-free food freezer (hereinafter referred to as "food freezer"): Frost-free appliance having one or more compartments suitable for freezing, from + 25 °C to – 18 °C for class SN, N and ST appliances, + 32 °C to – 18 °C for class T appliances (see clause 4), a quantity of at least 4,5 kg of test packages per 100 l of its storage volume in 24 h, and in no case less than 2 kg, under the test conditions specified in clause 17, and which is also suitable for the storage of frozen food under "three star" storage conditions (see 3.2.5.4).³⁾

NOTE 1 From the point of view of installation, there are various types of household refrigerating appliances: freestanding, wall-mounted, built-in, etc.

3.1.5 frost-free system: System in which cooling is provided by forced air circulation and the evaporator(s) is (are) defrosted by an automatic defrost system. Characteristics of the "frost-free" system are:

- a) the system is automatically operated to prevent the permanent formation of frost on all refrigerated surfaces;
- b) no accumulation of ice or frost forms on the stored food;
- c) storage temperatures in the fresh food compartment, the frozen food storage and/or freezer compartment and the cellar compartment (if any) are maintained within the limits specified in this International Standard;
- d) the water from defrosting is disposed of automatically.

3.2 Compartments and sections

3.2.1 fresh food storage compartment: Compartment intended for the storage of unfrozen food, which may be itself divided into sub-compartments, and in which the temperatures can be maintained in accordance with 6.2.1.

1) To be published. (Revision of ISO 817:1974)

2) In the case of a cellar compartment there can be an additional means for regulating the temperature of that compartment.

3) In certain instances, "two star" sections and/or compartments are permitted within the appliance (see 7.2.6).

3.2.2 cellar compartment: Compartment intended for the storage of particular foods or beverages at a temperature warmer than that of the fresh food storage compartment, and in which the temperatures can be maintained in accordance with 6.2.1.

3.2.3 low-temperature compartment: Compartment which may be either

- an ice-making compartment; or
- a frozen food storage compartment.

3.2.4 ice-making compartment: Compartment intended specifically for the freezing and storage of water ice-cubes.

3.2.5 frozen food storage compartments: Compartments intended specifically for the storage of frozen food. They are classified according to their temperature, as follows.

3.2.5.1 “one star” compartment: Compartment in which the storage temperature (see 3.4.3.2), measured as described in clause 13, is not warmer than $-6\text{ }^{\circ}\text{C}$.

3.2.5.2 “two star” compartment: Compartment in which the storage temperature (see 3.4.3.2), measured as described in clause 13, is not warmer than $-12\text{ }^{\circ}\text{C}$.

3.2.5.3 “two star” section: Part of a food freezer compartment (or cabinet) or of a “three star” compartment (or cabinet) which is not self-contained (i.e. which does not have its own individual access door or lid), in which the storage temperature (see 3.4.3.2), measured as described in clause 13, is not warmer than $-12\text{ }^{\circ}\text{C}$ (see 7.2.6).

3.2.5.4 “three star” compartment: Compartment in which the storage temperature (see 3.4.3.2), measured as described in clause 13, is not warmer than $-18\text{ }^{\circ}\text{C}$.⁴⁾

3.2.6 food freezer compartment: Compartment suitable for freezing from $+25\text{ }^{\circ}\text{C}$ to $-18\text{ }^{\circ}\text{C}$ for class SN, N and ST appliances, and from $+32\text{ }^{\circ}\text{C}$ to $-18\text{ }^{\circ}\text{C}$ for class T appliances (see clause 4), a quantity of at least 4,5 kg of test packages per 100 l of its storage volume in 24 h, and in no case less than 2 kg, under the test conditions specified in clause 17, and which is also suitable for the storage

of frozen food under “three star” storage conditions (see 3.2.5.4).⁴⁾

3.3 General definitions

3.3.1 top-opening type: Appliance in which the compartment(s) is (are) accessible from the top.

3.3.2 upright type: Appliance in which the compartment(s) is (are) accessible from the front.

3.3.3 overall dimensions (doors or lids closed): Measurements of the rectangular parallelepiped, whose base is horizontal, within which the appliance is inscribed to include the complete appliance except for the handle, the protrusion of which, if any, is to be specified separately.

3.3.4 overall space required in use (doors or lids open): Overall dimensions including the handle, increased by the space necessary for free circulation of the cooling air when the appliance is in service, plus the space necessary to allow opening of the means of access to that minimum angle permitting removal of all removable parts such as containers and shelves (see figure 1).

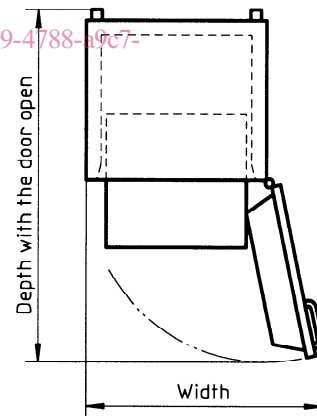


Figure 1 — Overall space required in use (upright type)

3.3.5 Volumes

3.3.5.1 gross volume: The volume within the inside walls of the appliance, or of a compartment with external door, without internal fittings, doors or lids being closed.

4) In certain instances, “two star” sections and/or compartments are permitted within the compartment (or cabinet) (see 7.2.6).

The gross volume is calculated by subtracting from the total volume the volume occupied by air ducts, evaporator, fan and other associated accessories.

3.3.5.2 rated gross volume: Gross volume stated by the manufacturer.

3.3.5.3 total gross volume: Sum of the gross volumes of the fresh food storage compartment(s), low-temperature compartment(s), food freezer compartment [including any "two star" section(s), and/or compartment(s) contained therein], and cellar compartment(s), as applicable, even if their doors or lids are independent.

3.3.5.4 rated total gross volume: Total gross volume stated by the manufacturer.

3.3.5.5 storage volume: That part of the gross volume of any compartment which remains after deduction of the volume of components and spaces recognized as unusable for the storage of food, determined by the method given in 7.2.

3.3.5.6 rated storage volume: Storage volume stated by the manufacturer.

3.3.5.7 total storage volume: Sum of the storage volumes of the appliance, comprising the storage volumes of the fresh food storage compartment(s), low-temperature compartment(s), food freezer compartment [including any "two star" section(s) and/or compartment(s) contained therein] and cellar compartment(s), as applicable.

3.3.5.8 rated total storage volume: Total storage volume stated by the manufacturer.

3.3.6 Storage surface

3.3.6.1 shelf: For the purpose of this International Standard, a shelf is any horizontal surface (shelves, partitions, etc.) on which food can be placed.

It may be formed by one component or by components fitted side by side, which may be fixed or removable.

3.3.6.2 storage shelf area: Sum of the horizontal projections of the storage surfaces within the storage volume including door shelves and the bottom of each compartment, determined in accordance with 7.3.

3.3.6.3 rated storage shelf area: Storage shelf area stated by the manufacturer.

3.3.7 load limit(s): Surface enveloping the frozen food storage volume(s).

3.3.8 load limit line(s): Permanent mark(s) indicating the limits of "three star" frozen food storage volume(s).

3.4 Definitions relating to some performance characteristics

3.4.1 energy consumption: Consumption of an appliance over a period of 24 h, running under stable operating conditions at an ambient temperature of + 25 °C (in the case of class SN, class N and class ST appliances) or + 32 °C (in the case of class T appliances (see clause 4) and measured under the conditions specified in clause 15.

NOTE 2 In some countries a different method for the measurement of energy consumption is required by law (see annex A).

3.4.2 rated energy consumption: Energy consumption stated by the manufacturer.

3.4.3 Storage temperatures

3.4.3.1 fresh food storage temperature, t_m : Arithmetical average of the instantaneous temperatures t_1 , t_2 and t_3 measured in "M" packages (see 3.4.6) and placed at given points in the fresh food storage compartment as specified in 8.5.

$t_{m,max}$ is the maximum value of t_m .

3.4.3.2 frozen food storage temperature, t^{*} , t^{**} , t^* (as appropriate):** Maximum temperature of the warmest "M" package of a load placed in storage as specified in 8.6.

3.4.3.3 cellar compartment temperature, t_{cm} : Arithmetical average of the instantaneous temperatures t_{c1} , t_{c2} and t_{c3} (as appropriate) measured in "M" packages (see 3.4.6) and placed at given points in the cellar compartment as specified in 8.5.

$t_{cm,max}$ is the maximum value of t_{cm} .

3.4.4 freezing capacity: Mass of test packages whose temperature (taken as the instantaneous arithmetical mean temperature of all the "M" packages) can be lowered from the loading temperature of + 25 °C or + 32 °C (see 3.1.4 or 3.2.6) to - 18 °C in 24 h under the test conditions specified in clause 17. The freezing capacity is expressed in kilograms.

3.4.4.1 rated freezing capacity: Freezing capacity stated by the manufacturer.

3.4.5 Defrosting

3.4.5.1 automatically defrosted: An evaporator is automatically defrosted where no action is necessary by the user to initiate the removal of frost accumulation nor to restore normal operation, and where the disposal of the defrost water is automatic.

3.4.5.2 automatic disposal of defrost water: Disposal of defrost water is automatic where the removal and the evaporation of the defrost water does not require any action by the user.

3.4.6 "M" package: A test package in accordance with 8.2, of dimensions 50 mm × 100 mm × 100 mm, fitted with a temperature sensor at its geometric centre.

3.4.7 Cycles

3.4.7.1 operating cycle: That period which commences at the initiation of a defrosting cycle and terminates at the moment of initiation of the next defrosting cycle.

3.4.7.2 defrosting cycle: The period between the moment when the means of defrosting the evaporator(s) is switched on and the moment when the refrigeration process is re-established.

3.4.8 stable operating conditions: Stable operating conditions exist when the appliance has been left running for a minimum time according to the manufacturer's instruction without any adjustment of temperature control setting(s) during this time, and when there is no marked trend away from the storage temperatures (see table 2) after this time.

3.4.9 percentage running time, R' (apparatus with on/off control for the refrigerating source): Under given conditions of ambient temperature and of internal storage temperature, the ratio

$$R' = \frac{d'}{D'} \times 100$$

where

d' is the duration of the refrigerating system operation during an operating cycle (see 3.4.7.1);

D' is the total duration of the operating cycle minus the duration of the defrosting cycle (see 3.4.7.2), even if defrosting occurs by a hot-gas system (see also figure 2).

When calculating the percentage running time for an appliance in accordance with this International Stan-

dard, the duration of the defrosting cycle must be taken into account, R' has been introduced in order to have a clear distinction between this and the percentage running time R of conventional appliances.

For appliances with a hot-gas defrosting system, the time required for hot-gas defrosting shall not be included in the running time of the refrigerating unit.

3.4.10 ice-making capacity: Quantity of ice the appliance is capable of producing within 24 h, or the time necessary for the freezing of the water in the ice tray(s) supplied with the appliance.

3.4.11 ambient temperature: Temperature in the space surrounding the appliance under test. It is the arithmetical average of the mean value of temperatures t_{a1} and t_{a2} , measured at two points located 350 mm from the vertical centreline of the side walls of the appliance at 1 m above the floor line.

3.4.12 temperature rise time: Period between the moment when, under specified test conditions, the temperature of the warmest "M" package in the food freezer compartment (or cabinet) or in any "three star" compartment (or cabinet) reaches $-18\text{ }^{\circ}\text{C}$ to the moment when any of the "M" packages (excluding any "two star" sections) first reaches a temperature of $-9\text{ }^{\circ}\text{C}$ when the operation of the refrigerating system is interrupted.

3.5 Definitions relating to the refrigerating system

3.5.1 refrigerant: Fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure of the fluid and rejects heat at a higher temperature and a higher pressure of the fluid, usually involving changes of state of the fluid.

3.5.2 cooling device: Device containing the evaporator or in thermal contact with the evaporator; it may be a device with fins or may be suitably shaped for the storage of frozen food or water ice-cubes.

3.6 Definitions relating to compression-type appliances

3.6.1 compression-type appliance: Appliance in which refrigeration is effected by the vaporization at low pressure in a heat exchanger (evaporator) of a liquid refrigerant, the vapour thus formed being restored to the liquid state by mechanical compression to a higher pressure and subsequent cooling in another heat exchanger (condenser).