



BSI Standards Publication

Refrigerated storage cabinets and counters for professional use — Performance and energy consumption

National foreword

This British Standard is the UK implementation of EN ISO 22041:2019+A1:2019. It is derived from ISO 22041:2019. It supersedes BS EN ISO 22041:2019, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee RHE/19, Commercial refrigerated food cabinets (cold room and display cases).

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Refrigerated storage cabinets and counters for
professional use - Performance and energy consumption
(ISO 22041:2019)

Armoires et comptoirs frigorifiques de stockage
destinés à un usage professionnel - Performances et
consommation d'énergie (ISO 22041:2019)

Servicekühlthecken- und -tische für den gewerblichen
Gebrauch - Leistung und Energieaufnahme (ISO
22041:2019)

This European Standard was approved by CEN on 24 May 2019.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 22041:2019) has been prepared by Technical Committee ISO/TC 86 "Refrigeration and air-conditioning" in collaboration with Technical Committee CEN/TC 44 "Commercial and Professional Refrigerating Appliances and Systems, Performance and Energy Consumption" the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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Endorsement notice

The text of ISO 22041:2019 has been approved by CEN as EN ISO 22041:2019 without any modification.

Foreword to amendment A1

This document (EN ISO 22041:2019/A1:2019) has been prepared by Technical Committee CEN/TC 44 "Commercial and Professional Refrigerating Appliances and Systems, Performance and Energy Consumption" the secretariat of which is held by UNI.

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 2020, and conflicting national standards shall be withdrawn at the latest by May 2020.

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A1 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).

For relationship with EU Directive(s), see informative Annex ZA and Annex ZB, which are integral parts of this document. **A1**

A1 Annex ZA (informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2015/1095 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 EN and its Amendment No. 1 Technical Update (ANNEX B OF M/495) to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) No 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers.

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Commission Regulation (EU) No 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers and Commission's standardisation request M/495 EN and its Amendment No. 1 Technical Update

Ecodesign Requirements of Regulation (EU) No 2015/1095	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex I 1	6.1	
Annex I 2, 3	4.2.1	
Annex III	5.3.5	
Annex IV 2a	4.2.1, 5.3.4	
Annex IV 2b	5.3.2.2, 5.3.2.3, Annex A	
Annex IX	5.3.2.7, Annex A	

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard.

Annex ZB (informative)

Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 2015/1094 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 EN and its Amendment No. 1 Technical Update (ANNEX B OF M/495) to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of professional refrigerated storage cabinets..

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA regulations.

Table ZB.1 - Correspondence between this European Standard and Commission Delegated Regulation (EU) No 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of professional refrigerated storage cabinets

Energy labelling requirements of Regulation (EU) No 2015/1094	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex I 1	6.1	
Annex I 2, 3	4.2.1	
Annex VIII	5.3.5	
Annex IX 2 first dashed item	4.2.1, 5.3.4	
Annex IX 2 second dashed item	5.3.2.2, 5.3.2.3, Annex A	
Annex X	5.3.2.7, Annex A	

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 86, *Refrigeration and air-conditioning*, Subcommittee SC 7, *Testing and rating of commercial refrigerated display cabinets*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Refrigerated storage cabinets and counters for professional use — Performance and energy consumption

1 Scope

This document specifies requirements for the verification of performance and energy consumption of refrigerated storage cabinets and counters for professional use in commercial kitchens, hospitals, canteens, preparation areas of bars, bakeries, gelateria, institutional catering and similar professional areas.

The products covered in this document are intended to store foodstuffs. It specifies test conditions and methods for checking that the requirements have been satisfied, as well as classification of the cabinets and counters, their marking and the list of their characteristics to be declared by the manufacturer.

It is not applicable to:

- refrigerated cabinets used in the direct sale of foodstuffs;
- cabinets that carry out food processing and not just storage function (e.g. bakery cabinets that chill, heat and humidify);
- cabinets with water cooled condenser;
- appliances with remote condensing unit;
- appliances with open top tables and saladettes for preparation or storage of foodstuffs;
- cabinets specifically intended for storage of specific foodstuffs (i.e. fresh meat, fresh fish, etc.) operating at a temperature different from those specified in [Table 1](#);
- chest freezers;
- appliances intended for short time /intermittent normal operation during the full day;
- built-in cabinets;
- roll-in cabinets;
- pass-through cabinets;
- ice cream freezers.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

refrigerated storage cabinet

cabinet cooled by an incorporated refrigerating system which enables chilled and frozen foodstuffs placed therein to be maintained within prescribed temperature limits

Note 1 to entry: Refrigerated storage cabinets are supplied with:

- transparent door: door where the transparent part is more than 20 % of the surface of the door;
- solid door: door where the transparent part is less than 20 % of the surface of the door.

3.1.1

vertical cabinet

refrigerated storage cabinet (3.1), having overall height equal or higher than 1 050 mm with one or more front doors or drawers accessing the same compartment

3.1.2

counter cabinet

refrigerated storage cabinet (3.1), having overall height lower than 1 050 mm, with one or more front doors or drawers accessing the same compartment

3.1.3

roll-in cabinet

refrigerated cabinet intended to be loaded with trolleys with shelves and designed to be introduced as such in the compartment

3.1.4

pass-through cabinet

refrigerated cabinet accessible from both sides

3.1.5

semi-professional or light duty cabinet

refrigerated cabinet for which the measurement of energy consumption and the capability of maintaining temperature in the compartment are verified when tested at test room climate class 3

3.1.6

normal duty cabinet

refrigerated cabinet for which the measurement of energy consumption and the capability of maintaining temperature in the compartment are verified when tested at test room climate class 4

3.1.7

heavy duty cabinet

refrigerated cabinet for which the verification of the capability of maintaining the temperature in the compartment is performed when tested at test room climate class 5 and the measurement of energy consumption is verified when tested at test room climate class 4

3.1.8

static air cabinet

cooling system without fan inside the cabinet, or system in which the fan can be switched off by the user

3.1.9

built-in cabinet

refrigerated storage cabinet (3.1) intended to be installed into a prepared recess in a wall or similar location and requiring furniture finishing

3.1.10

refrigerator

appliance where the chilled foodstuff is stored at temperature corresponding to that of class M1

3.1.11

freezer

appliance where the frozen foodstuff is stored at temperature corresponding to that of class D1

3.1.12**combined refrigerated cabinet**

refrigerated cabinet with different temperatures for chilled and/or frozen foodstuffs in separate compartments of the same cabinet

3.1.13**multi use refrigerated cabinet**

refrigerated cabinet or separate compartment of the same cabinet that may be set at different temperatures for chilled or frozen foodstuffs

3.1.14**ice cream freezer**

horizontal closed refrigerated cabinet intended to store and/or display and sell pre-packed ice cream where access by the consumer to the pre-packed ice cream is gained by opening a lid (solid or transparent)

3.2**commercial kitchen**

area in commercial premises where foodstuffs are processed and stored

Note 1 to entry: This area also includes counter area in a bar.

3.3**overall external dimensions**

dimensions of the right parallelepiped bounded by the length, depth and height of the cabinet, including its projecting accessories

3.4**net volume**

volume containing foodstuffs within the load limit

3.5**shelf**

surface, excluding the base deck, on which the goods are stored

3.6**shelf sham**

device intended to limit the loading of a shelf surface

3.7**shelf area**

area defined by the external dimensions of the *shelf* ([3.5](#)) or internal dimensions of the base of the drawer

Note 1 to entry: The shelf area used for the calculation of volume is different from the area loaded with packages as given in [5.3.3.3](#).

Note 2 to entry: In case of shelves that are recessed into the cabinet walls the recess part is not considered for the calculation of the surface area.

3.8**load limit**

each part of the cabinet boundary surface consisting of a plane or several planes within which foodstuffs can be loaded

3.9**load limit line**

permanently marked boundary line denoting the limit of the loading surface

3.10

operating conditions

conditions which exist when the cabinet, including all permanently located accessories, has been set up with the recommendations of the manufacturer and is in service

Note 1 to entry: Specific operating conditions are defined in [Clause 5](#).

3.11

defrosting

removal of frost, snow and ice from a refrigerated cabinet

3.11.1

automatic defrosting

defrosting ([3.11](#)) where no action is necessary by the user to initiate the removal of frost accumulation and to restore normal operation

Note 1 to entry: It includes automatic removal of defrost water.

3.11.2

semi-automatic defrosting

defrosting ([3.11](#)) where an action is necessary by the user to initiate the removal of frost accumulation and operating condition is restored automatically

Note 1 to entry: It either includes automatic removal of defrost water or entails manual removal of defrost water.

3.11.3

manual defrosting

defrosting ([3.11](#)) where an action is necessary by the user to initiate the removal of frost accumulation and restoration to normal operation requires a further action by the user

Note 1 to entry: It either includes automatic removal of defrost water or entails manual removal of defrost water.

3.12

defrost water removal

process through which defrost water is removed from a refrigerated cabinet

3.12.1

automatic removal of defrost water

removal and/or evaporation of defrost water that does not require any action by the user

3.12.2

manual removal of defrost water

removal of defrost water that requires an action by the user

3.13

condensing unit

combination of one or more compressors, condensers and liquid receivers (when required) and common accessories

3.14

compression-type refrigerating system

system 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)

3.15

indirect-type refrigerating system

system in which a secondary refrigerant circulating system is installed between a central refrigerating system and a refrigerated cabinet

3.16**frame heating**

system to avoid condensation on the frame surface and freezing of the gasket of the refrigerated cabinet

3.17**energy consumption****E24h**

energy consumption of the refrigerated cabinet in kWh

3.18**M-package**

test package fitted with a temperature measuring sensor at its geometric centre

3.19**M-package temperature class**

classification of *M-package* (3.18) temperature according to temperatures of M-packages during the temperature test

3.20**climate class**

classification of the test room climate according to the dry bulb temperature and relative humidity

3.21**drawer**

retractable device for food storage, not located behind a door and accessible directly from the front of the cabinet

3.22**cabinet section**

vertical part of a cabinet compartment containing one or more doors or *drawers* (3.21) placed above each other

4 Requirements**4.1 Condensate drainage**

Where drains, drip trays or evaporation receptacles are fitted, they shall have a capacity such to avoid overflow immediately during the testing period of 5.3.3.6.1 and whenever relevant (e.g. in case of manual cleaning), specific instructions shall be given on how to access and clean them.

4.2 Operating characteristics**4.2.1 Classification according to temperature**

The temperatures measured in the compartment(s) shall comply with the values specified in Table 1 and the tests shall be carried out as specified in 5.3.4.

Table 1 — M-package temperature classes

Class	Highest temperature, θ_{ah} , of warmest M-package less than or equal to (see Figure 11)	Lowest temperature, θ_b , of coldest M-package greater than or equal to (see Figure 11)	Lowest temperature, θ_{al} , of warmest M-package less than or equal to (see Figure 11)
	°C		
L1	-15	—	-18
M1	+5	-1	—