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Commercial beverage coolers - Classification, requirements and test conditions (ISO/DIS 22044:2024)

Gewerbliche Getränkekühler - Klassifikation, Anforderungen und Prüfbedingungen (ISO/DIS 22044:2024)

Meubles frigorifiques de vente pour boissons - Classification, exigences et conditions d'essai (ISO/DIS 22044:2024)

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Commercial beverage coolers — Classification, requirements and test conditions

*Meubles frigorifiques de vente pour boissons — Classification,
exigences et conditions 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.

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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 44, *Commercial and professional refrigerating appliances and systems, performance and energy consumption*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 22044:2021) which has been technically revised.

The main changes are as follows:

- Addition of date of publication of standards referenced into this standard
- Editorial improvement by moving information about net volume calculation and gross volume measurement from [Annex B](#) and [Annex C](#) into [subclauses 6.2.5](#) and [6.2.6](#) just after [6.2.4](#) “Linear dimensions, areas and volumes” and consequent renumbering of the figures and annexes
- Addition of Class K5 in [Table 1](#) “Classification according to temperature”, in [clause 6.3.11.3](#) Half reload recovery test” and in [clause B.2](#) “Calculation of equivalent volume”
- Addition of [Annex ZA](#) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2019/2024 OJEU L 315/313 aimed to be covered
- Addition of [Annex ZB](#) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 2019/2018 OJEU L 315/155 aimed to be covered

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.

Commercial beverage coolers — Classification, requirements and test conditions

1 Scope

This document specifies the classification for commercial beverage coolers and their requirements and test methods. This document is applicable to integral refrigeration systems.

This document is not applicable to remote and secondary system cabinets.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 817:2014, *Refrigerants — Designation and safety classification*

ISO 5149-2:2014, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2: Design, construction, testing, marking and documentation*

IEC 60335-1:2020, *Household and similar electrical appliances — Safety — Part 1: General requirements*

IEC 60335-2-89:2019, *Household and similar electrical appliances — Safety — Part 2-89: Particular requirements for commercial refrigerating appliances and ice-makers with an incorporated or remote refrigerant unit or motor-compressor*

3 Terms and definitions

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

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

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

3.1 Types of commercial beverage coolers

3.1.1

commercial beverage cooler

refrigerated cabinets to sell and/or display pre-packaged beverage products that are non-perishable, designed to chill products loaded at ambient temperature to the defined storage temperature class within a specified time and for which the customer is allowed direct access to the products

Note 1 to entry: In [Annex A](#) there is the designation of the commercial beverage cooler family.

Note 2 to entry: The customer is an organization or person that receives a product; customer can be internal or external to the organization.

EXAMPLE Consumer, client, end-user, retailer, beneficiary and purchaser.

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3.1.2

vertical commercial beverage cooler

beverage cooler with overall height between 0,5 m and 2,2 m

3.1.3

semi-vertical commercial beverage cooler

vertical beverage cooler for which the overall height does not exceed 1,5 m and having either a vertical or inclined display opening

3.1.4

horizontal commercial beverage cooler

beverage cooler with horizontal display opening on its top and accessible from above

3.1.5

open commercial beverage cooler

horizontal/vertical/semi-vertical beverage cooler where there are not barriers for the access to the displayed products

Note 1 to entry: Do not consider night covers as a barrier for the access to the displayed products.

3.1.6

closed commercial beverage cooler

horizontal/vertical/semi-vertical beverage cooler where access to the displayed product is gained by opening a door or a lid (transparent or solid)

3.2 Parts of commercial beverage coolers

3.2.1

air discharge

opening from which the air curtain emerges

3.2.2

air return

opening at which the air curtain flows back to the evaporator or heat exchanger inside the commercial beverage cooler air ducts

3.2.3

shelf

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

3.2.4

night cover

cover permanently integrated into the commercial open beverage cooler used to reduce the heat ingress (e.g. by infrared radiation or convection)

EXAMPLE Covers can be a night curtain, night blind, night lid.

3.2.5

front

side of the commercial beverage cooler facing the consumer

3.2.6

base deck

lowest display surface of a commercial beverage cooler

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3.3 Physical aspects and dimensions

3.3.1

refrigerated shelf area

refrigerated display area where the vertical clearance above any shelf or base deck is greater than or equal to 125 mm, measured perpendicularly above the plane of the shelf or base deck and within the bounds of any load limit

3.3.2

depth

horizontal distance, including rear spacers for air circulation channel, between the front and the rear of the commercial beverage cooler

3.3.3

width

horizontal distance between the two external sides of the commercial beverage cooler

3.3.4

height

vertical distance from the floor to the top of the commercial beverage cooler

Note 1 to entry: If the commercial beverage cooler has adjustable feet, the height defined shall be the minimum and the maximum height necessary at installation of the cooler.

3.3.5

load limit

boundary surface consisting of a plane or several planes within which all M-cans can be maintained within the limits for the M-cans temperature class declared

3.3.6

load limit line

permanently marked boundary line denoting the edge of the load limit surface

3.3.7

net volume

storage volume inside the appliance which can be used for storage of products

Note 1 to entry: For the calculation method see [Annex B](#).

3.3.8

gross volume

volume within the inside walls of the commercial beverage cooler or compartment, including internal fittings, doors or lids, if any, with these being closed, and with the load limit being taken into account if the commercial beverage cooler has no door or lid

3.3.9

equivalent volume

V_{eq}

reference volume corrected for compartment classification differences

3.3.10

total display area

TDA

total visible foodstuffs area, including visible area through the glazing, defined by the sum of horizontal and vertical projected surface areas of the net volume

Note 1 to entry: For the calculation method see [Annex D](#).

3.3.11

footprint

surface occupied by the commercial beverage cooler

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3.4 Terms and definitions relating to performance characteristics

3.4.1

air curtain

air flow going from the air discharge towards the air return, thereby limiting both heat and mass transfers between the commercial beverage cooler's gross volume and the surrounding environment

3.4.2

normal conditions of use

operating conditions which exist when the commercial beverage cooler, including all permanently located accessories, has been set up and situated in accordance with the recommendations of the manufacturer and is in service

Note 1 to entry: The effects of actions by non-technical personnel for purposes of loading, unloading, cleaning, defrosting, the manipulation of accessible controls and of any removable accessories etc., according to the manufacturer's instructions are within this definition. The effects of actions resulting from interventions by technical personnel for the purposes of maintenance or repair are outside this definition.

3.4.3

energy management device

EMD

electronic device that automatically controls the refrigeration system and/or other key components of the commercial beverage cooler during the standby mode

EXAMPLE Lights, fans.

3.4.4

standby mode

state in which commercial beverage cooler's lighting, refrigeration and/or other energy-using systems are automatically adjusted such that they consume less energy than they consume in an active mode

Note 1 to entry: In the case of commercial beverage coolers, equipped with an EMD and with night cover built in, or night lid built in, the EMD standby mode is activated manually when the night curtain or night lid is down.

Note 2 to entry: In the case of commercial beverage coolers, equipped only with night cover built-in, or night lid built-in for the energy consumption test refer to [6.3.8](#).

3.4.5

active mode

state in which the commercial beverage coolers are in the average temperature defined for the product class, also lighting and/or other energy-using systems are on

3.4.6

EMD product average temperature

temperature that allows the commercial beverage cooler, that has been in standby mode for 12 h, to recover the average product temperature defined for each product temperature class in a recovery time less than 4 h

3.4.7

half reload

capability of the beverage cooler to lower all product temperatures within a specified time after half of the products are removed and reloaded with product at ambient temperature

3.4.8

defrosting

removal of frost, snow and ice from a commercial beverage cooler

3.4.9

automatic defrosting

defrosting 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.

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3.4.10

automatic removal of defrost water

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

3.4.11

manual removal of defrost water

removal of defrost water that requires an action by the user

3.4.12

specific energy consumption

SEC

index of the efficiency of the *commercial beverage cooler* (3.1.1), expressed as the ratio of TEC divided by *equivalent volume* (3.3.9)

Note 1 to entry: SEC is expressed in kilowatt hours per 24 h per m³ [kWh/24 h·m³].

3.5 Terms and definitions related to test environment

3.5.1

M-can

test can used to simulate the product during tests, fitted with a temperature measuring device

3.5.2

climate class

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

3.5.3

M-cans temperature class

classification of test temperature according to temperatures of warmest and coldest M-cans during the temperature test

3.5.4

commercial beverage cooler classification

designation given by the combination of climate class and M-cans temperature class

4 Symbols and abbreviated terms

| | |
|-------------------|---|
| t_{run} | running time — time during which compressor is running in normal condition within 24 h |
| t_{stop} | stopping time — time during which compressor is not running (or solenoid valve is close) within 24 h |
| t_{def} | defrost time — time during defrost during which compressor is not running (or solenoid valve is closed) or secondary refrigerant is generally not circulating, within 24 h, but not considered as stopping time |
| t_{pull} | pull down time – time to pull down the temperature of the beverages from the ambient temperature to the defined temperature class |
| t_{hr} | half reload time – time to recover the beverage cooler temperature after the half reload with product at ambient temperature |
| t_{90} | time in which 90 % of a sudden temperature change of 20 °C is indicated, the measurement medium being moderately agitated air (velocity 1 m/s) |
| Δt | time between two consecutive measuring samples |
| N_{max} | number of measuring samples in 24 h |
| n_{def} | number of defrosts during 24 h |

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| | |
|-----------------|--|
| TEC | total energy consumption in kWh per 24 h |
| SEC | specific energy consumption for commercial beverage cooler expressed in kWh/24 h·m ³ (TEC/V _{eq}) |
| t _{rr} | relative or percentage running time |
| θ | temperature |
| θ_m | average mean temperature |
| θ_{ah} | highest temperature of warmest M-cans |
| θ_b | lowest temperature of coldest M-cans |
| V _{eq} | equivalent volume |

5 Classification and requirements

5.1 Classification according to temperature

The performance of commercial beverage cooler shall comply with one of the classifications defined in [Table 1](#). The performance shall be verified in accordance with the conditions and test methods specified in the following clauses.

Table 1 — Classification according to temperature

| Class | Highest temperature, θ_{ah} , of warmest M-can colder than or equal to [°C] | Lowest temperature, θ_b , of coldest M-can warmer than or equal to [°C] | Average temperature equal to or less than [°C] |
|----------------|--|--|--|
| K ₁ | +7,0 | 0,0 | 3,5 |
| K ₂ | +6,0 | -1,0 | 2,5 |
| K ₃ | +1,0 | -3,5 | -1,0 |
| K ₄ | +9,0 | 1,0 | +5,0 |
| K ₅ | 0,0 | -6,0 | -3,0 |
| S | Special classification | | |

NOTE The M-can temperature classes are measured with an expanded measurement uncertainty of $\pm 0,8$ °C.

5.2 Construction

5.2.1 General

5.2.1.1 Strength and rigidity

The commercial beverage cooler 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:

- 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.