



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 22044:2020**  
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**Komercialni hladilniki pijač - Razvrstitev, zahteve in preskusni pogoji (ISO/DIS 22044:2020)**

Commercial beverage coolers - Classification, requirements and test conditions (ISO/DIS 22044:2020)

Gewerbliche Getränkekühler - Klassifikation, Anforderungen und Prüfbedingungen (ISO/DIS 22044:2020)

Meubles frigorifiques de vente pour boissons - Classification, exigences et conditions d'essai (ISO/DIS 22044:2020)

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## Commercial beverage coolers — Classification, requirements and test conditions

ICS: 97.130.20

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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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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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](http://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](http://www.iso.org/members.html).

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# Commercial beverage coolers — Classification, requirements and test conditions

## 1 Scope

The scope of this Standard is to define the classification for commercial beverage coolers and to specify their requirements and test methods. This Standard is applicable to integral refrigeration systems.

This Standard 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, *Refrigerants — Designation and safety classification*

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

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

EN 60335-2-89, *Household and similar electrical appliances — Safety — Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor (IEC 60335-2-89)*

## 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 <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 Types of commercial beverage cooler

#### 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 the next [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 greater than 1,5 m

### 3.1.3

#### **semi-vertical commercial refrigerated 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

### 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)

### 3.1.7

#### **combined commercial beverage cooler with glass door top**

beverage cooler consisting of a refrigerated bottom, open or with transparent/solid lid, and a transparent/solid door refrigerated top

### 3.1.8

#### **combined commercial beverage cooler with open top**

beverage cooler consisting of a refrigerated bottom, open or with transparent/solid lid, and an open refrigerated top

## 3.2 Parts of commercial beverage cooler

### 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

#### **ticket holder**

profile fitted along the commercial beverage cooler shelves which enables different types of labels for consumer information to be displayed

### 3.2.5

#### **kickplate**

vertical plate or plinth that covers the gap between the floor and base of the commercial beverage cooler

**3.2.6****nightcover**

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

EXAMPLE Example of cover is night curtain, night blind, night lid.

**3.2.7****canopy**

upper front part of a vertical/semi-vertical commercial beverage cooler

**3.2.8****front panel(s)**

group of aesthetic pieces of the commercial beverage cooler front, visible to the customer

**3.2.9****front**

side of the commercial beverage cooler facing the consumer

**3.2.10****front riser**

device for retaining the goods within the display surface

**3.2.11****base deck**

lowest display surface of a commercial beverage cooler

**3.2.12****shelf sham**

device to limit the loading of a display surface

**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 side of the commercial beverage cooler

**3.3.4****height**

vertical distance from the floor to the top of the commercial beverage cooler; if the commercial beverage cooler has an 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

**ISO/DIS 22044:2020(E)****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**

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

**3.4 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 stand-by mode

EXAMPLE Lights, fans.

**3.4.4****stand-by 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 stand-by 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 stand-by 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

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**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.

**3.4.10****semi-automatic defrosting**

defrosting where an action is necessary by the user to initiate the removal of frost accumulation and normal operation is restored automatically

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

**3.4.11****defrost water removal**

process through which defrost water is removed from a commercial beverage cooler

**3.4.12****automatic removal of defrost water**

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

**3.4.13****manual removal of defrost water**

removal of defrost water that requires an action by the user

**3.4.14****total energy consumption****TEC**

total energy consumption in kilowatt hours per 24 h

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## 3.4.15

**specific energy consumption****SEC**

specific energy consumption for commercial beverage cooler expressed in kilowatt per 24 h per m<sup>3</sup> (TEC/V<sub>eq</sub>)

## 3.5 Definition related to test environment

## 3.5.1

**M-cans**

test cans 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

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## 4 Symbols

$t_{run}$	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
$t_{deft}$	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)
$\Delta t$	time between two consecutive measuring samples
$N_{max}$	number of measuring samples in 24 h
$n_{deft}$	number of defrosts during 24 h
$TEC$	total energy consumption in kilowatt hours per 24 h
$SEC$	specific energy consumption for commercial beverage cooler expressed in kilowatt per 24 h per m <sup>3</sup> (TEC/V <sub>eq</sub> )
$t_{rr}$	relative or percentage running time:

$$t_{rr} = \frac{t_{run}}{t_{run} + t_{stop}} = \frac{t_{run}}{24 - t_{deft}} \quad (1)$$

where

$$t_{run} + t_{stop} + t_{deft} = 24h \quad (2)$$

## 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, $\theta_{ah}$ , of warmest M-can colder than or equal to [°C]	Lowest temperature, $\theta_b$ , of coldest M-can warmer than or equal to [°C]	Average temperature equal to or less than [°C]
K <sub>1</sub>	+7,0	0,0	3,5
K <sub>2</sub>	+6,0	-1,0	2,5
K <sub>3</sub>	+1,0	-3,5	-1,0
K <sub>4</sub>	+9,0	1,0	+5,0
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.

##### 5.2.1.2 Pipes and connections

Pipes and connections to moving or resiliently mounted parts shall be arranged so as not to foul or transmit harmful vibrations to other parts. All other pipes and connections shall be securely anchored, and sufficient free length and/or vibration eliminators shall be provided to prevent failure due to fatigue. Where necessary, pipes and valves shall be adequately thermally insulated.