

For BIS use Only.

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

(Not to be reproduced without the permission of BIS or used as an Indian Standard)

भारतीय मानक मसौदा

बोतल कूलर — विशिष्टि

(IS 2167 : 2024 का चौथा पुनरीक्षण)
(ISO 22044 : 2021 का संशोधित अधिग्रहण)

Draft Indian Standard

BOTTLE COOLERS — SPECIFICATION

(*Fourth Revision of IS 2167 : 2024*)
(*Modified Adoption of ISO 22044 : 2021*)

ICS 97.130.20

Refrigeration and Air Conditioning
Sectional Committee, MED 03

Last date for receipt of comments
is **19 November 2024**

NATIONAL FOREWORD

(Adoption clause will be added later on)

This standard was first published in 1962 and subsequently revised in 1983, 2019 and 2024. This revision has been taken up to adopt the standard ISO 22044 : 2021 ‘Commercial beverage coolers — Classification, requirements and test conditions’ with modifications.

The text of ISO standard has been approved for publication as Indian Standard with modifications (*see National Annex A*). Additionally, certain terminologies and conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’; and
- b) Comma (,) has been used as a decimal marker while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standard for which Indian Standard also exist. The corresponding Indian Standard, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
ISO 817 Refrigerants — Designation and safety classification	IS 16656 : 2017/ISO 817 : 2014 Refrigerants — Designation and Safety classification	Identical
ISO 5149-2 Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2 : Design, construction, testing, marking and documentation	IS 16678 (Part 2) : 2018/ISO 5149-2 : 2014 Refrigerating systems and heat pumps — Safety and environmental requirements — Part 2 : Design, construction, testing, marking and documentation	Identical
IEC 60335-1 Household and similar electrical appliances — Safety — Part 1 : General requirements	IS 302 (Part 1) : 2024/ IEC 60335-1 : 2020 Household and similar electrical appliances — Safety Part 1 : General requirements (<i>Seventh Revision</i>)	Identical
IEC 60335-2-89 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	IS/IEC 60335-2-89 : 2010 Household and similar electrical appliances — Safety — Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor	Identical

This standard also makes a reference of technical deviation to the ISO standard, details of which are given in National Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

NOTE — The technical content of the document has not been enclosed as these are identical with the corresponding ISO standard. For details, please refer the corresponding **ISO 22044 : 2021** or kindly contact:

Head
Mechanical Engineering Department
Bureau of Indian Standard
9 Bahadurshah Zafar Marg

New Delhi 110002
Email: med@bis.org.in
Telefax: 011-23232509

NATIONAL ANNEX A

(National Foreword)

LISTS OF TECHNICAL DEVIATIONS

A-1 The text of the International Standard ISO 22044 : 2021 has been approved for publication as Indian Standard with agreed modifications as indicated below:

- a) In this standard wherever ‘M-cans’ are mentioned, the same should be read as M-cans or M-Polyethylene Terephthalate (M-PET) bottles. Also, wherever ‘cans’ are mentioned, the same should be read as cans or Polyethylene Terephthalate (PET) bottles.

Explanation: In order to align with other OEM standard and also lack of availability of M-cans, PET bottles have been allowed as an alternative to M-cans.

- b) Add the following to after first para of Clause **1** Scope:

‘Commercial beverage coolers covered under this standard, are intended for both cooling down and maintaining the product temperatures.

Following are outside the scope of this standard:

- 1) Deep freezers (IS 7872);
- 2) Appliances designed for medical applications;
- 3) DC/battery operated bottle cooler;
- 4) Combination type coolers; and
- 5) Eutectic or phase change material based coolers.

NOTE — This standard is intended to be applied on applications as per the scope of the standard. Any modification to the product at the user or manufacturer end is not covered in this standard.’

- c) Substitute the following for the existing in (a) of Clause **5.2.1.1**:

‘a) Interior fittings including shelfbaskets, rails, etc and their supports, shall be sufficiently strong for the duty required. Shelf load test as per **21.102** of IS/IEC 60335-2-89 shall be conducted to ensure adequate strength and rigidity of all the interior fittings;’

- d) Substitute the following for the existing in para 4 of Clause **6.3.2.2**:

‘The mean horizontal or vertical air velocity measured during 1 min with a maximal interval of 5 s at each of the points defined above shall be less than 0.25 m/s. However, for open type coolers, the air flow shall be used and measured horizontally.’

- e) Substitute the following for the existing in para 2 of Clause **6.3.3.1**:

‘Alternatively, Polyethylene Terephthalate (PET) bottles may be used filled with 500 ml of a 33 percent Propylene Glycol/67 percent water mixture (based on weight percentage). (see Annex H for indicative diagram for bottle shape and size).

The same dimensions and filling apply to all other cans than M-cans or PET bottles loaded in the commercial beverage cooler under test.’

- f) Substitute the following for the existing in para 1 of Clause **6.3.4.2**:

‘Air movement shall be provided vertically or horizontally (see Fig 7). The air movement shall be, as far as practicable, parallel to the plane of the cabinet display opening and to the longitudinal axis and parallel to the vertical axis in case of vertical air flow. The length of the cabinet is defined as the longest horizontal dimension of the display opening. With the refrigerated display cabinet switched off, the air velocity at the three points along the line shown in Fig. 7 for horizontal air flow or vertical flow shall be less than 0.25 m/s.’

- g) Add the following note to the existing in para 1 of Clause **6.3.5.2.1**:

‘NOTE — Double stacking applies to only M-can loading and not applicable for PET bottles.’

- h) Add the following new clause after Clause **6.3.5.2.10**:

‘**6.3.5.2.11** Refer Annex J for loading with PET bottles.’

- j) Read ‘M-cans or PET bottles’ in place of ‘M-cans’ in para 2 of Clause **6.3.11.2.1**.

- k) Substitute the following for the existing in para 2 of Clause **6.3.11.3.1**:

‘Ensure 50 percent of all PET bottles (rounded upto whole number) or packages cans are removed from the beverage cooler and ensure that the cooler operates in the active mode. If necessary possible EMD functionality may be switched off.’

- m) Add the following entries to Table 4:

‘Table 4 Door or Night Cover Opening Time Related to the Cooler Total Capacity

Sl No.	Cooler Door/Opening Capacity	Required Open Door/Night Curtain Open Time
		min
(1)	(2)	(3)
i)	Greater than 360 PET bottles	11
ii)	240-360 PET bottles	06
iii)	180-240 PET bottles	04
iv)	60-180 PET bottles	03
v)	Less than 60 PET bottles	02’

- n) Substitute the following for the existing in para 1 and para 2 of Clause **6.3.11.3.6**:

‘The test shall be performed at climate class CC2. Fig. 26 and Fig. 27 present the test procedure for cooling with or without EMD.

For commercial beverage cooler fitted with Energy Management Device (EMD), under stable condition and at test room climate class CC2 (*see 6.3.2.3, Table 3*), the EMD test shall be performed.’

Explanation: Considering the climatic condition in India and also to align the temperature conditions with other refrigeration appliances, CC2 conditions have been chosen for energy consumption test.

- p) Substitute the following for the existing in para 3 of Clause **C.2**:

‘ C_c is the climate class factor:

- a) For CC1 (25 °C/60 percent RH) beverage coolers;
- b) 1.05 for CC2 (32 °C/65 percent RH) beverage coolers; and
- c) 1.05 for CC3 (40 °C/75 percent RH) beverage coolers.’

- q) Add the following marking clause after Clause **7.3**:

‘7.4 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.’

- r) Add the following two new annexes after Annex G:

‘ANNEX H
(*Normative*)

500 ml PET BOTTLE INDICATIVE DIAGRAM FOR SHAPE AND SIZE

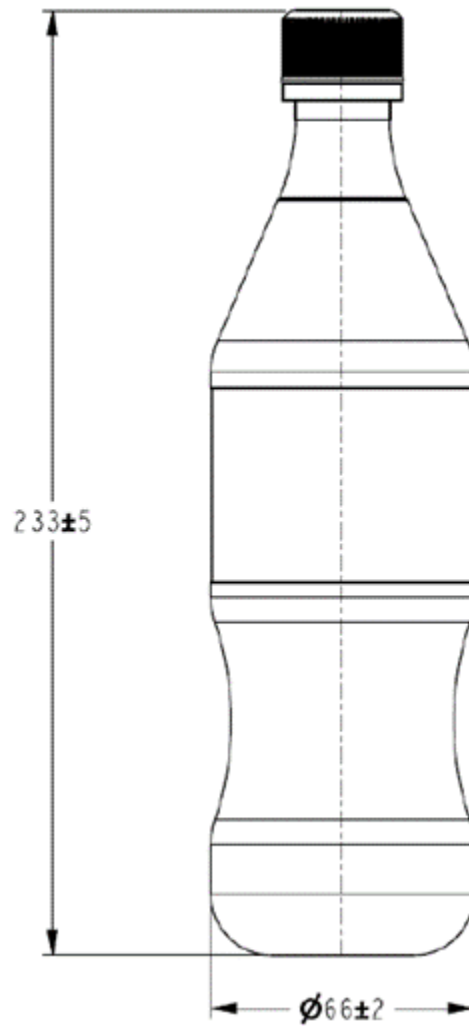


Figure H.1 – 500ml Beverage PET Plastic Bottle Tolerance on Liquid Quantity: ± 3 percent

ANNEX J
(Normative)

500 ml PET LOADING AND THERMOCOUPLE PLACEMENT

J-1 PROCEDURE

J-1.1 Installing the Shelves

J-1.1.1 To determine the maximum load capacity of the cooler, review the Section 6.2 before completing this Section.

- a) PET bottle is the standard package (*see* Annex H for bottle size and shape) for testing of commercial beverage coolers;

- b) Request an additional shelf if the cooler can accommodate a top shelf with horizontally positioned PET bottles;
- c) Regardless of the number of shelves shipped with the unit, use only the number of shelves you need to simulate the maximum loading of the unit;
- d) Do not use gravity feed shelves for standard evaluations; and
- e) Do not load bottles directly on floor of cooler. Do not place the shelf on the floor of the unit unless the shelving is designed to do so.

J-1.1.2 The cooler is to be loaded with PET bottles in an upright position. make every attempt to maximize the number of shelves.

J-1.1.3 In the event the cooler is manufactured with molded shelf brackets, evenly spacing the shelves may be difficult. In this case, locate the shelves as close to evenly spaced as possible.

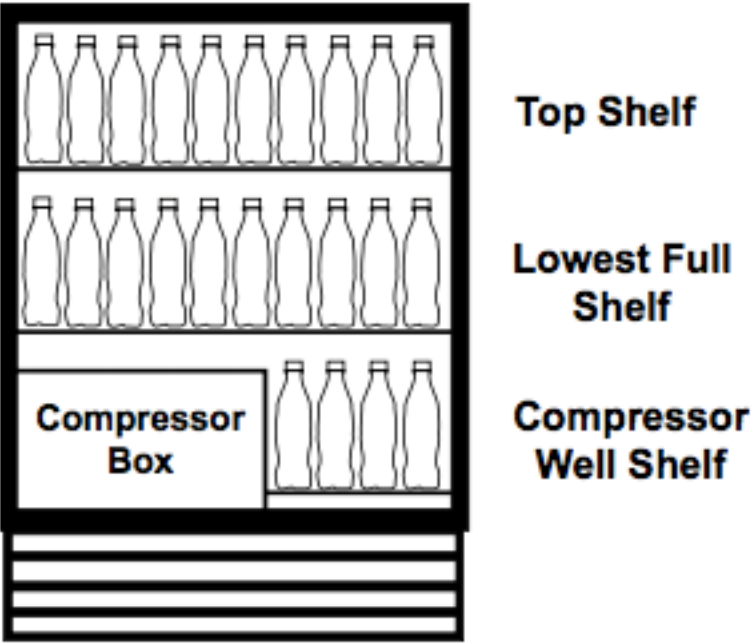
J-1.1.4 Measure the gap from the top of the package to the lowest portion of the next higher shelf to make sure the shelves are evenly spaced.

J-1.2 Loading

J-1.2.1 This section describes the general specifications and procedures for loading the bottles.

J-1.2.2 *See* the appropriate section (for example, single-door, double-door or triple-door) following this section to determine the location and number of test packages for each type of commercial beverage cooler.

- a) PET bottles must be loaded into the cabinet in a vertical position and done, so without twisting or rotating the bottles. If the top shelf cannot accommodate upright standing bottles due to lack of height, then the bottles on the top shelf can be placed onto their side in a horizontal position with the cap facing outward to the front door.
- b) Place bottles side-by-side on the shelves. Do not stagger or force the bottles into position.
- c) In the event the cooler is designed with some obstruction in the lower part of the cabinet (for example, evaporator or compressor housing), position the lower shelves, so that the PET bottles can be placed in an upright position. This may mean positioning a shelf higher than the top of the housing.
- d) When there is a single shelf beside a compressor well, position the higher shelf with enough space for PET bottle clearance. *See* the following illustration.



NOTE — Vertical or horizontal stacking of PET bottles is not allowed.

Figure J.1 — Illustration of PET Bottles Stacking

J-1.2.3 See the following illustration. For PET bottle loading, do not place an upper layer of bottles atop a lower layer.

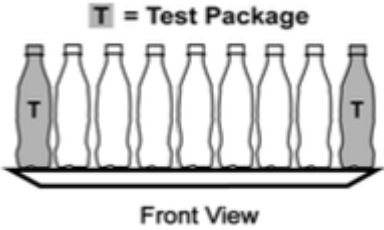


Figure J.2 — PET Bottle Loading Front View

J-1.2.4 For PET bottle loading, test packages are only to be vertically-standing bottles. Horizontally positioned PET bottles cannot be used as temperature probe test packages.

J-1.2.5 Place packages on the shelves. Do not allow packages to overhang the front edges of the shelves.

J-1.2.6 If the manufactures shelves are not equipped with rear product stops, push the packages back against the rear cabinet liner.

J-1.2.7 Beginning with the bottom shelf, completely load the shelf starting on the left side, in the rear of the cabinet. Load the packages as far back as the shelving allows.

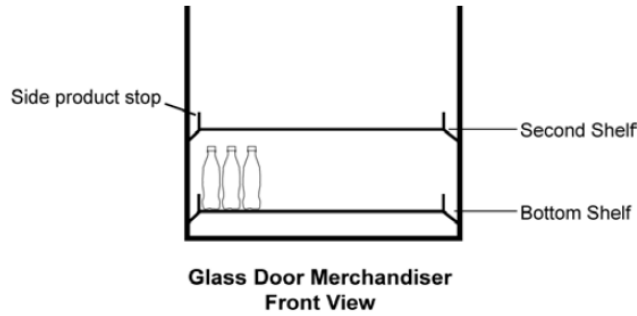


Figure J.3 — Glass Door Merchandiser Front View

J-1.2.8 Place the next shelf at the minimum necessary height to accommodate insertion and removal of PET bottles without twisting or rotating. On the next shelf, begin loading on the right side, in the rear of the cabinet. Load the packages as far back as the shelving allows.

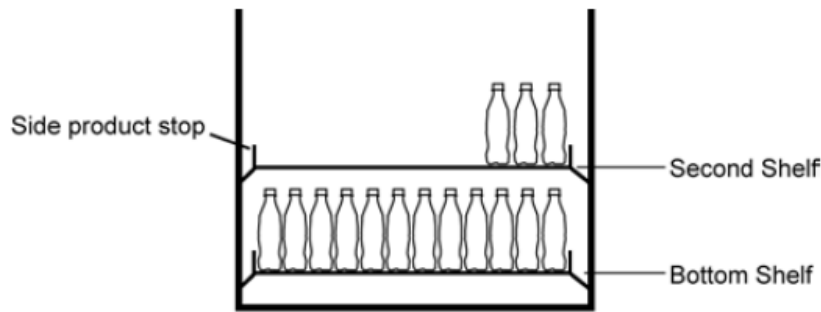


Figure J.4

J-1.2.9 Continue loading the cooler repeating the previous two steps until the cabinet is fully loaded.

J-1.2.10 If the very topmost shelf cannot have PET bottles standing upright on their base, then the bottles are to be placed lying down on their side with the cap facing outward to the front of the cooler. Place only a single layer of PET bottles on the top shelf in this fashion. If the cooler depth allows it, bottles can be placed two bottles deep.

J-1.2.11 Route the temperature sensor wires out of the cabinet through the side (between door frame and cabinet) versus the bottom. Further, every attempt must be made not to violate the integrity of the cooler door's seal. If manufacturer allows small hole can be made in cabinet to pass the sensor wires.

J-1.3 Single-Door Commercial Beverage Cooler Loading

J-1.3.1 For single door coolers, load each shelf (starting with the bottom shelf), with 4 test packages.

J-1.3.2 Place one test package at each corner. Refer to the following illustration:

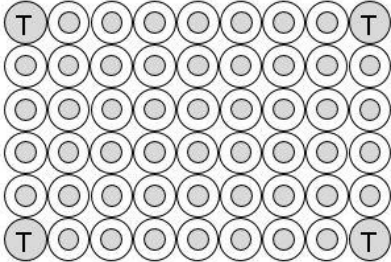


Figure J.5

J-1.4 Double-Door Commercial Beverage Cooler Loading

J-1.4.1 For double door coolers, load each shelf (starting from the bottom shelf) with six (6) packages. *See* the following illustration:

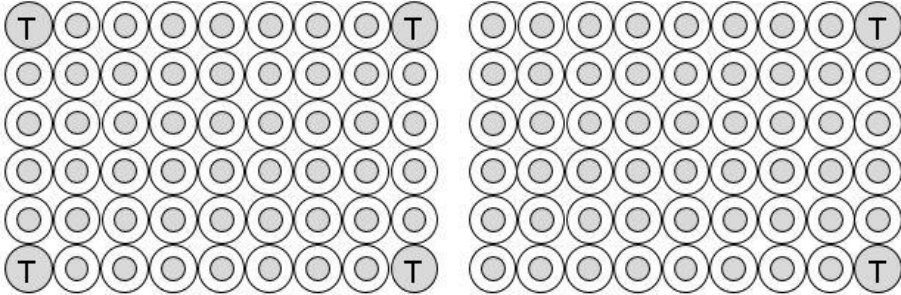


Figure J.6 — Commercial Beverage Cooler: Double-Door Merchandiser Bottom Shelf Top View

J-1.4.2 Load the second shelf form the bottom and alternate the location of the centre test packages. *See* the following illustration:

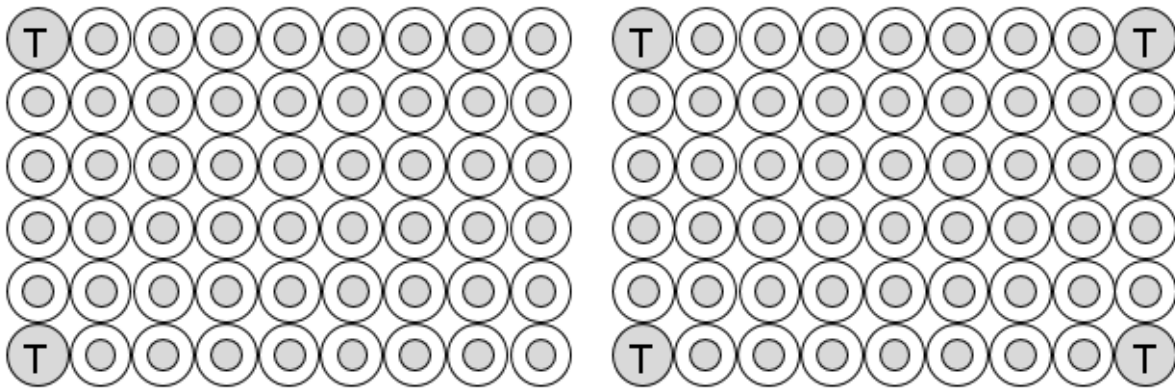


Figure J.7 — Commercial Beverage Cooler: Double-Door Merchandiser Second and Fourth Shelf Top View

J-1.4.3 Continue to alternate the location of the test packages as you load the Cooler from the bottom.

J-1.5 Triple-Door Commercial Beverage Cooler Loading

J-1.5.1 For Triple Door Coolers, load each shelf (starting from the bottom shelf) with eight (8) packages. *See* the following illustration:

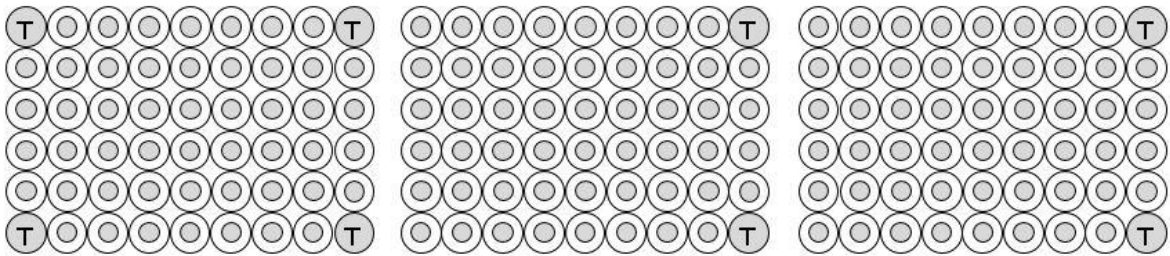


Figure J.8 — Commercial Beverage Cooler: Triple-Door Merchandiser Bottom Shelf Top View

J-1.5.2 Load the second shelf from the bottom and alternate the location of the centre test packages. *See* the following illustration:

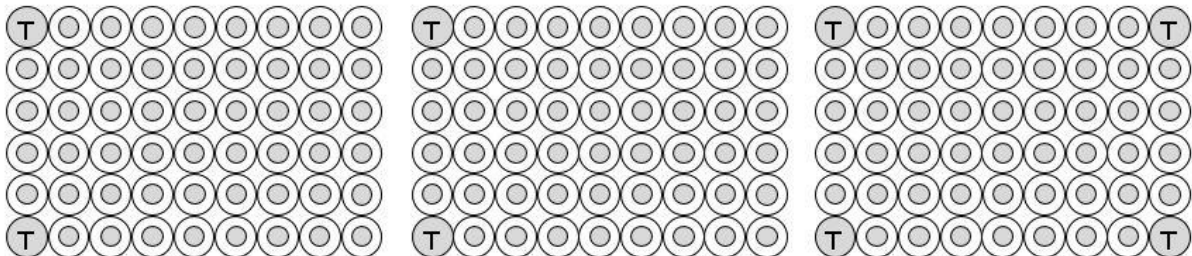


Figure J.9

J-1.5.3 Continue to alternate the location of the test packages as you load the cooler from the bottom.'