भारतीय मानक

***Indian Standard***

**रेफ्रिजरेटेड डिस्प्ले कैबिनेट**

**भाग 2 वर्गीकरण, आवश्यकताएँ और परीक्षण शर्तें**

**(ISO 23953-2 : 2015, संशोधित)**

*( पहला पुनरीक्षण )*

**Refrigerated Display Cabinets**

**Part 2 Classification, Requirements and Test Conditions**

**(****ISO 23953-2 : 2015, MOD)**

*( First Revision)*

ICS 27.080; 27.200

© BIS 2024

© ISO 2015

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

[www.bis.gov.in](http://www.bis.org.in) [www.standardsbis.in](http://www.standardsbis.in)

**August 2024 Price Group X**

Refrigeration and Air Conditioning Sectional Committee, MED 03

NATIONAL FOREWORD

This Indian Standard (Part 2) which is modified adoption of ISO 23953-2 : 2015 ‘Refrigerated Display Cabinets — Part 2 Classification, requirements and test conditions’ issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on recommendation of the Refrigeration and Air Conditioning Sectional Committee and approval of the Mechanical Engineering Division council.

This standard was first published in 2017 as IS 16672 (Part 2) : 2017/ISO 23953-2 : 2015 ‘Refrigerated display cabinets Part 2 Classification, requirements and test conditions’. The first revision of this standard has been contemplated to bring it line with ISO 23953-2 : 2015 incorporating the national deviation taking into account the Indian conditions.

After the publication of this standard, IS 1474 : 1959 ‘Specification for commercial refrigerators’ shall be treated as withdrawn.

Under the general title ‘Refrigerated display cabinets’, the standard is in two parts, other part in this series is as follows:

Part 1 Vocabulary

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:

1. Wherever the words ‘International Standard’ appears referring to this standard, they should be read as ‘Indian Standard’; and
2. 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 Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

| *International Standard* | *Corresponding Indian Standard* | *Degree of Equivalence* |
| --- | --- | --- |
| ISO 817 Refrigerants — Designation and safety classification | IS 16656 : 2017/ISO 817 : 2014 Refrigerants — Designation and safety classifications | Identical |
| ISO 5149-2 : 2014 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 |
| ISO 23953-1 : 2015 Refrigerated display cabinets — Part 1: Vocabulary | IS 16672 (Part 1) : 2017/ISO 23953-1 : 2015 Refrigerated display cabinets Part 1 Vocabulary | Identical |
| IEC 60335-1 Household and similar electrical appliances — Safety — Part 1: General requirements | IS 302 (Part 1) : 2008 Safety of household and similar electrical appliances: Part 1 General requirements (*sixth revision*) | Technically Equivalent |
| IEC 60335-2-89 Household and similar electrical appliances — Safety — Part 2-89 : Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or 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 (modifications) to the ISO standard. The deviations are given in National Annex E.

While formulating this National Annex E, the following standard has also been reviewed:

ANSI AHAM HRF-1 : 2004 Energy, performance and capacity of household refrigerators, refrigerator-freezers and freezers.

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.

**NATIONAL ANNEX E**

*(Foreword)*

**LISTS OF TECHNICAL DEVIATIONS**

**E-1** The text of the International Standard ISO 23953-2 : 2015 has been approved for publication as Indian Standard with agreed modifications as indicated below.

|  |  |  |
| --- | --- | --- |
| *Sl No.* | *Clause/Sub-clause* | *Modification* |
|  | **1** | Add the following to the existing clause at the end:  ‘Following are excluded from the scope of this standard:   1. Products falling under IS 7872; 2. Combined appliance (freezer plus cooler); 3. Appliances which are designed for medical applications; and 4. Appliances other than mains operated appliances.   NOTE ― The appliances covered under this standard are not intended for cooling down (pull-down) but are intended for maintaining the intended product temperature.’ |
|  | **2** | Add the following to the list of references:  ‘IS 7872 : 2020 Deep freezers — Specification (*second revision*)’. |
|  | **4.1.1.1**, a) | Add the following to the existing at the end:  ‘Compliance shall be checked by the test as per **21.102** of IS/IEC 60335-2-89.’ |
|  | **4.1.1.3**, para 2 | Substitute the following for the existing:  ‘Any condensate or defrost water receptacle, or group of receptacles, requiring to be emptied manually shall have a capacity equivalent to at least 48 h of normal operation as defined in **3.1.9** of IS/IEC 60335-2-89) in the appropriate climate class for which the cabinet is intended.’ |
|  | **4.1.1.4** | Add the following at the end of last para:  ‘The transparent doors and lids should be subjected to water vapor condensation test as per **4.2.4** and **5.3.4**. The acceptance criteria are condensation code ‘F’ or better as defined in **5.3.4**.’ |
|  | **4.2.6** | Add the following new sub-clause after **4.2.6**:  ‘**4.3** Safety requirements shall be met through compliance of IS/IEC 60335-2-89.’ |
|  | **5.2.2** | Add the following new sub-clause to the existing at the end:  ‘**5.2.3 Net Volume**  The net volume (*V*n) shall be calculated as the sum of the individual volumes which is obtained as follows.  — For shelves: by multiplying each refrigerated shelf area by the distance from the top of the shelf up to 10 mm from the next shelf top surface. For the top shelf the volume shall be obtained multiplying the refrigerated shelf area by the distance up to the load limit.  — For horizontal cabinets: by multiplying each bottom basket area by the distance from internal bottom of the basket up to 10 mm from the next top surface. For the top basket the volume shall be obtained multiplying the bottom basket area by the distance up to the load limit.  — For horizontal cabinets without baskets: by multiplying internal floor area by the distance from internal floor up to load line. Each individual volume above a shelf is the vertical projection of the refrigerated shelf area.  Each of the individual volumes shall be expressed in litres, to one decimal place. The net volume shall be rounded to one decimal place.  The net volume shall be calculated by summing-up all individual volumes.  The volume of constructional shelf support protuberances shall be excluded from the volume calculation (*see* Figure 1). Compartment(s) of a combined refrigerated cabinet that are not foreseen for storage are not subjected to calculation of net volume:  C:\Users\TNMD\Downloads\a-1-1.JPG  C:\Users\TNMD\Downloads\a-1-2.JPG  C:\Users\TNMD\Downloads\a-1-3.JPG  C:\Users\TNMD\Downloads\a-1-4.JPG    Fig. 1’ |
|  | **5.3.1.1**, para 1, first sentence | Substitute the following for the existing:  ‘The test room shall be a parallelepiped space in which two of the opposite side walls, referred to as the discharge technical side wall and the return technical side wall, are designed to create an even, horizontal or vertical air flow within the test room.’ |
|  | **5.3.1.1**, last para | Substitute the following for the existing:  The walls, ceilings and any partitions of rooms intended for the testing of refrigerated display cabinets shall be so painted that the emissivity is between 0.9 and 1 at 25 °C. |
|  | **5.3.1.2**, para 4 | Substitute the following for the existing:  ‘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 not exceed beyond 0.25 m/s.’ |
|  | **6.3.6** | Add the following new clauses after **6.3.6**:  ‘**6.4 Type Test**  The tests specified below shall constitute the type tests and shall be carried out on a sample selected preferably at random from regular production or from the finished stock. Before commencement of the tests, the sample shall be visually examined and inspected of components, parts and their assembly, constructions, mechanical hazards, marking provision of suitable terminals for supply connections, earthing, and the screws effectiveness and connection. The external surface finish shall be even and free from finishing defects.  The following tests shall constitute the type tests:   1. Seal test of doors and lids (*see* **6.2.1**); 2. Linear dimensions, areas and volumes (*see* **6.2.2**); 3. Test for absence of odour and taste (*see* **6.2.3**); 4. Temperature test (*see* **6.3.3**); 5. Water vapour condensation test (*see* **6.3.4**); 6. Electrical energy consumption test (*see* **6.3.5**); and 7. Heat extraction rate measurement when the condensing unit is remote from the cabinet (*see* **6.3.6**).   **6.5 Routine Test**  Each unit shall be subjected to the routine tests at the manufacturer’s works. The following shall constitute as a routine test as per IS 302-1:   1. Earth continuity test (*see* **A-1**); and 2. Electric strength (*see* **A-2**).’ |
|  | **7.2, (c)** | Delete the existing and renumber the subsequent Sl No. |
|  | **7.2** | Add the following to the existing at the end:  ‘f) Country of manufacture.’ |
|  | **7.3, (c), (12)** | Add the following to the existing at the end:  ‘13) A description of the cabinet’s internal fittings (if any).’ |
|  | **7.3** | Add the following new clause after **7.3**:  ‘**7.4 BIS Certification Marking**  The product 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 may be marked with the Standard Mark.’ |