

<b>STN</b>	<b>Distribučný chladiaci nábytok Časť 2: Triedenie, požiadavky a skúšobné podmienky (ISO 23953-2: 2023)</b>	<b>STN EN ISO 23953-2</b>  14 2741
------------	---	--

Refrigerated display cabinets - Part 2: Classification, requirements and test conditions (ISO 23953-2:2023)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/24

Obsahuje: EN ISO 23953-2:2023, ISO 23953-2:2023

Oznámením tejto normy sa ruší  
STN EN ISO 23953-2 (14 2741) z mája 2016

**138410**

---

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2024  
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii  
v znení neskorších predpisov.

EUROPEAN STANDARD

**EN ISO 23953-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2023

ICS 97.130.20

Supersedes EN ISO 23953-2:2015

English Version

**Refrigerated display cabinets - Part 2: Classification,  
requirements and test conditions (ISO 23953-2:2023)**Meubles frigorifiques de vente - Partie 2: Classification,  
exigences et méthodes d'essai (ISO 23953-2:2023)Verkaufskühlmöbel - Teil 2: Klassifizierung,  
Anforderungen und Prüfbedingungen (ISO 23953-  
2:2023)

This European Standard was approved by CEN on 25 September 2023.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 24 January 2024.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN ISO 23953-2:2023 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>
<b>Annex ZA (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2019/2024 OJEU L 315/313 aimed to be covered.....</b>	<b>4</b>
<b>Annex ZB (informative) 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 .....</b>	<b>6</b>

## **European foreword**

This document (EN ISO 23953-2:2023) 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 June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 23953-2:2015.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For the relationship with EU Directive(s) / Regulation(s), see informative Annex ZA and ZB, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## **Endorsement notice**

The text of ISO 23953-2:2023 has been approved by CEN as EN ISO 23953-2:2023 without any modification.

## EN ISO 23953-2:2023 (E)

## Annex ZA (informative)

### Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2019/2024 OJEU L 315/313 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/582 C(2022) 2764 final to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) No 2019/2024 of 1<sup>st</sup> October 2019 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for refrigerating appliances with a direct sales function OJEU L 315/313 5<sup>th</sup> December 2019 keeping into account the amending Commission Regulation (EU) 2021/341 of 23 February 2021 OJEU L 68/108.

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 2019/2024 of 01 October 2019 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for refrigerating appliances with a direct sales function OJEU L 315/313 5<sup>th</sup> December 2019 and Commission's standardisation request M/582 C(2022) 2764 final**

Ecodesign Requirements of Regulation (EU) No 2019/2024 OJEU L 315/313 5 <sup>th</sup> December 2019	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Article 4.3. (b)	Annex D.3, D.4, D.5, D.6, D.7, D.8	Calculation methods
Annex III 1	Annex D.2	General condition for the test. See below for loading height references
	5.3.3.3.2 a); b); c)	
	5.3.3.3.2 (d) i.	Loading of vertical closed freezer shall be half loading
	5.3.3.3.2 (d) ii.	Loading of vertical closed chilled cabinet shall be full loading
Annex III 2	<u>5.1, 5.2.1, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.6, 5.3.7, Annex A and Annex D</u>	Energy consumption and Annex A for $S_{TDA}$ calculation. $E_{daily}$ is equivalent to $E_{TEC}$ ; TDA is equivalent to $S_{TDA}$ .
Annex III Table 4	Table E.1	M and N coefficients

**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.

## EN ISO 23953-2:2023 (E)

## Annex ZB (informative)

### 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

This European Standard has been prepared under a Commission's standardization request M/582 C(2022) 2764 final to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 2019/2018 of 11<sup>th</sup> March 2019 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of refrigerating appliances with a direct sales function OJEU L 315/155 5<sup>th</sup> December 2019 keeping into account the amending Commission Regulation (EU) 2021/340 of 17 December 2020 OJEU L 68/108.

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 ZB.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 2019/2018 of 11<sup>th</sup> March 2019 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of refrigerating appliances with a direct sales function OJEU L 315/155 5<sup>th</sup> December 2019 and Commission's standardisation request M/582 C(2022) 2764 final**

Energy labelling requirements of Regulation (EU) No 2019/2018 OJEU L 315/155 5 <sup>th</sup> December 2019	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex III 1.2 item ,vi	<u>5.1, 5.2.1, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.6, 5.3.7</u> and Annex D	Testing methods , efficiency calculation $E_{\text{daily}}$ is equivalent to $E_{\text{TEC}}$ , see line below for Annex IV 2 b.
Annex III 1.2 items vii and ix	Annex A	$S_{\text{TDA}}$ calculation TDA is equivalent to $S_{\text{TDA}}$ . See line below for Annex IV 2.c).4.d) (TDA)
Annex III 1.2 items viii and x	5.3.4	Classification according to temperature
Annex IV 1	Annex D.2	General condition for the test
Annex IV 2	<u>5.1, 5.2.1, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.6, 5.3.7</u> , Annex A and Annex D	Energy consumption and Annex A for $S_{\text{TDA}}$ calculation
	5.3.3.3.2 a); b); c)	

	5.3.3.3.2 (d) i.	Loading of vertical closed freezer shall be half loading
	5.3.3.3.2 (d) ii.	Loading of vertical closed chilled cabinet shall be full loading
Annex IV 2 b	<u>5.1, 5.2.1, 5.2.3, 5.3.1, 5.3.2, 5.3.3, 5.3.4, 5.3.6, 5.3.7</u> and Annex D	$E_{\text{daily}}$ is equivalent to $E_{\text{TEC}}$ .
Annex IV 2.c).4.d) (TDA)	Annex A	$S_{\text{TDA}}$ calculation TDA is equivalent to $S_{\text{TDA}}$ .
Annex IV Table 3	Table E.1	M and N coefficients

**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.



# INTERNATIONAL STANDARD

# ISO 23953-2

Third edition  
2023-11

---

---

## Refrigerated display cabinets — Part 2: Classification, requirements and test conditions

*Meubles frigorifiques de vente —*

*Partie 2: Classification, exigences et méthodes d'essai*



Reference number  
ISO 23953-2:2023(E)

© ISO 2023

**ISO 23953-2:2023(E)****COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions, symbols and abbreviated terms</b> .....	<b>1</b>
3.1 Terms and definitions.....	1
3.2 Symbols.....	2
3.2.1 General.....	2
3.2.2 Compression-type refrigeration systems.....	3
3.2.3 Indirect refrigeration-type systems.....	4
<b>4 Requirements</b> .....	<b>4</b>
4.1 Construction.....	4
4.1.1 General.....	4
4.1.2 Materials.....	5
4.1.3 Thermal insulation.....	6
4.1.4 Refrigerating system.....	6
4.1.5 Electrical components.....	6
4.1.6 Temperature display.....	7
4.2 Operating characteristics.....	8
4.2.1 Absence of odour and taste.....	8
4.2.2 Classification according to temperature.....	8
4.2.3 Defrosting.....	8
4.2.4 Water vapour condensation.....	9
4.2.5 Energy consumption.....	9
4.2.6 Specific energy consumption.....	9
<b>5 Tests</b> .....	<b>9</b>
5.1 General.....	9
5.2 Tests outside test room.....	10
5.2.1 General.....	10
5.2.2 Seal test for doors and lids on low temperature applications.....	10
5.2.3 Linear dimensions, areas.....	10
5.3 Tests inside test room.....	10
5.3.1 General.....	10
5.3.2 General conditions.....	10
5.3.3 Preparation of test cabinet and general test procedures.....	21
5.3.4 Temperature test.....	48
5.3.5 Water vapour condensation test.....	56
5.3.6 Electrical energy consumption test.....	57
5.3.7 Heat extraction rate measurement when condensing unit is remote from cabinet.....	59
<b>6 Test report</b> .....	<b>68</b>
6.1 General.....	68
6.2 Tests outside test room.....	68
6.2.1 Seal test of doors and lids.....	68
6.2.2 Linear dimensions, areas and volumes.....	68
6.2.3 Test for absence of odour and taste.....	69
6.3 Tests inside test room.....	69
6.3.1 General test conditions.....	69
6.3.2 Cabinet preparation.....	69
6.3.3 Temperature test.....	70
6.3.4 Water vapour condensation test.....	70
6.3.5 Electrical energy consumption test.....	71

**ISO 23953-2:2023(E)**

6.3.6	Heat extraction rate measurement when the condensing unit is remote from the cabinet.....	71
<b>7</b>	<b>Marking</b> .....	<b>73</b>
7.1	Load limit.....	73
7.2	Marking plate.....	75
7.3	Information to be supplied by the manufacturer.....	75
<b>Annex A</b>	<b>(normative) Total display area (<math>S_{TDA}</math>)</b> .....	<b>77</b>
<b>Annex B</b>	<b>(informative) Comparison between laboratory and in-store conditions</b> .....	<b>90</b>
<b>Annex C</b>	<b>(informative) Test for absence of odour and taste</b> .....	<b>92</b>
<b>Annex D</b>	<b>(normative) Performance and energy rating of commercial refrigerated display cabinets</b> .....	<b>94</b>
<b>Annex E</b>	<b>(normative) M and N coefficient values</b> .....	<b>107</b>

## 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 document 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)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*, 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 third edition cancels and replaces the second edition (ISO 23953-2:2015), which has been technically revised.

The main changes are as follows:

- revision of:
  - the scope has been revised as this document not applicable to commercial beverage coolers covered by ISO 22044 and ice cream freezers covered by ISO 22043;
  - mass flow with EEV only, to adapt standard to technological improvement;
  - $E_{CPEC,24h}$  also for brine / indirect cooling;
  - testing repeatability;
  - requirements for refrigerant with glide;
- addition of:
  - extrapolation methods for liquid cooled condensing units, depth, height, length and plug-in alternative components;
  - liquid cooled condensing unit (semi plug-in) type;

**ISO 23953-2:2023(E)**

- $S_{TDA}$  for new types of cabinets;
- standard rating conditions and configurations;
- marking, load limits, multiple loading line for different M-package temperature.

A list of all parts in the ISO 23953 series can be found on the ISO website.

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).

# Refrigerated display cabinets —

## Part 2: Classification, requirements and test conditions

### 1 Scope

This document specifies requirements for the performance of refrigerated display cabinets used in the sale and display of foodstuffs and construction characteristics impacting performance. It specifies test conditions and methods for checking that the requirements have been satisfied, as well as classification of the cabinets, their marking and the list of their characteristics to be declared by the manufacturer.

This document is not applicable to refrigerated vending machines, commercial beverage coolers covered by ISO 22044, ice cream freezers covered by ISO 22043. It is also not applicable to cabinets intended for storage or cabinets intended for use, for instance, in catering or non-retail refrigerated applications.

This document does not cover health and safety aspects and ergonomic principles.

This document is not intended to specify storage temperature for foodstuff.

### 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*

ISO 23953-1:2023, *Refrigerated display cabinets — Part 1: Vocabulary*

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*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**