

JÄÄTISEKÜLMIKUD. KLASSIFIKATSIOON, NÕUDED JA
KATSETINGIMUSED

Ice-cream freezers - Classification, requirements and
test conditions

ESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16901:2016 sisaldab Euroopa standardi EN 16901:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 16901:2016 consists of the English text of the European standard EN 16901:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.12.2016.	Date of Availability of the European standard is 14.12.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 97.040.30

Standardite reproduutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16901

December 2016

ICS 97.040.30

English Version

Ice-cream freezers - Classification, requirements and test
conditions

Congélateurs pour crèmes glacées - Classification,
exigences et conditions d'essai

Speiseeis-Gefriermaschinen - Klassifikation,
Anforderungen und Prüfbedingungen

This European Standard was approved by CEN on 9 October 2016.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

	Page
Contents	Page
European foreword.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	6
3.1 General.....	6
3.2 Parts of ice-cream freezers.....	6
3.3 Physical aspects and dimensions	7
3.4 Definitions relating to performance characteristics.....	8
3.5 Definitions related to test environment.....	8
4 Symbols.....	9
5 Classification and requirements.....	9
5.1 Classification.....	9
Table 1 — Classification according to temperature	9
5.2 Requirements	10
5.2.1 Construction.....	10
5.2.2 Materials.....	10
5.2.3 Refrigerating system.....	11
5.2.4 Electrical components	11
5.2.5 Operating characteristics.....	12
6 Tests.....	13
6.1 General.....	13
Table 2 — Test summary.....	13
6.2 Tests outside test room.....	13
6.2.1 General.....	13
6.2.2 Seal test for lids.....	13
6.2.3 Test on durability of lid.....	14
Figure 1 — Durability of lid	14
6.2.4 Linear dimensions, areas and volumes.....	14
6.3 Tests inside test room	15
6.3.1 General.....	15
6.3.2 Test room conditions.....	15
Table 3 — Test room climate classes	16
6.3.3 Test packages and life-time	16
Table 4 — Dimensions and mass of test packages	17
Figure 2 — Thermal characteristics of test packages	18
Table 5 — Temperature and specific enthalpy of test packages.....	19
Table 6 — Temperature and increase in specific enthalpy of test packages.....	19
Figure 3 — M-Package	20
Table 7 — Temperature and specific enthalpy of filler packages	21
Table 8 — Temperature and increase in specific enthalpy of filler packages	21

Figure 4 — Thermal characteristics of filler packages.....	22
6.3.4 Instruments, measuring equipment and measuring expanded measurement uncertainty.....	22
6.3.5 Preparation of test ice cream freezer.....	22
Figure 5 — Ice cream location within the test room.....	23
Figure 6 — Condensing air with test room air flow, or across, but not opposed the test room air flow.....	24
Figure 7 — Air movement.....	25
Figure 8 — Climate measuring point for ice cream freezer.....	25
Figure 9 — Glass lid ice cream freezer with flat base deck with and without tubes laid at the base.....	27
Figure 10 — Glass lid ice cream freezer with stepped base deck with and without tubes laid at the base.....	28
Figure 11 — Tests on ice cream freezers with lights or without lights.....	29
6.3.6 Test on ice cream freezers.....	30
Figure 12 — Relevant temperature curve of M-packages.....	31
Figure 13 — Arithmetic mean temperature of M-packages	32
Figure 14 — Condensation code	33
Table 9 — Temperature rise time conditions for C1	34
7 Test report	34
7.1 Tests outside test room	34
Table 10 — Linear dimensions, areas and volumes.....	35
7.2 Tests inside test room	35
Table 11 — Conditions for tests inside test room	35
Table 12 — Ice cream freezer preparation for tests inside test room.....	35
Table 13 — Temperature test for tests inside test room	36
Table 14 — Water vapour condensation test	36
Table 15 — Electrical energy consumption test	36
Table 16 — Specific energy consumption	37
8 Marking	37
8.1 Load limit.....	37
Figure 15 — Load limit markings.....	37
Figure 16 — Dimensions of load limit line	37
Figure 17 — Different positions for the load limit.....	38
8.2 Marking plate	38
8.3 Information to be supplied by the manufacturer	38
Annex A (informative) Ice-cream freezer families	40
Table A.1 — Ice cream freezer families	40
Annex B (normative) Net volume calculation.....	41
Annex C (normative) Equivalent volume calculation	42

Annex D (normative) TDA calculation	43
D.1 General.....	43
D.2 Calculation of TDA	43
Figure D.1 — Horizontal, open, wall-site and island cabinets.....	44
Figure D.2 — Horizontal, open, island cabinets	45
Annex E (informative) Test for absence of odour and taste	46
E.1 Preparation and testing.....	46
E.1.1 Ambient temperature.....	46
E.1.2 Cleaning.....	46
E.1.3 Thermostat setting.....	46
E.1.4 Samples.....	46
E.1.5 Test period.....	46
E.2 Examination of samples.....	47
E.2.1 Conditions.....	47
E.2.2 Evaluation.....	47
Annex F (normative) Performance and energy rating of ice cream freezers	48
F.1 Scope.....	48
F.2 Standard rating conditions for ice cream freezers	48
F.3 Specific energy consumption (SEC) for ice cream freezers.....	48
Annex ZA (informative) Relationship between this European Standard and the ecodesign requirements of Commission Draft Ecodesign Regulation DG ENER LOT12 aimed to be covered.....	49
Table ZA.1 — Correspondence between this European Standard and Commission Draft Ecodesign Regulation DG ENER LOT12 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for refrigerated commercial display cabinets and Commission's standardization request 'M/495'	49
Bibliography.....	50

European foreword

This document (EN 16901:2016) has been prepared by 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 2017, and conflicting national standards shall be withdrawn at the latest by June 2017.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2009/125/EC.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

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

1 Scope

The scope of this European Standard is to define the classification for horizontal closed ice-cream freezers with access of the product from the top and to specify their requirements and test methods. These appliances are different to supermarket segment freezers, as they work with static air cooling, with a skin evaporator (no evaporator fan) and are used specifically for the storage and display of pre-packed ice-cream. This standard is only applicable to integral type refrigeration systems. This standard is not applicable to remote and secondary system type cabinets. Ice-cream freezers within this standard should have a net volume $\leq 600 \text{ l}$ and only for transparent lid ice cream freezers they should have a net volume/TDA $\geq 0,35 \text{ m}^3$.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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)*

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*

3 Terms and definitions

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

3.1 General

3.1.1

ice cream freezer

horizontal closed refrigerated cabinets intended to store and/or display and sell pre-packed ice cream where access by the consumer to the pre-packed ice cream is gained by opening a lid (solid or transparent) from the top

Note 1 to entry: See Annex A for the designation of the ice cream freezer family.

3.2 Parts of ice-cream freezers

3.2.1

condensing unit

combination of one or more compressors, condensers and liquid receivers (when required) and the regularly furnished accessories

3.2.2

night cover

top cover permanently integrated into the ice-cream freezer used to reduce the heat ingress (e.g. by infrared radiation or convection) during the period when there are no sales