



SLOVENSKI STANDARD

oSIST prEN 16878:2015

01-september-2015

Stroji za predelavo hrane - Kombinirani stroji in serije zamrzovalnikov - Varnostne in higienske zahteve

Food processing machinery - Combined machines and batch freezers - Safety and hygiene requirements

Nahrungsmittelmaschinen - Kombi-Geräte und Eismixgefriergeräte - Sicherheits- und Hygieneanforderungen

Machines pour les produits alimentaires - Machines combinées et turbines à glace - Prescriptions relatives à la sécurité et l'hygiène

Ta slovenski standard je istoveten z: prEN 16878

SIST EN 16878:2018

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>

ICS:

27.200	Hladilna tehnologija	Refrigerating technology
67.260	Tovarne in oprema za živilsko industrijo	Plants and equipment for the food industry

oSIST prEN 16878:2015

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16878

June 2015

ICS 67.100.40; 67.260

English Version

Food processing machinery - Combined machines and batch freezers - Safety and hygiene requirements

Nahrungsmittelmaschinen - Kombi-Geräte und
Eismixgefriergeräte - Sicherheits- und
Hygieneanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 153.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

[SIST EN 16878:2018](https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018)

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>



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

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

Contents

Page

Foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions and description of machines	8
3.1 Terms and definitions	8
3.2 Description of machines	9
3.2.1 Combined machines.....	9
3.2.2 Batch freezers	10
4 List of significant hazards	11
4.1 General.....	11
4.2 Mechanical hazards	11
4.2.1 General.....	11
4.2.2 Combined machines.....	12
4.2.3 Batch freezers	13
4.3 Electrical hazards	14
4.4 Thermal hazards	14
4.5 Hazards generated by noise	14
4.6 Hazard generated by neglecting ergonomic principles.....	14
4.7 Hazard generated by neglecting hygienic design principles	14
4.8 Hazards generated by loss of stability or tipping	14
5 Safety and hygiene requirements and/or protective measures	15
5.1 General.....	15
5.2 Mechanical hazards	15
5.2.1 Elimination of hazards by design.....	15
5.2.2 Zone 1 – Access to trapping points between the tank and the machinery’s lid	15
5.2.3 Zone 2 – Access to the rotating devices through the feed opening	15
5.2.4 Zone 3 – Access to the rotating parts through the draw-off opening	15
5.2.5 Zone 4 – Access to the transmission mechanism of the mixing device.....	16
5.2.6 Zone 5 – Loss of stability of machine – access to areas adjacent to the machine	16
5.3 Electrical hazards	17
5.3.1 General.....	17
5.3.2 Safety requirements relating to electromagnetic phenomena.....	17
5.3.3 Protection against electric shock	17
5.3.4 Power circuits	17
5.3.5 Earth faults	17
5.3.6 Emergency stop.....	17
5.3.7 Degrees of protection of external enclosures of electrical equipment (see EN 60529)	17
5.3.8 Start function.....	17
5.3.9 Unexpected start-up	17
5.3.10 Motor enclosures	18
5.3.11 Electrical requirements of controls	18
5.4 Thermal hazards	18
5.5 Noise control	18
5.6 Ergonomic design principles	18
5.7 Hygiene requirements	18
5.7.1 General.....	18
5.7.2 Food area.....	18

5.7.3	Splash area	19
5.7.4	Non-food area	19
5.7.5	Refrigeration	19
5.8	Harmful substance	21
6	Verification of safety and hygiene requirements and/or protective measures	21
7	Information of use	22
7.1	General	22
7.2	Instruction handbook	22
7.3	Service manual	24
7.4	Cleaning	24
7.5	Marking	24
Annex A (normative) Noise test code (Grade 2 of accuracy)		25
A.1	Terms and definitions	25
A.2	Installation and mounting conditions	25
A.3	Operating conditions	25
A.4	Emission sound pressure level determination	25
A.5	Measurement uncertainties	26
A.6	Information to be recorded	26
A.7	Information to be reported	26
A.8	Declaration and verification of noise emission values	26
Annex B (normative) Principles of design to ensure the cleanability of the machinery		27
B.1	Terms and definitions	27
B.2	Material of construction	27
B.2.1	Type of materials	27
B.2.2	Surface conditions	27
B.3	Design	28
B.3.1	Connection of internal surfaces	28
B.3.1.1	General	28
B.3.1.2	Connections of internal surfaces for food area	28
B.3.1.3	Connections of internal surfaces for splash area	31
B.3.1.4	Connections of internal surfaces for non-food area	32
B.3.2	Surface assemblies and overlaps	32
B.3.2.1	General	32
B.3.2.2	Surface assemblies and overlaps for food area	33
B.3.2.2.1	Surface assembly	33
B.3.2.2.2	Surface overlapping	33
B.3.2.3	Surface assemblies and overlaps for splash area	35
B.3.2.4	Surface assemblies and overlaps for non-food area	36
B.3.3	Fasteners	37
B.3.3.1	Fasteners for food area	37
B.3.3.1.1	General	37

prEN 16878:2015 (E)

B.3.3.1.2	Spot-facing.....	37
B.3.3.1.3	Pin drive systems.....	37
B.3.3.2	Fasteners for splash area	37
B.3.3.3	Fasteners for non-food area	38
B.3.4	Feet, support and bases for cleaning the machines underneath	38
B.3.4.1	Table-top machines	38
B.3.4.2	Machines on the floor.....	40
B.3.4.2.1	Fixed machines with or without a base	40
B.3.4.2.2	Mobile machines	41
B.3.5	Ventilation openings	42
B.3.5.1	Ventilation openings for non-food area	42
B.3.5.2	Ventilation openings for splash area.....	42
B.3.6	Hinges	42
B.3.7	Control panel.....	43
B.3.7.1	Control panel in the non-food area	43
B.3.7.2	Control panel in the splash area	43
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC		45
Bibliography		46

iTeh Standards
<https://standards.iteh.ai>
 Document Preview

[SIST EN 16878:2018](https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018)

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>

Foreword

This document (prEN 16878:2015) has been prepared by Technical Committee CEN/TC 153 “Machinery intended for use with foodstuffs and feed”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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 2006/42/EC.

For relationship with EU Directive 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

iTeh Standards (<https://standards.iteh.ai>) Document Preview

[SIST EN 16878:2018](https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018)

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>

prEN 16878:2015 (E)

Introduction

This European Standard is a type-C-standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type-C-standard are different from those which are stated in type-A- or –B-standards, the provisions of this type-C-standard take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of this type-C-standard.

Complementary to the hygiene requirements common to all food processing machines, specific requirements for cleanability and sanitation of the machines in the scope are formulated.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[SIST EN 16878:2018](https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018)

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>

1 Scope

This European Standard applies to machines of handling and delivery of ice cream mixes, pasty liquid products for gelato, pastry, chocolate and food processing, as described in Clause 3.

The standard applies to fixed and movable machinery (not designed to be moved during operation), with a rated capacity of not more than 100 L.

This European Standard deals with all significant hazards, hazardous situations and events relevant to the machinery, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard deals with the hazards which can arise during transport, assembly, commissioning, operation, cleaning, use, maintenance, decommissioning, dismantling, disabling and scrapping of the machine.

This European Standard covers the following types of machines:

- combined machines (pasteurizers and batch freezer);
- batch freezer.

This European Standard does not apply to equipment feeding and dosing, equipment, supply of inert gas and heating and cooling equipment and any extraction (container, extraction belt etc.).

This European Standard is not applicable to machines which are manufactured before the date of publication of this European Standard by CEN.

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 349:1993+A1:2008, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1672-2:2005+A1:2009, *Food processing machinery — Basic concepts — Part 2: Hygiene requirements*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

prEN 16878:2015 (E)

EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871)*

EN ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201)*

EN ISO 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1)*

EN ISO 13732-3, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces (ISO 13732-3)*

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

3 Terms and definitions and description of machines

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1.1

tank lid

mobile guard used to close the tank which contains the mixing device

3.1.2

mixing device

suitable device to ensure mixing and circulation of the mixture

3.1.3

draw-off device

suitable device to allow the extraction of the finished product

3.1.4

tank

part of the machinery suitable to contain the mixture during the work cycle

3.1.5**compression type machines**

machines where the cooling is performed by means of a refrigerant liquid at low pressure in a heat exchanger (evaporator), the steam thus formed becoming a liquid by a mechanical compression higher pressure and cooling in another heat exchanger (condenser)

3.1.6**condenser**

heat exchanger in which after compression, the vaporized refrigerant is liquefied, giving off heat to external cooling system

3.1.7**evaporator**

heat exchanger in which, after the reduction of pressure, the refrigerant is vaporized by absorbing heat from the medium which shall be cooled

3.1.8**heating and freezing devices**

device suitable to the heating and/or freezing food mixtures

3.2 Description of machines**3.2.1 Combined machines**

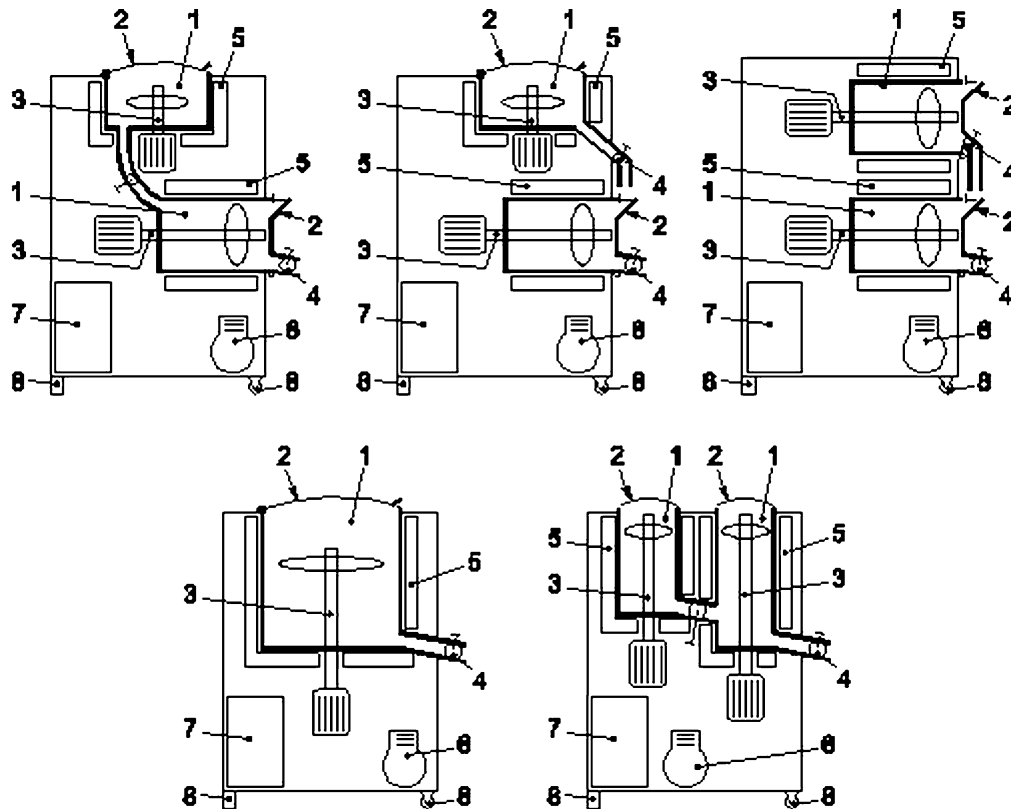
The machines covered by this standard are designed to pasteurize and freezing batches of liquid pasty, whose main ingredients are generally milk and its derivatives.

When the tank of pasteurization and freezing is in the load phase, the machine receives the ingredients weighed or measured. This operation is controlled by the operator of the machine.

The machine pasteurizes and freezes the ingredients during a period of time defined by a user cycle. At the end of the cycle of pasteurization and freezing, the product is downloaded through a draw-off device. The machine can be operated manually or fully automatically. The single tank or double tank can be heated or cooled. Figure 1 illustrates a typical machine combined with the following main elements:

[SIST EN 16878:2018](https://standards.iteh.ai/SIST/EN/16878/2018)

<https://standards.iteh.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>



Key

- 1 tank
- 2 cover of flange
- 3 agitation device
- 4 extraction device
- 5 heating or freezing device
- 6 compressor
- 7 condensing unit
- 8 wheels or feet

iTeh Standards
<https://standards.itih.ai>
 Document Preview

SIST EN 16878:2018

<https://standards.itih.ai/catalog/standards/sist/7a5b15d6-1a40-46ac-9b67-7c012a606da9/sist-en-16878-2018>

Figure 1 — Typical layout of combined machines

3.2.2 Batch freezers

Batch freezers perform only the operations of freezing of the liquid mixture, not providing the opportunity to pasteurize the product.