SLOVENSKI STANDARD
oSIST prEN 13732:2019

01-november-2019

Stroji za predelavo hrane - Hladilniki za shranjevanje namolzenega mleka - Zahteve za zmogljivost, varnost in higieno

Food processing machinery - Bulk milk coolers on farms - Requirements for performance, safety and hygiene

Nahrungsmittelmaschinen - Behältermilchkühlanlagen für Milcherzeugerbetriebe - Anforderungen an Leistung, Sicherheit und Hygiene

Machines pour les produits alimentaires - Refroidisseurs de lait en vrac à la ferme - Prescriptions pour les performances, la sécurité et l'hygiène

Ta slovenski standard je istoveten z: **prEN 13732**

ICS:

65.040.10	Poslopja, naprave in oprema za živino	Livestock buildings, installations and equipment
67.260	Tovarne in oprema za živilsko industrijo	Plants and equipment for the food industry

oSIST prEN 13732:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT prEN 13732

September 2019

ICS 65.040.10; 67.260

Will supersede EN 13732:2013

English Version

Food processing machinery - Bulk milk coolers on farms - Requirements for performance, safety and hygiene

Machines pour les produits alimentaires - Refroidisseurs de lait en vrac à la ferme - Prescriptions pour les performances, la sécurité et l'hygiène

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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.

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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.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. prEN 13732:2019 E

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European foreword

This document (prEN 13732:2019) 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 will supersede EN 13732:2013.

The main changes compared to the previous edition are the following:

a) continuous system of milking added in the scope;

b) updating of normative references;

c) specification of stainless steel equivalence;

d) new informative annex regarding estimation and measurement of energy consumption;

e) technical and editorial modifications.

Introduction

This document is a type-C-standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and 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.

1 Scope

1.1 This document specifies requirements for design, performance, safety and hygiene of refrigerated bulk milk coolers and the related methods of test.

NOTE The informative Annex J gives some elements regarding the estimation and calculation of energy consumption.

This document deals with all significant hazards, hazardous situations and events relevant to bulk milk coolers on farm, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

It applies to refrigerated bulk milk tanks with air-cooled condensing units and automatic control intended for installation on farms or at milk collection points. It applies to tanks for two milkings (24 h), four milkings (48 h) and six milkings (72 h), in which the cooling takes place totally (non-pre-cooled milk) or partially (in case of pre-cooled milk) within the tank. It also applies to tanks in combination with a continuous system of milking (e.g. milking with robot).

1.2 This document does not cover:

— mobile tanks;

— tanks intended to be tilted for drainage;

— equipment for delivering the milk to the tank;

— equipment for pre-cooling of the milk;

— the hazards due to the use of other energy than electrical energy;

— pressure aspect of vacuum tanks (i.e. tanks where the inner part of the vessel is designed to operate at a pressure below atmospheric pressure).

1.3 Noise is not considered to be a significant hazard, but relevant for bulk milk coolers. This document therefore includes information in 7.1 and in Annex A concerning the manufacturer's declaration of the noise emission level of the cooler.

1.4 This document does not cover the calibration requirements for the tank to be used as a system for payment purpose.

1.5 This document is not applicable to bulk milk coolers on farm which are manufactured before the date of its publication as EN.

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.

EN 378-1:2016, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and selection criteria*

EN 378-2:2016, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation*

EN 378-3:2016, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site and personal protection*

EN 378-4:2016, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 4: Operation, maintenance, repair and recovery*

EN 1005-3:2002+A1:2008, *Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation*

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

EN 10088-2:2014, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

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

EN 60335-1:2012, *Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1:2010, modified)*

EN 60335-2-34:2013, *Household and similar electrical appliances - Safety - Part 2-34: Particular requirements for motor-compressors (IEC 60335-2-34:2010)*

EN 60529:1991,[1)] *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61310-1:2008, *Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2008)*

EN ISO 1211:2010, *Milk - Determination of fat content - Gravimetric method (Reference method) (ISO 1211:2010)*

EN ISO 3651-2:1998, *Determination of resistance to intergranular corrosion of stainless steels - Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels - Corrosion test in media containing sulfuric acid (ISO 3651-2:1998)*

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 4288:1997, *Geometrical product specifications (GPS) - Surface texture: Profile method - Rules and procedures for the assessment of surface texture (ISO 4288:1996)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 11201:2010, *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 11201:2010)*

1) EN 60529:1991 is impacted by the amendments EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1991/A1:2000)* and by EN 60529:1991/A2:2013, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1991/A2:2013)*.

EN ISO 11202:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11463:2008, *Corrosion of metals and alloys - Evaluation of pitting corrosion (ISO 11463:1995)*

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

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2015, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2015)*

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

EN ISO 14122-2:2016, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2016)*

EN ISO 14122-3:2016, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

ISO 2852:1993, *Stainless steel clamp pipe couplings for the food industry*

ISO 2853:1993, *Stainless steel threaded couplings for the food industry*

ASTM G48:2015, *Standard test methods for pitting and crevice corrosion resistance of stainless steels and related alloys by use of ferric chloride solution*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 1672-2:2005+A1:2009 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
refrigerated bulk milk tank
equipment for refrigeration, and bulk storage of refrigerated raw milk freshly milked

Note 1 to entry: In the following referred to as “tank”.

Note 2 to entry: “milk freshly milked” is milk less than 2 h after being milked.

3.2
open tank
refrigerated bulk milk tank equipped with a lid which in the open position allows manual washing of the inner vessel

3.3
closed tank
refrigerated bulk milk tank equipped with automatic washing of the inner vessel

Note 1 to entry: A manhole is only used for maintenance.

3.4
pre-cooled milk
milk partially or completely cooled before entering the tank

3.5
automatic control
arrangement by which the equipment functions under normal operating conditions, without requiring action by the operator

3.6
atmospheric tank
tank in which the inner part of the vessel is designed to operate at atmospheric pressure

3.7
agitator
device to mix the milk to promote heat transfer and to ensure uniform distribution of butterfat

3.8
reference position
position specified by the manufacturer for correct installation and operation of the tank

3.9
maximum volume
V_m
volume to which the inner part of the vessel in its reference position and without agitation can be filled without overflowing (expressed in litres)

3.10
rated volume
V_r
volume of the maximum permissible filling of the tank under operating conditions as stated by the manufacturer (expressed in litres)

3.11
direct cooling system
cooling system in which the evaporator of the refrigerating system is in direct thermal contact with the milk or the inner part of the vessel

3.12
indirect cooling system
cooling system in which the heat is transferred from the milk to the refrigerant through a cooling medium

3.13
batch filling tank
tank intended to be filled by a number of milkings

3.14
ice bank tank
tank with an indirect integrated cooling system in which the cooling medium is water and ice is built on the evaporator

3.15
milking
a batch of milk (or test water) which is added to the tank and cooled in a specific cooling time

3.16
tank for two milkings
tank intended for cooling and storing milk where the milk is added in two batches each with a volume equal to 50 % of the tank's rated capacity

3.17
tank for four milkings
tank intended for cooling and storing milk where the milk is added in four batches each with a volume equal to 25 % of the tank's rated capacity

3.18
tank for six milkings
tank intended for cooling and storing milk where the milk is added in six batches each with a volume equal to 16,7 % of the tank's rated capacity

3.19
operating conditions
state during which the tank is in use for the cooling and storage of milk in accordance with its design requirements and all accessories are functioning effectively

3.20
ambient atmosphere
atmosphere surrounding the tank and in front of the air-cooled condenser of the refrigerating system

3.21
mean temperature
calculated average of the different temperatures (in Celsius degrees) of a medium (air, test water, milk) measured at different measuring points, at the same time

3.22
ambient temperature
mean temperature of the ambient atmosphere (in Celsius degrees)

Note 1 to entry: See B.3.

3.23
performance temperature
PT
ambient temperature (in Celsius degrees) to be used when measuring the milk cooling time

3.24
safe operating temperature
SOT
highest limit of the range of ambient temperatures (in Celsius degrees) at which the equipment is required to function

3.25
initial temperature
IT
mean temperature (in Celsius degrees) of the milk to be cooled at the time of the commencement of the cooling test

3.26
storage temperature
mean temperature (in Celsius degrees) to which the milk to be cooled is reduced for storage

3.27
cooling time
time (in hours) required to cool a milking from initial temperature to + 4 °C

3.28
cooling cycle
period between two successive milk collections

Note 1 to entry: For tanks for two milkings the cooling cycle is 24 h. For tanks for four milkings the cooling cycle is 48 h. For tanks for six milkings the cooling cycle is 72 h.

3.29
specific energy consumption
energy consumption in watt-hours per litre of cooled milk, measured as the mean consumption of all components (excluding cleaning) during a cooling test under the test conditions appropriate to the performance class

Note 1 to entry: The specific energy consumption can be also estimated as indicated in the informative Annex J.

3.30
milk
bovine mammary secretion without either addition thereto or extraction therefrom, untreated and not standardised, complying with Code of Principles concerning milk and milk products, international standards and standard methods of sampling and analysis for milk products of the Joint FAO/WHO Food Standards Programme

3.31
water
water, suitable for human consumption, meeting the requirements specified in the EU-Directive 80/778/EEC

3.32
test water
TW
water used for test purpose in place of milk

Note 1 to entry: The cooling time for water is nearly the same as that for milk.

3.33
filling
volume of the milk (or *TW*) in the tank

3.34
temperature of the milk (or *TW*)
mean temperature of the milk (or *TW*) at a particular moment

Note 1 to entry: See D.1.5.

3.35
compact and plug-in tank
tank where the condensing unit(s) is (are) mounted on the tank which leave(s) the manufacturer in a fully working condition

3.36
tank for continuous flow
tank designed for cooling milk when added continuously at a rate of x litres per hour where x is expressed in steps of 25 l/h

3.37
minimum and maximum flow
minimum and maximum average milk flow rates (expressed inl/h) at which a tank for continuous flow is designed to operate

3.38
minimum cooling volume
minimum quantity or flow rate at which the tank can operate without formation of ice:

— two milkings tanks: $V_r \times 0{,}2$;

— four milkings tanks: $V_r \times 0{,}1$;

— six milkings tanks: $V_r \times 0{,}067$;

— continuous flow tank: according to the minimum flow given by the manufacturer