



# SLOVENSKI STANDARD

## SIST EN 13732:2013

01-november-2013

Nadomešča:

SIST EN 13732:2003+A2:2009

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### 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 - Behälter-Milchkühlanlagen für Milcherzeugerbetriebe - Anforderungen für 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: EN 13732:2013**

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#### **ICS:**

65.040.20	Poslopja in naprave za predelavo in skladiščenje kmetijskih pridelkov	Buildings and installations for processing and storage of agricultural produce
67.260	Tovarne in oprema za živilsko industrijo	Plants and equipment for the food industry

**SIST EN 13732:2013**

**en,fr,de**

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EUROPEAN STANDARD

EN 13732

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2013

ICS 65.040.10; 67.260

Supersedes EN 13732:2002+A2:2009

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

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

This European Standard was approved by CEN on 7 June 2013.

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.

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**EN 13732:2013 (E)****Foreword**

This document (EN 13732:2013) 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 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 January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

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

This document supersedes EN 13732:2002+A2:2009.

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(s).

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

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

- a) specification of the scope:
- 1) pre-cooled milk is taken into account;
  - 2) other energy than electrical energy as well as the pressure aspect of vacuum tanks are excluded;
- b) updating of normative references; [SIST EN 13732:2013](https://standards.iteh.ai/catalog/standards/sist/8d203c2c-79ec-4811-9840-25e96c339b03/sist-en-13732-2013)
- c) specification of the electrical requirements (5.3 was revised and Annexes B and C were added);
- d) addition of subclause 7.2 "Warning signs";
- e) specification of the noise test code;
- f) editorial modifications.

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, 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.

## 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.

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**EN 13732:2013 (E)****1 Scope**

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

This standard deals with all significant hazards, hazardous situations and events relevant to bulk milk coolers on farms, 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 collecting 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.

Performance requirements in 5.5.1.2.1 and 5.5.1.2.2 do not apply to tanks in combination with instant cooling or in association with a continuous system of milking (e.g. milking with robot).

**1.2** This European Standard does not cover:

- mobile tanks;
- tanks intended to be tilted for drainage;
- equipment for delivering the milk to the tank;
- equipment for pre-cooling or instant cooling of the milk;
- the hazards due to the use of other energy than electrical energy;
- pressure aspect of vacuum tanks.

**1.3** Noise is not considered to be a significant hazard, but a relevant one for bulk milk coolers. This standard 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 standard does not cover the calibration requirements for the tank to be used as a system for payment purpose.

**1.5** This standard is not applicable to bulk milk coolers on farms which are manufactured before the date of its publication as an EN.



## 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 378-1:2008+A2:2012, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

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

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

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

EN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1088, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

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

EN 10088-2:2005, *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 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)*

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

EN 60529:1991,<sup>1)</sup> *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

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

EN ISO 1211, *Milk — Determination of fat content — Gravimetric method (Reference method) (ISO 1211)*

EN ISO 3744, *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)*

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

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

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<sup>1)</sup> EN 60529:1991 is impacted by EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1991/A1:2000)*.

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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)*

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

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

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

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

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

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**3 Terms and definitions**

[SIST EN 13732:2013](#)

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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.

- 3.1**  
**refrigerated bulk milk tank**  
equipment for refrigeration, and bulk storage of refrigerated raw milk freshly milked
- Note 1 to entry: Referred to as “Tank” throughout this document.
- 3.2**  
**open tank**  
refrigerated bulk milk tank equipped with a lid which allows in open position 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**  
**freshly milked**  
milk less than 2 h after being milked
- 3.5**  
**pre-cooled milk**  
milk partially cooled before entering the tank

**3.6****automatic control**

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

**3.7****atmospheric tank**

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

**3.8****vacuum tank**

tank of which the inner vessel is designed to operate at a pressure below atmospheric pressure

**3.9****agitator**

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

**3.10****reference position**

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

**3.11****maximum volume**

$V_m$

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

**3.12****rated volume**

$V_r$

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

**3.13****direct cooling system**

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

**3.14****indirect cooling system**

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

**3.15****ice bank tank**

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

**3.16****milking**

quantity of milk (or test water) which is equivalent to 50 % of the theoretical maximum daily milk production

**3.17****tank for two milkings**

tank intended to be emptied for milk collection each day and designed for cooling and storing its rated volume during 24 h

**EN 13732:2013 (E)****3.18****tank for four milkings**

tank intended to be emptied for milk collection every two days and designed for cooling and storing its rated volume during 48 h

**3.19****tank for six milkings**

tank intended to be emptied for milk collection every three days and designed for cooling and storing its rated volume during 72 h

**3.20****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

**3.21****ambient atmosphere**

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

**3.22****mean temperature**

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

**3.23****ambient temperature**

mean temperature of the ambient atmosphere (in degrees Celsius)

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Note 1 to entry: See B.3.

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**3.24****performance temperature****PT**

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

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**3.25****safe operating temperature****SOT**

highest limit of the range of ambient temperatures (in degrees Celsius) at which the equipment is required to function

**3.26****initial temperature****IT**

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

**3.27****storage temperature**

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

**3.28****cooling time**

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

**3.29****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.

**3.30****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

**3.31****milk**

bovine mammary secretion without either addition thereto or extraction therefrom, untreated and not standardized, 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

**3.32****water**

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

**3.33****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.

**3.34****filling**

volume of the milk (or TW) in the tank

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**3.35****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.

**3.36****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

## 4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk (see Table 1).

Table 1

Hazards (see EN ISO 12100)	Clause/subclause in this European Standard or in other standards
<b>Hazards, hazardous situations and hazardous events</b>	
<b>Mechanical hazards</b>	
Crushing: lid	5.2.1
Entanglement	5.2.2
Drawing-in: agitator, fan of the refrigerating system	5.2.2, 5.2.3
Trapping: enter in the tank	5.2.1
High pressure fluid ejection: Refrigerating system	5.2.3
<b>Electrical hazards due to:</b>	
Contact of persons with live parts (direct contact)	5.3
Contact of persons with parts which have become live under faulty conditions (indirect contact)	5.3
<b>Thermal hazards, resulting in:</b>	
Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme temperature: - Refrigerating system, cleaning hot water	5.2.3, 5.4, 5.8.1
<b>Hazards generated by materials and substances</b>	
Hazards from contact with or inhalation of harmful fluids, gases mists, fumes	5.4
Fire or explosion hazard	5.2.3
Biological or microbiological (viral or bacterial) hazards	5.5, 5.8.1, 5.8.2, 5.8.3, 5.8.4, 5.8.5, 5.8.6, 5.8.7 and 5.9
<b>Hazards generated by neglecting ergonomic principles in machinery design as, e.g. hazards from:</b>	
Unhealthy postures or excessive effort	5.6
<b>Unexpected start-up, unexpected overrun/overspeed (or any similar malfunction) from:</b>	
Failure/disorder of the control system	5.3, C.9
Restoration of energy supply after an interruption	5.7
<b>Errors of fitting</b>	7.5
<b>Loss of stability/overturning of machinery</b>	5.2.4
<b>Slip, trip and fall of persons (related to machinery)</b>	5.6

## 5 Safety requirements and/or protective measures — Performance

### 5.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for hazards relevant but not significant, which are not dealt with by this document.

### 5.2 Mechanical hazards

#### 5.2.1 Lids and covers

For open tanks, the open and closed positions of the lid shall be stable. The opening and closing operations shall require an intentional action.

Hinged lids of open tanks shall have a mean to keep them in the open position (e.g. spring, hook, bracket, etc.) or the centre of gravity of the lid shall be at least 15° over the balancing position.

For closed tanks having one or more manholes, the locking of the cover of this manhole(s) in the closed position shall require an intentional action. Furthermore, it shall be clearly and visibly marked, adjacent to the manhole(s), that (see also 7.2 and 7.3):

- before the closing of the cover, it shall be checked that nobody is in the vessel;
- before entering the tank, it shall be necessary to read the instruction handbook.

For reasons of hygiene, the design should avoid as much as possible the need to enter the tank.

#### 5.2.2 Agitators

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Access to the agitator attached to the lid of open tanks shall be safeguarded by interlocking the lid with the agitator movement according to EN 1088. When open the lid, the agitator shall stop within 2 s. The safety related parts of the control system shall comply at least with a performance level b in accordance with EN ISO 13849-1.

For agitators not attached to the lid (closed tanks), a warning sign close to the manhole(s) or inspection opening(s) shall warn for the possible automatic start of the agitator (see also Clause 7).

#### 5.2.3 Refrigerating system

The refrigerating system shall comply with EN 378-1 and EN 378-2.

#### 5.2.4 Stability

Tanks shall be stable independent of the level of filling. If not stable by itself, the manufacturer shall define the fixing mode.

Tanks with a mass of 75 kg or more when empty shall be so constructed that under normal operating conditions, it shall not tilt when subjected to an external horizontal force of 750 N applied in any direction at any accessible points, according to the test method given in Clause 6.

If the tank is equipped with a step or a platform, it shall not tilt when subjected to an external vertical force of 1 200 N applied on this step or platform.