
International Standard



5708

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Refrigerated bulk milk tanks

Refrigidisseurs de lait en vrac

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 5708 was developed by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, and was circulated to the member bodies in March 1981.

It has been approved by the member bodies of the following countries :

Austria	Ireland	South Africa, Rep. of
Belgium	Italy	Spain
Denmark	Korea, Rep. of	Sweden
Egypt, Arab Rep. of	Netherlands	United Kingdom
Finland	New Zealand	USSR
India	Portugal	
Iran	Romania	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
Czechoslovakia
France
Germany, F. R.

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Refrigerated bulk milk tanks

Section one : General

1 Scope

This International Standard specifies certain requirements for design, construction and performance of refrigerated bulk milk tanks and the related methods of test.

NOTE — Electrical safety regulations are not dealt with this International Standard.

2 Field of application

This International Standard applies to refrigerated bulk milk tanks with automatic control intended for fixed or mobile installation in farms or at milk collecting points. It only applies to tanks for two milkings (24 h) and four milkings (48 h).

3 References

ISO/R 468, *Surface roughness*.

ISO 683/13, *Heat-treated steels, alloy steels and freecutting steels — Part 13 : Wrought stainless steels*.

ISO/R 1662, *Refrigerating plants — Safety requirements*.

ISO 1992/2, *Commercial refrigerated cabinets — Methods of test — Part 2 : General test conditions*.

Code of principles concerning milk and milk products, International Standards and standard methods of sampling and analysis for milk products; Seventh edition 1973, Joint FAO/WHO Food Standards Programme, Codex Alimentarius Commission.

International Standard for drinking-water, Third edition 1971, World Health Organization, Geneva.

4 Definitions

For the purpose of this International Standard, the following definitions apply :

4.1 refrigerated bulk milk tank : Equipment for bulk refrigeration and bulk storage of refrigerated fresh raw milk.

4.2 automatic control : Arrangement by which the equipment functions, under normal operating conditions, without requiring action by the operator.

4.3 atmospheric tank : Tank of which the inner vessel is designed to operate at atmospheric pressure.

4.4 vacuum tank : Tank of which the inner vessel is designed to operate at a pressure below atmospheric pressure.

4.5 agitator : Device to mix the milk to promote heat transfer and to ensure uniform distribution of butterfat.

4.6 reference position : The position specified by the manufacturer for correct installation and operation of the tank.

4.7 maximum volume : Volume to which the inner vessel in its reference position and without agitation can be filled without overflowing.

4.8 rated volume : Volume of the maximum permissible filling of the tank stated by the manufacturer.

4.9 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.

4.10 indirect cooling system : Cooling system in which the heat is transferred from the milk to the refrigerant through a cooling medium.

4.11 ice bank tank : Tank with an indirect cooling system in which the cooling medium is water and ice is built on the evaporator.

4.12 milking : Quantity of milk which at one milking operation is added to the tank.

4.13 tank for two milkings : Tank intended to be emptied for milk collection each day and designed for cooling and storing its rated volume every 24 h.

4.14 tank for four milkings : Tank intended to be emptied for milk collection every two days and designed for cooling and storing its rated volume every 48 h.

4.15 normal 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.

4.16 ambient atmosphere : Atmosphere surrounding the tank and in front of the air-cooled condenser of the refrigerating plant.

4.17 ambient temperature : Mean temperature of the ambient atmosphere. [See 15.1.]

4.18 performance temperature (PT) : Ambient temperature to be used when measuring the milk cooling time.

4.19 safe operating temperature (SOT) : Higher limit of the range of ambient temperatures at which the equipment is required to function effectively.

4.20 initial temperature : Mean temperature of the milk to be cooled at the time of its entry into the tank.

4.21 storage temperature : Mean temperature to which the milk to be cooled is reduced for storage.

4.22 cooling time : Time required to cool a milking from the initial temperature to the storage temperature, including the period of entry into the tank.

4.23 cooling cycle : Period between two successive milk collections. For tanks for two milkings the cooling cycle is 24 h. For tanks for four milkings the cooling cycle is 48 h.

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

For the purpose of the methods of test, the following additional definitions also apply :

4.25 milk : Normal bovine mammary secretion obtained from one or more milkings 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.

4.26 water : Water, suitable for human consumption, meeting the requirements specified in *International standards for drinking-water* of the World Health Organization.

4.27 "milk" : Water used for test purpose in place of milk (the cooling time for water is nearly the same as that for milk).

4.28 "milking" : Volume of "milk" measured at a temperature of 4 °C which is fed into the tank in place of a milking.

4.29 filling : Volume of the milk (or "milk") in the tank measured at a temperature of 4 °C.

4.30 temperature of the milk (or "milk") : Mean temperature of the milk (or "milk") at a particular moment. [See 15.5.]

4.31 hot point of the milk (or "milk") : Maximum temperature of the milk (or "milk") at a given point during storage.

Section two : Requirements

5 Materials

The inner vessel and all attachments which are in, or may come into, contact with milk shall be manufactured from austenitic stainless steel or from a material approved by an appropriate official authority.

The grade of steel shall be of a quality at least equivalent to that of steel 11 in Part 13 of ISO 683, especially in regard to suitability for welding and resistance to corrosion. All joints shall be welded and ground and shall have a strength and corrosion resistance not less than that of the parent metal.

Stainless steel surfaces shall have a surface roughness $R_a < 1,0 \mu\text{m}$, where R_a is as defined in ISO/R 468.

Materials used for seals shall be fat-resistant, non-toxic, resistant to cleaning and disinfecting agents in normal conditions of dosage and temperature and shall not impart a taint to milk.

6 Construction

6.1 General

The tank and associated equipment shall be designed to provide sufficient mechanical strength to allow its transportation and handling and to give satisfactory and safe operation under normal conditions. It shall be so constructed as to prevent any contamination of the milk and any corrosion of the materials of construction and to enable cleaning, disinfection and inspection to be carried out without difficulty.

6.2 Inner vessel

The inner vessel shall be so designed that the rated volume is 90 to 95 % of the maximum volume (see clause 4).

All inside corners of the inner vessel which form an angle of less than 2,36 radians (135°) shall have radii not less than 25 mm (see figure 1). All other corners in the inner vessel shall have radii not less than 3 mm.

Every component which is permanently attached within the inner vessel shall be welded to it. The welds shall have radii not less than 6 mm and the angles shall be not less than 1,57 radians (90°). Any component not satisfying these requirements shall be capable of being removed.

If the tank is fitted with automatic or semi-automatic cleaning equipment, care shall be taken to ensure that all internal surfaces of the inner vessel will be cleaned effectively when the equipment is used in accordance with the manufacturer's instructions.

If the tank is equipped with a device for measuring the volume of milk by reference to linear measurements in accordance with the regulations of the relevant authorities, the inner vessel shall be so constructed and supported that it is rigid and free from deformation under normal conditions of transport and use.

6.3 Outer casing

The outer casing shall be rigid, shall prevent the ingress of water and shall be free draining.

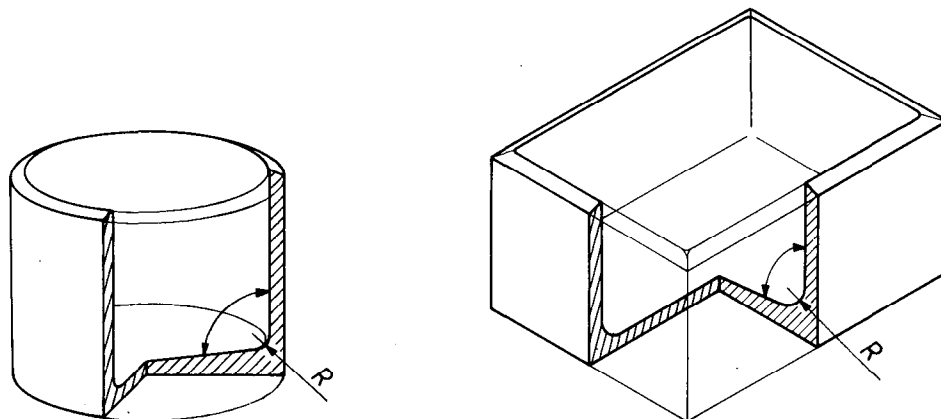


Figure 1 — Examples of inside corners less than 2,36 radians (135°) with radii R