

3-A[®] Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-11

*Standards Developing Organizations
3-A Sanitary Standards, Inc. (3-A SSI)
In Collaboration With
United States Public Health Service (USPHS)/
United States Food and Drug Administration (USFDA)
United States Department of Agriculture (USDA)
European Hygienic Engineering & Design Group (EHEDG)*

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Note: The highlighted text denotes changes to the previous document.

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Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Farm Milk Cooling and Holding Tanks. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

This 3-A Standard is for voluntary use by directly and materially affected organizations such as equipment and machinery fabricators, processors, regulatory agencies and by 3-A Sanitary Standards, Inc. to assure adequate public health protection exist for the devices and covered products. 3-A Sanitary Standards, Inc. use these documents as the source for sanitary criteria as part of 3-A Symbol authorization.

This 3-A Standard was developed jointly by 3-A Sanitary Standards, Inc. (3-A SSI), the United States Public Health Service (USPHS), United States Food and Drug Administration (USFDA), the United States Department of Agriculture – Dairy Programs (USDA), and the European Hygienic Engineering & Design Group (EHEDG).

It is our purpose to encourage inventive genius and provide a forum to discuss new developments. Suggestions for improvement and new technology are welcome any time for consideration by the 3-A Sanitary Standards Committees. Please forward comments to 3-A SSI, 6888 Elm Street, Suite 2D, McLean, VA 22101-3829 USA. By fax: 703-761-6284. By e-mail to: 3-ainfo@3-a.org.

A SCOPE

- A1 This standard covers the sanitary aspects of tanks in which bulk milk is cooled and stored on dairy farms.
- A2 Tanks made in conformance to these standards shall provide a means for cooling the milk.
- A3 The milk tank will consist of the following components: Lining, jacket and rail, personnel access openings and covers, outlet valve, vent, agitation, refrigeration, measuring device and internal solution piping.
- A3.1 Other components may include: external solution piping, cleaning controls, temperature indication thermometer, recording thermometer, and weather protective cover and sanitary seals for agitator.
- A4 In order to conform to these 3-A Sanitary Standards, farm milk cooling and holding tanks shall conform to the following design, material, fabrication, and cooling criteria.¹

B DEFINITIONS

- B1 *Product:* Shall mean milk.
- B2 *Farm Milk Cooling and Holding Tank:* Shall mean a vertical or horizontal cylindrical, rectangular, oval or other equally satisfactorily shaped tank.
- B3 **Surfaces**
- B3.1 *Product Contact Surfaces:* All surfaces which are exposed to the product and surfaces from which liquids may drain, drop, or be drawn into the product.
- B3.2 *Nonproduct Contact Surfaces:* All other exposed surfaces.
- B3.3 *Lining:* All surfaces used to contain the product, including the ends, sides, bottom, and top.
- B3.4 *Shell:* The material covering the exterior of the insulation and/or heat exchange jacket.
- B3.5 *Rail:* That portion of the metal used to join the lining to the shell.

- B3.6 *Bridge:* A cover on an open top type tank which is open on both sides and is permanently attached to the lining on opposite sides of the tank. It may be used to support a removable or nonremovable main cover(s) and accessories.

B4 Openings

- B4.1 *Outlet:* The opening in the lining and the passage for milk to the exterior of the tank. The outlet passage starts at the opening in the lining and terminates at the connection for the outlet valve.
- B4.2 *Inlet:* The opening that allows milk to enter the tank.
- B4.3 *Vent:* An opening into the tank for maintaining atmospheric pressure within a farm cooling and holding tank during filling, emptying and cleaning.
- B4.4 *Vent Cover:* A device for protecting the vent against entrance of contaminants into the tank.

B5 Cleaning

- B5.1 *Mechanical Cleaning or Mechanically Cleaned:* Soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment specifically designed for this purpose.
- B5.2 *Manual (COP) Cleaning:* Soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.
- B6 *Easily or Readily Removable:* Quickly separated from the equipment with the use of simple hand tools if necessary.
- B7 *Easily or Readily Accessible:* A location which can be safely reached by personnel from the floor, platform (fixed or movable), or other permanent work area.

¹ Use current revisions or editions of all referenced documents cited herein.

- B8 *Inspectable:* All product contact surfaces can be made available for close visual observation.
- B9 *Simple Hand Tools:* Implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.
- B10 *Nontoxic Materials:* Those substances which under the conditions of their use are in compliance with applicable requirements of the Food and Drug Administration.
- B11 *Corrosion Resistant:* The surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use, including expected contact with product and cleaning, sanitizing, or sterilization compounds or solutions.
- B12 *Sanitizing or Sanitization:* A process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 log₁₀ reductions (99.999%) to 7 log₁₀ reductions (99.99999%) by applying accumulated hot water, hot air, or steam, or by applying an EPA-registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.
- B13 *Sanitary Seal:* A device which prevents migration of contaminants into the tank through the annular or circular space at an opening in the tank lining.
- B14 *Sanitary Shield:* An umbrella, drip shield, cover, deflector, or arrangement of multiple components which directs fluids away from the opening in the lining of the tank and prevents the entrance of dust, oil, insects, and other contaminants into a space where they may drip, drain, drop, or be drawn into or onto any product contact surface.
- B15 *Weatherproof Shield:* A device which prevents the entrance of contaminants where they may drip, drain, drop, or be drawn into or onto any product contact surface of a sanitary seal.

C MATERIALS

C1 Metals

- C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series², (except 301 and 302) or corresponding Alloy Cast Institute (ACI) types³ (See Appendix, Section F.), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent. The metal used for the lining shall not be less than 18 U.S. standard gauge thickness or 0.0480 in. (1.22 mm) thick.

C2 Nonmetals

- C2.1 Rubber and rubber-like materials may be used for slingers, drip shields, O-rings, seals, gaskets, and parts having the same functional purpose or for protective caps for sanitary tubing, fittings or vents.
- C2.1.1 Rubber and rubber-like materials when used for the above-specified applications shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials, Number 18-.
- C2.2 Plastic materials may be used for slingers, sanitary shields, O-rings, seals, gaskets, sight and/or light openings, spray devices, direct reading gauge tubes, weatherproof shields, and parts having the same functional purpose or for protective caps for sanitary tubing, fittings or vents.
- C2.2.1 Plastic materials when used for the above-specified applications shall conform to the applicable provisions of 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-.
- C2.3 Glass may be used in sight and/or light openings and as direct reading gauge tubes, and when used, shall be of a clear, heat-resistant type.

² The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086.

³ Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

C3 Nonproduct Contact Surfaces

- C3.1 Nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. Nonproduct contact surfaces shall be relatively nonabsorbent, durable and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D FABRICATION**D1 Surface Texture**

- D1.1 All product contact surfaces shall have a texture at least as smooth as a 32 μ in. (0.8 μ m) R_a finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section G.) except that:

- D1.1.1 The measuring rod of an immersion type measuring device may have a 2B finish free of imperfections such as pits, folds, and crevices to facilitate reading.

D2 Permanent Joints

- D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded.
- D2.2 Welded areas of product contact surfaces shall be at least as smooth as a No. 4 ground-finish [32 μ in. (0.8 μ m)] R_a finish on stainless steel sheets and which are free of imperfections such as pits, folds, and crevices.

D3 Cleaning and Inspectability

- D3.1 Farm milk cooling and holding tanks that are to be mechanically cleaned shall be designed so that the product contact surfaces of the farm milk cooling and holding tanks and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.
- D3.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D4 Draining

- D4.1 Product contact surfaces shall be self-draining except for normal adherence.
- D4.2 The lining shall be so constructed that it will not sag, buckle, or become distorted in normal use.
- D4.3 When the tank is level or when it is in the position in which it was calibrated, or when it is in position to be calibrated, the bottom shall slope to the outlet to effect complete drainage.
- D4.4 The bottom of the lining shall have a slope of not less than 1.00 in. in 100 in. (10.0 mm per m) except that:
- D4.4.1 If the tank is designed for mechanical cleaning, the bottom of the lining shall slope (1) at least $\frac{1}{4}$ in. per ft (21.0 mm per m) toward the outlet in a horizontal tank, or (2) at least $\frac{3}{4}$ in. per ft (63.0 mm per m) toward the outlet in a vertical tank.

D5 Gaskets

- D5.1 Gaskets shall be removable. Any gasket groove or gasket retaining groove shall not exceed $\frac{1}{4}$ in. (6.35 mm) in depth or be less than $\frac{1}{4}$ in. (6.35 mm) wide except those for standard O-rings smaller than $\frac{1}{4}$ in. (6.35 mm).
- D5.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D6 Radii

- D6.1 All internal angles of less than 135° on product contact surfaces shall have minimum radii of $\frac{1}{4}$ in. (6.35 mm), except that:
- D6.1.1 Minimum radii where head(s) and the side wall(s) of tanks join shall not be less than $\frac{3}{4}$ in. (19.1 mm).
- D6.1.2 Minimum radii for fillets of welds in product contact surfaces may be $\frac{1}{8}$ in. (3.18 mm) where the thickness of one or both parts joined is less than $\frac{3}{16}$ in. (4.76 mm).