

3-A Sanitary Standards for Stainless Steel Automotive Transportation Tanks for Bulk Delivery and Farm Pick-Up Service, Number 05-15

Formulated by
International Association of Food Industry Suppliers (IAFIS)
International Association for Food Protection (IAFP)
United States Public Health Service (USPHS)
The Dairy Industry Committee (DIC)
United States Department of Agriculture – Dairy Programs (USDA)

It is the purpose of the IAFIS, IAFP, USPHS, DIC, and USDA in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Milk transportation tank specifications heretofore or hereafter developed which so differ in design, materials, and fabrication or otherwise as not to conform to the following standards but which, in the fabricator's opinion, are equivalent or better, may be submitted for the joint consideration of the IAFIS, IAFP, USPHS, DIC, and USDA at any time. The 3-A Sanitary Standards and 3-A Accepted Practices provide hygienic criteria applicable to equipment and systems used to produce, process and package milk, milk products and other perishable foods or comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A SCOPE

A1 These standards cover the sanitary aspects of automotive transportation tanks for milk, fluid milk products, and other liquid comestible products.

A2 In order to conform to these 3-A Sanitary Standards, transportation tanks shall comply with the following design, material and fabrication criteria.¹

B DEFINITIONS

B1 *Bulk Transportation Tank*: Shall mean an over the road truck or trailer tank used to transport milk, fluid milk products or other liquid comestible products. It may have more than one compartment.

B2 *Farm Pick-Up or Multiple Pick-Up and Delivery Tank*: Shall mean a bulk transportation tank as defined in B1 with transfer attachments and facilities, including a pump and/or hose cabinet, as specified herein.

B3 *Product*: Shall mean the milk, fluid milk product or other liquid comestible product transported in the tank.

B4 Surfaces

B4.1 *Product Contact Surfaces*: Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop or be drawn into the product.

B4.2 *Nonproduct Contact Surfaces*: Shall mean all other exposed surfaces.

B5 Cleaning

B5.1 *Mechanical Cleaning or Mechanically Cleaned*: Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the

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

surfaces to be cleaned by mechanical means in equipment or by systems specifically designed for this purpose.

- B5.2 *Manual (COP) Cleaning:* Shall mean 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 *Product Outlet:* Shall mean the opening in the lining of a tank or a compartment and the outlet passage for product to the exterior of the tank or compartment. The outlet passage starts at the opening in the lining and terminates at the connection for the outlet valve.
- B7 *Pump and/or Hose Cabinet:* Shall mean a cabinet used to house the pump and/or transfer hose and may also house a compartment for product sample trays and samples.
- B8 *Deck Plate:* Shall mean the personnel access port dust cover seat or that part of the outer jacket on which the cover rests.
- B9 *Soil:* Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.
- B10 *Sanitizing or Sanitization:* Shall mean 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.
- B11 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
- B12 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by personnel from the floor, platform, or other permanent work area.

B13 *Inspectable:* Shall mean all product contact surfaces can be made available for close visual observation.

B14 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B15 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food, Drug, and Cosmetic Act of 1938, as amended.

B16 *Corrosion Resistant:* Shall mean 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.

B17 *Close Coupled:* Shall mean mating surfaces or other juxtaposed surfaces that are less than twice the nominal diameter or cross section of the mating surfaces or a maximum 5 in. (127 mm).

C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series² (excluding, 301, 302) or corresponding Alloy Cast Institute (ACI) types³, 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. (See Appendix, Section E.)

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 (412) 776-1535.

³ Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

C2 Nonmetals

- C2.1 Rubber and rubber-like materials may be used for flexible transfer tubing, gaskets, seals, vents and parts having the same functional purposes.
- C2.1.1 Rubber and rubber-like materials, when used for the above-specified application(s), shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-.
- C2.2 Plastic materials may be used for flexible transfer tubing, gaskets, seals, vents, hose/pump cabinets and parts having the same functional purposes.
- C2.2.1 Plastic materials, when used for the above-specified application(s), shall comply with the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment, Number 20-.
- C2.3 Rubber and rubber-like materials or plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.
- C2.4 The final bond and residual adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.⁴
- C2.5 Where materials having certain inherent functional purposes are required for specific applications, such as agitator bearing surfaces and rotary seals, carbon, and/or ceramic materials may be used. Carbon and/or ceramic materials shall be inert, nonporous, nontoxic, nonabsorbent, insoluble, resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

⁴ Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202) 512-1800.

C3 Nonproduct Contact Surfaces

- C3.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating shall adhere. All 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.
- C3.2 The lining of the pump and/or hose cabinet shall be stainless steel or equally corrosion-resistant and durable material.
- C3.3 Gasket material for cabinet doors and dust covers for both personnel access ports and outlet valves shall be smooth, easily cleanable and nonabsorbent.
- C3.4 Sample trays and insulated sample boxes that will be in the pump and/or hose cabinet shall be made of stainless steel, plastic or other equally corrosion-resistant durable material.
- C3.5 Nonmetallic composite materials may be used as a supportive backing for the tank liner or the outer shell or both.

D FABRICATION**D1 Tank Liner Thickness**

- D1.1 The minimum gauge of material for the lining shall be determined by one of the following:
 - D1.1.1 16 U.S. Standard Gauge for tanks of capacities of 1,000 gal (3,785 L) or less; 14 U.S. Standard Gauge for tanks of capacities of over 1,000 gal (3,785 L) and not exceeding 2,000 gal (7,570 L); 12 U.S. Standard Gauge for tanks of over 2,000 gal (7,570 L) capacity.
 - D1.1.2 Lighter gauges of material shall be permitted if shell stress analysis on specific design application demonstrates they are so supported that they will have equal resistance to denting, buckling, sagging, and fatigue failures as provided by the three gauges specified above for the respective sizes of tanks.

D2 Surface Texture

- D2.1 All product contact surfaces shall have a finish at least as smooth as a No. 4 ground finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section F.)

D3 Permanent Joints

- D3.1 All permanent joints in metallic product contact surfaces shall be continuously welded.⁵

D4 Bonded Materials

- D4.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound, so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D5 Cleaning and Inspectability

- D5.1 Transportation tanks that are to be mechanically cleaned shall be designed so that the product contact surfaces of the transportation tanks and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.

- D5.2 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.

D6 Draining

- D6.1 All product contact surfaces shall be self-draining except for normal clingage. Tanks shall be so

constructed that the lining will not sag, buckle or prevent complete drainage of water when the tank has a pitch of not more than 1 in. (25.4 mm) in 100 in. (254 mm).

D7 Tank Height

- D7.1 The height of the vertical axis of the lining of the tank shall not be less than the minimum heights shown in the following tables:

TABLE 1. Tanks Having Uniform Vertical Axes
Note: 1 in. = 25.4 mm

Tank Size	Minimum Height
Up to and including 500 gal (1,892L)	36 in. (914.4 mm)
Over 500 gal (1,892 L) and up to and including 2,000 gal (7,570 L)	40 in. (1,016 mm)
Over 2,000 gal (7,570 L) and up to and including 2,800 gal (10,598 L)	42 in. (1,069 mm)
Over 2,800 gal (10,598 L) and up to and including 3,500 gal (13,248 L)	44 in. (1,118 mm)
Over 3,500 gal (13,248 L)	46 in. (1,168 mm)

TABLE 2. Tanks Having Varying Vertical Axes
Note: 1 in. = 25.4 mm

Tank Size	Min. Front Height	Min. Rear Height
Up to and including 500 gal (1,892 L)	36 in. (914.4 mm)	36 in. (914.4 mm)
Over 500 gal (1,892 L) and up to and including 2,000 gal (7,570 L)	40 in. (1,016 mm)	40 in. (1,016 mm)
Over 2,000 gal (7,570 L) and up to and including 2,800 gal (10,598 L)	41 in. (1,041 mm)	51 in. (1,295 mm)
Over 2,800 gal (10,598 L) and up to and including 3,500 gal (13,248 L)	43 in. (1,092 mm)	55 in. (1,397 mm)
Over 3,500 gal (13,248 L)	43 in. (1,092 mm)	57 in. (1,448 mm)

⁵ Criteria for hygienic welds may be found in AWS/ANSI D18.1 – *Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications*. Available from the American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126, phone: (305) 443-9353, fax: (305) 443-7559, e-mail: info@amweld.org; and EHEDG Doc. 9 – *Welding Stainless Steel to Meet Hygienic Requirements*. Available from the European Hygienic Equipment Design Group, Ellen Moens, Avenue Grand Champ 148, 1150 Brussels, Belgium.