

3-A[®] Sanitary Standards for Non-Coil Type Batch Processors, Number 25-03

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. Batch processor 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 other fluid comestible products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A SCOPE

A1 These standards cover sanitary aspects of non-coil type batch processors used to heat, cool, or process milk, fluid milk products, or other fluid comestibles. Batch processors may be either of the atmospheric or closed type. The latter may be operated at pressures from below to above that of the atmosphere.

A2 In order to conform to these 3-A Sanitary Standards, non-coil type batch processors shall conform to the following design, material, and fabrication criteria.¹

B DEFINITIONS

B1 *Batch Processor*: Shall mean a jacketed tank or vat provided with a heating and/or cooling jacket and agitation for the mixing and heat processing of milk, fluid milk products, or other fluid comestibles.

B2 *Product*: Shall mean milk, fluid milk products, or other fluid comestibles where heating and/or cooling are necessary.

B3 Surfaces

B3.1 *Product Contact Surfaces*: Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, diffuse, or be drawn into the product.

B3.2 *Nonproduct Contact Surfaces*: Shall mean all other exposed surfaces.

B3.3 *Lining*: Shall mean all surfaces used to contain the product, including the ends, sides, bottom, and top.

B3.4 *Shell*: Shall mean the material covering the exterior of the insulation and/or heat exchange jacket.

B3.5 *Breast*: Shall mean that portion of the metal used to join the top of the lining to the top of the shell.

B3.6 *Bridge*: Shall mean 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 Cleaning

B4.1 *Mechanical Cleaning or Mechanically Cleaned*: Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means.

B4.2 *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

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

recirculating pump(s), and with all cleaning aids manipulated by hand.

- B5 *Control Area(s)*: Shall mean the area(s) in which all appurtenances for the operation of the processor are located and vent lines terminate, except for top mounted agitators and shall be a part of one or more of the following:
- B5.1 A processing area.
- B5.2 An area in the plant at least the equivalent of a processing area.
- B6 *Alcove(s)*: Shall mean an extension of the control area(s) in which appurtenances and vent line openings are located.
- B7 *Easily or Readily Removable*: Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
- B8 *Easily or Readily Accessible*: Shall mean a location which can be safely reached by personnel from the floor, platform, or other permanent work area.
- B9 *Bond*: Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.
- B10 *Inspectable*: Shall mean all product contact surfaces can be made available for close visual observation.
- B11 *Simple Hand Tools*: Shall mean implements such as a screwdriver, wrench, or mallet normally used by operating and cleaning personnel.
- B12 *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.
- B13 *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.

C MATERIALS

C1 Metals

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

C2 Nonmetals

- C2.1 Rubber and rubber-like materials may be used for measuring devices, slinger or drip shields, agitator guides, protective caps for openings (other than a personnel access port) and/or sanitary fittings, scraper blades, gaskets, seals, and parts having the same functional purposes.
- 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 Used as Product Contact Surfaces in Dairy Equipment, Number 18-.
- C2.2 Plastic materials may be used for bearings, measuring devices, slinger or drip shields, agitator guides, protective caps for openings (other than a personnel access port) and/or sanitary fittings, sight and light ports, scraper blades, gaskets, seals, and parts having the same functional purposes.
- C2.2.1 Plastic materials when used for the above-specified applications shall conform to 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 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformation characteristics when

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.

exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment or sterilization.

C2.4 The adhesive, if used, for bonding rubber and rubber-like materials and bonded plastic materials shall be nontoxic.⁴

C2.5 Where materials having certain inherent functional properties are required for specific applications, such as 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, and resistant to scratching, scoring, and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment or sterilization.

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. 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.

D **FABRICATION**

D1 **Surface Texture**

D1.1 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.)

D2 **Permanent Joints**

D2.1 Permanent joints in metallic product contact surfaces shall be continuously welded. Welded areas on product contact surfaces shall be at least as smooth as a No. 4 ground finish on stainless steel sheets free of imperfections such as pits, folds, and crevices.

D3 **Bonded Materials**

D3.1 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, or sterilization the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded

D4 **Cleaning and Inspectability**

D4.1 Processors having an inside height of more than 96 in. (244 cm) shall be provided with means for mechanical cleaning.

D4.2 Processors that are to be mechanically cleaned shall be designed so that the product contact surfaces of the processor, including the product contact surfaces of the opening for a vertical mechanical agitator, and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible and readily removable and inspectable.

D4.3 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an assembled position or when removed. Demountable parts shall be readily removable.

D4.4 Appurtenances having product contact surfaces shall be readily removable, or they shall be readily cleanable when assembled or installed, and shall be easily accessible for inspection.

D5 **Gaskets**

D5.1 Gaskets having a product contact surface(s) shall be removable or be bonded.

D5.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D5.3 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in the 3-A Standards referenced in Sections D9.1, D10.7, and D11.1.

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, DC 20402 (202) 512-1800.

D6 Radii

- D6.1 Internal angles of less than 135° on product contact surfaces shall have radii of not less than 1/2 in. (12.70 mm), except that:
- D6.1.1 Minimum radii for fillets of welds in product contact surfaces may be 1/8 in. (3.18 mm) where the thickness of one or both parts joined is less than 3/16 in. (4.76 mm).
- D6.1.2 The radii in agitator shaft bottom support or guide and in gasket grooves or gasket retaining grooves for removable gaskets, except those for standard 1/4 in. (6.35 mm) and smaller O-rings, shall not be less than 1/8 in. (3.18 mm) and those provided in the 3-A Standards referenced in Sections D9.1, D.10.7, D11.1, D13.1 and D14.1.
- D6.1.3 Radii in standard O-ring grooves shall be as specified in Appendix, Section J.
- D6.1.4 Radii in nonstandard O-ring grooves shall be those radii closest to a standard O-ring as specified in Appendix, Section J.
- D6.1.5 The radii of covers shall be not less than 1/4 in. (6.35 mm).

D7 Draining

- D7.1 All product contact surfaces shall be self-draining except for normal adherence.
- D7.2 The lining shall remain in a relatively fixed position within the shell or body of the processor and shall be so constructed that it does not sag, buckle, or become distorted in normal use. The bottom of the lining shall have a minimum slope of 3/8 in. per foot (31.2 mm per m) toward the outlet.
- D7.3 The breast shall be integral with or continuously welded to the lining and shall be sloped so that drainage is away from the lining. The junction of the breast and the shell shall be continuously welded.

D8 Threads

- D8.1 There shall be no threads on product contact surfaces.

D9 Fittings and Tubing

- D9.1 Sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.
- D9.2 Sanitary tubing shall conform to 3-A Sanitary Standards for Polished Metal Tubing for Dairy Products, Number 33-.
- D9.3 Materials conforming to C2.1.1 or C2.2.1 may be used for caps of sanitary design for the protection of terminal ends of sanitary tubes, fittings, or vents.

D10 Openings and Covers

- D10.1 *Main Covers for Atmospheric-Type Processors:* Main covers (1) shall be of a type which can be opened and maintained in an open position, (2) shall be sufficiently rigid to prevent buckling, (3) shall be self-draining in the closed position, (4) shall be provided with an adequate, conveniently located and durable handle(s) of sanitary design, which are welded in place or formed into the cover materials, (5) shall have flanges extending downward not less than 3/8 in. (9.52 mm) along all edges and (6) shall be close fitting. The design shall be such that when raising the cover(s) any liquid on the top will not enter the processor. When the cover(s) is in its fully opened position, the drops of condensate formed on the underside of the cover(s) shall not drain into the processor.
- D10.2 *Bridges and Fixed Covers for Atmospheric-Type Processors:* Bridges and fixed covers shall pitch to the outside edge(s) of the processor for complete drainage, and shall have a raised flange not less than 3/8 in. (9.52 mm) in height where the edge(s) meets the main cover(s). The bridges and fixed covers shall be integral with or continuously welded to the lining, and shall be installed so the underside is accessible for cleaning and inspection without completely entering the processor.
- D10.3 *Personnel Access Port Covers and Openings:* An access port(s) shall be provided for closed type processors. If there is more than one control area, there shall be an access port accessible from the lowest control area. The inside dimensions of the access port(s) opening shall not be less than 15 by 20 in. (305 x 686 mm) oval, 12 by 27 in. (381 x 508 mm) elliptical, or 18 in. (457.2 mm) in diameter.