

3-A[®] Sanitary Standards for Ball-Type Valves for Milk and Milk Products, Number 68-00

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)

It is the purpose of the IAFIS, IAFP, USPHS, and DIC in connection with the development of the 3-A Sanitary Standards Program to allow and encourage full freedom for inventive genius or new developments. Ball-type valve 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, and DIC at any time. **NOTE:** Use current revisions or editions of all referenced documents cited herein. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

A	SCOPE	B4	Cleaning
A1	These standards cover the sanitary aspects of ball-type valves used on processing equipment and on equipment and lines which hold or convey milk or milk products.	B4.1	<i>Manual (COP) Cleaning:</i> 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.
A2	In order to conform with these 3-A Sanitary Standards, ball-type valves shall comply with the following design, material, and fabrication criteria.		
B	DEFINITIONS	B5	<i>Close Coupled:</i> 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 of 5 in. (127 mm).
B1	<i>Products:</i> Shall mean milk and milk products.		
B2	Equipment Components	B6	<i>Readily or Easily Removable:</i> Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
B2.1	<i>Ball-type Valves:</i> Shall mean valves which use a ball with a single or multiple passages to direct or stop flow. The ball is coupled to a shaft to turn the ball.		
B2.2	<i>Body Cavity Fillers (Encapsulating Seals):</i> Shall mean seals which fill the voids between the ball and body.	B7	<i>Simple Hand Tools:</i> Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or hammer.
B3	Surfaces	C	MATERIALS
B3.1	<i>Product Contact Surfaces:</i> 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.	C1	Metals
B3.2	<i>Nonproduct Contact Surfaces:</i> Shall mean all other exposed surfaces.	C1.1	Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series ¹ or corresponding Alloy Cast Institute (ACI)

¹ The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, November 1990, Table 2-1, pp. 17-20. Available from the American Iron and Steel Society, 186 Thorn Hill

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types² (See Appendix, Section G), 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.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets, O-rings, seals, body cavity fillers, and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials, when used for the above specified application(s), shall conform 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 gaskets, body cavity fillers, seals, O-rings, and parts having the same functional purposes.

C2.2.1 Plastic materials when used for the above specified application(s) shall conform 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 and 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 or sterilization.

C3 Sterilization

C3.1 In a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher, all materials having product contact surface(s) used in the construction of ball valves and nonmetallic component parts shall be such that they can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operated at the temperature required for processing.

C4 Nonproduct Contact Surfaces

C4.1 All 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 All 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, and be free of imperfections such as pits, folds, and crevices.

D3 Cleaning and Inspectibility

D3.1 Product contact surfaces shall be easily accessible for inspection and manual cleaning only. Removable parts shall be readily demountable.

D4 Draining

D4.1 All product contact surfaces of the valve shall be self-draining, except for normal clingage, when the valve is properly installed and the valve ball is properly positioned.

D4.2 There shall be no voids between the ball and the valve body.

D5 Fittings

D5.1 All sanitary fittings and connections shall conform with the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-.

Road, Warrendale, PA 15086 (724) 776-1535.

²Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016 (708) 299-9160.

D6 Gaskets

- D6.1 Gaskets having a product contact surface shall be removable.
- D6.2 Grooves in gaskets shall be no deeper than their width.
- D6.3 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 Section D5.1.

D7 Radii

- D7.1 All internal angles of less than 135° on product contact surfaces shall have radii of not less than 1/8 in. (3.18 mm) except that:
 - D7.1.1 The radii in grooves in gaskets or gasket retaining grooves, except for those provided for in Section D5, and those for standard 1/4 in. (6.35 mm) and smaller O-rings, shall be not less than 1/16 in. (1.59 mm).
 - D7.1.2 The radii in grooves for standard 1/4 in. (6.35 mm) O-rings shall not be less than 3/32 in. (2.38 mm) and for standard 1/8 in. (3.18 mm) O-rings shall be not less than 1/32 in. (0.794 mm).

D8 Threads

- D8.1 There shall be no threads in contact with the product.

D9 Outlet Valves

- D9.1 Outlet valves shall be close coupled to minimize the distance between the mounting face and shutoff point.

D10 Sterilization

- D10.1 Ball-type valves used in a processing system to be sterilized by heat and operated at a temperature of 250°F (121°C) or higher shall comply with the following additional criteria:
 - D10.1.1 The construction shall be such that all product contact surfaces can be (1) sterilized by saturated steam or water under pressure (at least 15.3 psig or 106 kPa) at a temperature of at least 250°F (121°C) and (2) operate at the temperature required for processing.

- D10.1.2 Ball-type valves that have a product contact surface(s) to be used in such a processing system, not designed so that the system is automatically shut down if the product pressure in the system becomes less than that of the atmosphere and cannot be restarted until the system is resterilized, shall have a steam or other sterilizing medium chamber surrounding all nonpermanent joints and seals. The ball valves shall be constructed so that the steam chamber or other sterilizing medium chamber may be exposed for inspection.

- D10.1.3 Where steam or other sterilizing medium is used, the connection(s) on the ball-type valves shall be such that the steam lines or other sterilizing medium lines can be securely fastened to the ball-type valves. The ball-type valves shall be constructed so that the steam or other sterilizing medium chamber may be exposed for inspection.

D11 Powered Valve Actuators

- D11.1 Valves with powered actuators shall have an open space of at least 1 in. (25.4 mm), clear for inspection, between the actuator and the valve.
- D10.2 Powered actuators shall be readily demountable from the valve and stem.

D12 Nonproduct Contact Surfaces

- D12.1 Nonproduct contact surfaces shall be smooth, free of pockets and crevices, and be readily cleanable. Those to be coated shall be effectively prepared for coating.

APPENDIX**E STAINLESS STEEL MATERIALS**

Stainless steel conforming to the applicable composition ranges established by ANSI for wrought products, or by ACI for cast products, should be considered in compliance with the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08 %. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series. Cast grades of stainless steel corresponding to types 303, 304, and 316 are designated CF-16F, CF-8, and CF-8M, respectively. The chemical compositions of these cast grades are covered by ASTM specifications³ A351/A351M, A743/A743M and A744/A744M.

³ Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Phone: (610) 832-9500.