

# 3-A<sup>®</sup> Sanitary Standards for Automatic Positive Displacement Samplers for Fluid Milk and Fluid Milk Products, Number 59-00

*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. Automatic positive displacement samplers 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. 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | B    | DEFINITIONS                                                                                                                                                                                                                   |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1 | These standards cover the sanitary aspects of air operated or electrically operated automatic positive displacement samplers (reference revised 3-A drawings, numbers 3-A-100D-1, 3-A-100D-2, 3-A-100D-3, 3-A100D 1. 3-A-100D-5 and 3-A-100D-6) used on processing equipment and on equipment and lines which hold or convey fluid milk or fluid milk products. The sampler assembly may consist of a body, plunger, head, O-rings, seals, cylinder valves, diaphragm, springs and an air or electrically operated mechanism. It shall also include a closure plug or sample discharge port closure suitable for sealing the sample discharge opening when the sampler is not in use. These standards shall not cover automatic positive displacement samples used in aseptic or ultra pasteurization systems | B1   | <i>Product</i> : Shall mean the fluid milk and fluid milk products.                                                                                                                                                           |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B1.1 | <i>Sample</i> : Shall mean that portion of the product removed for analytical purposes.                                                                                                                                       |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B2   | <b>Surfaces</b>                                                                                                                                                                                                               |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B2.1 | <i>Product Contact Surfaces</i> : Shall mean all surfaces that are exposed to the product or from which liquid may drain, drop or be drawn into the product.                                                                  |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B2.2 | <i>Sample Contact Surfaces</i> : Shall mean all product surfaces that are exposed exclusively to the sample once removed from the product stream or from which liquid may drain, drop or be drawn into the sample.            |
| A2 | In order to conform to these 3-A Standards, air operated or electrically operated positive displacement samplers shall comply with the following in design, material and fabrication. <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | B2.3 | <i>Nonproduct Contact Surfaces</i> : Shall mean all other exposed surfaces.                                                                                                                                                   |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | B3   | <i>Mechanical Cleaning or Mechanically Cleaned</i> : 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. |

<sup>1</sup> Use current revisions or editions of all referenced documents cited herein.

59-00

B4 *Electrodeposition*: Shall mean coated to specific dimensions or processed to specified dimensions after coating.<sup>2</sup>

## C MATERIALS

### C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series<sup>3</sup> or corresponding Alloy Cast Institute (ACI) types<sup>4</sup> (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, except that:

### C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets, diaphragms, O-rings, seals and parts used in similar applications.

C2.2 Rubber and rubber-like materials when used shall conform to the applicable provisions of the current 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces In Dairy Equipment, Number 18-.

C2.3 Plastic materials may be used for gaskets, diaphragms, O-rings, seals and parts used in similar applications.

C2.4 Plastic materials, when used, shall conform the applicable provisions of the current 3-A Sanitary Standards for Multiple-Use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment Number 20-.

C2.5 Rubber and rubber-like materials and plastic

---

<sup>2</sup>Federal Specification #QQ-320B for Chromium Pating (Electrodeposited), June 1954 with Amendment 4 on April 10, 1987. Federal Specification #QQ-N-290A for Nickel Plating (Electrodeposited), November 12, 1971. Available from the General Services Administration, Federal Supply Services Bureau, Specification Section, 470 East L'nfant Plaza, Suite 8100, Washington, DC 20407 (202)755-0325.

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

<sup>4</sup>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.

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.

C2.6 The final bond and residual adhesive, if used, of bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.<sup>5</sup>

C2.7 Rubber and rubber-like materials and plastic materials having product contact surfaces that are a bonded coating or a covering shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.

C2.8 Plungers of air operated positive displacement samplers made of materials provided for in subsection C1 may be covered with an electrodeposited coating of chromium.

C3 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 G).

---

<sup>5</sup>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 Rd., Warrendale, PA 15086 (724) 776-1535.

**D2 Coatings**

- D2.1 The minimum thickness of electrodeposited coatings on plungers (see C2.8) shall be not less than 0.0002 in. (0.005 mm). When these surfaces are other than stainless steel, the minimum thickness of electrodeposited coatings shall not be less than 0.002 in. (0.05 mm).

**D3 Cleaning and Inspectability**

- D3.1 Automatic positive displacement samplers that are to be mechanically cleaned shall be designed so that the product and sample contact surfaces of the sampler, and all nonremovable appurtenances thereto can be mechanically cleaned and are easily accessible for inspection.

- D3.2 Appurtenances having product and sample contact surfaces shall be removable or they shall be mechanically cleanable in place and accessible for inspection employing simple hand tools available to operating or cleaning personnel.

- D3.3 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. Removable parts shall be demountable using simple hand tools used by operating or cleaning personnel.

- D4 The primary seal or seat shall be located as close as possible to the product entry point and the passage length shall not exceed two times (2x) the nominal product-entry port diameter. D5

**D5 Sanitary Fittings**

- D5.1 All sanitary fittings and connections shall conform with those applicable provisions of current 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63-, except as provided in Section E1.

**D6 Gaskets**

- D6.1 Gaskets having a product contact surface shall be removable or bonded. D6.2

- D6.2 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.

- D7 Gasket grooves or gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6 mm) in depth or be less than 1/4 in. (6 mm) wide except those for standard O-rings smaller than 1/4 in. (6 mm) and those provided for fittings specified by Section D5.

**D8 Radii**

- D8.1 All internal angles of 135° or less on product contact surfaces shall have radii of not less than 1/8 in. (3 mm) except that:

- D8.1.1 Smaller radii may be used when they are required for essential functional reasons such as pop-valve spring interfaces. In no case shall such radii be less than 1/32 in. (1 mm).

- D8.1.2 The radii in gasket grooves, gasket retaining grooves or, grooves in gaskets, except for those for standard 1/4 in. (6 mm) and smaller O-rings, shall be not less than 1/8 in. (3 mm)] and those provided for fittings specified by Section D5.

- D8.1.3 The radii in grooves for standard 1/4 in. (6 mm) O-rings shall not be less than 3/32 in. (2 mm) and for standard 1/8 in. (3 mm) O-rings shall be not less than 1/32 in. (1 mm).

**D9 Threads**

- D9.1 There shall be no threads on product or sample contact surface.

**D10 Springs**

- D10.1 Any coil spring having product contact surfaces shall have at least 3/32 in. (2 mm) openings between coils including the ends when the spring is in the free position.