

3-A[®] Sanitary Standards for Mechanical Strainers, Number 87-00

*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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Drawings and illustrations contained herein are to assist in understanding the criteria in this 3-A Standard. Drawings and illustrations are not intended to show all variations of the equipment or system nor are they (it) to exclude alternate methods meeting this standard. Drawings and illustrations are non-normative.

Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Mechanical Strainers. 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), 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 3-A Sanitary Standard covers the sanitary aspects of mechanical strainers used for processing a mixture of liquid milk, milk products, and other liquid comestibles containing particulates. The equipment receives the product into a chamber (i.e., housing) which contains the components used for mechanically separating the product into two or more streams. The equipment shall start at the point where the product in-feed piping is connected to the mechanical strainer and ends at the points where the streams exit the mechanical strainer.

A2 This standard does not apply to vibratory screeners, belt-type screeners, centrifugal separators or decanters.

A3 In order to conform to these 3-A Sanitary Standards, mechanical straining equipment shall comply with the following design, material, and fabrication criteria.

B NORMATIVE REFERENCES¹

B1 The following listed 3-A Sanitary Standards, 3-A Accepted Practices and other documents shall be considered as Normative References and the provisions of the referenced documents shall apply to this Standard.

B2 3-A Sanitary Standards**Doc. No. Title**

18-	Multiple-Use Rubber and Rubber-Like Materials
20-	Multiple-Use Plastic Materials
33-	Polished Metal Tubing
63-	Sanitary Fittings
65-	Sight and/or Light Windows and Sight Indicators
74-	Sensors and Sensor Fittings and Connections
78-	Spray Devices to Remain in Place

C DEFINITIONS

C1 *Barrier*: Element or elements with defined openings to allow flow of liquid products while preventing the passage of particulate materials.

C2 *Bond*: Adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

C3 Cleaning

C3.1 *Clean-in-Place (CIP) Cleaning*: (CIP—previously referred to as mechanical cleaning.): The removal of soil from product contact surfaces in their process position by circulating, spraying, or flowing chemical solutions and water rinses onto and over the surfaces to be cleaned. Components of the equipment, which are not designed to be cleaned in place are removed from the equipment to be manually or COP cleaned.

C3.1.1 Product contact surfaces shall be inspectable, except when the cleanability by CIP has been documented and accepted by the regulatory agency. In such accepted equipment all product and solution contact surfaces do not have to be readily accessible for inspection (for example: permanently installed pipelines and silo tanks). Such exceptions shall be noted in those specific Sanitary Standards.

C3.2 *Clean-Out-of-Place (COP)*: Removal of soil when the equipment is partially or totally disassembled. Soil removal is effected by circulating chemical solutions and water rinses in a wash tank, which may be fitted with pump(s).

C3.3 *Manual Cleaning*: Removal of soil 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, and high or low pressure hoses, with cleaning aids manipulated by hand.

C4 *Corrosion Resistant*: A surface or material which has the property to retain its original surface characteristics for its predicted service period, when exposed to the conditions encountered in the environment of intended use, including contact with product, cleaning and sanitizing chemicals, steam, or sterilization compounds or solutions.

C5 *Essential Functional Reason*: A condition or feature of design or fabrication that cannot be modified and is required for the proper operation of the equipment.

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

- C6 *Inspectable*: Designed, fabricated and installed to make product contact surfaces available for close visual observation.
- C7 *Nontoxic Materials*: Substances, which under the conditions of their use, are in compliance with applicable requirements of the FDA.
- C8 *Product*: Liquid milk, milk products and other comestibles containing particulates.
- C9 *Readily Accessible*: A location that can be safely reached by personnel from the floor, other permanent work area or stable platform (permanent or moveable).
- C10 *Readily Removable*: Designed, fabricated, and installed to be quickly separated from the equipment with or without the use of simple hand tools.
- C11 *Simple Hand Tools*: A screwdriver, wrench, mallet, or readily available dedicated tool(s) normally used by operating and cleaning personnel.
- C12 *Soil*: Unwanted organic residue or inorganic matter.
- C13 *Strainers*: Equipment having one or more barrier elements with defined openings to separate and retain particulate material from liquid product streams.
- C14 **Surfaces**
- C14.1 *Product Contact Surfaces*: All surfaces which are exposed to the product and surfaces from which splashed product, liquids or material may drain, drop, diffuse, or be drawn into the product or onto product contact surfaces.
- C14.2 *Nonproduct Contact Surfaces*: All exposed surfaces from which splashed product, liquids, or other materials cannot drain, drop, diffuse or be drawn into or onto the product, product contact surfaces.
- C14.3 *Splash Contact Surfaces*: Nonproduct contact surfaces that during normal use are subject to accumulation of soil and which require routine cleaning and from which the accumulated soil cannot drain, drop, diffuse or be drawn into the product or product contact surfaces.

- C14.4 *Solution Contact Surfaces*: All interior surfaces of the equipment or system, including associated piping, that are used for supplying and recirculating cleaning and/or sanitizing solutions, except those used to supply concentrated cleaning and sanitizing chemicals from bulk storage to the point of chemical addition.

C15 **Surface Modifications²**

- C15.1 *Surface Treatments*: Processes where chemical composition or mechanical properties of the existing surface are altered. There is no appreciable removal of existing material.

C15.1.1 Surface treatments include:

1. Mechanical (shot peening³, grinding, polishing)
2. Electropolishing

D **MATERIALS**

D1 **Product, Solution, and Splash Contact Surfaces**

D1.1 **Metals**

- D1.1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series, excluding 301, 302, and 303⁴ or corresponding Alloy Cast Institute (ACI)⁵ types or metal which under conditions of intended use is at least as corrosion resistant as 304 stainless steel of the foregoing types, and is nontoxic and nonabsorbent. (Refer to Appendix, Section F.) Where welding is involved, the carbon content of the stainless steel shall not exceed 0.08%.

² *Advanced Materials and Processes*, Volume 137(1), "Coatings and Coating Practices" by H. Herman, "Surface Modification" by F. A. Smidt. ASM International, Materials Park, OH 44073 (216) 338-5151.

³ AMS-S-13165 *Shot Peening of Metal Parts*. Society of Automotive Engineers (AWS), 400 Commonwealth Dr., Warrendale, PA 15096-0001.

⁴ *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. American Iron and Steel Society, 410 Commonwealth Dr., Warrendale, PA 15086. Phone: 412-776-1535.

⁵ Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016. Phone: 708-299-9160.

D1.1.2 Solder, when used, shall be gold or silver containing solder and shall be corrosion resistant, free of cadmium, lead and antimony, nonabsorbent, and shall not impart any toxic substance to the product when exposed to the conditions encountered in the environment of intended use, including cleaning and sanitization treatment.

D1.2 Nonmetals

D1.2.1 Rubber and rubber-like materials may be used for O-rings, slingers, seals, and gaskets and when used for the specified applications, shall conform to the applicable provisions of the 3-A Sanitary Standard, Number 18-.

D1.2.2 Plastic materials may be used for O-rings, seals, slingers, sight glasses, woven barriers, scrapers, and gaskets and when used for the above-specified applications, shall conform to the applicable provisions of the 3-A Sanitary Standard, Number 20-.

D1.2.3 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, including cleaning and sanitizing treatment.

D1.2.4 Adhesive used for bonding rubber and rubber-like materials and bonding plastic materials shall be nontoxic. Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings.⁶

D1.2.5 Carbon and ceramic materials (including tungsten carbide), may be used for seals and, when used, 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, including cleaning and sanitizing treatment.

D1.2.6 Multi-use woven barrier material and stitching shall be constructed of materials meeting one of the following:

D1.2.6.1 Title 21 CFR, Part 177- Indirect Food Additives: Polymers;⁷

D1.2.6.2 Title 21 CFR, Part 182- Substances Generally Recognized as Safe (GRAS);⁸

D1.2.6.3 Title 21 CFR, Part 186- Indirect Food Substances Affirmed as Generally Recognized as Safe;⁹

D1.2.6.4 Or, otherwise be accepted by the Food and Drug Administration for food contact.

D1.2.7 Cotton, linen, or rayon may be used for barrier material. When used, these materials shall be single service, nontoxic, non-shedding, relatively insoluble, and shall not impart a flavor to the product.

D2 Nonproduct Contact Surfaces

D2.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If the surfaces are coated, including painted surfaces, 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.

E FABRICATION

E1 Product, Splash, and Solution Contact Surfaces

E1.1 Surface Texture

E1.1.1 Surfaces, including fabricated, welded and soldered joints, shall be at least as smooth as a 32 µin. (0.8 µm) R_a finish and shall be free of pits, folds, crevices, cracks, and misalignments in the final fabricated form (Refer to Appendix, Section G.), except that:

E1.1.1.1 Barrier elements are exempt from E1.1.1.

⁶ Title 21 CFR, Part 175- Indirect Food Additives: Adhesives and Components of Coatings. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

⁷ Title 21 CFR, Part 177- Indirect Food Additives: Polymers. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

⁸ Title 21 CFR, Part 182- Substances Generally Recognized as Safe (GRAS). Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

⁹ Title 21 CFR, Part 186- Indirect Food Substances Affirmed as Generally Recognized as Safe. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.