

3-A[®] Sanitary Standards for Enclosed Cheese Vats and Tables, Number 83-00

*Standards Developing Organizations
3-A Sanitary Standards, Inc. (3-A SSI)
in collaboration with
United States Public Health Service (USPHS)
United States Department of Agriculture (USDA)
European Hygienic Engineering & Design Group (EHEDG)*

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Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Enclosed Cheese Vats and Tables. 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 the 3-A SSI, 1451 Dolley Madison Boulevard, Suite 210, McLean, VA 22101-3850, USA. By fax: 703-761-4334. By e-mail to: 3-ainfo@3-a.org.

A SCOPE

A1 These standards cover the sanitary aspects of enclosed cheese vats and tables used in the batch production of cheese curd and open vats that are covered during mechanical cleaning. This standard does not include equipment with capabilities for pressing of curd.

A2 In order to conform to these 3-A Sanitary Standards, enclosed cheese vats and tables shall conform to the following design, material and fabrication criteria.¹

B DEFINITIONS

B1 *Product:* Shall mean milk, cheese curd and whey, and other comestibles.

B2 *Enclosed Cheese Vat and Table:* (Referred to hereinafter as "vat(s).") Shall mean an enclosed vessel in which cheese curd is produced or drained and may include (1) means for heating and/or cooling, (2) means for mechanical cutting and stirring and (3) means for curd handling within the vessel.

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

B4 *Bridge:* Shall mean a structure that spans over the product and lining of a vat and is permanently attached to the sides of the vat. It may be used to support one or more of the following: removable or non-removable agitators, curd-handling tools, or traversing carriages.

B5 *Traversing Carriage:* Shall mean a moving device on which agitators, curd-handling tools, or drive mechanisms may be mounted.

B6 Surfaces

B6.1 *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.

B6.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B7 *Lining:* Shall mean all surfaces used to contain the product.

B8 *Shell:* Shall mean the outer jacket.

B9 *Outlet:* Shall mean an opening in the liner and the passage for the product to the exterior of the vat. In the case of liquid or curd slurry, the outlet passage starts at the opening in the lining and terminates at the connection for an outlet valve or downstream process piping. In the case of drained curd, the outlet passage starts at the opening in the lining and terminates at the connection for downstream curd handling equipment, whether in the form of a gravity discharge chute or a connection for downstream vacuum piping.

B10 Cleaning

B10.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B10.2 *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.

B11 Component Equipment

B11.1 *Curd-Handling Tools:* Shall mean the knives (blades or wires), tines, or other devices used for cutting, stirring, forking or pushing.

B11.2 *Whey Removal Equipment:* Shall mean apparatus for removal of whey from within the vat by various means.

B11.3 *Curd-Discharge Devices:* Shall mean integral apparatus in which product is mechanically conveyed.

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

B12 Surface Modification²

B12.1 Surface Treatments: Shall mean a process whereby chemical compositions or mechanical properties of the existing surface are altered. There is no appreciable, typically less than 1 µm, build-up of new material; or removal of existing material.

B12.1.1 Surface treatments include:

1. Mechanical (shot peening³, polishing)
2. Thermal (surface hardening laser, electron beam)
3. Diffusion (carburizing, nitriding)
4. Chemical (etching, oxidation)
5. Electropolishing

B12.2 Coatings: Shall mean the results of a process where a different material is deposited to create a new surface. There is appreciable, typically more than 1 µm, build-up of new material. The coating material does not alter the physical properties of the substrate.

B12.2.1 Coating processes include:

1. Chemical (conversion coatings)
2. Electrodeposition⁴
3. Thermal spraying (flame, plasma, arc spray)

B13 Soil: Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.

B14 Easily or Readily Removable: Shall mean quickly separated from the equipment with the use of simple hand tools and if necessary with the use of lifting equipment.

B15 Easily or Readily Accessible: Shall mean a location which can be safely reached by personnel from a floor, platform (fixed or movable), or other permanent work area.

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.

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

⁴ SAE-AMS-QQ-C-320, Chromium Plating (Electrodeposited). SAE-AMS QQ-N-290, Nickel Plating (Electrodeposited). Available from Society of Automotive Engineers (AMS), 400 Commonwealth Dr., Warrendale, PA 15096-0001.

B16 Inspectable: Shall mean all product contact surfaces can be made available for close visual observation.

B17 Simple Hand Tools: Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, mallet, or readily available dedicated tool(s).

B18 Nontoxic Materials: Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food and Drug Administration.

B19 Bond: Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B20 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.

C MATERIALS**C1 Metals**

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series⁵, except 301 and 302, or corresponding Alloy Cast Institute (ACI) types⁶ (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:

C1.1.1 Curd knives may be made of AISI⁵ 301 and 302 series stainless steel.

⁵ 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.

⁶ Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

C1.1.2 Solder, when used, shall be silver bearing 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 and in cleaning and sanitization.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for protective caps for sanitary tubes, fittings, vents, O-rings, seals, gaskets, roller coverings 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, Number 18-.

C2.2 Plastic materials may be used for protective edges or sliding components on curd-handling tools integral with the vat, spray devices, agitator bearings, augers, conveyor belting, protective caps for sanitary tubes, fittings, vents, O-rings, seals, gaskets, roller coverings 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, 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 sanitization.

C2.4 The adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.⁷

C2.5 Where materials having certain inherent functional properties are required for bearing surfaces and rotary seals, carbon, silicon carbide, tungsten

carbide and/or ceramic material may be used. These 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 sanitization.

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. 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 be at least as smooth as a 32 µin. (0.8 µm) R_a finish on stainless steel sheets free of imperfections such as pits, folds and crevices in the final fabricated form (See Appendix, Section F.), except that:

D1.1.1 A finish produced by a shot peening surface treatment may be used on curd handling tools and curd cutting knives. In no case shall the surface finish exceed an R_a value of 125 µin. (3.2 µm), but shall be free of imperfections such as pits, folds and crevices when in the final fabricated form.

D1.1.2 Machined plastic components may have a finish equal to or less than 125 µin. (3.2 µm) R_a.

D1.1.3 Metal tubing shall be welded in accordance to 3-A Accepted Practice for Permanently Installed Product and Solution Cleaning Systems, Number 605-⁸.

⁷ 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.

⁸ AWS D18.1, Specifications for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications, AWS D18.2, Guide to Weld Discoloration Levels on Inside of Austenitic Stainless Steel Tube, American Welding Society (AWS), 550 LeJuene Rd., Miami, FL 33126, 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.