

3-A® Sanitary Standard for Plate Type Heat Exchangers, Number 11-09

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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Disclaimers

3-A Sanitary Standards and 3-A Accepted Practices are developed through the efforts of experts, working on a volunteer basis, using science-based information and their professional experiences to reach consensus decisions on the sanitary (hygienic) criteria in these 3-A documents.

3-A SSI, its employees and its volunteer committees/working groups shall not incur any obligation or liability for damages, including consequential damages, arising from or in connection with the development, use, interpretation, or reliance upon this 3-A Sanitary Standard.

3-A Sanitary Standards and 3-A Accepted Practices do not include provisions for mechanical, electrical, or personnel safety. Such safety criteria are established by government regulations and other standards development organizations (SDOs). Other SDO standards may be referenced.

Drawings and illustrations contained herein are examples to assist in understanding the criteria in this 3-A Sanitary Standard. Appendix drawings and illustrations are not intended to show all variations of the equipment or system nor are they exclusive of alternate approved methods. Appendix drawings and illustrations are non-normative.

Foreword

This 3-A Sanitary Standard establishes minimum sanitary (hygienic) requirements for design, materials, fabrication, and installation of Plate Type Heat Exchangers.

This 3-A Sanitary Standard is for use on a voluntary basis by directly and materially affected organizations such as equipment and machinery fabricators, processors, regulatory agencies and by other SDOs to assure adequate public health protections exist for plate type heat exchangers. 3-A SSI will use this document as its source of sanitary criteria for 3-A Symbol authorization.

This 3-A Sanitary Standard was developed jointly by 3-A SSI, the United States Public Health Service (USPHS), the United States Food and Drug Administration (USFDA), the United States Department of Agriculture – Dairy Programs (USDA), and the European Hygienic Engineering & Design Group (EHEDG).

It is our intent to encourage inventive genius and provide a forum to discuss new developments. Suggestions for improvement and new technology are welcome at any time for consideration by 3-A SSI. Please forward comments to 3-A Sanitary Standards, Inc., 6888 Elm Street, Suite 2D; McLean, VA 22101-3829, USA or by fax: 703-761-6284, or by e-mail to: 3-ainfo@3-a.org.

A **Scope**

- A1. This standard covers the sanitary aspects of plate type heat exchangers beginning with the inlet fittings for product(s) and for heat exchange media and ending with the outlet fittings for product(s) and for heat exchange media. This standard include the frame and/or support components for holding the heat exchange plates and the means for manual or mechanical opening and closing of the plate pack assembly.
- A2. In order to conform to this 3-A Sanitary Standard, plate heat exchangers shall conform to the following criteria for design, materials of construction, fabrication techniques and installation, as appropriate, and the current revisions or editions of all referenced documents cited herein in Section B.

B **Normative References**

- B1. The following listed 3-A Sanitary Standards, and other documents shall be considered as Normative References and the provisions of the referenced documents shall apply to this Standard without further reference in this document unless necessary to describe special considerations.

B2 **3-A Sanitary Standards**Doc. No Title (3-A Sanitary standards for:)

- | | |
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| 18- | <u>Multiple-Use Rubber and Rubber-like Materials</u> |
| 20- | <u>Multiple-Use Plastic Materials</u> |
| 63- | <u>Sanitary Fittings</u> |
| 33- | <u>Metal Tubing</u> |
| 88- | <u>Machine Leveling Feet and Supports</u> |

B3 Other References and Standards

Ref. No. Title

1. AIST Steel Products Manual, Stainless & Heat Resisting Steels, Table 2-1. Association for Iron & Steel Technology (AIST), 410 Commonwealth Drive, Warrendale, PA 15086, Phone: (412) 776-1535. www.AIST.org
2. Steel Casting Handbook, Supplement 2, 1999. Available from Steel Founders Society of America, 780 McArdle Dr., Unit G, Crystal Lake, IL 60014, Phone: (815) 455-8240, Fax: (815) 455-8241, www.sfsa.org.
3. MIL-C-26074E. *Military Specification: Coatings, Electroless Nickel Requirements For*. Standardization, Document Automation & Production Service (Department of Navy), 700 Robbins Avenue, Building 4, Section D, Philadelphia, PA 19111-5094, Phone: (215)697-2179, Fax: (215) 697-1462.
4. ASTM specifications for Cast Grades A351/A351M, A743/A743M and A744/A744M. Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-1959, Phone: (610) 832-9500. www.astm.org/standard/index.shtml
5. ASTM specifications for Wrought Grades A276, A582, and A666. Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Phone: (610) 832-9500. www.astm.org/standard/index.shtml
6. (ANSI)/American Society of Mechanical Engineers (ASME) B46.1 – *Surface Texture Waviness and Lay*. Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392, Phone: (212) 705-7722.
7. EHEDG Doc. 35 – Welding of Stainless Steel Tubing in the Food Industry. European Hygienic Engineering & Design Group. Published by EHEDG. www.ehedg.org

8. The Code of Federal Regulations (CFR), Title 21, Parts 175 – Indirect Food Additives: Adhesives and Components of Coatings. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Phone: (202) 512-1800 or at <http://gpoaccess.gov/cfr/index.html>.
9. GAR C-9 Cast Microfinish Comparator. Available from Gar Electroforming Division, Electroformers Inc., 11 Augusta Drive, Commerce Park, PO Box 340, Danbury, CT 06813-0340, Phone: (203) 744-4300.
10. *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, Phone: (216) 338-5151.

C DEFINITIONS

- C1 *Bond*: The adhesive or cohesive forces holding materials together. This definition does not concern press-fits and shrink-fits, nor does it apply to mechanically retained gaskets as defined in Section C20.3.
- C2 *Heat Exchange Media or Media*: Product or nonproduct fluids used to exchange heat with product.
- C3 **Cleaning**
- C3.1 *Clean-in-Place (CIP) 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.
- C3.2 *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.
- C3.3 *Cleanable or Cleanability*: The suitability of materials of construction, design and fabrication required to assure that the equipment can be freed from soil.
- C3.4 *CIPable*: The design and fabrication of equipment which allows the equipment surfaces to be cleaned by CIP methods for a prescribed time and at a prescribed concentration, flow rate, pressure, and temperature demonstrated to be effective.
- 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 *CIP Fittings*: Sanitary fittings complying with 3-A Sanitary Standard No. 63 – which are designed for cleaning in-place.
- C6 *Inlet*: An opening that allows product, media, cleaning solutions and sanitizing solutions to enter the equipment.
- C7 *Inspectable*: Designed, fabricated and installed to make product contact surfaces available for close visual observation.
- C8 *Nontoxic Materials*: Substances, which under the conditions of their use, are in compliance with applicable requirements of the FDA.
- C9 *Outlet/Product Outlet*: An opening that allows product, media, cleaning solutions, and sanitizing solutions to exit the equipment.
- C10 *Product*: Milk, liquid milk products or other liquid food products.
- C11 *Readily Accessible*: A location that can be safely reached by personnel from the floor, other permanent work area or stable platform (permanent or moveable).