

3-A® Sanitary Standards for Insulated Tanks, Number 01-09

*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)*

Technical and Editorial Changes from the previous version of this Standard are highlighted in **Yellow**.

Effective Date: November 19, 2013

TABLE OF CONTENTS

TITLE	i
DISCLAIMERS	v
FOREWORD	v
A SCOPE	1
B NORMATIVE REFERENCES	1
C DEFINITIONS	3
C1 Alcove	3
C2 Bond	3
C3 Cleaning	3
C3.1 Clean-in-Place (CIP)	3
C3.2 Clean-Out-of-Place (COP)	4
C3.3 Manual Cleaning	4
C3.4 Cleanable or Cleanability	4
C4 Close-Coupled	4
C5 Corrosion Resistant	4
C6 Fittings	4
C6.1 CIP Fittings	4
C6.2 Manually Cleaned Fittings	4
C7 Inlet	4
C8 Inspectable	4
C9 Nontoxic Materials	4
C10 Opening	4
C11 Outlet	4
C12 Outlet Passage	4
C13 Processing Area	4
C14 Product	5
C15 Readily Accessible	5
C16 Readily Removable	5
C17 Roughness Average (Ra)	5
C18 Sanitizing or Sanitization	5
C19 Sealed	5
C20 Simple Hand Tools	5
C21 Soil	5
C22 Solution	5
C23 Sterilization	5
C24 Substantially Flush	5
C25 Surfaces	5
C25.1 Product Contact Surfaces	5
C25.1.1 Lining	5
C25.2 Solution Contact Surfaces	6
C25.3 Nonproduct Contact Surfaces	6

	C25.3.1 Breast	6
	C25.3.2 Shell	6
C26	Surface Modification	6
	C26.1 Surface Treatments	6
C27	Vent Shield	6
D	MATERIALS	6
D1	Product and Solution Contact Surfaces	6
	D1.1 Metals	6
	D1.2 Nonmetals	7
	D1.3 High Temperature Materials	7
D2	Nonproduct Contact Surfaces	7
E	FABRICATION	8
E1	Product and Solution Contact Surfaces	8
	E1.1 Surface Texture	8
	E1.2 Permanent Joints	8
	E1.3 Bonded Materials	8
	E1.4 Cleaning and Inspectability	8
	E1.5 Draining	9
	E1.6 Temperature-Sensing Device Connections	9
	E1.7 Fittings and Valves	9
	E1.8 Instruments	10
	E1.9 Thermometers	10
	E1.10 Gaskets, Gasket Retaining Grooves, O-rings and Seals	10
	E1.11 Radii	12
	E1.12 Threads	13
	E1.13 Openings and Covers (Other Than Personnel Access Ports)	13
	E1.14 Agitators	14
	E1.15 High Temperature Systems	14
E2	Nonproduct Contact Surfaces	15
	E2.1 Surfaces	15
	E2.2 Joints	15
	E2.3 Guards	15
	E2.4 Cleaning and Inspectability	15
	E2.5 Draining	15
	E2.6 Threads	16
	E2.7 Service Piping and Lines	16
	E2.8 Supports	16
	E2.9 Name and Information Plates	17
F	SPECIAL CONSIDERATIONS	18
F1	Direct Reading Gauges	18
F2	Insulation	18
F3	Refrigeration	18

APPENDIX

G	STAINLESS STEEL AND EQUIVALENT MATERIALS	19
H	PRODUCT CONTACT SURFACE FINISH	21
I	AIR VENTING.....	22
J	SUGGESTED CLEANING PROCEDURES	23
K	ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE ...	23

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/or installation of Insulated Tanks.

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 the equipment or systems and covered products. 3-A SSI uses these documents 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 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 the 3-A Secretary, 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 These standards cover the sanitary aspects of insulated tanks that are to be installed horizontally, or vertically if the inside height of the tank is no greater than 10 ft. (3.048 m), and that are to be used for the storage of product or solutions, inclusive of storage at a maintained temperature. The tank begins and ends at the product or solution inlet or outlet and, when provided, includes product or solution valves, spray devices for cleaning, agitators, instrument connections, alcoves, sight and light openings, thermometers, direct reading gauges, personnel access ports and air vents.

A2 This standard does not include equipment covered within the scope of any of the following:

A2.1 3-A Sanitary Standard 05-: "Sanitary Standards for Stainless Steel Automotive Transportation Tanks for Bulk Delivery and Farm Pick-up Service."

A2.2 3-A Sanitary Standard 13-: "Farm Milk Cooling and Holding Tanks."

A2.3 3-A Sanitary Standard 24-: "Non-Coil Type Batch Pasteurizers for Milk and Milk Products."

A2.4 3-A Sanitary Standard 25-: "Sanitary Standards for Non-Coil Type Batch Processors."

A2.5 3-A Sanitary Standard 38-: "Cottage Cheese Vats."

A2.6 3-A Sanitary Standard 83-: "Enclosed Cheese Vats and Tables."

A3 In order to conform to this 3-A Sanitary Standard, Insulated Tanks 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.

B NORMATIVE REFERENCES

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 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:)**

18-	Multiple-Use Rubber and Rubber-Like Materials
20-	Multiple-Use Plastic Materials
33-	Metal Tubing
51-	Plug-Type Valves
52-	Plastic Plug-Type Valves
53-	Compression-Type Valves
56-	Inlet and Outlet Leak-Protector Plug-Type Valves
57-	Disc-Type Valves

- 58- Vacuum Breakers and Check Valves
- 59- Automatic Positive Displacement Samplers for Fluid Products
- 60- Rupture Discs
- 62- Hose Assemblies
- 63- Sanitary Fittings
- 64- Pressure Reducing and Back Pressure Regulating Valves
- 65- Sight and/or Light Windows and Sight Indicators in Contact with Product
- 68- Ball-Type Valves
- 73- Shear Mixers, Mixers, and Agitators
- 74- Sensors and Sensor Fittings and Connections Used on Equipment
- 78- Spray Cleaning Devices to Remain in Place
- 84- Personnel Access Ports for Wet Applications
- 85- Double-Seat Mixproof Valves
- 88- Machine Leveling Feet and Supports

B3 3-A Accepted Practices

Doc. No. Title (3-A Accepted Practice for:)

- 604- Supplying Air Under Pressure in Contact with Product, and Product Contact Surfaces
- 605- Permanently Installed Product and Solution Pipelines and Cleaning Systems

B4 Other References and Standards

Ref. No. Title

1. AMS-S-13165, *Shot Peening of Metal Parts*. Society of Automotive Engineers (AWS), 400 Commonwealth Dr., Warrendale, PA 15096-0001.
2. SAE-AMS-QQ-C-320, Chromium Plating (Electrodeposited). SAE-AMS QQ-N-290A, Nickel Plating (Electrodeposited). Society of Automotive Engineers (AWS), 400 Commonwealth Dr., Warrendale, PA 15096-0001.
3. *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. Association for Iron & Steel Technology, 410 Commonwealth Drive, Warrendale, PA 15086, Phone: (412) 776-1535.
4. ASTM specifications for Wrought Grades A-276, and A-666. Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Phone: (610) 832-9500.
5. (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.
6. Aerospace Standard (AS) 568, Aerospace Size Standards for O-rings, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086, Phone: (412) 776-4970.

7. ANSI/ AWS D18.1 – Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications
8. ANSI/ AWS D18.2 – Guide to Weld Discoloration Levels on Inside of Austenitic Stainless Steel Tube
9. ANSI/ AWS D18.3/D18.3M – Specification for Welding of Tanks, Vessels, and Other Equipment in Sanitary (Hygienic) Applications
10. Published by American Welding Society, 550 N.W. LeJeune Rd., Miami FL, Phone: (800) 443-3953, www.aws.org.
11. EHEDG Guideline 35 – Hygienic Welding of Stainless Steel Tubing in the Food Processing Industry. European Hygienic Engineering & Design Group. Published by EHEDG, www.ehedg.org.
12. 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, <http://www.gpoaccess.gov/cfr/index.html>.
13. The Code of Federal Regulations (CFR), Title 21, Part 177 Indirect Food Additives: Polymers. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Phone: (202) 512-1800 or at <http://www.gpoaccess.gov/cfr/index.html>.
14. Steel Founders Society of America, 780 McArdle Dr., Unit G, Crystal Lake, IL 60014 Phone: (815)455-8240 Fax:(815)455-8241 Internet: www.sfsa.org.
15. Official Methods of Analysis. Available from the AOAC International, 481 N. Frederick Ave., Suite 500, Gaithersburg, MD 20877-2417. Phone (301) 924-7077; Fax (301) 924-7089. E-mail: AOAC@aoac.org.

C DEFINITIONS

- C1 *Alcove*: An extension of the tank in which vent lines may terminate and where appurtenances for the operation of the tank can be located.
- C2 *Bond*: The adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.
- C3 **Cleaning**
- C3.1 *Clean-in-Place (CIP)*: 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 COP or manually cleaned.

- 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 circulating 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.
- C3.4 *Cleanable or Cleanability*: The suitability of materials of construction, design and fabrication required to assure that the equipment can be freed from soil.
- C4 *Close Coupled*: Mounting or connecting of components so that the intervening product contact area separating the components is as short as possible.
- C5 *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.
- C6 **Fittings**
- C6.1 *CIP Fittings*: Fittings designed to be cleaned while fully assembled. If such a fitting has a removable joint, the joint is self-centering, employs a gasket, and the resulting gasketed joint forms a substantially flush interior surface.
- C6.2 *Manually Cleaned Fittings*: Removable joint fittings of which the design requires dismantling for manual cleaning.
- C7 *Inlet*: An opening that allows product, solution, steam, or air to enter the equipment.
- C8 *Inspectable*: Designed, fabricated and installed to make product contact surfaces available for close visual observation with or without the use of visual aids (i.e.: boroscope or mirror).
- C9 *Nontoxic Material*: A substance, which under the conditions of its intended use, is in compliance with applicable requirements of the FDA.
- C10 *Opening*: A hole through the product contact surface of equipment that is unsealed and is either connected to external piping or is open to the atmosphere.
- C11 *Outlet*: An opening that allows product or solutions to exit the equipment.
- C12 *Outlet Passage*: The passage connecting the lining to the connection for the outlet valve through which the product or solutions exit the tank.
- C13 *Processing Area*: A room or area suitable for the manufacturing and packaging of products.