

3-A Accepted Practice for Sanitary Construction, Installation, and Cleaning of Membrane Processing Systems,

Number 610-03

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)

Effective Date: March 29, 2018

TABLE OF CONTENTS

TITLE	1
TABLE OF CONTENTS	2
DISCLAIMERS	4
FOREWORD	4
A SCOPE	5
B NORMATIVE REFERENCES	5
C DEFINITIONS	7
C1 Balance or Surge Tank	7
C2 Concentrate	7
C3 Diafiltration Water	7
C4 Feed	7
C5 Feed Connector	7
C6 Inlet	7
C7 Manifold	7
C8 Permeate	7
C9 Product	7
C10 Product Contact Surfaces	7
C11 Retentate	7
C12 Safe Water	7
C13 System	7
D MATERIALS	8
D1 Product Contact Surfaces	8
D1.1 Metals	8
D1.2 Non-Metals	8
D2 Non-Product Contact Surfaces	8
E FABRICATION OF PRODUCT AND SOLUTION CONTACT SURFACES	9
E1 Surface Texture	9
E2 Product Contact Surfaces	9
E2.1 Balance or Surge Tanks	9
E3 Joints	9
E3.1 Permanent Joints	9
E3.2 Non-Permanent Joints	10
E4 Cleaning and Inspectability	10
E5 Draining	10
E6 Dead Ends	10
E7 Gaskets, Gasket Retaining Grooves, O-rings and Seals	10
E8 Radii	10

E9	Threads	10
E10	Temperature-Sensing Device Connections	10
E11	Product Recirculation.....	10
F	FABRICATION OF NON-PRODUCT CONTACT SURFACES	11
F1	Surfaces.....	11
F2	Joints	11
F3	Coatings	11
F4	Cleaning and Inspectability	11
F5	Threads	11
F6	Service Piping and Lines	11
F7	Guards and Other Safety Devices	11
F8	Supports	11
F9	Name and/or Information Plates (Nameplates)	11
F10	Casters.....	11
F11	Mounting.....	12
	F11.1 Slabs, Islands and Floors.....	12
	F11.2 Walls and Columns	12

APPENDIX

1	STAINLESS STEEL AND EQUIVALENT MATERIALS.....	13
2	PRODUCT CONTACT SURFACE FINISH	13
3	ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE ...	13
4	INSTRUCTION HANDBOOK FOR INSTALLATION, MAINTENANCE, AND CLEANING	13
5	SLABS, ISLANDS, OR FLOORS	15
6	PRODUCT RECIRCULATION	16
7	WATER F OR DIAFILTRATION	16
8	TEMPERATURE REQUIREMENTS FOR PROCESSING OF RAW MILK OR MILK PRODUCTS.....	16
9	HARMONIZATION.....	16

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 Sanitary Standards Inc. (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 Accepted Practice.

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 Accepted Practice. 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.

Metric conversions are provided for convenience and are not intended to be mandatory.

The Appendix is an advisory or informative section unless specifically cited in the Materials or Fabrication Section as requiring conformance.

Foreword

This 3-A Accepted Practice establishes minimum sanitary (hygienic) requirements for design, materials, fabrication, and/or installation of Membrane Processing Systems.

This 3-A Accepted Practice 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 Accepted Practice was developed jointly by 3-A SSI, the United States Public Health Service (USPHS), 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 SSI, 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 3-A Accepted Practice applies to the sanitary aspects of equipment necessary for membrane processing of products. The unit operations of the Membrane Processing Systems include the following: ultrafiltration, diafiltration, microfiltration, nanofiltration and reverse osmosis. Product enters the inlet to the supply tank which delivers the product to the membrane equipment and, when diafiltration is used, at the outlet of the nearest valve which delivers water for diafiltration. The product exits at the connections on the membrane equipment where concentrate and permeate leave the membrane equipment for storage or further processing.
- A2 This 3-A Accepted Practice does not cover materials and fabrication of membrane modules. Membrane modules are covered under 3-A Sanitary Standard, 45-.
- A3 To conform to this 3-A Accepted Practice, membrane processing systems shall conform to the following criteria for design, materials of construction, fabrication techniques and installation, as applicable, 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 Accepted Practice without further reference in this document unless necessary to describe special considerations.
- B2 **3-A Sanitary Standards**

Doc. No. Title (3-A Sanitary Standard for:)

00-	General Requirements
01-	Insulated Tanks
02-	Centrifugal and Positive Rotary Pumps
04-	Homogenizers and Reciprocating Pumps
11-	Plate Type Heat Exchangers
12-	Tubular Heat Exchangers
28-	Flow Meters
32-	Uninsulated Tanks
33-	Metal Tubing
45-	Crossflow Membrane Modules
53-	Compression-Type Valves
54-	Diaphragm-Type Valves
57-	Disc-Type Valves
58-	Vacuum Breakers and Check Valves
61-	Steam Injection Heaters
62-	Hose Assemblies
63-	Sanitary Fittings