

3-A Sanitary Standards for Pneumatic Conveyors for Dry Milk and Dry Milk Products, Number 39-01

*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 Pneumatic Conveyors for Dry Milk and Dry Milk Products. 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: trugh@3-a.org.

A SCOPE

- A1 These standards cover the sanitary aspects of equipment used in systems solely for the pneumatic conveying of dry milk, dry milk products, or other dry comestibles utilizing air flow which is caused by either a pressure or vacuum differential. These standards are not intended to cover pneumatic conveying equipment or systems that are an integral part of a spray drying or instantizing system unless specifically referenced for that purpose in the applicable 3-A Sanitary Standard or 3-A Accepted Practice. The equipment begins at the point at which product enters the conveyor and ends at the point(s) where product is discharged from the conveyor. With respect to air, the equipment begins at the point where conveying air leaves the final filter and ends at the entrance of the air/product separator equipment. These standards also include any required product accumulation, conditioning and metering equipment which are located before product introduction into the conveying air pipeline and which are provided by the equipment manufacturer.

These standards do not cover the use of:

1. Air slide type conveyors which convey product using air flow through a permeable membrane type media or perforated plate.
2. Wand type pneumatic conveying equipment from open containers or bags where ambient air can be introduced to convey product.
3. Product storage bins, hoppers, silos that are part of the air/product separation equipment.
4. Bag collectors, when used as air/product separators, which are covered by 3-A Sanitary Standards for Bag Collectors, No. 40-.

- A2 In order to conform to these 3-A Sanitary Standards, pneumatic dry milk conveyors shall conform to the following design, material and fabrication criteria.¹

A3 Normative references

- A3.1 **Doc. No. Title (3-A Sanitary Standard for:)**
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| 18- | Multiple-Use Rubber and Rubber-Like Materials |
| 20- | Multiple-Use Plastic Materials |

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

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| 50- | Level Sensing Devices for Dry Products |
| 53- | Compression-Type Valves |
| 62- | Hose Assemblies |
| 65- | Sight and/or Light Windows and Sight Indicators in Contact with Product |
| 66- | Caged-Ball Valves |
| 68- | Ball-Type Valves |
| 74- | Sensors and Sensor Fittings and Connections Used on Equipment |
| 78- | Spray Devices to Remain in Place |

- A3.2 **Doc. No. Title (3-A Accepted Practice for:)**
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| 604- | Supplying Air Under Pressure in Contact with Product, and Product Contact Surfaces |
| 605- | Permanently Installed Product and Solution Pipelines and Cleaning Systems |

B DEFINITIONS

- B1 *Product:* Shall mean the dry milk, dry milk products or other dry comestibles which are conveyed pneumatically in this equipment.
- B2 *Dry Milk Conveyors* (Referred hereinafter as "conveyors"): Shall mean equipment in which product is conveyed pneumatically.
- B3 *Conveying Air:* Shall mean air in contact with and used to convey product.
- B3.1 *Air Under Positive Pressure:* Shall mean air, the pressure of which has been increased by mechanical means to exceed atmospheric pressure by one of the following methods:
- B3.1.1 *Compressors:* Shall mean equipment such as rotary screw and reciprocating piston type which compresses air to a maximum of 150 psig.
- B3.1.2 *Fans and Blowers:* Shall mean equipment such as centrifugal fans, regenerative vane and positive displacement type blowers which increases air pressure to a maximum of 15 psig.
- B3.2 *Air Under Negative Pressure:* Shall mean air, the pressure of which has been decreased by mechanical means to below atmospheric pressure by one of the following methods:

- B3.2.1 *Vacuum Pumps*: Shall mean equipment such as; rotary screw, air operated ejector and vane type which decreases air pressure to a maximum vacuum of 29 in.-Hg (737 mm-Hg).
- B3.2.2 *Vacuum Fans and Vacuum Blowers*: Shall mean equipment such as centrifugal fans, regenerative and positive displacement type blowers which decreases air pressure to a maximum vacuum of 15 in. (381 mm) Hg.
- B4 *Fluidizing/Conditioning*: Shall mean utilizing the introduction of air to improve product flowability or homogeneity.
- B5 **Surfaces**
- B5.1 *Product Contact Surfaces*:
- B5.1.1 Shall mean all surfaces that are exposed to the product and surfaces from which liquids and/or solids may drain, drop, diffuse, or be drawn into the product.
- B5.1.2 Shall mean all surfaces in contact with conveying air commencing at the discharge of the final air filter and ending at the first downstream surface in contact with the product.
- B5.2 *Nonproduct Contact Surfaces*: Shall mean all other exposed surfaces.
- B6 **Cleaning**
- B6.1 *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.
- B6.2 *Cleaned In Place (CIP)*: Shall mean mechanical cleaning of equipment, the cleanability of which has been sufficiently established such that all product or solution contact surfaces do not have to be readily accessible for inspection (for example, silo-type tanks, and welded pipelines.)
- B6.3 *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.
- B7 *Soil*: Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.
- B8 *Easily or Readily Removable*: Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.
- B9 *Easily or Readily Accessible*: Shall mean a location which can be safely reached by personnel from a floor, other permanent work area, or stable platform (permanent or moveable).
- B10 *Inspectable*: Shall mean all product contact surfaces can be made available for close visual observation.
- B11 *Simple Hand Tools*: Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.
- B12 *Nontoxic Materials*: Shall mean those substances which under the conditions of their use are in conformance to applicable requirements of the Food and Drug Administration.
- B13 *Bond*: Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.
- B14 *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.
- B15 *Substantially Flush*: Shall mean mating surfaces or other juxtaposed surfaces shall be within 1/32 in. (0.794 mm).

C MATERIALS**C1 Metals**

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series² (excluding 301 and 302) or corresponding Alloy Cast Institute (ACI) types³ (See Appendix, Section J), 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 Aluminum alloys conforming to the Aluminum Association⁴ designates 5052, 6061 and 6063 may be used as a dry product contact surface for dust covers, shields and parts having the same functional properties. These shall be removed prior to mechanical cleaning.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets, fluidizers, and flexible connectors, 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, Number 18- except that flexible tubing to distribute compressed air needs only to meet the requirements of 21 CFR 177.2600.

C2.2 Plastic materials may be used in sight and/or light openings, divertor valves and for fluidizers, gaskets and flexible connectors, 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, Number 20- except that sintered fluidizers and flexible tubing to distribute compressed air shall meet the requirements of 21 CFR Parts 170-199 or otherwise be accepted by Food and Drug Administration for food contact.

² 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.

³ Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

⁴ Aluminum Association, 420 Lexington Avenue, New York, NY 10017.

C2.3 Rubber and rubber-like materials and plastic materials having a product contact surface(s) shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and sanitization.

C2.4 Cotton, linen, synthetic or silk materials may be used for flexible connectors and filter media. These materials shall be nontoxic, nonshedding, relatively insoluble, easily cleanable, and shall not impart a flavor to the product.

C2.5 Glass may be used in sight and/or light openings and shall be of a clear heat resistant type, and conform to the applicable provisions of 3-A Sanitary Standards, Number 65-.

C2.6 The adhesive, if used, for bonding rubber and rubber-like materials and bonding plastic materials shall be nontoxic.⁵

C3 Air Filters

C3.1 Air filter media used to filter conveying air shall consist of one or more of the following materials:

C3.1.1 Fiberglass with a downstream backing dense enough to prevent fiberglass break-off from passing through, cotton flannel, wool flannel, nonwoven fabric, absorbent cotton fiber, polyester fiber or other suitable materials which, under conditions of intended use, are nontoxic and nonshedding and which do not release toxic volatiles or other contaminants to the air, or volatiles which may impart any flavor or odor to the product.

C3.1.2 Bonding materials contained in the air filter media shall be nontoxic, nonvolatile and insoluble under all conditions of use.

C3.2 Filter element sealing gaskets, if affixed to the upstream face of the filter frame, or to the filters as supplied by the filter manufacturer, shall be of nonabsorbent material. Conformance of such gaskets to the 3-A Sanitary Standard, Number 18- is not required.

⁵ Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.