

# 3-A<sup>®</sup> Sanitary Standards for Bag Collectors, Number 40-04

*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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**Note: The highlighted text denotes changes to the previous document.**

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## Foreword

This 3-A Standard establishes minimum sanitary (hygienic) requirements for Bag Collectors. 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 intent 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 3-A SSI, 6888 Elm Street, Suite 2D, McLean, VA 22101-3829, USA. By fax: 703-761-6284. By e-mail to: [3-ainfo@3-a.org](mailto:3-ainfo@3-a.org).

A **SCOPE**

A1 These standards cover the sanitary aspects of bag collectors for the dry filter entrapment and collection of particulates of dry food products from air exhausted from spray drying systems, instantizing systems, or other dry product systems beginning at the flanges or junctions of the product/air inlets of the bag collector and terminating at the flanges or junctions of the air exhaust and product outlets.

With respect to pressurized air, the bag collector starts at the air inlet to the pressurized air reservoir, or, in the case of an internal pressurized air receiver, it shall start at the air inlet to the bag collector.

With respect to processing air, if provided, the bag collector starts at the flange or junction of the processing air inlet(s).

If the bag collector is designed for mechanical cleaning, these standards include the cleaning solution pipelines, valves, and associated components integral to the bag collector.

These standards also include materials and fabrication criteria appropriate for bag collectors:

- a. to be cleaned by a variety of methods and with different degrees of prior disassembly.
- b. which have optional integral fluid bed components.

These standards do not include **equipment mounted** upstream from inlet flanges or junctions or downstream from the outlet flanges or junctions, **including but not limited to product outlet valves, isolation valves, air ducting, fans, and blowers.**

A2 In order to conform to these 3-A Sanitary Standards, bag collectors shall conform to the following design, material, and fabrication criteria, and the applicable documents referenced herein.<sup>1</sup>

B **DEFINITIONS**

B1 *Product:* Shall mean dry milk, dry milk products, and other dry comestibles.

B2 *Solutions:* Shall mean water and/or those homogenous mixtures of cleaning agents and/or sanitizers and water used for flushing, cleaning, rinsing, and sanitizing.

B3 *Pressurized Air:* Shall mean air compressed by mechanical means to exceed atmospheric pressure for uses such as pulse or reverse air cleaning of filter bags, operation of inflatable seals, dislodging of product, and purging of shaft seals, instruments, and spray cleaning devices.

B4 *Processing Air:* Shall mean filtered air which is intended to be used in contact with the product and/or product contact surfaces for fluid beds, air sweeps, drying filter bags, and similar uses.

B5 *Exhaust Air:* Shall mean air which has passed through the filter bags and is ready for discharge from the bag collector.

B6 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools, if necessary.

B7 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B8 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by an employee from a floor, platform, or other permanent work area.

B9 *Inspectable:* Shall mean surfaces which can be made available for close visual observation.

B10 *Bond:* Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B11 *Nontoxic Materials:* Shall mean those substances that under the conditions of their use are in conformance to applicable requirements of the Food and Drug Administration.

B12 **Surfaces**

B12.1 *Product Contact Surfaces:* Shall mean all surfaces that are exposed to the product or airborne product, terminating at the filter bag(s), and surfaces from which liquids and/or

<sup>1</sup> Use current revisions or editions of all referenced documents cited herein.

solids may drain, drop, diffuse, or be drawn into the product.

B12.2 *Pressurized Air Contact Surfaces:* Shall mean surfaces that are exposed to pressurized air downstream of the final pressurized air filter and terminating at the outlet of the air distribution device(s).

B12.3 *Processing Air Contact Surfaces:* Shall mean surfaces that are exposed to processing air beginning at the inlet flange(s) or junction(s) and terminating at the point(s) of introduction into contact with product or product contact surfaces.

B12.4 *Exhaust Air Contact Surfaces (Also known as Clean Air Plenum Surfaces):* Shall mean:

a. the surfaces of bag cages, plenum chambers, and appurtenances located downstream of the filter bag(s), including the exterior surfaces of pulse air or reverse air distribution devices located in exhaust air plenums, and

b. the exterior and interior surfaces of air distribution pipes located in exhaust air plenums downstream from pulse air or reverse air distribution devices.

NOTE: Flow of pressurized air through those pipes is intermittent. When there is no flow of pressurized air, the interior surfaces become exhaust air contact surfaces.

B12.5 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

## B12.6 **Surface Modification<sup>2</sup>**

B12.6.1 *Surface Treatments:* Shall mean a process whereby chemical composition or mechanical properties of the existing surface are altered. There is no appreciable, typically less than 1  $\mu\text{m}$  (39.0  $\mu\text{in.}$ ), build-up of new material.

B12.6.1.1 *Surface Treatments Include:*

- a. Mechanical (polishing)
- b. Thermal (surface hardening laser, electron beam)
- c. Electropolishing

B12.6.2 *Coatings on surfaces other than filter bags:* 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  $\mu\text{m}$  (39.0  $\mu\text{in.}$ ), build-up of new material. The coating material does not alter the physical properties of the substrate.

B12.6.2.1 *Coating Processes Include:*

- a. Chemical (conversion coatings)
- b. Chemical vapor deposition
- c. Overlays and encapsulation

## B13 **Cleaning**

B13.1 *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.

B13.2 *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 re-circulating pump(s), and with all cleaning aids manipulated by hand.

B13.3 *Dry Cleaning:* Shall mean cleaning with a vacuum cleaner and/or dry brushes and other tools.

B13.4 *Sanitize, Sanitizing:* 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  $\log_{10}$  reductions (99.999%) to 7  $\log_{10}$  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.

<sup>2</sup> Additional information on surface modification is contained in *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.

**B14 Component Equipment**

**B14.1** *Fire or Explosion Suppression or Deluge Systems:*

**B14.1.1** *Fire Suppression System:* Shall mean equipment which quickly introduces a substance(s) to reduce the level of oxygen required for combustion.

**B14.1.2** *Deluge System:* Shall mean equipment for the quick introduction of water to extinguish fire.

**B14.1.3** *Explosion Suppression System:* Shall mean equipment for the extremely fast introduction of a substance(s) to eliminate or minimize the damaging effect of catastrophic combustion.

**B14.2** *Pressure Relief:* Shall mean equipment which will vent excessive pressures in the system so that structural and mechanical damage is avoided or minimized.

**B14.3** *Fluid Beds:* Shall mean equipment which suspends and moves product particles using processing air forced through a fluid bed screen.

**B14.4** *Fluid Bed Screens:* Shall mean thin metal sheets, which have perforations for the transmission of processing air.

**B14.5** *Product Conveyors:* Shall mean equipment which mechanically conveys product.

**B14.6** *Pulse Air Or Reverse Air Distribution Devices (Air Distribution Devices):* Shall mean equipment which distributes pressurized air for pulsing or reverse air cleaning of filter bag(s). Air distribution devices may be valves.

**B14.7** *Pulse Air or Reverse Air Reservoir (Air Reservoir):* Shall mean a receptacle for accumulating or storing pressurized air. The device may be a manifold or a component of an air distribution device.

**B14.8** *Venturis:* Shall mean all devices which direct and amplify the effect of pressurized air for the pulsing or reverse air cleaning of filter bags.

**B14.9** *Filter Bags (Bags):* Shall mean the nonpleated media which serves as the means of entrapment of suspended particles from a stream of air.

**B14.10** *Bag Cages:* Shall mean rigid frames to provide support to the filter bags.

**C MATERIALS****C1 PRODUCT, PRESSURIZED AIR, PROCESSING AIR, AND EXHAUST AIR CONTACT SURFACES****C1.1 Metals**

**C1.1.1** Product contact surfaces, processing air contact surfaces, pressurized air contact surfaces, and exhaust air contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) Series<sup>3</sup> 300 (except 301 and 302) or Corresponding Alloy Cast Institute (ACI) types<sup>4</sup> (See Appendix, Section F.), 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:

**C1.1.1.1** Aluminum alloys conforming to the Aluminum Association<sup>5</sup> designates A-360, A-380, A-319, A-315G and Danish Standard<sup>6</sup> DS3002 designates Number 4261 or Number 4253, may be used in exhaust air contact surfaces for venturis or for construction of pressurized air distribution devices.

**C1.1.2** Stainless steel surfaces of bag collectors may be modified by surface treatment or coatings to provide a nonstick surface, reduce product retention, and prevent galling on moving surfaces. Product contact surfaces of stainless steel pressure relief panels which have perforations and/or grooves may be modified by surface treatment or coating as defined in Section B12.6 to provide a cleanable, functional surface.

<sup>3</sup> 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.

<sup>4</sup> Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

<sup>5</sup> The Aluminum Association, 900 19th Street, N.W., Suite 300, Washington, D.C. 20006.

<sup>6</sup> Danish Standard DS3002—Standards may be ordered via [www.en.ds.dk](http://www.en.ds.dk) (Website in English) or Danish Standards Association, Kollegievej 6, 2920 Charlottenlund, Denmark, e-mail: [dansk.standard@ds.dk](mailto:dansk.standard@ds.dk).

**C1.2 Nonmetals**

- C1.2.1 Rubber and rubber-like materials may be used for short flexible connectors, gaskets, inflatable seals, plugs for pressure relief and fire suppression devices and openings and similar functional purposes.
- C1.2.2 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-.
- C1.2.3 Plastic materials may be used for short flexible connectors, gaskets, coatings (as provided for in Section C1.1.2), sight and/or light openings, venturis, pressure relief port membranes, coverings for pressure relief and fire and explosion suppression devices, sliding sealing surfaces for air distribution devices and parts having the same functional purposes.
- C1.2.4 Plastic materials when used for the above-specified applications, except for coatings, shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-.
- C1.2.4.1 Coatings shall meet 21 CFR 177<sup>8</sup> or be on the FDA Premarket Notification List.
- C1.2.5 Bonded rubber and rubber-like materials and bonded plastic materials 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 bactericidal treatment.
- C1.2.6 The adhesive, if used, for bonding rubber and rubber-like materials and bonding plastic materials shall be nontoxic.<sup>7, 8</sup>
- C1.2.7 Filter bags may be made of cotton, wool, linen, silk, or synthetic fibers. The filter bags may optionally be covered by an expanded synthetic membrane laminate. When necessary to control static electrical charges, metallic fibers conforming to C1.1.1 may be incorporated into the bags. These materials shall be nontoxic, relatively insoluble in water, easily cleanable

and shall not impart particulate material or a flavor to the product.

- C1.2.8 All plastic materials referenced in Section C1.2.7 shall be constructed of materials meeting Title 21, Part 170-199 of the Code of Federal Regulations<sup>8</sup>, or be otherwise accepted by the Food and Drug Administration for repeated food contact.
- C1.2.9 Plastic materials which meet Section C1.2.8 may be used for flexible tubing and fittings for such tubing, used to distribute pressurized air for purging shaft seals and for sensing air pressure or flow as described in Section D1.9.1.
- C1.2.10 Rubber and rubber-like materials which meet applicable FDA regulations 21 CFR 177.2600<sup>8</sup> may be used for flexible tubing to distribute pressurized air for purging purposes described in Section D1.9.1. Fittings and connections for such tubing may be made of stainless steel or of plastic specified in Section C1.2.8.

**C2 NONPRODUCT CONTACT SURFACES**

- C2.1 All nonproduct contact surfaces shall be of corrosion-resistant material or material that is rendered corrosion resistant. If coated, the coating used shall adhere. All nonproduct contact surfaces shall be relatively nonabsorbent, durable, and cleanable. Parts removable for cleaning having both product contact surfaces and nonproduct contact surfaces shall not be painted.

**D FABRICATION****D1 PRODUCT, PRESSURIZED AIR, AND EXHAUST AIR CONTACT SURFACES—GENERAL CRITERIA****D1.1 Coatings**

- D1.1.1 Coatings, if used, shall be free from surface delamination, pitting, flaking, spalling, blistering and distortion when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment.
- D1.1.2 Plastic materials, when used as a coating, shall be at least 0.00100 in. (0.0250 mm) thick.

<sup>7</sup> Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings.

<sup>8</sup> Documents for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

**D1.2 Threads**

D1.2.1 There shall be no threads on these surfaces, except that:

D1.2.1.1 Surfaces provided for in D3.1.2 may have exposed threads.

D1.2.1.2 ACME type threads may be used for connections of pulse air or reverse air piping. In such case(s) the threads shall be ACME type as specified in the 3-A Sanitary Standards for Sanitary Fittings for Milk and Milk Products, Number 63- or the American Standard Stub Acme Thread. (See Appendix, Section P.) The length of the nut for either of the threads shall not exceed 3/4 of the basic thread diameter. The nuts shall be of the open type. Equipment components with exposed threads as described above shall be designed for manual cleaning. The nuts shall be installed on the piping components which are removed for manual cleaning.

D1.2.1.3 Threads may be enclosed by using cap nuts and appropriately located O-rings or flush-fitting gaskets for essential functional reasons in the following applications:

D1.2.1.3.1 Special flange connections necessary to attach removable solution piping, pulse air piping, and air distribution devices.

D1.2.1.3.2 Attachment of inspection ports.

D1.2.1.4 Equipment with enclosed threads shall be designed for mechanical cleaning.

**D1.3 Springs**

D1.3.1 Any coil spring shall have at least 3/32 in. (2.38 mm) openings between coils, including the ends, when the spring is in the free position. Coil springs intended for mechanical cleaning shall be made of round material, and shall not have flattened ends.

**D1.4 Bearings**

D1.4.1 Bearings having these surfaces shall be of a nonlubricated type.

D1.4.2 Lubricated bearings, including the permanently sealed type, shall be located outside these surfaces with at least 1 in. (25.4 mm) clearance

open for inspection between the bearing and these surfaces.

**D1.5 Shafts**

D1.5.1 Where a shaft passes through these surfaces, the portion of the opening surrounding the shaft shall be protected to prevent the entrance of contaminants and unfiltered air.

**D1.6 Gaskets and Seals**

D1.6.1 Gaskets having these surfaces shall be removable or bonded.

D1.6.2 Foam rubber or hollow tubular gaskets shall not be used, except that:

D1.6.2.1 Hollow tube material may be used only as inflatable seals using pressurized air. When hollow tube material is used as inflatable seals, a pressure sensing device and alarm shall be provided to detect rupture of, or air leakage from, hollow tube material, and

D1.6.2.2 The manufacturer shall provide means to test the alarm.

D1.6.3 Grooves in gaskets shall be no deeper than their width, unless the gasket is readily removable and reversible for cleaning.

D1.6.4 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings 1/4 in. (6.35 mm) or smaller, and those provided for in the 3-A Standards referenced in Section D1.8.1 and D1.9.1.

**D1.7 Bonded Materials**

D1.7.1 Bonded rubber and rubber-like materials and bonded plastic materials shall be bonded in a manner that the bond is continuous and mechanically sound so that when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.