

Department of Primary Industry

**AUSTRALIAN CODE OF PRACTICE
FOR DAIRY FACTORIES**

June 1986

Appendix VI

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Appendix vi— 3-A: Accepted practices for supplying air under pressure in contact with milk, milk products and product contact surfaces

Number 604-03

Formulated by International Association of Milk, Food and Environmental Sanitarians, United States Public Health Service, The Dairy Industry Committee

It is the purpose of the IAMFES, USPHS and DIC in connection with the development of the 3-A Sanitary Standards program to allow and encourage full freedom for inventive genius or new developments. Practices for supplying air under pressure heretofore or hereafter developed which so differ in material, fabrication and installation or otherwise as not to conform with the following practices, but which, in the opinion of the operator, manufacturer or fabricator are equivalent or better, may be submitted for the joint consideration of IAMFES, USPHS, and DIC, at any time.

A **Scope**

- A.1 These 3-A Accepted Practices shall pertain to the equipment used in the supplying of air under pressure which comes in contact with milk or milk products and/or product contact surface.
- A.2 In order to conform with these 3-A Accepted Practices, equipment for supplying air as defined herein shall comply with the following design, material and fabrication criteria and the applicable Special Requirements.

B **Definitions**

- B.1 *Air under pressure:*
Shall mean air, the pressure of which has been increased by mechanical means to exceed atmospheric pressure, and which is used for agitation of milk and milk products, the movement of milk and milk products, incorporation of air into frozen dessert and frozen dessert mixes, and whipped butter, the automatic opening of containers, the drying of product contact surfaces, and for other purposes where specifically directed at a product contact surfaces.
- B.2 *Low pressure air:*
Shall mean air under pressure which does not exceed 300 p.s.i.
- B.3 *High pressure air:*
Shall mean air under pressure which is in excess of 300 p.s.i.
- B.4 *Air systems:*
Air systems are of two general categories:

B.4.1 *Central system:*
Shall mean those which furnish air to more than one piece of equipment. (See Figure No. 1.) Such systems usually require the use of an air storage tank.

B.4.2 *Individual system:*
Shall mean those which furnish air to one piece of equipment, and which may be an integral part of a given piece of equipment. (See Figures No. 2, No. 3, No. 4, and No. 5.)

B.5 *Product:*
Shall mean milk, milk products, frozen dessert and frozen dessert mixes, and whipped butter.

B.6 *Product contact surface:*
Shall mean all surfaces that are exposed to the product, or from which liquid may drain, drop, or be drawn into the product.

B.7 *Non-product contact surface:*
Shall mean all other exposed surfaces.

C Material

C.1 *Filter media:*
Intake and air pipeline filters shall consist of fiberglass with a downstream backing dense enough to prevent fiberglass break off from passing through, cotton flannel, wool flannel, spun metal, sintered metal, activated carbon, activated alumina, non-woven fabric, absorbent cotton fibre, or other suitable materials which, under conditions of intended use, are non-toxic and non-shedding and which do not release toxic volatiles or other contaminants to the air, or volatiles which may impart any flavour or odor to the product. Chemical bonding materials contained in the media shall be non-toxic, non-volatile and insoluble under all conditions of use. Disposable media are not intended to be cleaned and re-used.

Note:

Electronic air cleaners use electro-static precipitation principles to collect particulate matter and therefore are not included in the preceding list of acceptable filter media. This does not preclude their use.

C.2 *Filter performance:*

C.2.1 *Intake filters:*
The efficiency of intake filters shall be at least 50% as measured by the National Bureau of Standards "Dust Spot Method",¹ using atmospheric dust as the test aerosol. In an aggravated atmospheric environment, such as industrial districts, prefilters are recommended to prolong the useful life of intake filters.

C.2.2 *Air pipeline and disposable filters:*
The efficiency of either air pipeline filters or disposable filters shall be at least 50% as measured by the DOP² test.

¹ For a description of this method see: Dill, R.S., A Test method for air filters. Amer. Soc. Heating and Vent. Eng. Trans., Vol 44, p. 379, 1938.

² Dioctylphthalate fog method ("DOP"). For a description of this test see: Military Standard No. 282 (MIL-STD-282, 28 May, 1956) — Method 102.9.1; Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

- C.3 *Piping:*
Air distribution piping, fittings, and gaskets between the downstream terminal filters and the processing equipment except where the compressing equipment is of the fan or blower type or high pressure type and except as provided in the Section II shall conform to "3-A Sanitary Standards for Fittings used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Serial #0809", as amended and supplements thereto, except that where air distribution piping, or fittings and gaskets do not actually contact the product or form a part of the product contact surfaces, transparent plastic tubing may be used.

D Fabrication and installation

D.1 *Air supply equipment:*

- D.1.1 The air supply shall be taken from a clean space or from relatively clean outer air and shall pass through a filter upstream from the compressing equipment. This filter shall be so located and constructed that is easily accessible for examination, and the filter media are easily removable for cleaning or replacement. This filter shall be protected from weather, drainage, water, product spillage, and physical damage.
- D.1.2 Relatively oil free air may be produced by one of the following known methods or its equivalent:
- D.1.2.1 Use of carbon or teflon ring piston, or diaphragm type, or water-lubricated compressors.
- D.1.2.2 Use of oil-lubricated compressors with effective provision for removal of oil.
- D.1.2.3 Water-lubricated or non-lubricated blowers.
- D.1.3 An air tank(s), if used, should meet the requirements of ASME and/or National Board of Underwriters Code for unfired pressure vessels.

D.2 *Moisture removal equipment:*

If necessary to cool the compressed air, a liquid-cooled aftercooler shall be installed between the compressor and the air storage tank for the purpose of removing moisture from the compressed air (See Figure No. 1), except that a compressor the design of which incorporates the aftercooling function does not require a separate aftercooler. Other moisture removal equipment may be used downstream from the compressing equipment prior to the final point of application. The resultant condensate from the aftercooler shall flow to a properly trapped outlet and shall be discharged to the atmosphere.

D.3 *Filters and moisture traps:*

- D.3.1 Filters shall be constructed so as to assure effective passage of air through the filter media only.
- D.3.2 The air under pressure shall pass through an oilfree filter and moisture trap for removal of solids and liquids. The filter and trap shall be located in the air pipeline downstream from the compressing equipment, and from the air tank, if one is used. (See Figures No. 1 and No. 2.) The filter shall be readily accessible for examination, cleaning, and for replacing the filter media. The moisture trap shall be equipped with a petcock or other means for draining accumulated water. Air pipeline filters and moisture traps downstream from compressing equipment shall not be required where the compressing equipment is of the fan or blower type. (See Figures No. 3 and No. 4.)

- D.3.3 A disposable media filter shall be located in the sanitary air pipeline upstream from and as close as possible to each point of application or ultimate use of the air (See Figures No. 1, No. 2 and No. 5), except that a disposable media filter shall not be required for high pressure air lines or where the compressing equipment is of the fan or blower type (See Figures No. 3 and No. 4).
- D.3.4 Filters other than those in D.3.2 shall not be required on high pressure lines.
- D.4 *Air piping:*
The requirements of D.4 which follow do not apply where the compressing equipment is of the fan or blower type nor do they apply to high pressure lines (See Section 1).
- D.4.1 The air piping from the compressing equipment to the filter and moisture trap described under D.3.2. shall be readily drainable.

Figure 1 — Central system

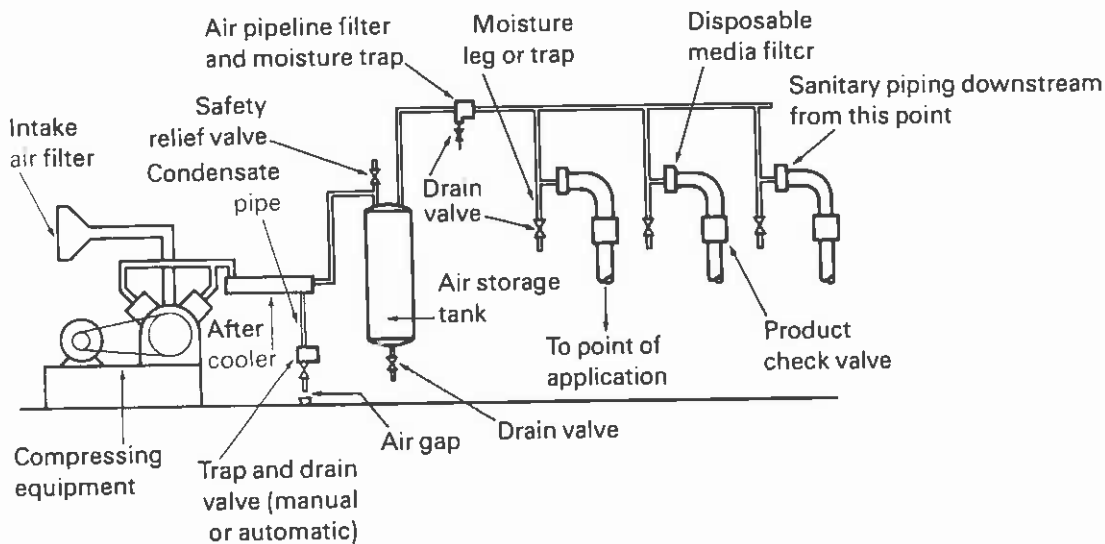


Figure 2 — Individual system

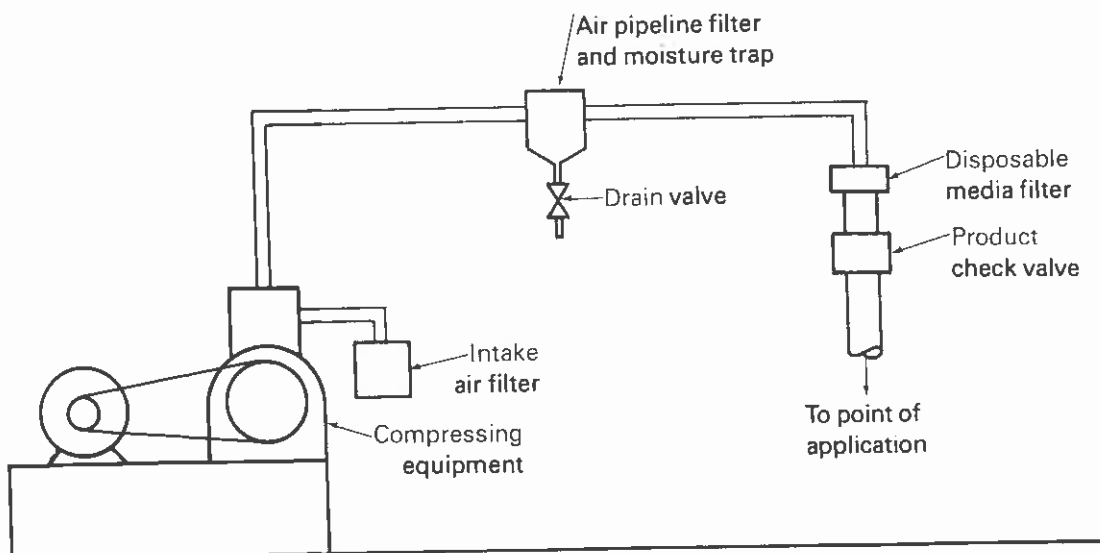


Figure 3 — Individual system

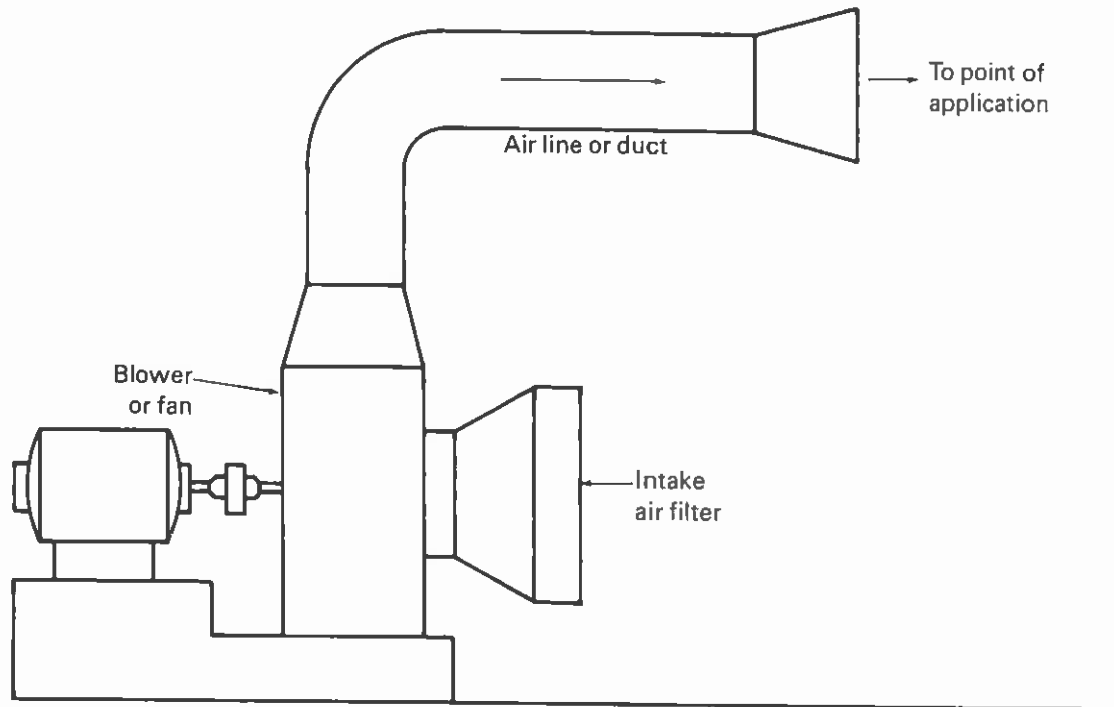
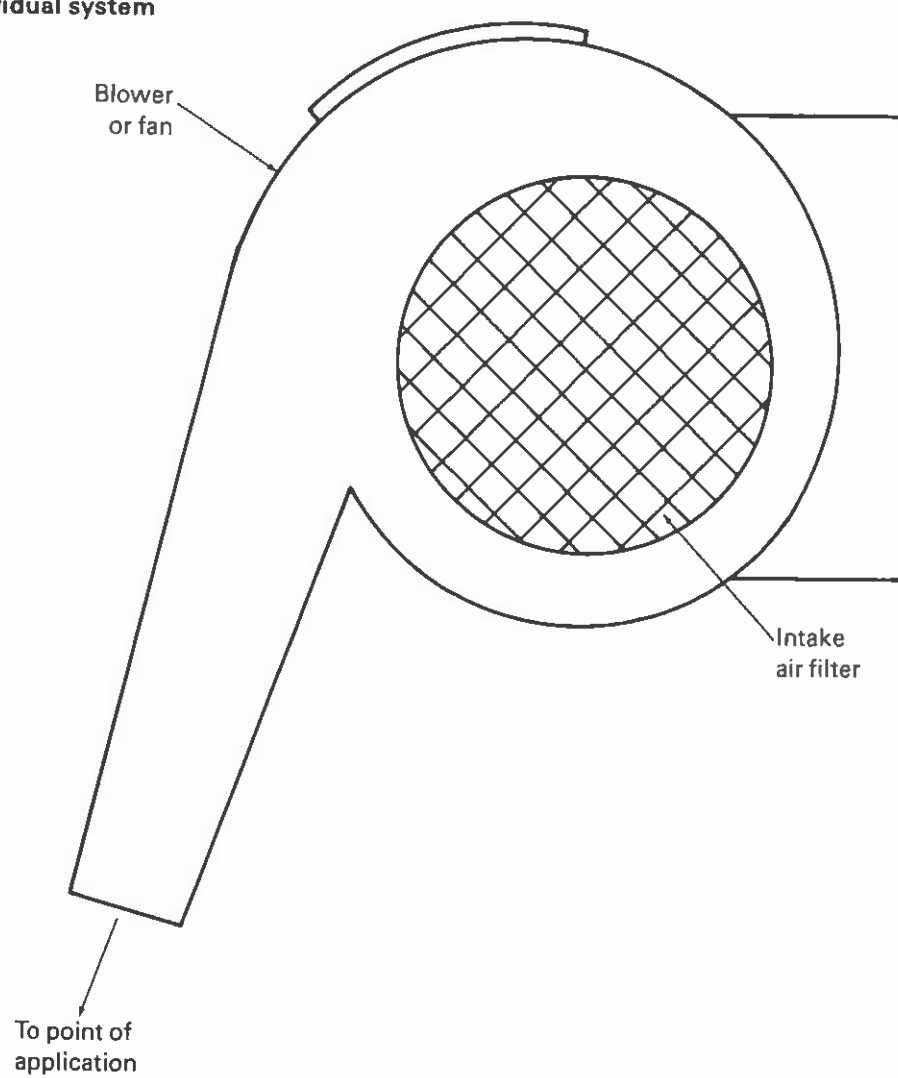


Figure 4 — Individual system



- D.4.2 A product check valve of sanitary design which complies with the criteria set forth in Section E.1 of the "3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Serial #0809", as amended and supplements thereto, shall be installed in the air piping downstream from the disposable media filter described in D.3.3 to prevent backflow of product into the air pipeline; except that a check valve shall not be required if the air piping enters the product zone from a point higher than the product overflow level which is open to atmosphere.

E Special requirements for agitation by air

- E.1 Tubing used to introduce air into the product and/or product zone shall be of stainless steel and shall conform to "3-A Sanitary Standards for Fittings Used on Milk and Milk Products Equipment and Used on Sanitary Lines Conducting Milk and Milk Products, Serial #0809", as amended and supplements thereto.
- E.2 There shall be no threads on product contact surfaces.
- E.3 Where drilled or perforated pipe is used, internal drilling burrs shall be removed and the orifices shall be chamfered on the outer surface of the pipe.
- E.4 If the volume of the air from the compressing equipment is in excess of that required for satisfactory agitation, suitable means should be employed to eliminate the excess volume.
- E.5 If the product to be agitated is in an enclosed tank, means to allow the air used for agitation to escape should be provided on the tank by a vent or a safety valve as described in F.2.

F Special requirements for the movement of products by air displacement method

- F.1 The requirements of E.1, E.2 and E.3 shall also apply to this section.
- F.2 A safety (pressure relief) valve should be installed in the air line. This valve should be set to open upon reaching a pressure not greater than the maximum allowable internal working pressure specified by the manufacturer of tank from which the product is to be moved. This safety valve should have ample capacity to freely pass the entire output of the compressor.
- F.3 The safe internal working pressure of the tank should be stated on a plate attached to the tank.
- F.4 The check valve specified in D.4.2 shall be installed in the air piping wherever air is used for displacement purposes.

G Special requirements for air which is to be incorporated in products

An air system in which the air is compressed by a sanitary rotary pump shall require only an intake air filter which shall be of the disposable media type. Non-sanitary air line should be pitched away from sanitary air inlet pipeline, or a transparent sump shall be provided to collect any moisture or scale that may originate from the non-sanitary air line.

H Special requirements for moving containers from rotating mandrels

- H.1 When air under pressure is used for moving containers from rotating mandrel assemblies with integral air passages, the parts forming the air passages shall be of non-toxic, relatively non-absorbent materials.

H.2 A disposable media filter shall be located at the closest possible point upstream from rotating mandrel assembly (See Figure No. 5).

I Special requirements for high pressure air which is to be incorporated in products

When high pressure air is to be incorporated in products:

I.1 Stainless steel piping, tubing, and fittings in conformity with applicable ASA Standards for high pressure air should be used downstream from the filter.

I.2 A high pressure stainless steel check valve should be installed upstream from and as near as possible to the point of introduction of air to the product line.

These Practices are effective June 23, 1972, at which time the "3-A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products and Product Contact Surfaces," published April 1984, effective July 26, 1964, Serial #60400 and amendments thereto, are rescinded and become null and void.

Selected reference

Friedlander, Silverman, et al — *Handbook on Air Cleaning*. Atomic Energy Commission, 1952, U.S. Government Printing Office, Washington, D.C. 20402.

Figure 5 — Rotating mandrel assembly

