

Department of Primary Industry

**AUSTRALIAN CODE OF PRACTICE
FOR DAIRY FACTORIES**

June 1986

Section B

Produced Under the Auspices of:
Chief Dairy Officers Committee

Australian Government Publishing Service
Canberra 1986

R85/1301 Cat. No. 86 0639 7

Section B— Services and equipment

Table of contents

Part I—Services		
<i>Clause</i>		
B1	Service lines	29
B2	Water	29
B3	Re-use of potable water	31
B4	Steam	31
B5	Steam and water hoses	31
B6	Hose points	31
B7	Compressed air	31
B8	Refrigeration	32
Part II—Equipment		
B9	Construction and cleaning	32
B10	Equipment and utensils	32
B11	Canning equipment requirements	33
B12	Stairs, platforms and stands	33
B13	Metallic surfaces	33
B14	Stainless steel standards	33
B15	Pipelines and fittings	33
B16	Non-metallic surfaces	33
B17	Accessibility and installation	33
B18	Distance from walls and ceilings	34
B19	Internal inspection	34
B20	Cleaning-in-place	34
B21	Design and construction	34
B22	Storage tanks	34
B23	Thermometers	35
B24	Installation of thermometers	35
B25	Air supply to equipment	35

Section B— Services and equipment

Part I—Services

Service lines

- B1.1 Each service line in the building shall be identified at outlet points and at intervals along the lines in accordance with AS 1345: Rules for the Identification of Piping Conduits and Ducts 1972.
- B1.2 Fixtures, pipes and ducts shall not be suspended over working areas in such a manner that condensation, dust or leaks may contaminate dairy produce or equipment.

Note:

Factory buildings should be designed in such a way that service lines are kept outside manufacturing rooms as far as is practicable.

Water

- B2.1 There shall be an ample supply of both hot (75°C and above) and cold water of potable quality, protected against contamination and suitably distributed throughout the plant.

Note:

Hot water may be supplied by the use of steam mixers at the cold water outlets if the steam is of culinary standard.

- B2.2 Potable water supplies shall comply with the World Health Organisation, International Standards for Drinking Water (1971). These are as follows:
- (a) throughout any consecutive 12 months, 95% of samples shall not contain any coliform organisms in 100 mL;
 - (b) no sample shall contain *E. coli* in 100 mL;
 - (c) no sample shall contain more than 10 coliform organisms per 100 mL; and
 - (d) coliform organisms shall not be detected in 100 mL of any two consecutive samples;

Unless exempted by the relevant Dairy Authority, water supplies designated as being of potable quality shall be sampled at specified outlets within the establishment on not less than twenty days in twelve months and at least once monthly. Results of tests on these samples shall be recorded and retained for inspection by the relevant Dairy Authority.

Methods of sampling and bacteriological analysis of water shall be according to AS 2031 Part 2. Recommendation for the Selection of Containers and Preservation of Water Samples for Chemical and Microbiological Analysis, and AS 1095 Part 4, Section 1, Microbiological Examination of Water for Dairy Purposes, respectively.

- B2.3 Where chlorination of water is carried out by a dairy factory, the available chlorine content shall be monitored at least once daily and the results of all tests shall be recorded and retained for inspection by the relevant Dairy Authority.

B2.4 Chlorinated water coming into contact with dairy products shall have an available chlorine content of not more than 0.5 mg/L except where it can be demonstrated that higher levels have no adverse effect on product, the chlorine content, contact time or pH shall be such as to ensure bactericidal activity adequate for the intended purpose.

B2.5 Water of potable standard shall not exceed the following standards for chemical and physical quality:

(a) Toxic Chemicals	mg/L
Arsenic	0.05
Cadmium	0.01
Cyanide	0.05
Lead	0.1
Mercury	0.001
Selenium	0.01
Fluoride	1.0
Nitrates plus nitrites (as nitrate)	45

(b) Physical and Chemical Properties	mg/L (except where otherwise stated)
Colour	50 units
Taste	unobjectionable
Odour	unobjectionable
Turbidity	25 units
Filtrable residue	500
Hardness (as CaCO ₃)	300 ppm
Oil and grease	not detectable
Oxygen consumed by 5 day BOD Test	20
Phenolics	0.001
Copper	0.05
Iron	0.1
Manganese	0.05
Sulphate	60
Chloride:	
—Highly desirable	200
—Maximum permissible	600
pH	6.5–9.2

B2.6 Any tank used for the storage of potable water shall be fully covered and protected against the entry of dust, pests and sunlight. The interior of each such tank shall be kept clean.

B2.7 Only potable water shall be used for product contact applications.

Note:

Non-potable water may be used in boilers, in condensers, in the non-product passes in heat exchangers, for toilet flushing, fire-fighting and outside cleaning.

B2.8 Non-potable water shall be distributed in a piping system separate from potable water. The system shall preclude the possibility of contaminating potable water, equipment surfaces and dairy produce with non-potable water. There shall be no non-potable water outlets in manufacturing rooms except those used for fire-fighting.

B2.9 Signs shall be placed near all non-potable water outlets advising personnel of its unsuitability for manufacturing use or for drinking.

Re-use of potable water

- B3.1 Water used for the cooling of canned product shall only be recirculated if:
- (a) it is effectively chlorinated so that the level of residual chlorine is not less than 1.0mg/L sampled at any point within the system;
 - (b) it is filtered before re-use; and
 - (c) all storage tanks, cooling towers, pipelines or the like, utilised in handling the re-used water are constructed in such manner as to facilitate inspection and cleaning.

Steam

- B4.1 Steam shall be supplied in sufficient volume, quality and pressure for the satisfactory operation of each applicable piece of equipment. Where other heating media are used the supply shall be sufficient to meet the above requirements.
- B4.2 Steam which comes into direct contact with dairy produce shall be free of toxic or contaminating materials. Only boiler water compounds suitable for food industry application shall be used in the preparation of such steam. Steam traps, strainers and condensate traps shall be used wherever applicable to ensure a satisfactory and safe steam supply. The steam shall comply with the 3A Accepted Practices for a Method of Producing Steam of Culinary Quality No. 609-00 (1979). Refer to Appendix V.

Note:

Australian regulations do not specifically list the boiler water additives that may safely be used in the preparation of steam which will come into contact with food. There is however, a general overriding consideration as noted by the National Health and Medical Research Council (NHMRC), that:

Unless specifically permitted by the Pure Food Regulations, the presence in food of any substance foreign to food is prohibited.

Steam and water hoses

- B5.1 Hoses that supply steam and/or potable water to dairy products or product contacting surfaces shall be made from materials that will not cause tainting of dairy products and shall comply where appropriate with the relevant section of AS2070—(plastics materials for food contact use).
- B5.2 Hoses shall be maintained in a clean and sound condition.

Hose points

- B6.1 Hose points shall be provided.
- B6.2 Hose racks shall be provided at each hose point and shall be constructed of rust resistant materials.
- B6.3 Hoses shall be placed in racks provided when not in use.

Compressed air

- B7.1 Compressed air which comes into direct contact with dairy produce or equipment surfaces which contact dairy produce shall comply with the 3A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products and Product Contact Surfaces (1972). Refer to Appendix VI

Note:

- (i) The method of bacteriological analysis of air should be in accordance with AS1095 Part 4, Section 2, Microbiological Examination of Air for Dairy Purposes.
- (ii) As compressed air is highly dangerous if misused, the requirements of the relevant State authority with responsibility for industrial safety, including appropriate warning signs, should be observed.

Refrigeration

- B8.1** Sufficient refrigeration capacity shall be available to maintain storage temperatures for finished products at appropriate levels and also to chill and maintain raw and pasteurised milk and cream at a temperature not greater than 4°C.

Part II—Equipment

Construction and cleaning

- B9.1** Equipment and utensils used for the manufacture of dairy produce, and collection or transport of dairy produce other than in a packaged form, shall be capable of being readily taken apart for cleaning and sanitising or constructed and designed for cleaning-in-place.
- B9.2** After each use such equipment shall be cleaned, and where necessary, sanitised prior to use. (All product contact surfaces shall be sanitised prior to use.)
- B9.3** All equipment shall be designed, constructed and maintained to prevent extraneous matter contamination of product.

Equipment and utensils

- B10.1** Equipment and utensils shall be so designed, constructed, installed, operated and maintained to prevent hygienic hazards and to permit easy and thorough cleaning. Glass utensils shall not be used in manufacture areas.
- B10.2** All food contact surfaces shall be:
- (a) non-absorbent;
 - (b) free from pits, crevices and loose scale;
 - (c) smooth;
 - (d) non-toxic;
 - (e) unaffected by food products; and
 - (f) capable of withstanding repeated exposure to normal cleaning.
- B10.3** Re-usable product containers, tubs or bins for edible and inedible product shall be smooth, impervious and easy to clean.
- B10.4** Containers, tubs or bins used for inedible product shall be clearly identified as such.

Canning equipment requirements

- B11.1 Thermal processing equipment shall comply, where applicable, with the requirements specified in Australian Standard AS 2478 - 1981, Equipment for Processing Low Acid Foods in Hermetically Sealed Containers — Essential Design Features and Performance Requirements.

Stairs, platforms and stands

- B12.1 Stairs, catwalks, stands, platforms, ladders and the like in processing areas shall:
- (a) be of a material and construction that is impervious to water, non-slip, easy to clean, and impact resistant; and
 - (b) be so situated and constructed as not to constitute a contamination hazard through particles falling into food or onto food processing equipment.

Metallic surfaces

- B13.1 Any metallic surfaces of equipment such as holding tanks, pumps, coolers and pipelines, which come into contact with dairy produce, shall be constructed of stainless steel or other materials approved by the relevant Dairy Authority.

Stainless steel standards

- B14.1 All product contact surfaces shall be finished to at least Ra 1.0 micrometer on stainless steel sheet, as determined by the method given in BS1134 Part 1, Method for the Assessment of Surface Texture, except where otherwise approved by the Dairy Authority.

Pipelines and fittings

- B15.1 The materials and surface finish of milk pipelines and fittings shall comply with AS 1528, Tubes (Stainless Steel) and Tube Fittings for the Food Industry Part 1 (1973), Part 2 (1976), Part 3 (1975), Part 4 (1976), except that the use of pipelines of other materials may be approved by the relevant Dairy Authority.

Non-metallic surfaces

- B16.1 The materials for non-metallic product contact surfaces other than glass shall meet the requirements of the 3A Sanitary Standard for Multiple-use Rubber and Rubber-like Materials Used as Product Contact Surfaces for Dairy Equipment No. 18-00 (1963) or 3A Sanitary Standard for Multiple-use Plastic Materials Used as Product Contact Surfaces for Dairy Equipment No. 20-13 or other standards accepted by the relevant Dairy Authority. Refer to Appendices VII and VIII.

Note:

Glass, where allowed, should be of a borosilicate type with a coefficient of expansion between 3.0 and 3.5 parts per million per degree Celsius in the range 30°C to 300°C.

Accessibility and installation

- B17.1 All equipment and piping shall be designed and installed so as to be easily accessible for cleaning and inspection and installed so as not to interfere with the free flow of drainage. They shall be kept in good repair, free from cracks and corroded surfaces, with a seal around the feet of all equipment, except where equipment is supported on "ball" feet.

Distance from walls and ceilings

- B18.1 New or re-arranged items of equipment shall be set away from walls, ceilings, columns and other equipment at a minimum distance of 0.6m unless otherwise approved and be spaced in such a manner as to be accessible for proper cleaning, inspection and maintenance.

Note:

Equipment and pipelines passing through walls and ceilings are permitted, if complying with Section A.

Internal inspection

- B19.1 All interior parts of equipment, fittings or pipes (except piping which is cleaned-in-place) shall be accessible for inspection. Pumps for dairy produce shall be of a sanitary type, and easily dismantled for cleaning or constructed to allow effective cleaning-in-place.

Cleaning-in-place

- B20.1 All cleaning-in-place systems shall be designed and operated in a manner which ensures:

- (a) adequate cleaning and sanitising of equipment; and
- (b) prevention of product contamination with residues of detergents or sanitisers.

Note:

Design methods and practices for cleaning-in-place of dairy factory equipment are described in AS2541, 1982, Guide to the Cleaning-In-Place of Dairy Factory Equipment.

Design and construction

- B21.1 Except where technical reasons make it undesirable, all bearings shall be located outside the product contact zone and, if adjacent thereto, shall be constructed with a seal at the entrance of the shaft into the product contact zone.
- B21.2 Bearings within the product contact zone shall be of a design approved by the Dairy Authority.
- B21.3 Internal corners of all equipment shall be coved with a minimum radius of 6mm where practicable to facilitate cleaning.
- B21.4 All welded joints within the product contact zone, with the exception of internal surfaces of pipelines, shall be properly cleaned and ground to a continuous, smooth, even and relatively flush finish.
- B21.5 All welding of pipelines that may convey dairy produce shall be carried out by the Tungsten Inert Gas (TIG) method or other equally satisfactory method. Welded pipelines shall comply with AS 1528 Tubes (Stainless Steel) and Tube Fittings for the Food Industry Part 1 (1973), Part2 (1976), Part 3 (1975), Part4 (1976).

Storage tanks

- B22.1 Unless otherwise specifically approved by the relevant Dairy Authority for technological reasons, no storage tank for dairy produce shall have any opening to the air other than to the interior of a room in which dairy produce is manufactured.
- B22.2 Unless exempted by the relevant Dairy Authority permanent external access to the top of storage tanks shall be provided.

Thermometers

- B23.1 Thermometers which include glass in their construction shall not be used in any application where glass may come into contact with dairy produce or product contacting surfaces.
- B23.2 The accuracy of all thermometers, automatic recording thermometers, indicating and recording instruments and automatic flow diverting equipment shall be checked regularly in accordance with the following schedule:

<i>Instrument or Thermometer Type</i>	<i>Frequency of checking</i>	<i>Accuracy</i>	<i>Reference instrument</i>
Recorder—Controller and Flow Diversion Valve for Pasteurisers	Daily	± 0.2°C at the diversion temperature	Mercury in-glass thermometer
Recording Thermometers	Monthly	± 1% of appropriate chart range	Certified reference thermometer
Dial Type and Digital Type Thermometers	Monthly	± 1 graduation interval	Certified reference thermometer
Mercury-in-glass Thermometer	6 months	± 1 graduation interval	Certified reference thermometer
Reference Thermometer	6 months		Zero point (melting ice)
	5 years		Standard calibrating thermometer

B23.3 Thermometers shall comply with AS 1030 Dial-type General Purpose Thermometers for use in the Dairying Industry (1973) and AS 1031 Metal Cased Mercury-in-glass Thermometers for use in the Dairying Industry (1973).

B23.4 A record of thermometer accuracy checks shall be kept and made available for inspection by the relevant Dairy Authority.

Installation of thermometers

B24.1 A thermometer of such size and design that the divisions can easily be read to 0.5°C shall:

- (a) be provided for each cold room or freezer; and
- (b) be located in such a position that it can be conveniently and easily read.

B24.2 Cold stores shall be:

- (a) equipped with continuous temperature recorders; or
- (b) temperatures shall be taken and recorded at a minimum of twice daily and not less than eight hours apart.

Air supply to equipment

B25.1 Ventilation systems used to supply air to processing equipment and conveying systems shall comply with sub-clauses A27.2, A28.1, A28.2, A28.3, A28.4 and A28.5. Where air is drawn from inside the building the intake shall be at least 2 m above floor level.