

Code of practice for

Equipment and procedures for the cleaning and disinfecting of milking machine installations

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Committees responsible for this British Standard

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- British Agricultural and Garden Machinery Association Ltd.
- British Association for Chemical Specialities
- Dairy Trade Federation
- Electricity Supply Industry in United Kingdom
- Milk Marketing Board
- Milking Machine Manufacturers' Association
- Ministry of Agriculture, Fisheries and Food
- National Farmers' Union
- Society of Dairy Technology
- West of Scotland College

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Foreword

This British Standard has been prepared under the direction of the Agriculture and Food Standards Policy Committee. It supersedes BS 5226:1982, which is withdrawn.

This second revision of BS 5226 takes into account the requirements of BS 5545. BS 5545-2 specifies detailed requirements for construction and performance of those parts of milking machine installations that operate during milking and includes a general requirement that installations which are designed for in-place cleaning and disinfecting are so constructed that all milk contact surfaces are capable of being effectively cleaned and disinfected. BS 5226 gives recommendations which, if followed, should ensure that an installation meets that general requirement.

Recommendations are made concerning the equipment, materials and operating procedures for the in-place and manual cleaning and disinfecting of milking machine installations, including farm bulk milk tanks, for the guidance of farmers, milking machine manufacturers, equipment dealers and other interested parties.

It is well established that the periodic use of a process of heat disinfection is the most effective means of reducing the residual bacterial contamination in milking machine equipment and a primary recommendation is concerned with the provision of an adequate supply of hot water at 96 °C. Recommendations are made about periodic treatments and actions to be taken if a problem with the hygienic quality of the milk arises.

Attention is drawn to BS 5305 which gives guidance on the cleaning and disinfecting procedures for a wide range of equipment used in the dairying industry, including milking machine installations, but the recommendations in this present standard are more specific and give greater detail.

The revision omits recommendations for assessment of hygienic conditions (these will be included in BS 4285-4) and recommendations for water storage heaters relate only to electrically operated heaters as gas and oil fired heaters are now rarely used for this application.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 28, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1 Scope

This British Standard gives recommendations for the equipment and procedures concerned in the in-place cleaning and disinfecting of milking machine installations and farm bulk milk tanks.

General recommendations are given in section 1. Section 2 gives recommendations for design and materials of certain ancillary components of milking machine installations that specifically influence in-place cleaning and disinfecting. Section 3 gives guidance on the main factors that will determine the choice of water heater. Section 4 gives details of recommended methods of in-place cleaning and disinfecting.

Appendix A gives recommendations for the design, construction, installation and operation of electric water storage heaters, and Appendix B describes a procedure for acceptance tests for acidified boiling water (ABW) cleaning and disinfecting systems.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the definitions given in BS 5283, BS 5305 and BS 5545-1 apply, together with the following.

2.1

chemical disinfecting agent

an agent that is suitable for disinfecting milking machines. It may be mixed with a detergent to provide a balanced product that cleans and disinfects (See clause 8 of BS 5305:1984.)

NOTE These balanced products are referred to as detergent/disinfectants.

2.2

clean water

water that, at the point of use, is of a quality sufficient to comply with the classification set out in section 4, "Standards of Bacterial Quality", of "Reports on Public Health and Medical Subjects No. 71"¹⁾

NOTE In the case of small rural supplies, if bacteriological examination of samples repeatedly shows inability to comply with the classification set out in the above-mentioned report, efficient chlorination or other equally effective treatment should be practised.

2.3

teatcup jettlers²⁾

an assembly comprising a tube from the wash pipeline or the air pipeline (milking vacuum) connected to a manifold and four cups or plugs to which the teatcups are attached during cleaning

2.4

air pipeline (milking vacuum)²⁾

the part of the air pipeline between the sanitary trap and the milking point(s) furthest from the vacuum pump(s), that may also form part of the cleaning circuit

2.5

air pipeline (pulsators)²⁾

the part of the air pipeline connecting the air pipeline (main) to the pulsators

2.6

milking pipeline²⁾

a pipeline which carries milk and air during milking and has the dual function of providing milking vacuum and conveying milk to a receiver

2.7

transfer pipeline²⁾

a pipeline the sole purpose of which during milking is to convey milk to the receiver

2.8

wash pipeline²⁾

a pipeline which during the cleaning process carries cleaning and disinfectant solutions from the wash trough or water heater to the milking pipeline or an air pipeline (milking vacuum). The wash pipeline is not usually in circuit during milking

2.9

delivery pipeline²⁾

a pipeline in which milk flows under positive pressure from a releaser or releaser milk pump or recording vessel to a storage vessel

2.10

air pipeline (main)²⁾

the part of the air pipeline between the vacuum pump(s) and the sanitary trap

3 Effective cleaning and disinfecting

Any recommended cleaning and disinfecting procedure that has been followed correctly may be expected to:

- leave milk contact surfaces visibly free from milk residues and other deposits;
- leave surfaces free from undesirable residues of cleaning and disinfecting chemicals;
- reduce the count of viable bacteria to less than 500 000 per m² of milk contact surfaces when the installation is rinsed as a whole and the rinse examined in accordance with BS 4285.

¹⁾ The Bacteriological Examination of Water Supplies' (1982), published by and available from HMSO, PO Box 276, London SW8 5ET.

²⁾ These definitions are taken from BS 5545-1.

NOTE 1 Before using a newly installed cleaning and disinfecting system it is necessary to ensure that it is working properly. The factors in a circulation cleaning system, which are critical are:

- 1) design and installation of the equipment;
- 2) volume of solutions used in the cleaning and disinfecting process;
- 3) temperatures of the solutions used in the cleaning and disinfecting process;
- 4) chemical strength of the cleaning and disinfecting solutions;
- 5) flow rates and the distribution of the cleaning and disinfecting solutions throughout the plant.

With acid boiling water cleaning, heat is the main disinfecting agent. The concentration of the solutions used is therefore less critical. However all of the other criteria apply equally. It is normally the responsibility of the installers to examine the system to ensure that it is operating correctly and to provide a written report to this effect.

NOTE 2 For methods of assessing hygienic conditions see BS 4285-4.

4 Legislation

The more important regulations directly affecting milking installations in England, Wales, Scotland and Northern Ireland, current at the date of publication of this code, are listed in **3.2** of BS 5545-2:1988.

NOTE In some localities in Scotland there are byelaws that require all dairy utensils to be rinsed with sterile water after cleaning and disinfecting. The local authority therefore should be consulted.

5 Official sources of advice

Further advice on milking installations and cleaning and disinfecting may be obtained from the following sources.

- a) In England and Wales:

Agricultural Development and Advisory Service of the Ministry of Agriculture, Fisheries and Food.

- b) In Scotland:

Advisory Officers of the Scottish Agricultural College, Model Dairy Byelaws, 1961, prepared by the Department of Health for Scotland and published by HMSO.

- c) In Northern Ireland:

Department of Agriculture for Northern Ireland, Milk Production Advisory Service.

6 Exchange of information regarding water heaters

Recommendations for the design, construction, installation, operation and selection of electric water storage heaters capable of providing boiling water are given in section 3 and Appendix A. Early consultation and exchange of information should take place between customer and supplier, who should provide dimensioned drawings of the water heater and necessary pipelines.

Section 2. Design and materials of equipment

7 Materials and equipment

The installation should comply with BS 5545-2. Attention is drawn to Table 3 of BS 5305:1984 which gives details of the compatibility of materials of construction with cleaning and disinfecting agents.

8 Pipelines of the milk system

The air pipeline (milking vacuum) and the air pipeline from the milk receiver should be connected directly and separately to the sanitary trap or traps.

9 Milk system

9.1 General

The milk system should comply with BS 5545-2.

9.2 Materials and duty

Any valve, tap, reducing bush or plug in the milk system should be constructed from a suitable rigid material.

Provision should be made for complete drainage of all parts of the milking machine installation. (See also 7.1 and clause 8 of BS 5545-2:1988.)

9.3 Teatcup jetters

Teatcup jetters should be of a material capable of withstanding cleaning and disinfecting fluids at temperatures up to 96 °C and should be designed to make an airtight seal with the teatcup shell or liner during the cleaning and disinfecting process.

9.4 Recorder jars

Recorder jars should be designed or fitted with a means of ensuring even distribution of cleaning and disinfecting fluid over the internal surface during washing without adversely affecting the vacuum in the recorder jar during milking. (See also clause 16 of BS 5545-2:1988.)

The spreader device at the top of the recorder jar should be of such a design that it is permanently positioned so as to direct cleaning solution around the whole of the internal surface of the recorder jar.

9.5 Milk meters and other attachments

Milk meters and other attachments such as filters, mastitis detectors, milk flow indicators, coolers and ancillary equipment not forming part of the basic milking system, unless specifically designed for in-place cleaning and disinfecting at temperatures up to 96 °C, should be removed and cleaned and disinfected separately.

9.6 Flexible tubes

Flexible tubes forming part of the milking system that come into contact with milk should be renewed at least once a year. (See also clauses 12 and 18 of BS 5545-2:1988.)

9.7 Plate or tubular coolers

If plate or tubular coolers are fitted, they should comply with the following.

- a) There should be means to adjust or bypass the milk flow control valve to permit adequate flow of the cleaning and disinfecting fluid through the cooler. If the rate of flow through the cooler is having a detrimental effect on the plant flow rate either the cooler capacity should be increased or a bypass tube fitted to take some of the solution from the plant.
- b) There should be means, preferably automatic, to stop the flow of coolant during the washing cycle.
- c) Valves should be fitted in the delivery lines to enable cleaning fluids to be drained from the cooler after cleaning.

NOTE The quantity of hot water required for cleaning milking systems fitted with plate or tubular coolers may be larger than the minima recommended in section 3 in order to allow the cooler and delivery line to reach the required temperature for adequate cleaning and disinfecting. The supplier should advise when this is so.

Section 3. Selection of water heaters

10 Water heaters

NOTE Only electrically operated water heaters are considered (see foreword).

10.1 Temperature and capacity

The main factors that determine the choice of water heater are as follows.

- a) *Temperature*. The heater should be capable of providing water at a temperature of 96 °C to permit hot water disinfection. This is the case even where routine washing is at a lower temperature.

NOTE For routine washing by manual or circulation cleaning, the water temperature in the plant should be that required for the chemical in use. An allowance for the drop in temperature between the water heater and the plant should be made. Thus in these cases the heater should also be capable of providing water at temperatures below 96 °C.

- b) *Capacity*. The capacity of the heater is determined by the following.

- 1) The cleaning system to be used and the size and form of the plant. Recommended hot water usages are given in Table 1.
- 2) The period during each day when water is to be heated. It may be desirable, for instance, to heat all the water required for one day's use overnight on a reduced price electricity tariff. For example, where there are to be two hot washes per day, the storage capacity of the water heater should be double the quantity recommended in Table 1.

10.2 Type of water heater

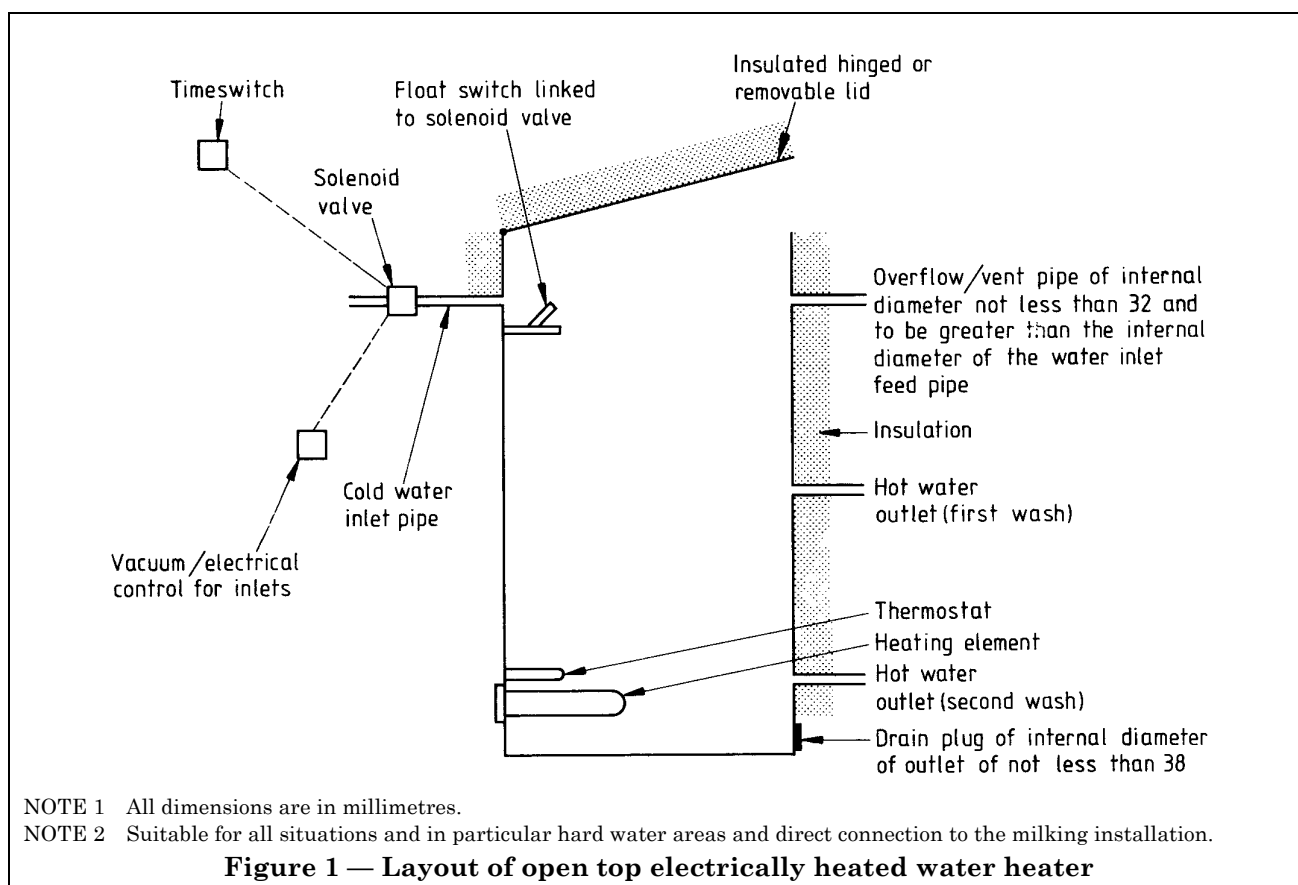
Water heaters should be of the open top or fully enclosed type. Open top tanks should be used in areas of hard water where regular descaling may be necessary, or where water is drawn from the tank under vacuum.

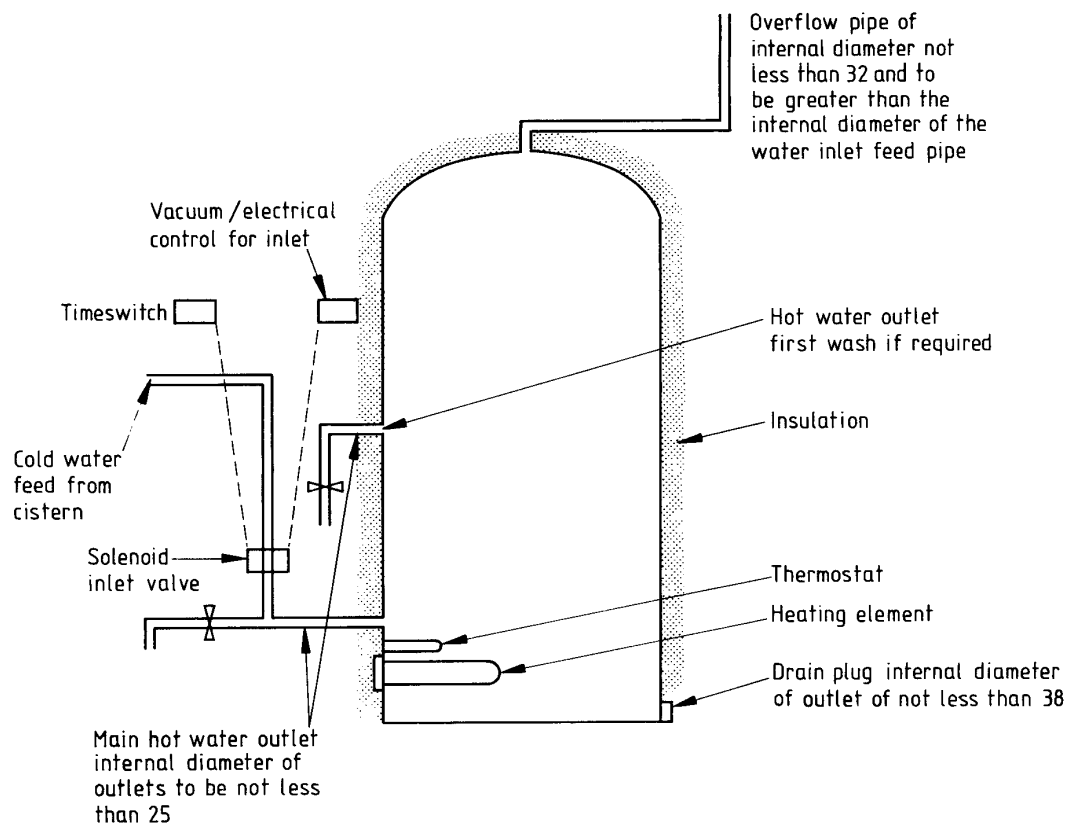
10.3 Examples of suitable designs

Examples of suitable designs and installations of water heaters are shown in Figure 1, Figure 2 and Figure 3.

Table 1 — Recommended capacity of water heater

Milking system	Cleaning method		
	Manual	Circulation	ABW
		L	L
Bucket	See note	Not applicable	Not applicable
Recorder jar	Not applicable	18 per milking point	18 per milking point
Cowshed pipeline	Not applicable	45 per milking point plus 20 per 30 m of pipeline	Not applicable
Parlour milking pipeline	Not applicable	18 per milking point	Not applicable
NOTE Sufficient for complete immersion of the bucket and associated equipment in the wash trough (see 11.5).			





NOTE 1 All dimensions are in millimetres.

NOTE 2 Not suitable for sustained high temperature use in hard water areas or direct connection to the milking installation.

Figure 2 — Layout of closed top electrically heated water heater (gravity discharge)

