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Code of Practice on CIP of Milk Tankers

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DIAL is the trade association representing the manufacturers, processors and distributors of milk, formed by the amalgamation of the Dairy Industry Federation (DIF) and the National Dairymen's Association (NDA).

TANKER CLEANING CODE OF PRACTICE

Introduction

The de-regulation of the milk industry in the UK has brought about a multiplicity of arrangements for buying and selling milk products many of which are not firmly based on written contracts. One of the consequent grey areas to emerge is that of Tanker Cleaning where difficulties may arise over the allocation of responsibility for cleaning and the standards of cleanliness which should be achieved. The situation is further complicated by the absence of an industry standard for a Tanker Specification and the consequent emergence of a wide range of new vehicle designs.

This Code of Practice is intended to establish a framework of minimum requirements which, in the absence of any formal contractual arrangements, gives guidance in these areas. The Code only recommends good practice as it is impossible to include every cleaning and disinfection schedule. Each operator must determine the most suitable methods applicable to his needs and verify that they perform the function required.

The Code is based on two presumptions:-

- i) that consignees will be responsible for the proper cleaning of vehicles after unloading at their premises,
- ii) that hauliers will present properly cleaned vehicles for loading at a despatching dairy.

In interpreting this Code, 'milk' should be deemed to include milk and milk products intended for human consumption, and a clean tanker is one which has been thoroughly cleaned by CIP within the previous 24 hours.

This Code also includes health and safety guidelines for tanker cleaning.

This guidance is advisory only. An individual buyer and seller are at complete liberty to agree contractual arrangements different from these.

1.0 Cleaning and disinfection of tankers

- 1.1 All tankers used for the transport of milk must be cleaned and disinfected once in a working day. This operation should preferably be carried out at the end of the day. The consignee is responsible for carrying out this operation where the milk is delivered to his premises in such tankers. Where milk is transhipped prior to delivery to the dairy the haulier is responsible for ensuring the cleanliness and sterility of the primary tankers.
- 1.2 In the case of Ex-Silo tankers it is the haulier's responsibility to present a clean tanker for loading. Nevertheless, the consignor is responsible for ensuring that the tanker is clean before filling. The consignee is responsible for cleaning and disinfecting the tanker after emptying.
- 1.3 Tankers will normally be cleaned each day. Where a tanker has been out of service and misses one such daily clean, it need only be given a disinfectant rinse prior to use provided that it is otherwise visually satisfactory. A tanker which has been out of service for a longer period must be fully cleaned and disinfected before being used again.
- 1.4 Suitable facilities must be available at all milk reception centres and hauliers' premises where appropriate to enable cleaning and disinfection of tankers to be adequately carried out.
- 1.5 Vacuum-filling tankers must be cleaned with the manway lids firmly shut and the vent pipe open. Other types must be cleaned with the manway lids open unless they are fitted with venting devices designed to give adequate venting under full CIP with the lid closed and which comply with the standards set down in BS 3441:1995. When the lids are left open, the consignee must provide and fit splash deflectors.
- 1.6 Ex-Silo supplies must be accompanied by a quality consignment note indicating that the tanker has been inspected before despatch and cleaned and disinfected if necessary.

2.0 Road tankers for the carriage of milk

- 2.1 Tankers for the carriage of milk must be suitable for this purpose and designed to be cleaned effectively by CIP.
- 2.2 Each tanker must carry a document or plate that defines how safe and effective cleaning must be carried out, e.g. whether or not it can be cleaned with the lids shut; if it has spray balls installed the delivery pressure and flow-rate required per section; if spray balls are required, how many per section and what type.
- 2.3 All vessels shall be equipped with sprayballs or rotary devices capable of withstanding water/chemical maximum temperatures of 80°C and cleaning effectively all exposed surfaces inside the vessel given a minimum fluid delivery of 340 litres/minute (i.e. 20400 l/hour) at 20 psi.

- 2.4 Supply pipework shall be permanently fixed on the outside of the vessel but sprayballs or rotary devices shall be removable for inspection and maintenance. Any joints in exposed pipework shall be sealed to prevent unauthorised dismantling.
- 2.5 All tankers and trailers shall have provision for the carriage in an accessible and weatherproof location of a Cleaning Logbook measuring 350 x 228 x 13mm.
- 2.6 Tankers are supplied with cleaning fluid through a cleaning inlet on the nearside of the vehicle and are drained through the outlet pipework. The inlet connection is 2 inch RJT male, the outlet 2.5 inch male.

3.0 Tanker cleaning facilities

3.1 Tanker cleaning bay

- 3.1.1 The tanker cleaning bay should be sloped or suitable vehicle ramps provided to ensure adequate drainage.
- 3.1.2 The bay should be of sufficient size to allow for tankers being prepared for CIP while others are being cleaned.
- 3.1.3 An adequate supply of potable water of a suitable level of softness should be available for detergent make-up and tanker rinsing.
- 3.1.4 Facilities for hand cleaning parts (eg hose-ends, filters and upstands, etc) must be provided. A supply of hot water must be available together with suitable brushes in good condition retained exclusively for use on milk contact surfaces together with a supply of detergent and approved disinfectant or approved detergent/disinfectant.

3.2 Spray heads

- 3.2.1 Spray heads must be checked regularly to ensure that they are not blocked or damaged.
- 3.2.2 Vacuum tankers designed specifically for Farm Collection normally utilise removable spray ball assemblies which shall be provided by the Customer and matched to the CIP delivery pump.
- 3.2.3 If for reasons of convenience or to suit individual installations it is considered preferable not to use spray ball assemblies, suitable alternatives may be provided by the centres responsible for cleaning the tanker. If these are fitted into the tank vessel as direct replacements for spray ball assemblies, i.e. by utilising the CIP feed lines which are built into the tanker, it is the responsibility of the centre carrying out the cleaning to supply the necessary fittings and adaptors. Where the tanker's CIP feed lines are not employed for this purpose, they must be cleaned and disinfected with the remainder of the tank vessel and pipework.

Where rotary devices are employed they must be maintained in a free-running and safe condition.

It is the responsibility of the cleaning operator to ensure that where an alternative spray head is employed it is suitable for cleaning the tank vessel in which it is used.

3.3 Connection of tankers to cleaning plant

3.3.1 Tankers are supplied with cleaning fluid through a cleaning inlet on the nearside of the vehicle and are drained through the outlet pipework. The inlet connection is 2 inch RJT male, the outlet 2.5 inch male.

3.4 Cleaning plant

3.4.1 Each cleaning site must have facilities capable of effectively cleaning all sizes of tanker that will require cleaning at that site. Each CIP set should carry documentation stating its capabilities.

3.4.2 The circulation plant should incorporate a cleaning solution storage tank of at least 500 litres (110 gallons) minimum capacity.

3.4.3 A rinse water recovery tank of equal capacity to the detergent tank may be provided.

3.4.4 A feed pump should be of the centrifugal type and constructed of stainless steel. It should be capable of pumping at least 340 litres/minute at a pressure of 14kPa (20lb/in²). A pressure gauge of suitable range should be fitted to the feed pump discharge.

3.4.5 A return pump of larger capacity than the feed pump should be provided.

3.4.6 The provision of removable wire mesh filters in both the feed and return lines is essential.

3.4.7 The cleaning solution should be heated by means suitable to the facilities of the site, but direct steam injection should not be used. The preferred temperature range is 60-80°C.

3.4.8 A vacuum release valve shall be fitted to the suction side of the return pump to be operated automatically during the final rinse stage of the cleaning process. In case of doubt consult the supplier of equipment.

3.4.9 An air release valve shall be fitted to the suction side of the return pump.

3.4.10 A conductivity cell should be included in the return line between the pump and detergent tank to enable a check to be maintained on the strength of the detergent solution.

3.4.11 The CIP set should give, in recordable format, the pressure, temperature (inlet and return), and ideally the concentration, flow-rate and time.

4.0 Detergents, disinfectants and detergent/disinfectants

4.1 References

In considering detergents, disinfectants and detergent/disinfectants to be used in the cleaning and disinfection of road tankers reference may be made to:-

- (i) "CIP : Cleaning in Place". Edited by AJD Romney, Society of Dairy Technology.

4.2 The basic steps in cleaning of milk tankers and ancillary equipment are:

- (i) A preliminary rinse or rinses to waste with cold or lukewarm water to remove gross soiling.
- (ii) A cleaning treatment with detergent solution so that the soiled surfaces are cleaned. Approximately 500 litres of solution should be circulated at the predetermined temperature for 15 minutes.
- (iii) One or more rinses of the cleaned surfaces with potable water so that they are free from released contaminant and detergent solution.
- (iv) Where appropriate a disinfection treatment to reduce the number of micro-organisms present to a minimum.
- (v) Where appropriate further rinses with potable water to remove traces of chemical disinfectants where used. Treatments (ii) and (iv) may be combined in certain detergent/ disinfectants. The rinse water from (iii) and (v) may be recovered for subsequent pre-rinse purposes.

4.3 In specifying the cleaning sequence consignees should bear in mind that cleaning of the air elimination vessel (AEV) is achieved by the intermittent diversion of CIP fluid from the inlet line. This may be achieved by means of a pulsed valve which allows fluid into the AEV and the cleaning sequence therefore needs to be timed so as to ensure that there is a flow of CIP fluid during this period.

4.4 Detergents

A wide range of chemicals is available for use in manual and circulation cleaning. Detergents may be formulated from the basic chemicals at the dairy for use in cleaning systems, or suitable proprietary blended detergents are available.

4.4.1 Where branded dairy detergents are used the suppliers can be expected to provide the consignee with a statement indicating the detergent is suitable for the cleaning operation for which it is intended.

4.4.2 The optimum concentration can only be determined from manufacturers' recommendations and the results of trial runs. The strength of detergent solutions used in manual and in CIP systems must be subject to laboratory monitoring to ensure optimum conditions are maintained.

4.5 Disinfectants

4.5.1 Chemicals

In the dairy industry "chemicals" may be disinfectants alone or combined detergent/disinfectants. Only those brands of chemical disinfectants and combined detergent/disinfectants suitable for this purpose should be used as an alternative to hot water.

4.5.2 Acids

From time to time it may be necessary to use acid to remove milk stone or scale, particularly if unsoftened water is used.

5.0 Assessment of the effectiveness of cleaning systems

5.1 General

The interior of each tank compartment must have no surface film or deposits and must smell clean without any trace of stale or sour odours. The underside of the manway lid and seal must be clean and the interior surface of milk valves and hose end fittings must be clean.

If these criteria are not met the tanker cleaning is unsatisfactory and no further investigation need be carried out until after rectification of the problem.

5.2 Swab technique

If the conditions described in 6.1 are met, the effectiveness of the tanker cleaning may be further investigated using swab techniques.

5.3 Recommended areas to be swabbed

Any accessible area of the tanker and pipework which comes into direct contact with the milk may be swabbed. It is recommended for normal checking procedures that swabs should be representative of the following areas:

- i. The top/side internal surface of the tanker.
- ii. The internal surface of the manway lid.
- iii. The interior surface of AEV ports if appropriate.

iv. The internal surface of the tanker hose end or outlet pipe.

5.4 Standards

Recommended standards are as follows:-

Less than 2,500 colonies/900 cm ²	- satisfactory
2,500 - 25,000 colonies/900 cm ²	- doubtful
More than 25,000 colonies/900 cm ²	- unsatisfactory

Coli-aerogenes organisms should be absent from all samples.

ATP testing is an alternative to plate counts. The target is a satisfactory standard.

5.5 Frequency of testing

Some tankers should be examined by swab procedure each week to check the efficiency of the cleaning process. All the tankers should ideally be examined each month.

In the case of Ex-Silo tankers both the consignee and the consignor have a responsibility to ensure cleaning and disinfection is adequate and spot checks of tankers using the swab technique should be made. In the event of unsatisfactory results the owner of the vehicle concerned should be informed as soon as possible.

When consignees' laboratories are not equipped to carry out swab tests, arrangements should be made for a suitable competent laboratory to carry out the tests. Records of swabs taken should be entered in the tanker logbook.

In the case of Farm Collection tankers cleaned at hauliers' premises alternative arrangements should be made between the haulier, consignor and consignee to check the efficiency of cleaning.

6.0 Tanker cleaning record

- 6.1 A full record should be maintained of tanker cleaning together with bacteriological results at the consignee or haulage depot responsible for such cleaning and disinfecting procedures as may be necessary.
- 6.2 In addition all tankers should be provided with tank cleaning log sheets (for example as in Annex I). These sheets indicate brief details of the cleaning process and visual inspection of the interior of the tank(s) and pipelines and should be completed at the depot responsible each time the tankers are cleaned and disinfected. Copies should be kept by the haulier for 6 months.

7.0 Health and Safety

7.1 General

- 7.1.1 The following health and safety guidelines should be adhered to, where reasonably practicable. As CIP systems vary from Dairy to Dairy, it is accepted that not all health and safety guidelines will apply. Failure to comply with these guidelines does not constitute a breach of Health and Safety Legislation excepting that a Court may use this document as guidance on best practice. In addition, compliance with these guidelines does not exempt an employer from conforming with Statutory Instruments.
- 7.1.2 Risk Assessment as required by the Control of Substances Hazardous to Health Regulations 1995 and the Management of Health and Safety at Work Regulations 1992 should be carried out.
- 7.1.3 Safe systems of work must be in operation to minimise the risk of injury to personnel.
- 7.1.4 All exposed personnel should be trained or instructed regarding:
- i The CIP system & operation
 - ii The Safe System of Work
 - iii Emergency Procedures
 - iv Where to obtain help or further instruction
 - v Defect reporting
 - vi Accident and near miss reporting
 - vii Access to First Aid

Instruction for haulage drivers should normally be given by the Dairy Management in conjunction with the haulage provider.

Data sheets and COSH assessments should be available to all exposed personnel.

7.2 Personnel

- 7.2.1 CIP chemicals must never be decanted using buckets. For transfer from one container to another, a pump should be used. Each pump should be dedicated to a particular chemical or group of chemicals (e.g. Caustics or Acids) and be flushed after use with a copious amount of clean water to ensure the contaminant is removed.
- 7.2.2 Any task which involves breaking into or removing CIP plant (including pipe-work) must be carried out under a permit to work. This may also apply to plant or equipment connected to the CIP system if chemical exposure is possible.

7.2.3 CIP plant should be dismantled and/or cleaned when there is a minimum of staff on site. Warning notices (or other means) should also be posted when CIP is in progress.

7.2.4 Failed plant must be given time to drain down and be flushed with copious amounts of clean water to remove chemical contamination (this may be tested with litmus paper) before maintenance or repair is attempted. If this is not practicable, suitable Personal Protective Equipment (PPE) must be worn. Employees risking this type of exposure must be suitably trained and supervised.

7.2.5 Flexible hoses should be opened slowly to see if CIP chemicals leak out. Only if there is no sign of leakage should the hose be completely disconnected. This procedure should be covered by a safe system of work.

7.2.6 Manual cleaning of tanks should be avoided. Where this is absolutely necessary, work should be carried out under a permit to work.

7.2.7 If hot unprotected pipes have to be handled then either PPE must be worn or clamps/forceps may be used.

7.3 Tanker Access

Requirements for tanker access are given in BS2441:1995 "Specification for tanks for the transport of milk and liquid milk products". Each site needs to devise its own safety rules for accessing the tops of the tankers.

7.4 Process

7.4.1 CIP chemicals which produce irritant or corrosive vapours should only be handled in sealed containers. If a leak or spillage occurs, suitable respiratory protective equipment must be worn.

7.4.2 Empty and part empty chemical containers should be sealed prior to movement and be kept sealed until disposed of.

7.4.3 CIP plant control must be programmed so as not to discharge reactive chemicals into the same drain at the same time. Personnel should also be instructed not to pour away chemicals haphazardly.

7.5 Design

7.5.1 Local bunds or an alternative general bund should be provided for chemical pumps, valves, filters, chemical drums containers or other areas of potential significant leakage.

7.5.2 Joints and seals must be designed to withstand pressure, temperature and chemicals used in the particular CIP system.

- 7.5.3 Flexible hoses must be resistant to crushing (from internal negative pressure) and have protection from the environment in which they are used. A sheath or "O" rings may be used to prevent damage on floor surfaces. Flexible hoses should also be carefully stored to prevent their being driven over by tankers and other vehicles.
- 7.5.4 Pumps, plate-packs, filters and large joints should be shrouded to prevent spraying of CIP chemicals onto personnel if there is a significant risk of leaks.
- 7.5.5 The control system for CIP must be able to detect blockages (rises in pressures or volumes) and shut the CIP off before vessels are dangerously over-filled. Any overflow pipes must be located close to drains to minimise splashing and flooding.
- 7.5.6 Drain-down points should preferably go straight into drains or be located very close to drains to prevent flooding or splashing. Drains should be sited away from pedestrian routes. Splashing or flooding may be contained or minimised by built bunds or shrouds.
- 7.5.7 All pipe-lines and vessels should be lagged to protect personnel from burns on hot pipes. Where this is not possible, exposure may be prevented by positioning or guarding.
- 7.6 **Maintenance**
 - 7.6.1 Seal safe working life must not be exceeded. A maintenance programme should schedule inspection and replacement at appropriate intervals.
 - 7.6.2 Removable pipe sections (where applicable) should be properly stored and inspected at regular intervals to check for damage; ensure integrity of seals and to check for distortions of the coupling faces.
- 7.7 **First Aid**
 - 7.7.1 Emergency showers and eyewash must be provided at key areas such as bulk chemical unloading points; milk unloading; chemical storage and where large plant is CIP cleaned.
 - 7.7.2 First Aid provision must also include (as a minimum) one member of staff available at all times who holds a current HSE approved First Aid at Work certificate.

