
Specification for

Safety requirements in rotary milking parlours

Spécification des exigences de sécurité dans les salles de traite tournantes

Spezifikation für Sicherheitsanforderungen in Melkkarussellen

Contents

Foreword	Inside front cover
Cooperating organizations	Back cover

Specification

Section one. General

1. Scope	1
2. References	1
3. Definitions	1
4. Legislation and statutory and other regulations	2
5. Official sources of advice	2

Section two. Materials and equipment

6. Code of practice	2
---------------------	---

Section three. Design, construction and installation

7. Collection and dispersal areas, buildings and mechanical equipment	2
8. Electrical installations: wiring and equipment	4

Figures

1. Rotary tandem milking systems	
(a) Intermittent rotation manually actuated stop-start type	4
(b) Continuous rotation type	5
(c) Articulated stall type	6
2. Rotary herringbone milking system	7
3. Reverse cow exit rotary abreast milking system (13 or more stalls)	8
4. Centre cow exit rotary abreast milking system	9
5. Forward cow exit (at periphery) rotary abreast milking system	10

Foreword

This British Standard has been prepared at the request of the Milking Machine Manufacturers' Association and with the cooperation of the dairying industry and the Health and Safety Executive.

Rotary milking systems have been developed in which cows and milking units are located in stalls on a platform (or platforms) which moves in a closed circuit during milking whilst the operator (or operators) remains in a stationary working position, in contrast to the traditional procedure in which cows and milking units are stationary and the operator moves from unit to unit.

During milking, cows move freely from collection areas into the rotary milking parlour and, after milking, move out into dispersal areas. The openings of cow entrances and exits and related access routes are therefore restricted in size to control the passage of cows. At this time the relevant parts of the installation are in motion and, in the absence of

adequate safeguards, there is risk to operators and cows of being trapped, especially in entrances and exits; there is also the possibility of electrical hazard.

This British Standard has therefore been prepared to give guidance on the design, construction and installation of rotary milking systems and associated buildings and equipment in order to reduce the risk of accident during use.

Attention is also drawn to CP 3007, which gives guidance on the design, installation, testing and maintenance of milking machine equipment, and to appendix D of BS 5226 : 1975 which gives recommendations for the design, construction, installation and operation of electrically heated and other types of storage heaters to provide boiling water for cleaning and sterilizing of milking machine installations.

British Standard Specification for

Safety requirements in rotary milking parlours

Section one. General

1. Scope

This British Standard specifies safety requirements and recommendations for the design, construction and installation of rotary milking systems and associated buildings and equipment, including devices for marshalling the cows in collection or dispersal areas, in order to reduce the risk of accident during use.

Typical layouts of seven rotary milking systems are shown in figures 1 to 5.

2. References

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

3. Definitions

For the purposes of this British Standard the following definitions apply.

3.1 rotary milking system. An installation in which the cow stalls and milking units are mounted on a rigid or articulated platform which moves continuously or intermittently in a closed circuit during milking whilst the operators remain within a limited working area which is lower than the cow platform.

3.2 rotary milking parlour. The building or part of a building which houses a rotary milking system.

3.3 internal milking system. A rotary milking system in which the operators work on the inside of the moving cow platform(s) as detailed in 3.3.1 and 3.3.2.

3.3.1 rotary tandem milking systems. Rotary milking systems of two types in which the platform(s) moves either intermittently or continuously.

NOTE. See figure 1 (a) for intermittent movement and figures 1 (b) and 1 (c) for continuous movement.

In the types illustrated in figures 1(a) and 1(b) the cows stand nose to tail on a platform which moves around the periphery of the operators' working area. In the case of one-man operated systems which have intermittent rotation, the vacated stall is re-occupied immediately by the incoming cow (see figure 1(a)). Movement of the platform is stopped automatically and the platform remains stationary until completion of cow preparation and cluster attachment after which it is restarted manually. Clusters are removed after each cow completes the circuit. The systems with continuous rotation (see figure 1(b)) have at least one vacant stall between those at the entry and exit positions and a second operator is stationed in the working area near the exit unless clusters are removed automatically.

In the type illustrated in figure 1(c) articulated stalls move continuously round the periphery of the operators' working area. The cows enter the stalls from the side and leave them from the side, having travelled around three sides of the working area.

3.3.2 rotary herringbone milking system. A rotary milking system in which the cows stand in stalls (usually 12 or more) facing outwards and inclined to each other on a cow platform which moves (continuously or intermittently) around the perimeter of a circle. Through the cow entry, a cow enters the parlour and moves through one stall to the next and then turns to face the outside of the cow platform and is prepared and milked by a procedure similar to that described in 3.3.1. The cow leaves the cow platform at the same level through the cow exit, which is adjacent to the cow entry.

NOTE. See figure 2.

3.4 external milking system. A rotary milking system in which the operators work on the outside of a moving cow platform as in the following installations.

3.4.1 rotary abreast milking systems. Rotary milking systems in which the cows stand side by side in stalls facing the centre on a raised circular cow platform, which may rotate intermittently or continuously. The cows enter the stalls on the platform one at a time, are prepared, and the milking units are attached by an operator. After milking, the clusters are removed by a second operator or by an automatic teat cup remover.

There are three types of rotary abreast systems as follows:

- (a) *reverse cow exit* (see figure 3), in which the cows back off the cow platform when opposite the break in the static rump rail;
- (b) *centre cow exit* (see figure 4), in which the cows leave the cow platform through the cow exit in the central area;
- (c) *forward cow exit (at periphery)* (see figure 5), in which the cows turn through an empty stall and walk off the platform at the periphery through the cow exit.

3.5 cow platform. The part of the installation on which the cows stand.

3.6 operator platform. A moving platform, attached to the cow platform, from which the operators work and which is at or near the floor level of the working area.

3.7 stall. The part of the installation which retains the cow.

3.8 retaining wall. A static barrier enclosing the stalls.

3.9 neck yoke. A device which retains the cow by its neck.

3.10 preparation stall. A stall sited externally to the rotary milking system in which a cow is prepared for milking.

3.11 cow entry. The point of access for the cow to the cow platform.

3.12 cow exit. The point of egress for the cow from the cow platform.

3.13 cow entry gate. A barrier at the cow entry.

3.14 cow exit gate. A barrier at the cow exit.

3.15 operator access. A separate access in the retaining wall specifically for the operator.

3.16 working area. The area, at a lower level than the cow platform, in which the operator is situated during milking.

3.17 backing gate. A barrier for marshalling the cows in collection or dispersal areas.

3.18 diverting gate. A barrier situated near the cow exit to divert the cow(s) if required.

3.19 pick-up gate. An auxiliary gate operated automatically by a circular yard backing gate after the latter has travelled through an arc of 180°

3.20 stall gates. Divisions which locate and separate the cows.

3.21 drive mechanism. Equipment which provides and transmits motive power to the platforms.

3.22 alternative drive. Equipment to enable the platform(s) to be rotated in the event of failure of the drive mechanism, e.g. as a result of a break in the main electricity supply.

3.23 safety stop pressure pad. A device, operated by pressure from the cow if caught between the rotating cow platform and the static cow entry or exit, which stops rotation of the cow platform.

3.24 control console. A housing, located in the working area, for the instruments, switches, etc. that are required to control the operation of the milking system.

3.25 support wheels. Wheels or rollers which support the platform and on which it moves.

3.26 cluster. An assembly comprising teatcups and claw.

4. Legislation and statutory and other regulations

The principal legislation and statutory and other regulations which directly affect safety in rotary milking parlours are:

The Health and Safety at Work etc. Act 1974;

The Agriculture (Stationary Machinery) Regulations 1959;

The Agriculture (Safeguarding of Work Places) Regulations 1959;

Regulations for the Electrical Equipment of Buildings (including April 1976 amendments). Institution of Electrical Engineers.

5. Official sources of advice

Further advice on safety in rotary milking parlours may be obtained from the following:

in England, Scotland and Wales, Health and Safety Executive (Agricultural Inspectorate);

in Northern Ireland, Department of Agriculture, Northern Ireland.

Section two. Materials and equipment

6. Code of practice

All materials and equipment described in this British Standard shall comply with the recommendations in clauses 2, 5 and 6 of CP 3007: 1968.

Section three. Design, construction and installation

7. Collection and dispersal areas, buildings and mechanical equipment

In addition to requirements of statutory regulations (see clause 4) and other regulations and recommendations (see clause 4 and CP 3007 and appendix D of BS 5226 : 1975), the following requirements apply.

7.1 General

7.1.1 Flooring. The surface of all flooring inside and leading into the rotary milking parlour (e.g. cow entry, cow platform, operator access, operator work area, steps, etc.) shall be slip-resistant. The floors of internal milking systems shall slope toward the periphery of the working area.

7.1.2 Control console. To cater for maintenance and emergencies the control console shall be fitted with a switch that can be locked in the off position, the key being removed to prevent restarting of the installation by another operator. A suitable warning notice covering use of the switch shall be positioned next to it.

7.1.3 Manually operated emergency switches. For use in an emergency not less than two switches shall be fitted in readily accessible and suitably marked positions, at least one switch inside the rotary milking parlour and another outside, in order to break instantaneously the main electricity supply to the drive mechanism. The emergency switches shall be of the lock-down type requiring manual re-setting. For restarting see 7.4.1.

7.1.4 Automatically operated safety switches. Automatic switches shall be fitted to break the main electricity supply to the drive mechanism during normal operation if:

- (a) cows or operators become trapped;
- (b) the operator becomes incapacitated (e.g. safety switches designed to operate when the clusters are not attached in the normal position in the rotation of the platform);
- (c) a cow approaches the cow exit with the cluster attached.

These automatic switches shall be connected via a delay device into the circuit for operating the visual and audible warning devices (see 7.1.6(b)).

7.1.5 Alternative drive. Any electrical or mechanical alternative drive shall comply with the safety requirements of this standard. Provision shall be made for manual rotation of the platform.

7.1.6 Warning devices. Visual and audible warning devices shall be fitted both inside the rotary milking parlour and externally to it in a populated place. The devices shall be:

(a) capable of being manually operated at all times and connected to the manually operated emergency switches circuit (see 7.1.3);

(b) connected to the automatically operated safety switches circuit (see 7.1.4) via a device which is designed to provide a delay period of not more than 2 min between automatic operation of the switch and operation of the warning devices.

NOTE. The purpose of the delay period is to allow for the operator being able to correct any mishap and restart the driving mechanism. In this way the delay serves to avoid the unnecessary repeated operation of emergency warning devices which is likely to reduce their effectiveness in drawing attention to a genuine emergency.

7.1.7 Marking of controls. All controls for manual operation shall be clearly marked in writing and with appropriate symbols to indicate their function, as required by the appropriate statutory regulations.

7.1.8 Drive mechanism and running wheels. The drive mechanism and support wheels shall be suitably guarded with securely fixed guards, in accordance with the appropriate statutory requirements.

7.1.9 Stationary equipment. Stationary fittings and equipment (e.g. steps to the platform or automatic milk recording equipment) sited less than 0.9 m from the rotating platform shall be protected by suitable automatic safety devices that stop rotation of the platform if a person (or a part of a cow) becomes trapped against them.

7.2 Backing gates and diverting gates

7.2.1 Operating weights shall be guarded.

7.2.2 Provision shall be made for weight-operated gates to be locked in the open position to facilitate entry of cows for milking, and in the closed position between milkings.

7.2.3 A warning notice shall be securely fixed to the gate(s) and shall be worded similarly to the following:

‘DANGER. This gate closes with great force’.

7.2.4 The spacing between the rails of the gate shall be not greater than 150 mm in order to prevent any part of the cow being trapped.

7.2.5 The clearance between the end of a gate and the perimeter of the collection area shall be not greater than 50 mm in order to prevent injury to the cow.

7.2.6 In collection and dispersal areas of circular shape a suitable safety device (e.g. pick-up gate) shall be installed to prevent cows being trapped.

7.3 Cow entry and exit

7.3.1 To ensure that not more than one cow at a time arrives at the cow entry, the width of the cow entry shall be not greater than 0.8 m.

7.3.2 A suitable automatic safety device shall be fitted in order to stop the rotation of the cow platform and to prevent forward or reverse rotation if a cow becomes trapped when entering or leaving a stall. To release the cow, an override switch shall be fitted requiring manual actuation throughout the operation. For restarting see 7.4.1.

7.3.3 Provision shall be made for preventing a cow from leaving the platform with the cluster still attached.

7.4 Cow platform

7.4.1 Rotation of the cow platform shall be started *only* from the control console. When the rotation of the platform has been stopped by a safety device it shall be incapable of being restarted except by manual actuation. Either adequate communication shall be assured between the operator and other personnel, or an audible warning of imminent start-up shall be provided.

7.4.2 The platform shall be incapable of being rotated if the safety stop pressure pad circuits are inoperative.

7.4.3 Suitable equipment shall be installed to enable rotation of the cow platform to be reversed if required. This reverse rotation shall be controlled from the control console only and by means of a switch or other device which has to be held in the closed position by the operator and which, if released, will move to the open position and stop rotation of the platform.

7.4.4 In order to prevent a cow's foot becoming trapped between the cow platform and either the retaining wall or a stationary floor the clearance between the platform and the wall or floor shall be not greater than 33 mm.

7.4.5 The minimum clearance between the cow platform and overhead structures shall be 1.9 m.

7.4.6 If the retaining wall is not of solid construction there shall be no apertures through which a cow can put its head or limbs.

7.4.7 Any static rump rail shall be so positioned in relation to moving parts of the installation as to avoid any part of the cow being trapped.

7.4.8 Provision shall be made to protect the operator(s) from being kicked when attending cows or recording apparatus.

7.5 Operator platform

7.5.1 The platform shall be designed to reduce to a minimum the possibility of any part of the operator being trapped.

7.5.2 Means shall be provided to prevent the operator from slipping off the operator platform in the direction of the cow platform.

7.6 Operator access

7.6.1 All operator access doors and gates located in the perimeter wall of internal milking systems and leading into the rotary milking parlour shall be fitted with automatic devices to stop the rotation of the cow platform when they are opened. Rotation of the cow platform shall not recommence automatically when all doors and gates are closed but by manual control only (see also 7.4.1).

7.6.2 In internal milking systems provision shall be made, in the form of steps opposite the cow exit and movable sections of stallwork, to enable the operator to move between the inside and the outside of the circuit, but only when the platform is stationary.

7.6.3 In internal milking systems squeeze-gaps shall be provided for the operator, between the cow entry and cow exit passages (see figures 1(a), 1(b), 1(c) and 2; see figure 5 for squeeze-gaps in an external system).