BS EN 12043:2014

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Food processing machinery — Intermediate provers — Safety and hygiene requirements

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National foreword

This British Standard is the UK implementation of EN 12043:2014. It supersedes BS EN 12043:2000+A1:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/3/5, Food industry machines.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Food processing machinery - Intermediate provers - Safety and hygiene requirements

Machines pour les produits alimentaires - Chambres de repos - Prescriptions relatives à la sécurité et à l'hygiène

Nahrungsmittelmaschinen - Zwischengärschrank - Sicherheits- und Hygieneanforderungen

This European Standard was approved by CEN on 6 September 2014.

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Foreword

This document (EN 12043:2014) has been prepared by Technical Committee CEN/TC 153 “Machinery intended for use with foodstuffs and feed”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2015 and conflicting national standards shall be withdrawn at the latest by May 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12043:2000+A1:2010.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2006/42/EC.

For relationship with EU Directive 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

Significant changes:

The significant changes with respect to the previous edition EN 12043:2000+A1:2010 are listed below:

— protective measures for the loading were modified;

— requirements for emergency stop were added;

— requirements for nip guards were stated more precisely;

— thermal hazards, lamps, and hazards generated by UV radiation were added;

— the table of verification of safety and hygiene requirements was completely revised.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

1 Scope

1.1 This European Standard specifies safety and hygiene requirements for the design and manufacture of intermediate provers with powered moving pocket carriers as described in Clause 3 and used in the food industry, pastry-making, bakeries, etc. for giving a resting time to dough between different phases of the process.

This European Standard deals with all significant hazards, hazardous situations and events relevant to the installation, adjustment, operation, cleaning, maintenance, dismantling, disabling and scrapping of intermediate provers with moving pocket carriers when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

Noise is not considered to be a significant hazard by intermediate provers. This does not mean that the manufacturer of the machine is absolved from reducing noise and making a noise declaration. Therefore a noise test code is proposed in Annex A.

1.2 The following machines are excluded:

— independent automatic loading system not integrated with the machine;

— experimental and testing machines under development by the manufacturer;

— retarder and final proofer.

1.3 This European Standard is not applicable to intermediate provers with moving pocket carriers which are manufactured before the date of its publication as EN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1672-2:2005+A1:2009, *Food processing machinery — Basic concepts — Part 2: Hygiene requirements*

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 61000-6-1, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1)*

EN ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871)*

EN ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201)*

EN ISO 12001, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code (ISO 12001)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1)*

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14119, S*afety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119)*

3 Terms, definitions and description

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following applies.

3.1.1
pocket
tilting/guided plate or tilting/guided basket or tilting/guided cup, inside the prover, on which the piece of dough is placed during the resting time

3.2 Description

As shown in Figure 1, an intermediate prover consists of:

— a variable number of pockets supported in a carrier into which dough pieces are placed. One pocket may hold more than one dough piece;

— a mechanical transfer system moving the pocket carrier along a defined path inside the machine;

— a housing supporting or containing the transmission machinery.

The following features may also be included:

— an automatic device to control the temperature and/or humidity inside the machine;

— a flour dusting device;

— other accessories, e.g. germicidal lamp (device to prevent the formation of mould – generally an ultraviolet lamp), pocket drier (device to dry the pockets – generally an infrared lamp or a ventilation system with or without heating);

— integrated system(s) to load/unload the pockets.

The resting time is the period of time from loading until unloading of a single pocket. This time can be fixed or variable.

There are openings in the frame where dough portions are introduced into the machine and where they are taken out.

The position of loading and unloading depends on the frame shape and the path of movement of the pockets.

Some machines may have more than one unloading position. These machines may provide different resting times depending on which of the unloading positions is being used.

The movement of the pockets may be continuous or intermittent.

In some cases (e.g. cleaning, lubrication…) access to the path of movement of the pockets – in addition to the loading and unloading openings – is provided.

4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk (see Table 1).

Table 1 – List of significant hazards

Hazards, hazardous situations and hazardous events	Location or cause	Clause/subclause in this European Standard
Mechanical hazards (see Figure 1):		5.2
— shearing; — trapping; — drawing-in; — crushing	Zone 1 – zone of loading and unloading of the dough portions Zone 3 – carrier transfer system (except Zone 1) Zone 6 – between chain and sprockets Zone 4 – zone covered by moving parts of the flour duster (if fitted)	
— cutting;	Zone 2 – drive mechanisms Zone 5 – fan with or without heating device	
— loss of stability	Complete machine	
Electrical hazards	Electric shock from direct or indirect contact with live components External influences on electrical equipment (e.g. cleaning with water) Unexpected start-up Electromagnetic disturbance	5.3
Hazards generated by materials and substances (inhalation of dust)	Flour dusters	5.4
Thermal hazards	Fan with or without heating device	5.5
Material/substance hazards	Breakage of the lamps (e.g. germicidal lamps, lights, etc.)	5.6
Hazard generated by neglecting hygienic design principles	e.g. contamination by microbial growth or foreign materials	5.7
Hazard generated by neglecting ergonomic principles	During operation, cleaning and maintenance	5.8
Hazard generated by UV radiation	UV lamps	5.9

The examples in Figure 1 illustrate the danger zones associated with these hazards:

— Zone 1: zone of loading of the dough portions, hazards of shearing, trapping;

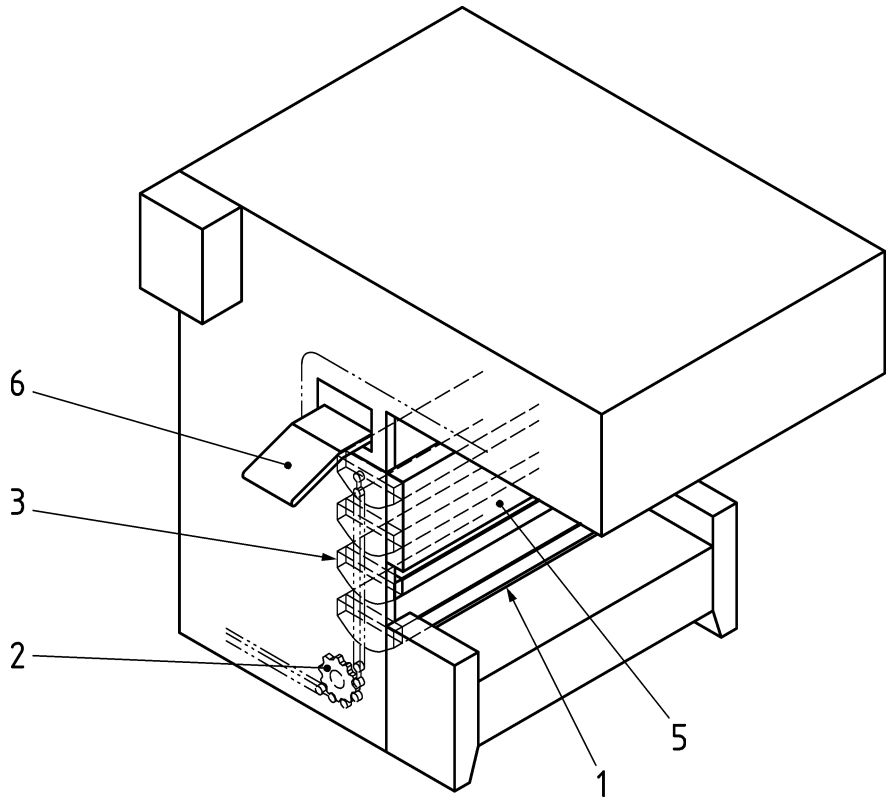
— Zone 2: drive mechanisms, hazards of shearing, trapping, cutting;

— Zone 3: carrier transfer system (except zone 1), hazards of shearing, trapping;

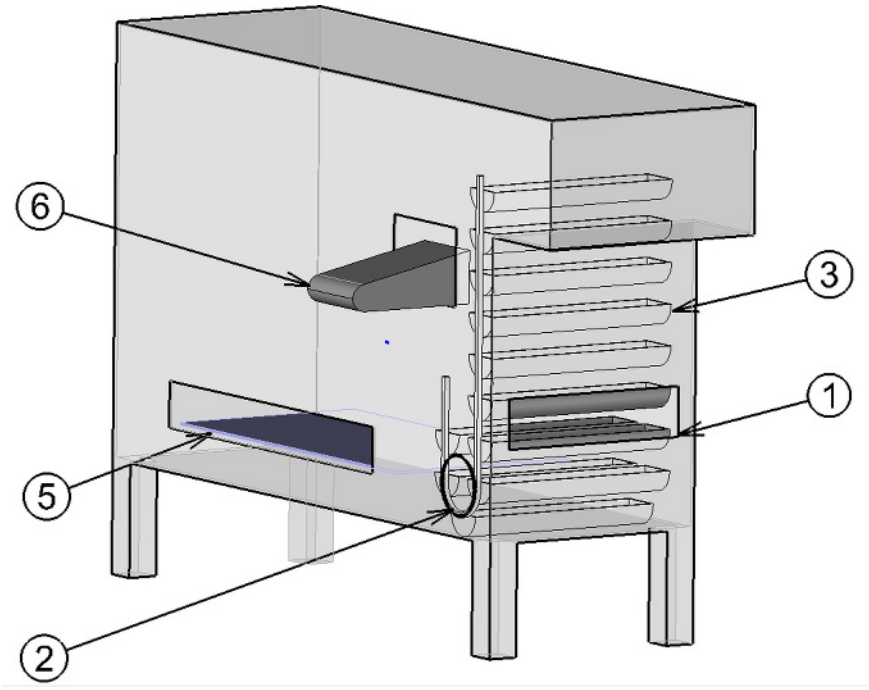
— Zone 4: zone covered by moving parts of the flour duster (optional), hazards of shearing, trapping; (not shown in Figure 1b)

— Zone 5: fan with or without heating device, hazards of cutting, burns;

— Zone 6: zone of unloading of the dough portions, hazards of shearing, trapping.



a) Example of a small intermediate prover



b) Example of an automatically loaded intermediate prover

c) Example of an automatic feeding intermediate prover

Figure 1 — Danger zones for various types of intermediate provers

5 Safety and hygiene requirements and/or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards, which are not dealt with by this document.

Fixing systems of fixed guards or of parts of the machine acting as such shall remain attached to the guards or to the machinery when the guards are removed.

5.2 Mechanical hazards

5.2.1 General

Where reference is made to interlocking devices, they shall comply with EN ISO 14119.

Where the interlocking mechanism has movable parts, e.g. position switches, these shall not be affected by contamination with dough or dry ingredients.

Where safety related parts may be exposed to water, e.g. during cleaning, they shall be protected to an appropriate IP rating at least IPX4 (see EN 60529).

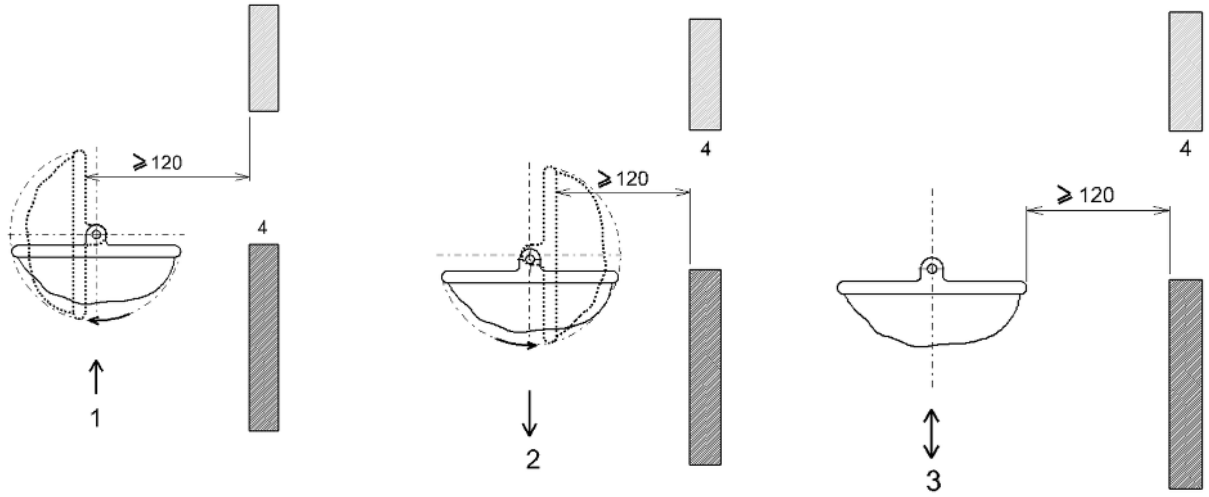
The safety related parts of the control systems shall present at least a performance level “c” defined in accordance with EN ISO 13849-1:2008.

5.2.2 Zone 1 and zone 6 – Zone of loading and unloading of the dough portions

5.2.2.1 When loading is manual, the risk of trapping the arm between the moving pocket carrier and the fixed edges of the loading or unloading openings shall be prevented by:

— using a hold to run control device. This method can only be used where both the loading and the unloading area are visible from the position of the control device or

— ensuring the distance between the fixed edge of the opening and the nearest rigid part of the pocket carrier is a minimum of 120 mm (see Figure 2) and provision of a fixed guard behind the first line of carriers preventing through access.



a) **b)** **c)**

Key

1 movement of tilting pocket

2 movement of tilting pocket

3 movement of fixed pocket

4 frame

Figure 2 — Gap between fixed edge and moving pocket carrier

5.2.2.2 When loading is automatic the following shall apply:

— either the loading system is enclosed in the machine frame with at least one interlocking guard, in order to permit the access for cleaning in the loading zone;

— or the loading system is outside the frame, but is part of the prover: the loading system shall be mechanically and electrically interlocked with the machine and access to any danger points of the loading zone shall be prevented by a provision of a fixed or an interlocking guard.

In both cases all openings shall be in accordance with the dimensions indicated in Table 2. Otherwise, a trip device is mandatory.

Interlocking devices shall be actuated when the guard is opened at the maximum of 25 mm from the closed position.

Table 2 — Dimensions of the opening in closed conditions

Dimensions in millimetres

A max.	40	45	50	55	60	65	70	105	140	250[a]
B min.	225	250	300	350	400	450	500	550	600	850
E	See EN ISO 13857:2008, Table 4									

Where:

A: maximum distance between the conveyor belt and the front opening of the guard when the interlocking device actuates;

B: minimum distance between the edge of the guard and the vertical plane through the axis of the nearest roller;

E: distance between the lower edge of the guard and the conveyor belt.

[a] The distance between the table and the front opening of the guard when the guard in the rest position shall be less or equal to 200 mm.

5.2.3 Zone 2 – Drive mechanisms

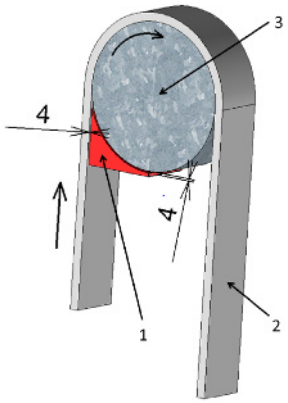
Access to the primary drive system, for example motor and V-belt drives, shall be prevented. This may be achieved by use of fixed guards complying with EN 953. The machine frame itself may act as a fixed guard.

Access to inrunning nips of the pocket carriers shall be prevented by one of the following:

— ensuring that the distances between openings and in-running nips are in accordance with EN ISO 13857;

— individual safeguarding with nip guards as shown in Figure 3;

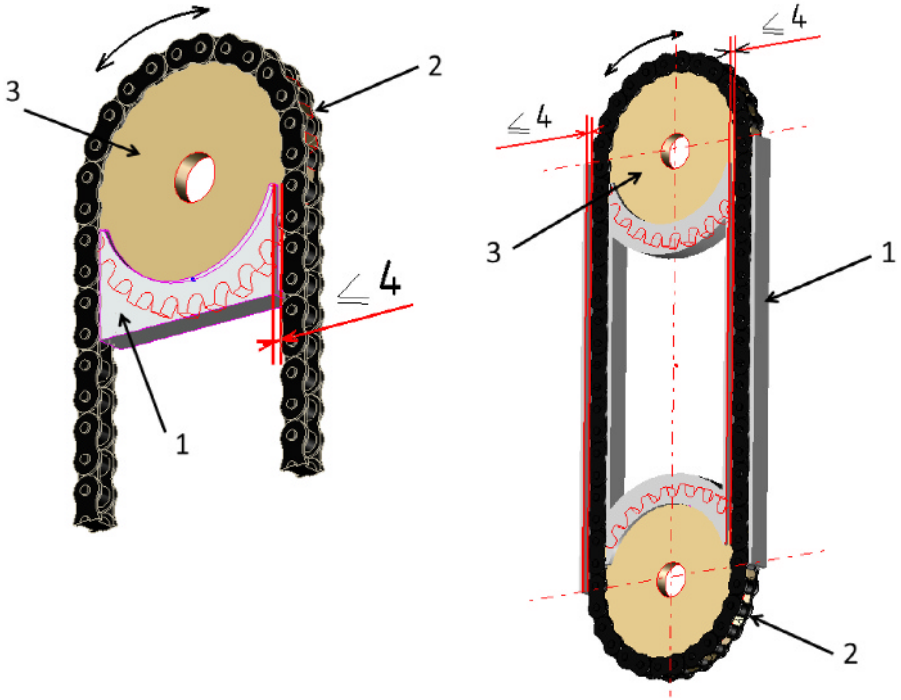
— using hold to run button (see 5.2.2.1).



Key

1 guard
2 belt
3 pulley

a) Nip guards for pulleys and belts



Key

1 guard
2 chain
3 sprocket

b) Nip guards and protection for chains and sprockets

Figure 3 — Safeguarding of inrunning nips

5.2.4 Zone 3 — Carrier transfer system

If access to inside of the machine is required for maintenance or cleaning purposes, the access to the hazardous zones shall be prevented by fixed guards or interlocking movable guards (e.g. doors, movable panels), depending on the frequency of access. The guards shall be in accordance with EN 953. Openings shall be in accordance with EN ISO 13857.

5.2.5 Zone 4 — Flour duster

If there are mechanical risks (e.g. crushing, trapping…), the access to the dangerous zone shall be protected by a fixed guard or interlocked guard.

Openings in the guards shall be in accordance with EN ISO 13857:2008, Table 4.

If the stopping time of the flour duster is more than 1 s, the movable guard shall be interlocked with guard locking.

If there are no mechanical hazards (e.g. if the feed consists of a spindle with rubber spokes or notches, or if the flour is sprinkled by a vibrating device) due to the flour feed system and if a guard is necessary to prevent flour dust emission (see 5.7), this guard shall automatically be closed (e.g. by gravity, etc.). In this case, an interlocked guard is not necessary.

5.2.6 Zone 5 – Fan with or without heating device

Access to the fan and/or heater shall be prevented by any of the following:

— either the sum of the distances from the floor to the danger point is greater than or equal to 2,50 m;

— or access to the danger point is prevented by fixed guards, e.g. wire mesh with dimensions in accordance with EN ISO 13857:2008, Table 4.

5.2.7 Loss of stability

5.2.7.1 Machines shall be designed to be stable and shall comply with 5.2.7.2 and 5.2.7.3 as applicable. For machines designed to be fixed to the floor, the instruction handbook shall indicate the values of forces at the fixing points.

5.2.7.2 Free standing machines without castors shall be stable when tilted 10° from the horizontal plane, in the most unfavourable direction.

5.2.7.3 Free standing machines with castors shall have a locking device for example a brake on at least two castors (or sets of castors) and shall comply with the provisions of 5.2.7.2.

5.3 Electrical hazards

5.3.1 General

Electrical equipment – for example switches – that may be exposed to water, e.g. during cleaning, shall be protected to an appropriate IP rating according to EN 60529 and EN 60204-1.

The electrical equipment shall comply with EN 60204-1, with the following requirements given from 5.3.2 to 5.3.5.

5.3.2 Safety requirements related to electromagnetic phenomena

The machines shall have sufficient immunity to electromagnetic disturbances to enable them to operate safely as intended and not fail to danger when exposed to the levels and types of disturbances for the intended use of the machine (see EN 61000-6-1).

The manufacturer of the machines shall design, install and wire the equipment and sub-assemblies taking into account the recommendations of the suppliers of these sub-assemblies.

5.3.3 Protection against electric shock

The electrical equipment shall comply with EN 60204-1:2006, Clause 6.

5.3.4 Power circuits

Devices for detection and interruption of over-current shall be applied to each live conductor in compliance with EN 60204-1:2006, 7.2.3. In case of single phase machines, no such device is required for the earthed neutral conductor.

5.3.5 Protection against earth faults in control circuits

For machinery supplied from a single-phase conductor and an earthed neutral conductor the single pole interruption shall be in the phase conductor (see EN 60204-1:2006, 9.4.3.1).

5.4 Emergency stop

An emergency stop device, according to EN ISO 13850, is required when loading and unloading zones are not at the same side of the machine. Stopping category 0 or 1 according to EN 60204-1:2006, 9.2.2, is required. The emergency stop shall be located in the loading zone and unloading zone.

5.5 Motor enclosures

Where a motor has a degree of protection lower than IP23 (see EN 60529) it shall be mounted inside an enclosure (see EN 60204-1:2006, 14.2) that guarantees a minimum degree of protection of IP23 (see EN 60529).

5.6 Protection against flour dust emission

Means shall be provided to prevent flour from spilling onto the floor, for example a collecting device for flour below the end of conveyors.

If a fan is used (drying/air conditioning), means shall be implemented to prevent any additional flour dust emission outside the machine.

If a flour duster is used to sprinkle special types of dough, the following shall be provided:

— a solid cover;

— means to stop the flour duster if the machine stops;

— maximum height of 5 cm from the underside of the flour duster to the largest dough pieces as specified in the instruction handbook.

5.7 Thermal hazard

5.7.1 General

If a heating system is used, a thermal protection shall be provided to prevent risks from hot surfaces and fire.

5.7.2 Hot surfaces

To prevent injury from hot external surfaces, the heating system shall be designed so that the temperatures of external surfaces comply with EN ISO 13732-1 in case of unintentional contact, e.g. distances, insulation, material etc.

In addition, warning signs (see Figure 4) shall be attached to warn of hot surfaces for operation of maintenance and cleaning.

a) **b)**

Figure 4 — Examples of warning signs for hot surfaces

5.7.3 Fire hazard

In case of overheating, the power of the heating system shall be switched off.

5.8 Lamps

Lamps shall be protected or installed in such a way that any fall of debris into the dough pieces or empty pocket carriers is prevented to avoid cutting hazards.

5.9 Hygiene requirements

Machines shall be designed and manufactured in accordance with EN 1672-2. Annex B gives further information.

The 3 zones mentioned in EN 1672-2 are defined as follows and shown in Figure 5 and Figure 6:

NOTE The precise boundary between the zones depends on the detailed design of the machine.

a) food area:

   1) the pocket surfaces in contact with foodstuffs;

   2) the surfaces, in contact with dough pieces, of automatic loading and unloading devices;

   3) the inner surface of the flour duster if this device is fitted.

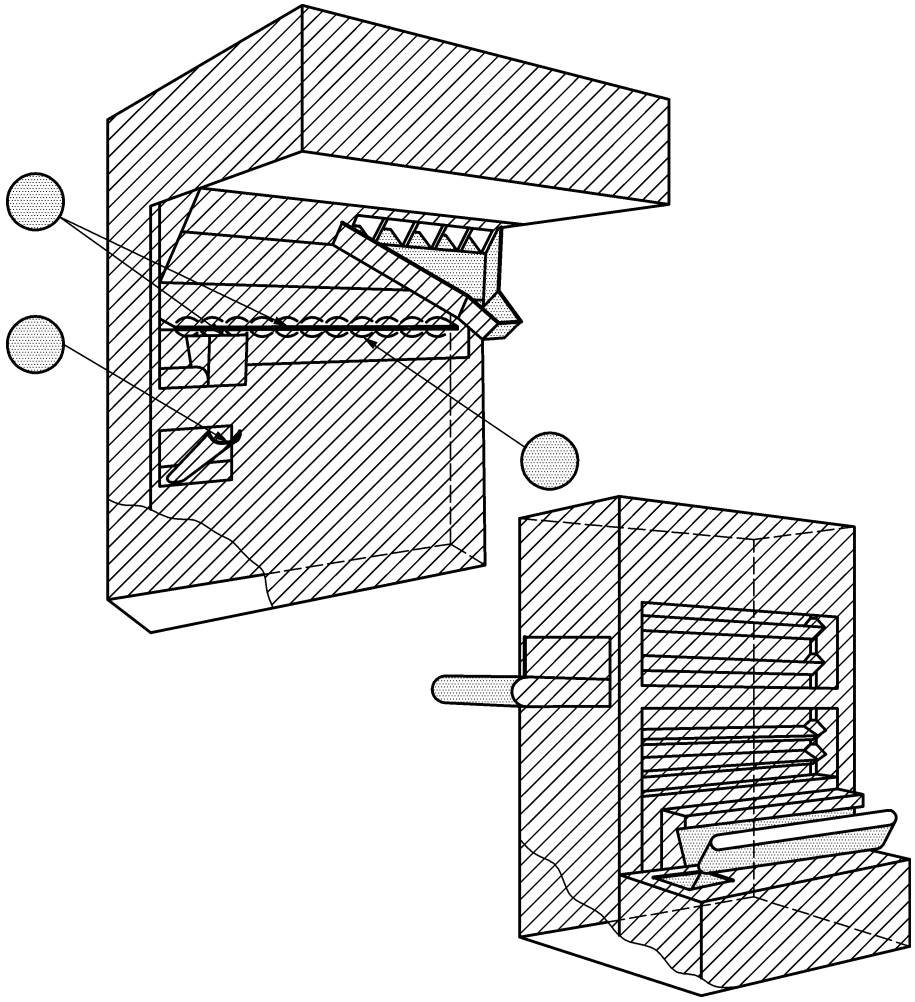
b) splash area:

1) the horizontal inner surfaces of the machine body underneath the moving pockets.

   In order to remove flour, flour dust and dough from inside the machine, the splash zone shall be easily accessible for cleaning.

c) non-food area:

   1) the remaining areas of the machine.



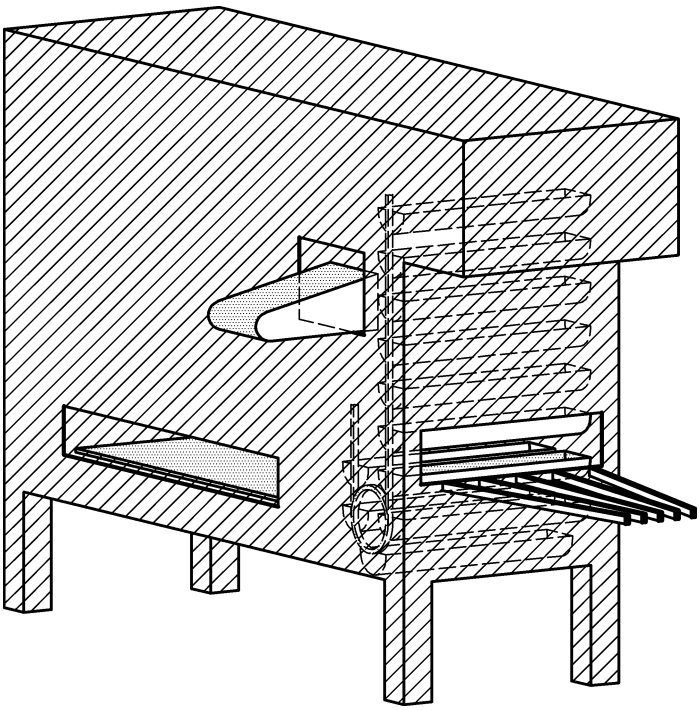
Key

food area

non-food area

splash area

Figure 5 — Hygiene areas – Example 1 of intermediate provers



Key

food area

non-food area

splash area

Figure 6 — Hygiene areas – Example 2 of intermediate prover

5.10 Hazards generated by neglecting ergonomic principles

Awkward body postures during maintenance and cleaning as well as loading and unloading the pockets and other operations, shall be avoided.

If it is necessary to lift or move any part of the machine weighing more than 25 kg in cases of installation, maintenance and dismantling purposes, suitably positioned facilities shall be provided to be attached to lifting devices.

Manual control devices in the loading and unloading area shall be placed within proper reach of the operator as stated in EN 614-1:2006+A1:2009, Annex A.

5.11 Hazards generated by UV radiation

When machines contain UV radiation sources, the direct view to the UV sources shall be prevented by a shield. If this shield is movable, it shall be interlocked.

The manufacturer shall detail the protective measures in the instruction handbook. This includes description of energy disconnection, use of personal protective equipment, measures against hazards for persons in the vicinity of the machine.

In addition, warning signs (see Figure 7) shall be attached to warn of the danger zones approaching to UV radiation.

Figure 7 — Example of warning sign for optical radiation emission

6 Verification of safety and hygiene requirements and/or protective measures

This clause contains the methods of testing for the presence and adequacy of the safety requirements stated in Clause 5.

Verification of the requirements can be made by means of inspection, measurement, calculation or testing. These shall be applied to the machine in a fully commissioned condition but partial dismantling may be necessary for the purpose of some checks. Such partial dismantling shall not invalidate the result of verification.

Methods of verification are given in Table 3.

Table 3

Relevant subclause	Safety and hygiene requirements	Method of verification
5.1	General	by calculation by inspection
5.2.1	Mechanical hazards – General	by functional test of the interlocking guards by inspection
5.2.2	Mechanical hazards – Zone 1 – Zone of loading and unloading of the dough portions	by measurement of distances, forces and times by functional test of the pressure sensitive bar by functional test of the interlocking guards by inspection
5.2.3	Mechanical hazards – Zone 2 – Drive mechanisms	by inspection and measurement of distances
5.2.4	Mechanical hazards – Zone 3 — Carrier transfer system	by inspection and functional test of the interlocking panels
5.2.5	Mechanical hazards – Zone 4 — Flour duster	by inspection, functional test of the interlocking guards, and measurement of forces and dimensions
5.2.6	Mechanical hazards – Zone 5 – Fan with or without heating device	by measurement
5.2.7	Mechanical hazards – Loss of stability	by calculation or by test (machine tilted 10° from the horizontal plane in the most unfavourable direction shall be stable) by inspection

Relevant subclause	Safety and hygiene requirements	Method of verification
5.3	Electrical hazards	by tests given in EN 60204–1:2006, Clause 18 a), b) and f)
5.4	Protection against flour dust emission	by inspection and functional test by measurement of distances
5.5	Thermal hazard	by measurement of temperature, inspection and functional test
5.6	Lamps	by inspection
5.7	Hygiene requirements	in accordance with EN 1672–2:2005+A1:2009, Clause 6
5.8	Hazards generated by neglecting ergonomic principles	by measurement of the forces by inspection of the visibility of the indications, buttons …
5.9	Hazards generated by UV radiation	by inspection

7 Information for use

7.1 General

Information for use shall meet the requirements of EN ISO 12100:2010, 6.4. An instruction handbook shall be provided.

7.2 Instruction handbook

The instruction handbook shall meet the requirements of EN ISO 12100:2010, 6.4.5.

In particular, the instruction handbook shall provide:

— the provisions for handling, transportation, storage, installation, starting up;

— the provisions for cleaning: the cleaning products to be used, the recommended implements, the procedures and frequency, any necessary warning (for example, the cleaning shall be done once the machine is stopped, using a brush, a plastic scraper, a vacuum cleaner... Metallic implements are not recommended);

— the normal quantity of processed material of given products;

— the dimensions of the maximal piece of dough which can be processed by the machine;

— a list of ingredients with known health risks, e.g. flour, highlighting the need to consult supplier's hazard data sheets. The possible need to wear respiratory protective equipment during manual loading shall be indicated;

— the values of forces at fixing points if the machine is fixed;

— the value of the overcurrent protective device in the case of machines covered by 5.3.4;

— a notice indicating the need to test trip devices daily before starting work;

— the instruction handbook shall give the declared noise emission values of the machinery and give the reference to the noise test code in Annex A and to the basic noise emission standards on which the determination of these values is based;

— the limits that shall be respected and the measures to be taken for ensuring stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;

— the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;

— in the case of machinery capable of being plugged into an electricity supply: information warning the user that he shall be able to check that the plug remains visible from any of the points to which he has access.

Information for maintenance:

— lubrication drawing, frequency of operation and a list of products to be used;

— recommended technique and frequency of cleaning the machine if needed for maintenance;

— instructions to isolate the machine in a safe condition in the event of repair or maintenance (isolation from energy supply of all nature, locking of the disconnecting device, neutralizing residual energy, testing);

— appropriate warnings and instructions to prevent back running, if there is a risk of such movement, during maintenance, when drive mechanisms shall be disconnected;

— a warning to the operator during maintenance on the hazard of residual voltage especially from capacitors;

— a warning to the operator during cleaning and maintenance on the hazard of residual hot surfaces from heating system;

— the limits that shall be respected and the measures to be taken for ensuring stability during use, transportation, assembly, dismantling when out of service, disabling and scrapping, testing or foreseeable breakdowns;

— the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;

— list and identification of spare parts;

— the specifications of the spare parts to be used, when these affect the health and safety of operators;

— if need be: the description of the adjustment and maintenance operations to be carried out by the user and the preventive maintenance measures to be observed;

— if need be: instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures to be taken during these operations;

— if UV sources are used: description of energy disconnection, information regarding avoidance of direct exposure of eyes and the skin, use of personal protective equipment, measures against hazards for persons in the vicinity of the machine, recommended frequency for change

— information for the user on the significant environmental characteristics and energy performance of the product; information for the user on how to install, use and maintain the product in order to minimize its impact on the environment and to ensure optimal life expectancy, as well as on how to return the product at end-of-life.

7.3 Marking

The minimum marking shall include:

— the business name and full address of the manufacturer and, where applicable, his authorized representative;

— mandatory marking[1)];

— designation of series or type;

— serial number if any;

— rating information (mandatory for electrical products: voltage, frequency, power...);

— designation of the machinery;

— the year of construction, that is the year in which the manufacturing process is completed.

1) For machines and their related products intended to be put on the market in the EEA, CE-marking as defined in the applicable European directive(s), e.g. Machinery.

Annex A
(normative)

Noise test code — Grade 2 of accuracy

A.1 Definitions

The definitions shall be in accordance with EN ISO 12001.

A.2 Installation and mounting conditions

The test environment suitable for the measurement of the emission sound pressure level shall be a flat outdoor area (for example a car park) or an indoor space that provides an essentially free field over a reflecting plane. This test environment shall be in accordance with the requirements given in EN ISO 3744:2010, Annex A.

Care shall be taken to ensure that any electrical conduits, piping or air ducts which are connected to the machinery do not radiate significant amounts of sound energy thus influencing the determination of the noise emission values of the machine under test. This can be avoided by damping or partially encasing these parts.

A.3 Operating conditions

During the determination of emission sound pressure level, the operating conditions shall be as follows:

— the machine shall be empty;

— every part of the machine shall operate at their maximum speed (e.g. fans, loading device).

A.4 Emission sound pressure level determination

The determination of the emission sound pressure level (A-weighted) shall be done in accordance with the EN ISO 11201.

The measurement time for sound pressure level measurements for the determination of the emission sound pressure level shall be 30 s.

The measurement shall be done at:

— 1,6 m height above the floor;

— 1 m in front of the machine (in the axis of the machine in front of the control board).

At first, the background noise measured with A-weighting or in each of the frequency bands of interest, shall be determined. It shall be at least 6 dB (and preferably more than 15 dB) below the level due to the machine under test.

In order to obtain the emission sound pressure level at the specified position, the background noise correction K_1 shall be applied. The determination and use of K_1 shall be made in accordance with EN ISO 11201.

Emission sound pressure levels using other frequency weightings or in octave or one-third octave frequency bands may additionally also be measured, as required for the purposes of the measurements.

A.5 Measurement uncertainties

A standard deviation of reproducibility from 0,5 dB to 2,5 dB is expected for the A-weighted emission sound pressure level (see EN ISO 11201).

A.6 Information to be recorded

The information to be recorded covers all of the technical requirements of this noise test code. Any deviations from the noise test code and/or from the basic noise emission standards used are to be recorded together with the technical justification for such deviations.

A.7 Information to be reported

The information to be included in the test report is that which the manufacturer requires to prepare a noise declaration or which the user requires to verify the declared values.

As a minimum, the following information shall be included:

— identification of the manufacturing company, of the machine type, model, serial number and year of manufacture;

— reference to the basic noise emission standard(s) used;

— description of the mounting and operating conditions used;

— microphone position for the determination of the emission sound pressure level at the workstation;

— the noise emission values obtained.

It shall be confirmed that all requirements of the noise test code and/or the basic noise emission standards used have been fulfilled, or, if this is not the case, any unfulfilled requirements shall be identified; the deviations from the requirements shall be stated and technical justification for the deviations shall be given.

A.8 Declaration and verification of noise emission values

The declaration of the noise emission value shall be made as a dual number noise emission declaration according to EN ISO 4871.

It shall declare the noise emission values L (L_{pA} and L_{wA}) and the respective uncertainty K (K_{pA} and K_{wA}) according to 7.2.

The uncertainty K_{pA} is expected to have a value of 2,5 dB.

The noise declaration shall state that the noise emission value has been obtained according to this noise test code and the basic standard EN ISO 11201. If this statement is not true, the noise declaration shall indicate clearly what the deviations are from this noise test code (Annex A of this standard) and/or from basic standard.

If undertaken, verification shall be done according to EN ISO 4871 by using the same mounting, installation and operating conditions as those used for the initial determination of the noise emission value.

Annex B
(normative)

Principles of design to ensure the cleanability of intermediate provers

B.1 Definitions

For the purpose of this annex, the following definitions apply.

B.1.1

easily cleanable

designed and constructed to permit the elimination of soil by a simple cleaning method (e.g. hand and sponge)

B.1.2

fitted surfaces

surfaces separated by a distance less than or equal to 0,5 mm

B.1.3

joined surfaces

surfaces between which no particle of product becomes trapped in small crevices, thus becoming difficult to dislodge and so introduce a contamination hazard

B.2 Materials of construction

B.2.1 Type of materials

Materials of construction for food area shall comply with EN 1672-2:2005+A1:2009, 5.2.

Some materials (e.g. plastics) shall be the subject to overall or specific migration tests.

NOTE European Directives give the list of materials in contact with food and foods intended for human consumption (see also CEN/TR 15623). Materials not mentioned in the European Directives are accepted as long as food compatibility is proven.

B.2.2 Surface conditions

The surface finish of materials used on surfaces shall permit easy cleaning under satisfactory conditions. The roughness values (R_Z) according to EN ISO 4287 shall comply with the values given in Table B.1 and Table B.2.

Table B.1 — Surface conditions for food area

Values in micrometres

Technique of construction	Roughness (R_z)
Drawn – rolled – spun	≤ 34
Moulded – cast	≤ 40
Machined	≤ 34
Injected - metals - plastics	≤ 34 ≤ 34
Textiles - woven - non woven	According to manufacturer cleaning specifications
Netting-nets-perforated metal	According to manufacturer cleaning specifications
Coating - paint (test reservation) - plastics (test reservation) - glass - metal (test reservation)	≤ 22 ≤ 22 ≤ 22 ≤ 22

Table B.2 — Surface condition for splash area

Values in micrometres

Technique of construction	Roughness (R_z)
Drawn – rolled – spun	≤ 40
Moulded – cast	≤ 54
Machined	≤ 54
Injected - metal - plastics	≤ 54 ≤ 54
Netting-nets-perforated metal	According to manufacturer cleaning specifications
Coating - paint - plastics - glass metal	≤ 40 ≤ 40 ≤ 40 ≤ 40

B.3 Design

B.3.1 Connections of internal surfaces

B.3.1.1 General

Connections shall have the same roughness as the connected surfaces. These shall be designed to avoid any dead space, see EN 1672-2:2005+A1:2009.

B.3.1.2 Connections of internal surfaces for food area

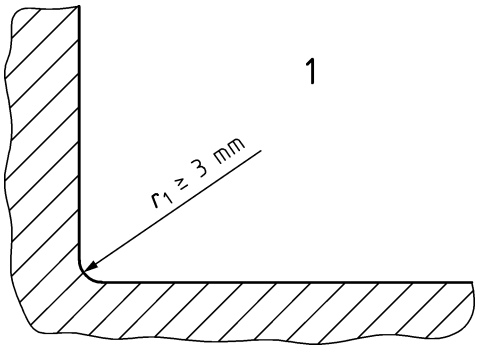
Two surfaces shall be connected according to:

a) rounded edge having a radius greater than a curve of minimum radius (r_1) of 3 mm obtained by:

1) machining (cutting into material mass);

2) bending the sheet metal (bending and forming);

3) design (in moulds, shells of foundry, injection and blasting ...) (see Figure B.1).

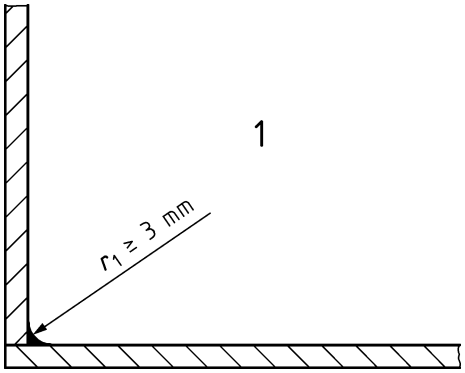


Key

1 food area

Figure B.1

4) or by welded assembly with grinding and polishing (see Figure B.2).

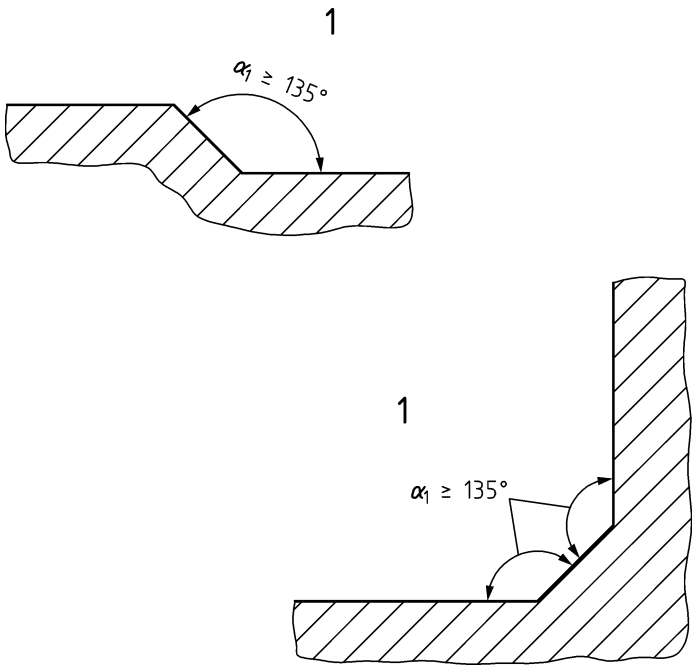


Key

1 food area

Figure B.2

b) for an internal angle (α_1) greater than or equal to 135° there are no special requirements for the radius (see Figure B.3).



Key

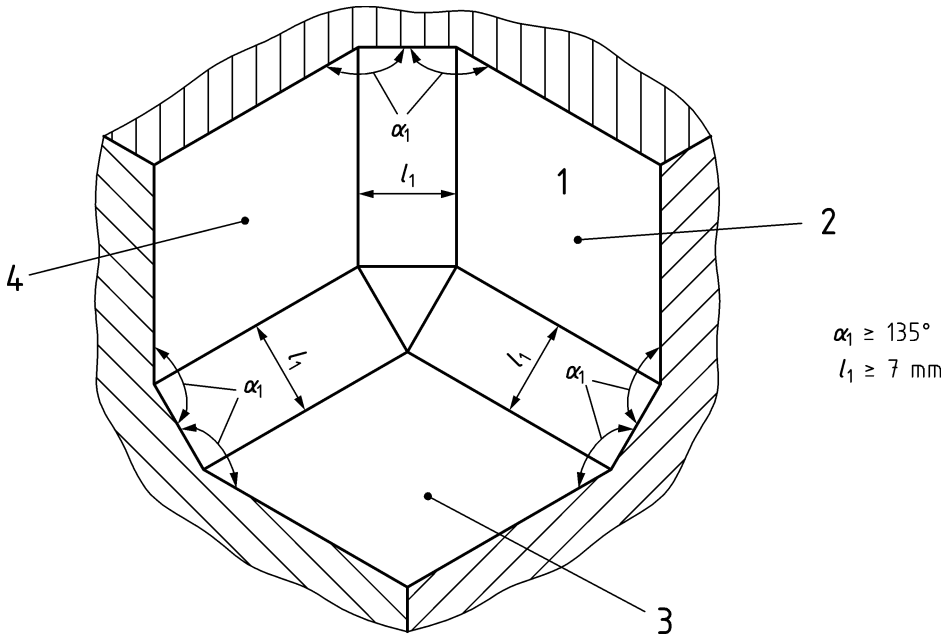
1 food area

Figure B.3

Three surfaces shall be connected (see Figure B.4):

— by using rounded edges, two rounded edges having a radius greater than or equal to 3 mm and the third having a radius greater than or equal to 7 mm;

— by angles of 135° so that the dimension (l_1) between two bends is then equal to or greater than 7 mm.



Key

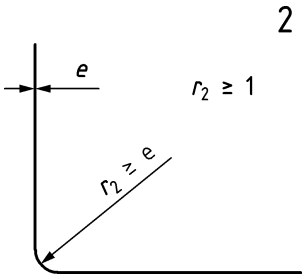
1 food area

2, 3, 4 plan

Figure B.4

B.3.1.3 Connections of internal surfaces for splash area

If two surfaces are perpendicular, the radius (r_2) shall be greater than 1 mm (see Figure B.5).

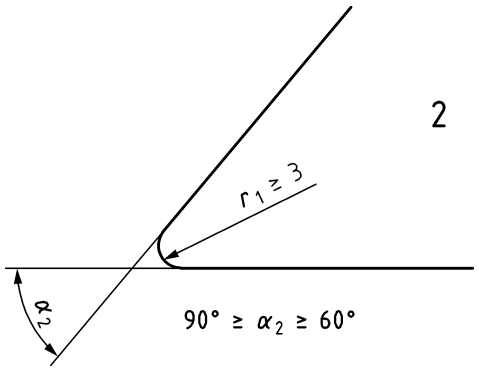


Key

2 splash area

Figure B.5

If the internal angle (α_2) is between 60° and 90°, the radius (r_1) shall be greater than or equal to 3 mm (see Figure B.6):

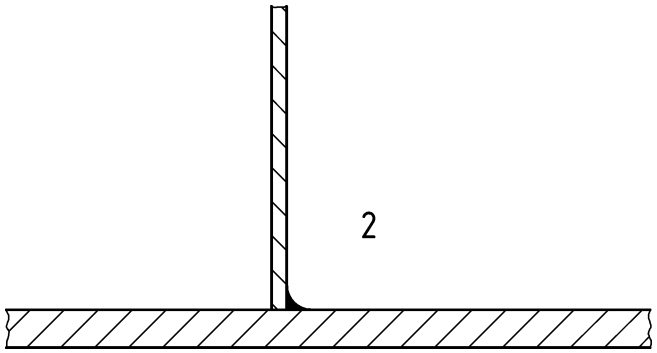


Key

2 splash area

Figure B.6

When two perpendicular surfaces are welded together, the weld shall ensure tightness (see Figure B.7). A ground finish is acceptable.



Key

2 splash area

Figure B.7

B.3.1.4 Connections of internal surfaces for non-food area

No particular requirement.

B.3.2 Surface assemblies and overlaps

B.3.2.1 General

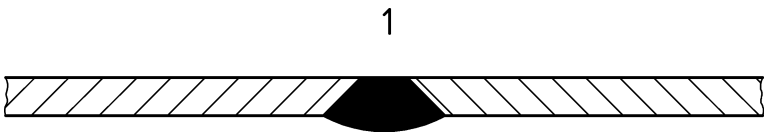
The sheet metal assembly methods shall take into account the expanding or contracting due to temperature variations.

B.3.2.2 Surface assemblies and overlaps for food area

B.3.2.2.1 Surface assembly

Assembled surfaces are considered joined either:

— by a continuous weld (see Figure B.8);

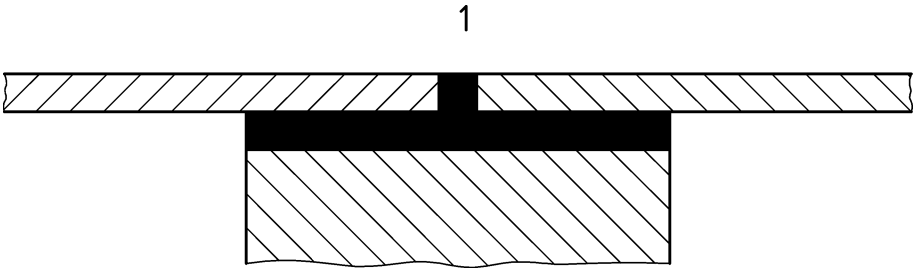


Key

1 food area

Figure B.8

— or by a continuous sealed and flushed joint (see Figure B.9).



Key

1 food area

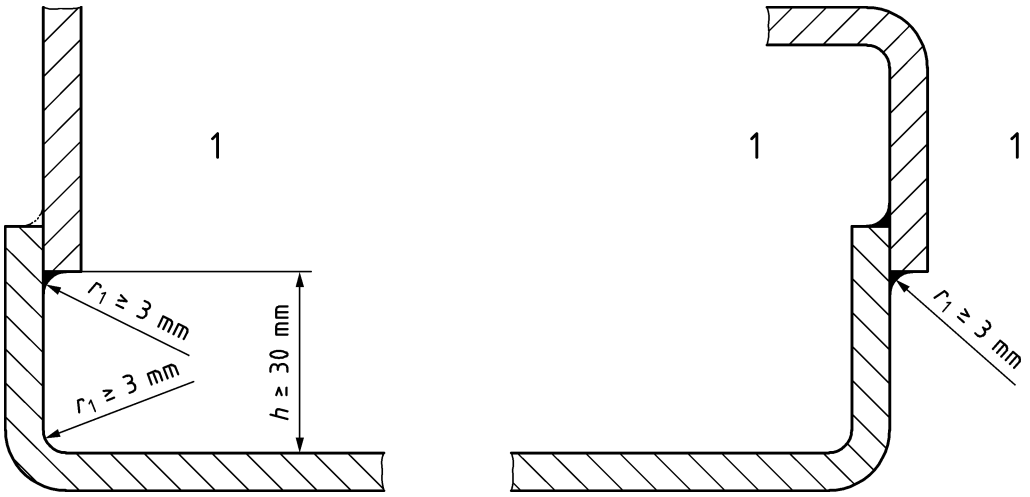
Figure B.9

B.3.2.2.2 Surface overlapping

In the event of unavoidable technical constraints (e.g. long sheet metal parts of varying thicknesses), assemblies may be made by the overlapping of sheet, in which case the assembled surfaces are joined to each other:

— either by a continuous weld.

The upper surfaces shall overlap the lower surfaces in the direction of liquid flow. The end of the overlapping and the corner shall be separated with a distance (*h*) more than or equal to 30 mm (see Figure B.10):

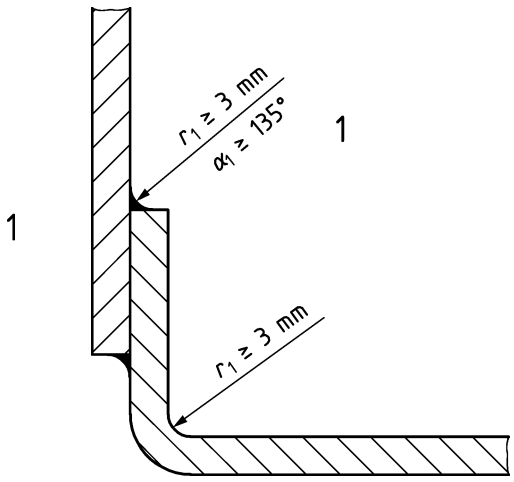


Key

1 food area

Figure B.10

If this is impossible to construct, connections shall be in compliance with the requirements concerning rounded areas in the food area (see B.3.1.2 and Figure B.11).



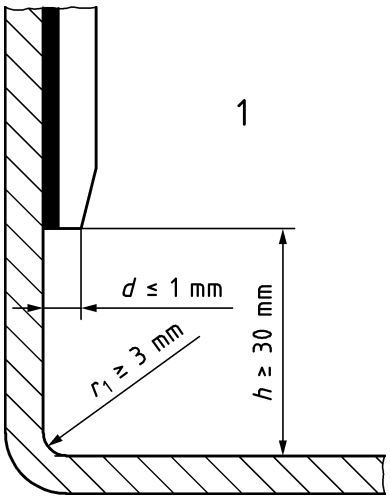
Key

1 food area

Figure B.11

— or by continuous sealed and flush jointing.

When the overall thickness of the overlapping part and joint is more than 1 mm, the upper part shall be chamfered in order to reduce the thickness (*d*) to smaller than or equal to 1 mm (see Figure B.12).



Key

1 food area

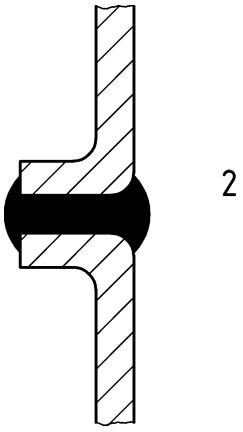
Figure B.12

B.3.2.3 Surface assemblies and overlaps for splash area

The surfaces may be:

a) either grouted:

1) by means of a profile which cannot be pulled away and which is installed before assembly (see Figure B.13):

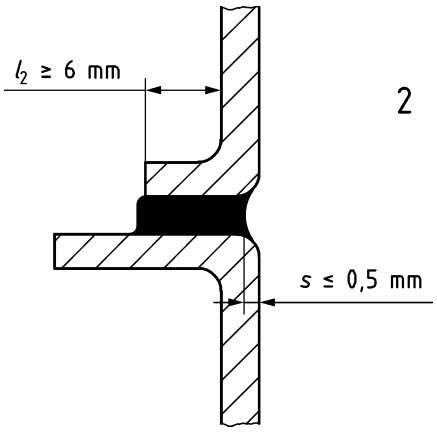


Key

2 splash area

Figure B.13

2) by flush bonding (the folds of the part used for bonding shall have a flange length (l_2) greater than or equal to 6 mm and the flash of the bond shall not have a shrinkage (s) more than 0,5 mm), see Figure B.14.

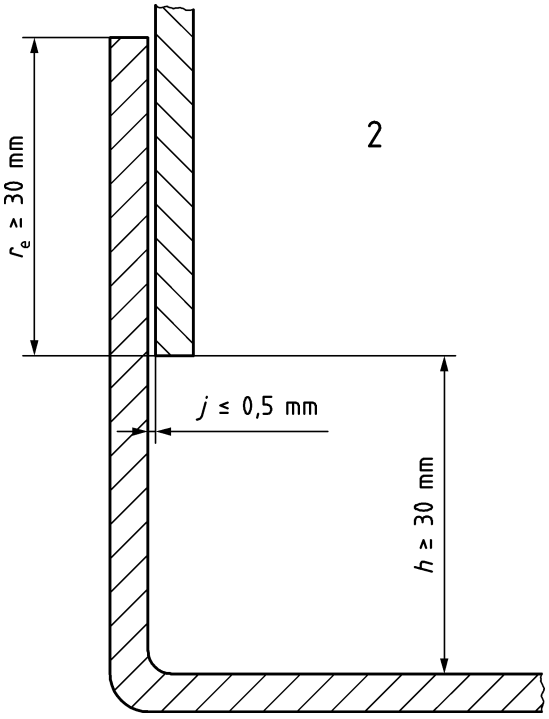


Key

2 splash area

Figure B.14

b) or assembled and fitted (maximum clearance (*j*) less than or equal to 0,5 mm) with the upper surfaces overlapping the lower surfaces in the direction of product flow. An overlapping distance (r_e) of at least 30 mm is essential to prevent liquid rising by a capillarity (see Figure B.15).



Key

2 splash area

Figure B.15

B.3.2.4 Surface assemblies and overlaps for non-food area

No particular requirements.

B.3.3 Fasteners

B.3.3.1 Fasteners for food area

See EN 1672-2:2005+A1:2009, 5.3.1.3.

If construction requires the use of hexagon socket head screws embedded in a spot-face:

— either construction shall comply with the Figure B.16 and the manufacturer in his instruction handbook can prescribe suitable cleaning facilities;

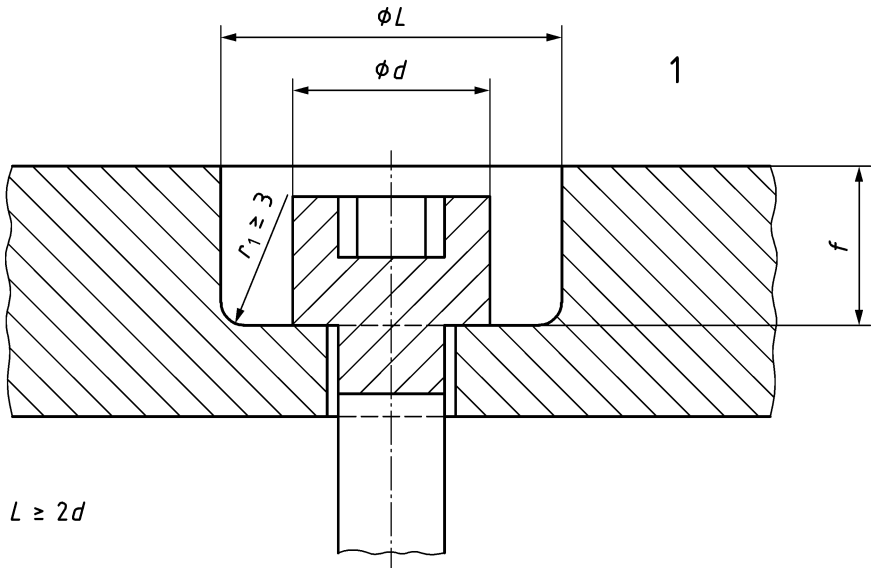


Figure B.16

— or the manufacturer shall take the necessary steps to fill in the spot-face by sealed and lasting plugs corresponding to the requirements of the food area.

B.3.3.2 Fasteners for splash area

The fasteners easily to be cleaned shall be chosen amongst those on Figure B.17.

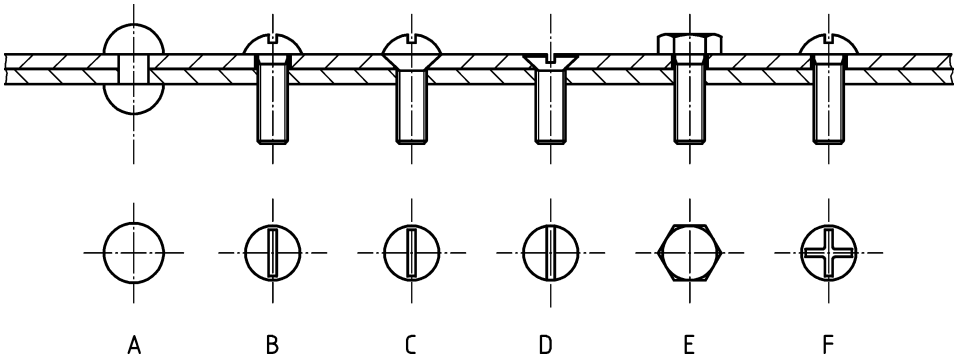


Figure B.17

If construction requires the use of hexagon socket screws embedded in a spot-face hole, the design shall comply with:

— either a method complying with the principle of Figure B.16 for the food area whereby manufacturer can specify in his instruction handbook the cleaning facilities that are required (e.g. high pressure jet);

— or the manufacturer shall take all necessary measures to plug the spot-facing with sealed plugs.

B.3.3.3 Fasteners for non-food area

No particular requirement.

B.3.4 Feet, support and bases for cleaning the machines underneath

B.3.4.1 Machines on the floor

B.3.4.1.1 Fixed machines with or without a base

Fixed machines with or without a base shall either be based on the floor with an interposed continuous and sealed joint, the instruction handbook shall specify the jointing method (see Figure B.18), or shall have their feet (*H*) higher than or equal to 150 mm.

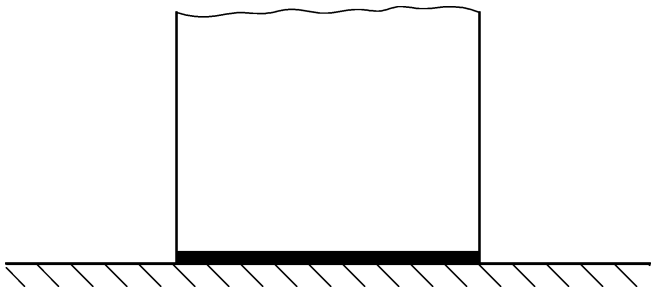


Figure B.18

However, if the space (*L*) to be cleaned is not deeper than 150 mm, the height *H* may be reduced to 100 mm as long as the various access possibilities are taken into account (see Figure B.19).

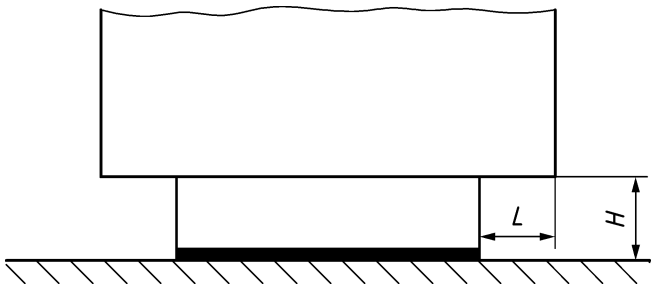
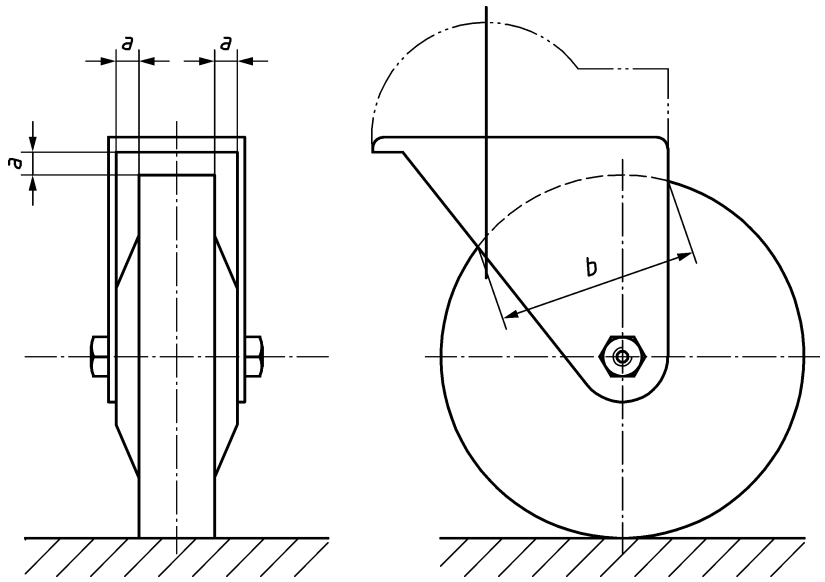


Figure B.19

B.3.4.1.2 Mobile machines

The castors shall be cleanable. An example is given in Figure B.20, where *b* is the greater width of the covering at the circumference of the wheel.



Key

If $b \leq 25$ mm, then $a \geq 3{,}5$ mm.

If $b > 25$ mm, then $a \geq 6$ mm.

Figure B.20

B.3.5 Ventilation openings

B.3.5.1 Ventilation openings for non-food area

Ventilation openings shall be located in the non-food area.

Their design shall prevent any infiltration or retention of fluid in the machine.

Whenever possible, for machines standing on the floor, a guard shall prohibit access to rodents in all technical areas of the machine and for this reason the smallest dimension of the opening shall be less than or equal to 5 mm.

B.3.5.2 Ventilation openings for splash area

In case of technical constraints, ventilation openings may be in the splash area. In such cases, they shall be designed to be cleanable.

Whenever possible, for machines standing on the floor, a guard shall prevent access to rodents in any technical areas of the machine.

The smallest dimension of the opening (*b*) shall be less than or equal to 5 mm (see Figure B.21).

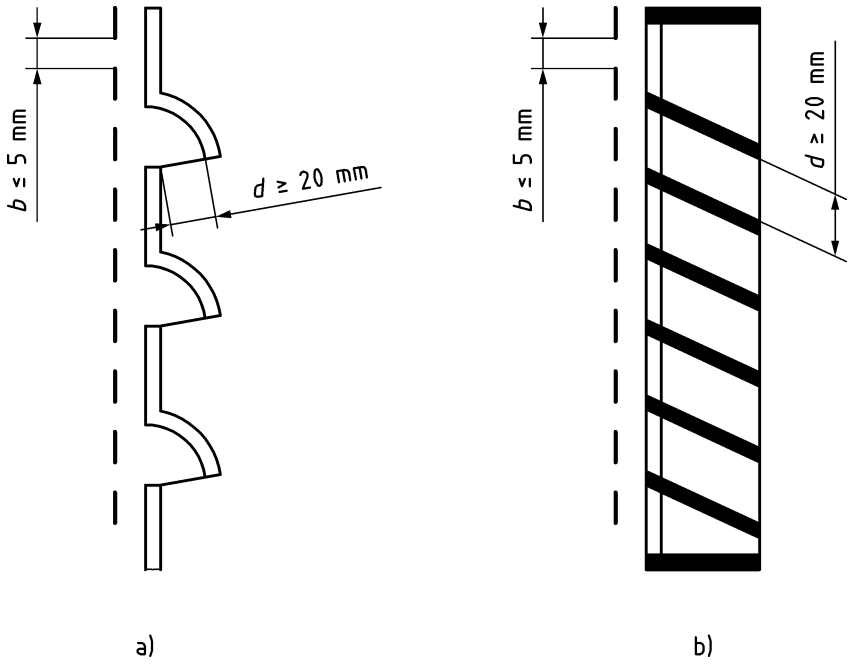


Figure B.21

B.3.6 Hinges

Whenever possible, the manufacturer shall eliminate swivel points from the food area.

If their presence in the food area is technically necessary, then:

— they shall be easily removable;

— if they cannot be removed, all surfaces shall be accessible.

Assembly with a fixed part shall be made by a joint designed to prevent any infiltration. Access to all these areas is acceptable when the passage width (l_3) is greater than or equal to two times the depth (p). In no case this width (l_3) shall be less than 10 mm (see Figure B.22). The gap between parts shall be less than 1 mm.

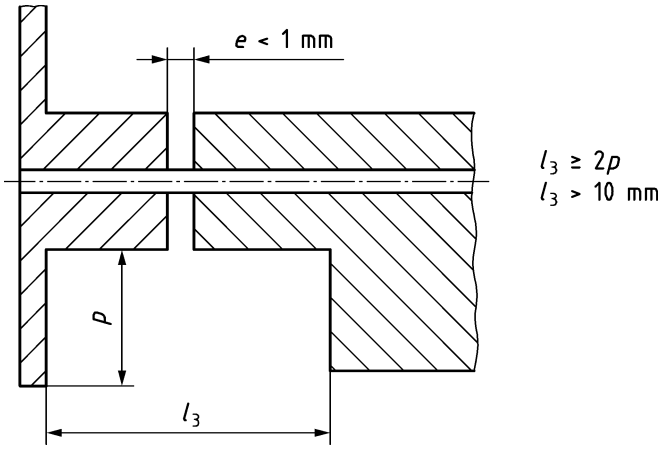


Figure B.22

B.3.7 Control panel

B.3.7.1 Control panel in the non-food area

Normally, the control panel should be in the non-food area and should also be cleanable whenever possible.

B.3.7.2 Control panel in the splash area

If it is not possible for technical reasons to place the control panel in the non-food area the various controls shall have easily cleanable surfaces.

The distance *L* between two elements shall be greater than or equal to:

— 20 mm (see Figure B.23);

— 12,5 mm if their height *h* is less than or equal to 8 mm (see Figure B.24).

If the above requirements cannot be complied with, controls shall be protected by a cap (see Figure B.25).

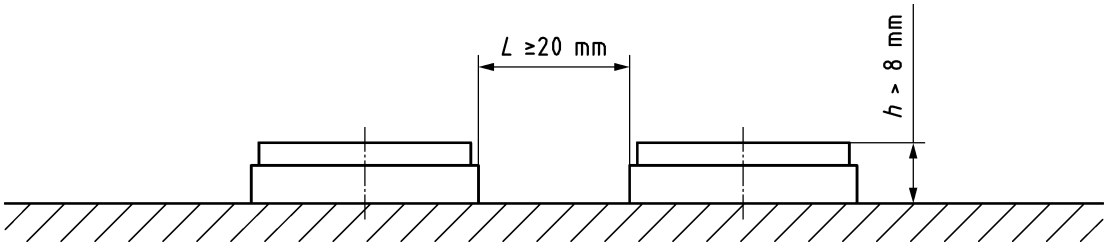


Figure B.23

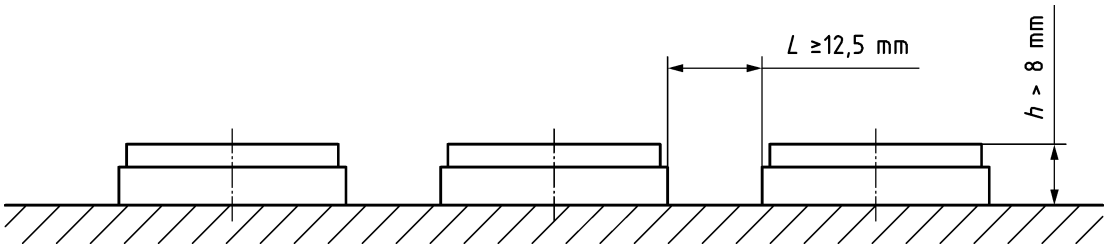


Figure B.24

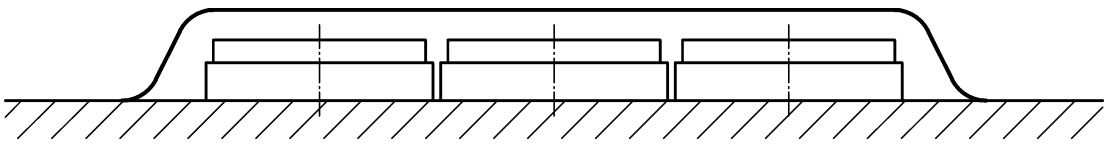


Figure B.25

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

[1] EN 894 (all parts), *Safety of machinery — Ergonomics requirements for the design of displays and control actuators*

[2] EN 1005-2, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

[3] EN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

[4] EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

[5] EN ISO 13856-2, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2)*

[6] CEN/TR 15623, *Food processing machinery — Route map — Materials for food area*

[7] *Les mélanges explosifs, poussières et combustibles* (edition INRS ED 944)

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