BS EN 1674:2015

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Food processing machinery — Dough sheeters — Safety and hygiene requirements

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National foreword

This British Standard is the UK implementation of EN 1674:2015. It supersedes BS EN 1674:2000+A1:2009 which is withdrawn.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 - Dough sheeters - Safety and hygiene requirements

Machines pour les produits alimentaires - Laminoirs à pâte - Prescriptions relative à la sécurité et à l'hygiène

Nahrungsmittelmaschinen - Teigausrollmaschinen - Sicherheits- und Hygieneanforderungen

This European Standard was approved by CEN on 1 August 2015.

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European foreword

This document (EN 1674:2015) 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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 1674:2000+A1:2009.

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 1674:2000+A1:2009 are listed below:

— normative references were updated;

— list of significant hazards and dangers zones for mechanical hazards were specified more detailed;

— new sub-clauses: 5.3.5 (Unexpected start-up) and 5.4 (flour duster).

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

This European Standard specifies safety and hygiene requirements for the design and manufacture of dough sheeters, as described in Clause 3, used in the food industry and craft activities (bread-making, pastry-making, sweet industries, bakeries, confectioners, delicatessens, catering facilities, etc.) for reducing the thickness of a solid mass of dough or pastry by rolling it out.

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

This European Standard deals with all significant hazards, hazardous situations and events relevant to dough sheeters, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 5).

Noise is not considered to be a significant hazard. This does not mean that the manufacturer is absolved from reducing noise and making a noise declaration. Therefore a noise test code is given in Annex B.

The following machines are excluded:

— experimental and testing machines under development by the manufacturer;

— dough sheeters where the dough is fed to the rollers by gravity (e.g. pizzabase dough sheeters);

— domestic appliances[1)].

This European Standard is not applicable to dough sheeters 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 ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO 3743-1)*

1) EN 60335-1 and EN 60335-2-64 are applicable

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

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 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

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 apply.

3.1.1
manual operation
the rollers and conveyor belts are driven by electric motor and the rollers' gap is adjusted by hand control

3.1.2
automatic operation
the machine is normally automatically controlled and the rollers' gap is adjusted by an electric motor

3.2 Description

A dough sheeter usually consists of a machine frame mounted on a mobile or fixed base or placed on a table or a support. The operation is carried out by passing the dough back and forth between the rollers whose distance apart is reduced progressively either by manual adjustment or automatically.

The frame supports the following components (see Figure 1):

1) the electric motor which drives the rollers;

2) two superimposed rollers. The height of the lower one is fixed, the height of the upper one can be adjusted to obtain dough of the desired thickness. The two rollers rotate in opposite directions;

3) scraping devices to remove dough residues from the rollers;

4) a table or conveyor on one sides or both sides of the rollers;

5) the control system which may include an on/off switch, a device for reversing the direction of rotation, and a rollers' gap adjustment control;

6) an optional attachment to spread flour;

7) optional devices to cut dough and to roll dough. The cutting device is used at the end of the rolling phase to cut predetermined forms from the dough. The system is often composed of a roller fitted with circular knives for making bands, and of a roller fitted with imprints to make special forms such as croissants, chocolate filled pastry tartlets, etc. Rolling up the dough can be done by using a winding net to make special rolled forms such as croissant etc.

The capacity of the machine is defined by the width of the in-feed table (or conveyors).

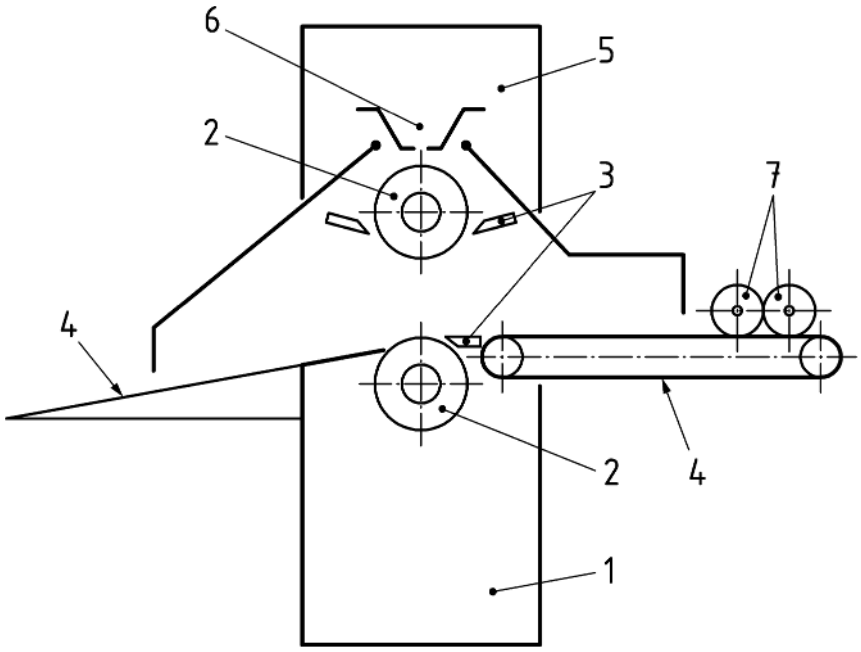


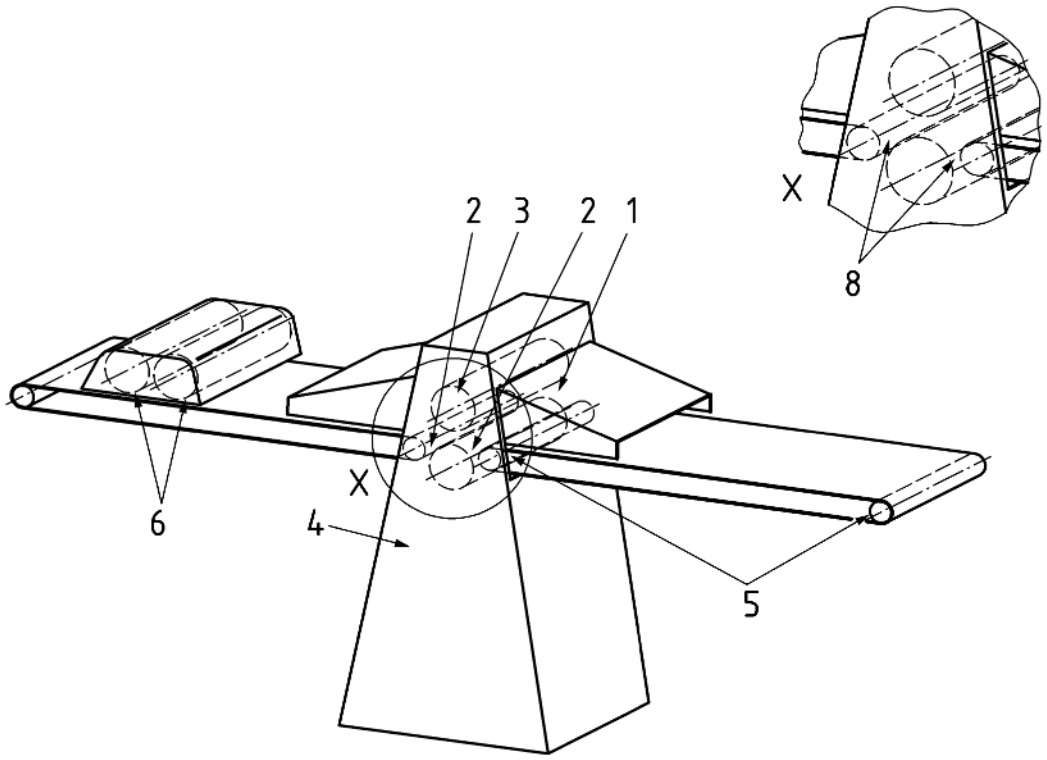
Figure 1 — Main parts of a dough sheeter

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

Danger zones	Mechanical hazards (see Figure 2)	Clause/subclause in this European Standard
Zone 1: gap between the two rollers on the in-running side	— drawing-in and crushing	5.2.1.1
Zone 2: gap between the fixed support for the dough and the lower roller	— drawing-in and crushing	5.2.1.2
Zone 3: gap between the rollers and the side guards	— scraping	5.2.1.1
Zone 4: drive mechanism	— shearing — entanglement	5.2.1.3
Zone 5: input and output devices: gap between conveyor belts and their drive or guide rollers	— drawing-in and crushing	5.2.1.4
Zone 6 (optional): dough cutting/rolling devices, either power driven or driven by friction between the blades and the belt	— cutting	5.2.1.5
Zone 7 (optional): removable attachment to spread flour	— drawing-in and crushing	5.2.1.6
Zone 8: space between the roller and the scraping device	— drawing-in and crushing	5.2.1.7
	Loss of stability	5.2.2
	Electrical hazards	5.3
	Hazards generated by unexpected start-up	5.3.5
	Hazards generated by materials and substances (e.g. inhalation of dust)	5.4
	Hazards generated by neglecting hygienic design principles	5.5
	Hazards generated by neglecting ergonomic principles	5.6



Key

1 Zone 1: gap between the two rollers on the in-running side;

2 Zone 2: gap between the fixed support for the dough and the lower roller;

3 Zone 3: gap between the rollers and the side guards;

4 Zone 4: drive mechanism;

5 Zone 5: input and output devices: gap between conveyor belts and their drive or guide rollers;

6 Zone 6: (optional) dough cutting/rolling devices, either power driven or driven by friction between the blades and the belt;

7 Zone 7: (optional) removable attachment to spread flour;

8 Zone 8: space between the roller and the scraping device.

NOTE to Zone 1 The outrunning side can become the in-running side due to the reversal function.

Figure 2 — Danger zones of a dough sheeter

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 12100:2010 for relevant, but not significant hazards, which are not dealt with by this document.

Interlocking guards shall be at least interlocking without guard locking as defined in EN ISO 14119:2013, 4.1, and they shall comply with EN ISO 14119:2013, Clause 5 and 8.7.1.

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.

When fixed guards, or parts of the machine acting as such, are not permanently fixed e.g. by welding, their fixing systems shall remain attached to the guards or to the machinery when the guards are removed.

In general no emergency stop is required for dough sheeters. In this case particular attention shall be given to the accessibility of the normal OFF-switch from the operator position.

5.2 Mechanical hazards

5.2.1 General

The danger zones, as described in Clause 4, shall be safeguarded according to 5.2.1.1 to 5.2.1.7.

5.2.1.1 Zone 1 and zone 3

Each in-running side of the rollers shall be protected with guards which are:

— fixed guards dimensioned according to EN ISO 13857:2008 (the frame can have the function of a fixed guard);

— or movable and interlocking guards, with the dimensions of Table 2 (see Figure 3a) and Figure 3b));

— or a combination of both types of guards.

Table 2 — Dimensions of the guard

Dimensions in millimetres

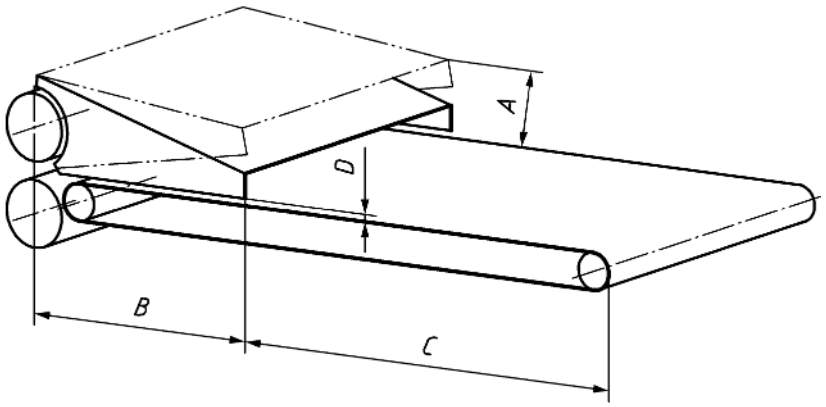
A max.	40	45	50	55	60	65	70	105
B min.	225	250	300	350	400	450	500	550
C min.	-	-	-	-	-	300	300	300
D min.	EN ISO 13857:2008, Table 4							

A distance between the upper part of the guard and the surface where the dough is lying, when the interlocking device is actuated;

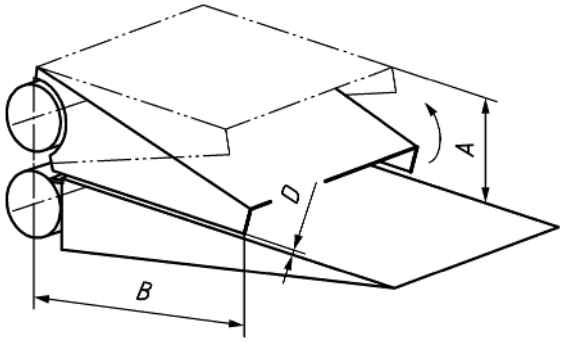
B distance between the edge of the guard and the vertical plane through the axes of the rollers;

C distance between the end of guard and end of belt;

D distance between the lower edge of the guard and the surface where the dough is lying, when the interlocking device is activated.



3a)



3b)

Figure 3 — Guard dimensions

The interlocking mechanism shall be housed within the machine body or otherwise protected to ensure that its operation is not adversely affected by for example dough or flour.

Movable interlocking guards shall be free to move at their ends furthest from the rollers in order to act like a trip device if an operator attempts to reach under any guard.

In case of openings inside the fixed or movable guard, the safety distances of the openings, e.g. carried out as bars or mesh, shall comply with EN ISO 13857:2008, Table 4.

The safety distances shall be maintained for every position of the conveyor.

The actuation of the interlocking device due to the lifting of the guard shall within one second

— either cause the machine to stop. In this case restarting shall only be possible by intentionally actuating the starting control;

— or it shall result in the reversal of the rotation of the rollers so that the operator cannot be drawn in, i.e. that the nip between the rollers is outrunning; when both guards are lifted, the machine shall stop.

5.2.1.2 Zone 2

The requirements for zone 1 shall be fulfilled.

The maximum gap between the fixed support for the dough and the lower roller shall be ≤ 4 mm (see Figure 4).

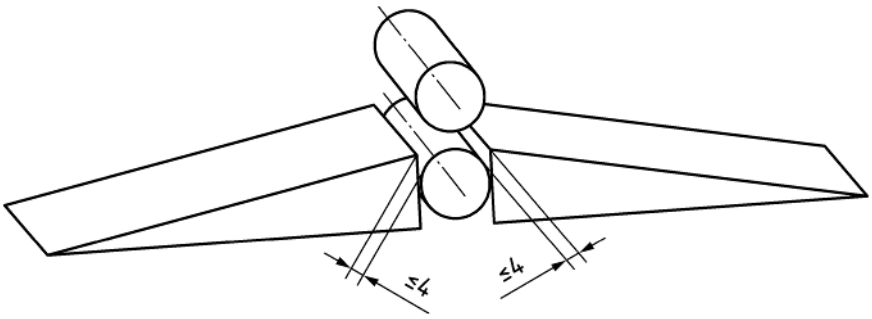


Figure 4 — Gap between the fixed support for the dough and the lower roller

5.2.1.3 Zone 4

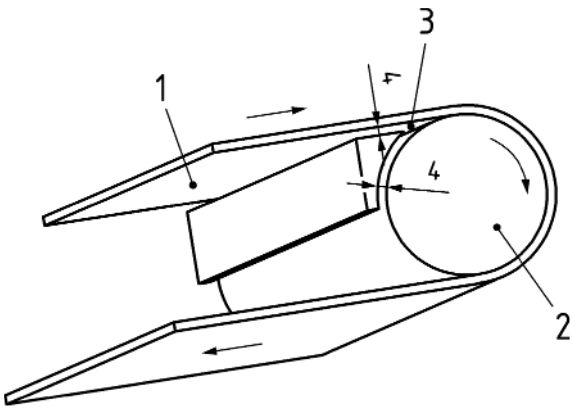
The drive mechanism shall be guarded by fixed guards (machine frame can have the function of fixed guard) (see EN 953 and EN ISO 13857:2008) and/or movable interlocking guards.

The actuation of the interlocking device due to the opening of the guard shall cause the machine to stop within one second.

5.2.1.4 Zone 5

Access to the in-running nip of the conveyors shall be prevented, e.g. by a guard such as the one marked "c" in Figure 5.

The in-running nips shall be safeguarded by nip guards shaped as filling elements, filling bars or similar with a maximum gap of 4 mm both to the conveyor belt and the roller (see Figure 5).



Key

a input or output conveyor

b roller

c nip guard

Figure 5 — Safeguarding for the in-running nip

5.2.1.5 Zone 6

Each in-running side of the rollers shall be protected with guards which are:

— fixed guards dimensioned according to EN ISO 13857:2008 (the frame can have the function of a fixed guard);

— or movable and interlocking guards, with the dimensions of Table 3 (see Figure 6);

— or a combination of both types of guards.

Table 3 — Dimensions of the guard

Dimensions in millimetres

A max.	40	45	50	55	60	65	70	105
B min.	225	250	300	350	400	450	500	550
C min.	-	-	-	-	-	300	300	300
D min.	EN ISO 13857, Table 4							

A distance between the upper part of the guard and the surface where the dough is lying, when the interlocking device is actuated;

B distance between the edge of the guard and the danger zone (see Figure 6);

C distance between the end of guard and end of belt;

D distance between the lower edge of the guard and the surface where the dough is lying, when the interlocking device is activated.

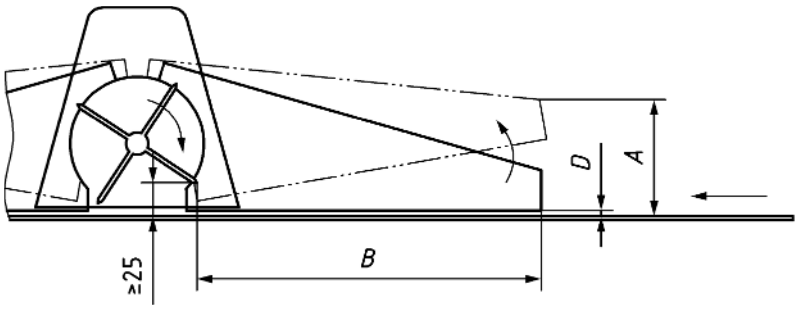


Figure 6 — Guard dimensions

Requirements for guards shall be identical to 5.2.1.1.

5.2.1.6 Zone 7

If flouring devices are removable (e.g. without tools) their removal shall not allow access to any hazardous area, otherwise, they shall be interlocked and cause the machine to stop.

If the force necessary to stop the moving parts of the flour duster is more than 150 N, the flour duster shall be protected by a fixed or interlocking guard.

The flour container opening can be left unprotected if there is no risk from the flour feed system (e.g. if the feed consists of a spindle with rubber spokes or notches or if the flour is sprinkled by a vibrating device).

5.2.1.7 Zone 8

The requirements for zones 1, 2 and 3 shall be fulfilled.

5.2.2 Loss of stability

5.2.2.1 Machines shall be designed to be stable and shall comply with 5.2.2.2 to 5.2.2.3 as applicable.

For machines designed to be fixed to the floor, the instruction handbook shall indicate the values of forces at the fixing points.

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

5.2.2.3 Unfixed free standing machines with castors shall have at least two castors (or sets of castors) fitted with a locking device, and shall comply with the provisions of 5.2.2.2.

5.3 Electrical hazards

5.3.1 General

The electrical equipment shall comply with EN 60204-1:2006 with the precisions given in the following sub-clauses.

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 60204-1:2006.

5.3.2 Protection against electric shock

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

5.3.3 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).

5.3.4 Motor enclosures

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

5.3.5 Unexpected start-up

Unexpected start-up, after a stop due to a lack or fluctuation of electrical energy, shall be avoided. A voluntary action on the start device is needed to restart the machine.

5.4 Requirements concerning flour dust emission

When the machine is equipped with a flour sprinkling system, the quantity of delivered (discharged) flour in a time unit and/or the distance between the bottom side of the sprinkling system and the dough shall be adjustable to reduce flour dust emission.

Drip trays shall be provided at all areas where flour falls off conveyors.

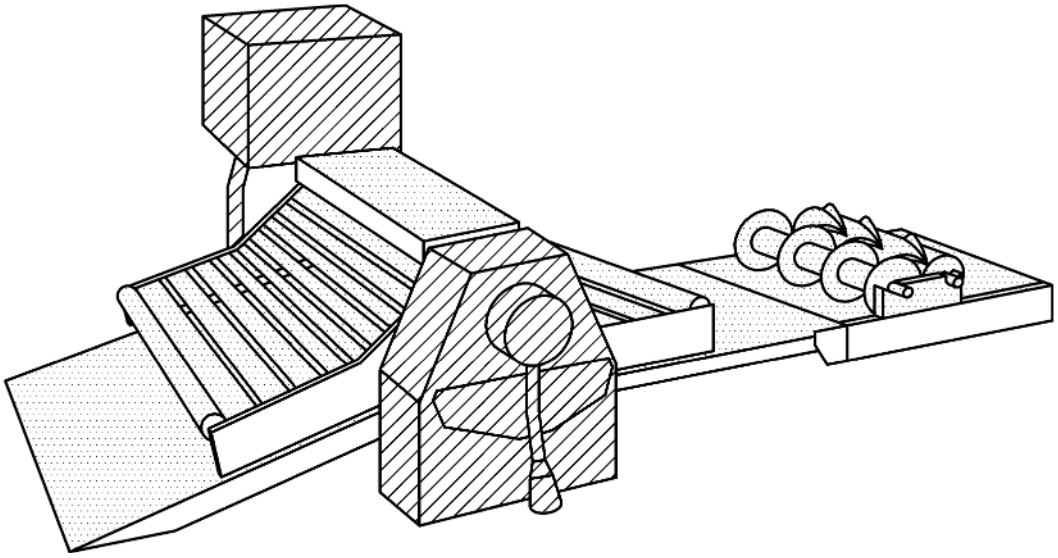
5.5 Hygiene requirements

5.5.1 General

Dough sheeters shall be designed and manufactured in accordance with EN 1672-2:2005+A1:2009 and Annex A.

In addition, the fixing of the tables, the belts and the scraping devices shall be constructed in such a way that they can be removed and easily cleaned.

The 3 zones defined in EN 1672-2:2005+A1:2009 are defined as follows and are shown in Figure 7; the precise boundary between the areas depends on the detailed design of the machine.



Key

food area

splash area

non-food area

NOTE Figure without guard device.

Figure 7 — Hygiene areas

5.5.2 Food area

The food area is as follows:

— the surfaces of the rollers;

— the surfaces of the scraping devices;

— the surfaces of the input/output tables or conveyor belts;

— the guards (the whole surface when the guard is not solid, the inside face when it is solid);

— the inside of the flour dispenser;

— cutting/rolling accessories.

5.5.3 Splash area

The splash area is as follows:

— the side and internal parts of the base;

— the outside of solid guards.

5.5.4 Non-food area

The remaining area of the machine does not come into contact with food.

5.6 Hazards generated by neglecting ergonomic principles

Awkward body postures during operation, maintenance and cleaning shall be avoided by design, and control actuators shall be placed within proper reach distance for the operator as stated in EN 614-1:2006+A1:2009, Annex A.

6 Verification of safety and hygiene requirements and/or measures

This clause contains the methods of testing for the presence and adequacy of the safety requirements stated in Clause 6.

Verification of the requirements can be made by means of inspection, calculation or testing. These shall be applied to a 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 4.

Table 4 — Verification

Relevant sub-clause	Method of verification
5.2.1.1 and 5.2.1.2	By measurement and functional test of the interlocking device
5.2.1.3	By measurement
5.2.1.4	By inspection
5.2.1.5, 5.2.1.6 and 5.2.1.7	By measurement and functional test of the interlocking device
5.2.2	By test: when tilted 10° the machine shall return to upright position
5.3	By tests given in EN 60204–1:2006, Clause 18 a), b) and f)
5.4	By inspection
5.5	In accordance with EN 1672–2:2005+A1:2009, Clause 6
5.6	By measurement of the forces By inspection of the visibility of the indications, buttons.

7 Information for use

7.1 Instruction handbook

The manufacturer shall provide an instruction handbook in accordance with 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 duster, a vacuum cleaner, … Metallic implements are not recommended.);

— information warning the users about the health risk from dust. Detailed instructions on careful handling of flour and the minimal generation of dust during use and cleaning shall be provided and shall include in particular reference to:

  1) methods to minimize flour dust (e.g. prohibit compressed airlines for cleaning);

  2) the need to properly adjust and maintain roller scrapers to ensure minimal sticking of dough and hence dusting flour requirements;

— for machines with a flour sprinkling system, information shall be given about using, filling and cleaning the sprinkling flour system;

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

— a warning to the operator on the hazard of residual voltage especially from capacitors after dismantling the guards e.g. during maintenance;

— the value of the overcurrent protective device;

— 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;

— 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;

— the specifications of the spare parts to be used and their instruction of mounting, 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;

— instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures to be taken during these operations (period of checking, check if the machine stops after actuation of the guard, distance for actuation of the guard, the stopping time of the machine);

— 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 on airborne noise emissions, determined and declared in accordance with Annex B of this European Standard:

1) the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact shall be indicated,

2) the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa),

3) the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).

Whenever sound emission values are indicated the uncertainties "*K*" surrounding these values shall be specified. The operating conditions of the machinery during measurement and the measuring methods used shall be described.

— A notice indicating the need to test trip devices daily before starting work.

7.2 Marking

The minimum marking shall include:

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

— mandatory marking [2)];

— 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.

2) 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)

Principles of design to ensure the cleanability of dough sheeters

A.1 Terms and definitions

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

A.1.1

easily cleanable

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

A.1.2

fitted surfaces

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

A.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

A.2 Materials of construction

A.2.1 Type of materials

A.2.1.1 General

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

Some materials (e.g. plastics) shall be 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.

A.2.1.2 Materials for food area:

Materials in contact with food and foods intended for human consumption shall comply with the relevant directives and regulations (e.g. Commission Regulation (EU) No. 10/2011 on plastic materials and articles intended to come into contact with food).

A.2.1.3 Materials for splash area

See EN 1672-2:2005+A1:2009, 5.2.2.

A.2.1.4 Non-food area

See EN 1672-2:2005+A1:2009, 5.2.3.

A.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 Tables A.1 and A.2.

Table A.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	≤ 34
— plastics	≤ 34
Coating	
— paint (test reservation)	≤ 22
— plastics (test reservation)	≤ 22
— glass	≤ 22
— metal (test reservation)	≤ 22

Table A.2 — Surface conditions for splash area

Values in micrometres

Technique of construction	Roughness (R_z)
Drawn – rolled – spun	≤ 40
Moulded – cast	≤ 54
Machined	≤ 54
Injected	
— metal	≤ 54
— plastics	≤ 54
Coating	
— paint	≤ 40
— plastics	≤ 40
— glass	≤ 40
— metal	≤ 40

A.3 Design

A.3.1 Connections of internal surfaces

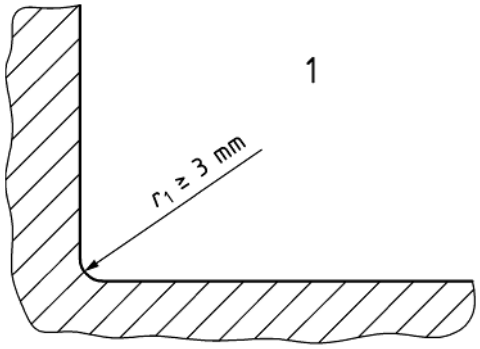
A.3.1.1 General

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.

A.3.1.2 Connections of internal surfaces for food area

Two surfaces shall be connected according to:

- rounded edge having a radius greater than a curve of minimum radius (r_1) of 3 mm obtained by:
  - machining (cutting into material mass);
  - bending the sheet metal (bending and forming);
  - design (in moulds, foundry patterns, injection and blasting...) (see Figure A.1.1).

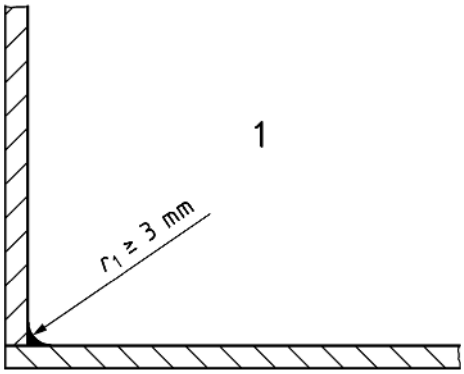


Key

1 food area

Figure A.1.1 — Internal surfaces for food area (rounded)

- or by welded assembly with grinding and polishing (see Figure A.1.2).

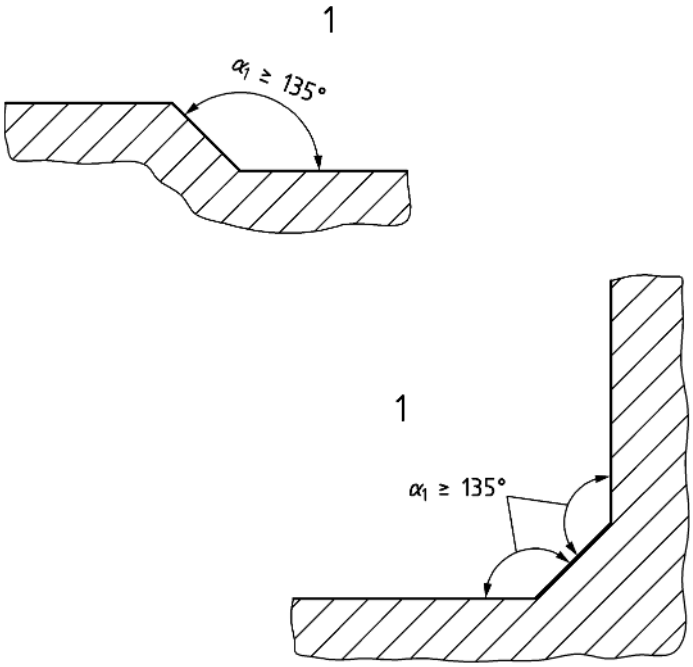


Key

1 food area

Figure A.1.2 — Internal surfaces for food area (welded)

— for an internal angle (α_1) greater than or equal to 135° there are no special requirements for the radius (see Figure A.1.3)



Key

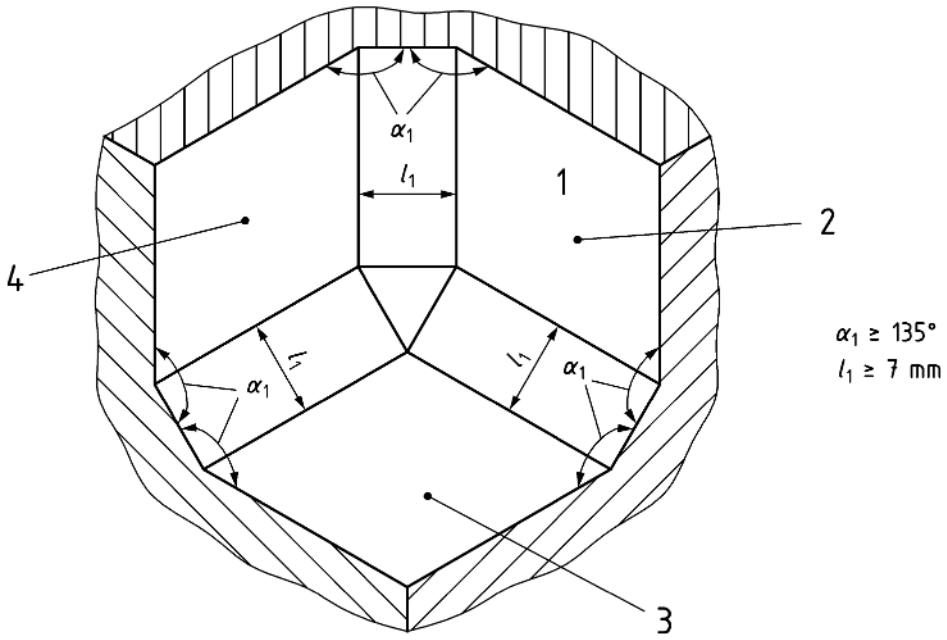
1 food area

Figure A.1.3 — Internal angle for food area greater than or equal to 135°

Three surfaces shall be connected:

— by using rounded edges, with 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° (α_1) so that the dimension (l_1) between two bends is then equal to or greater than 7 mm (see Figure A.1.4).



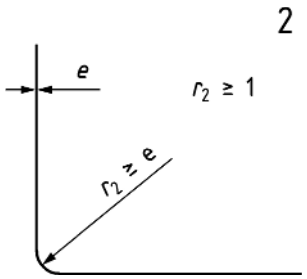
Key

1 food area

Figure A.1.4 — Connections of three surfaces for food area

A.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 A.2.1).

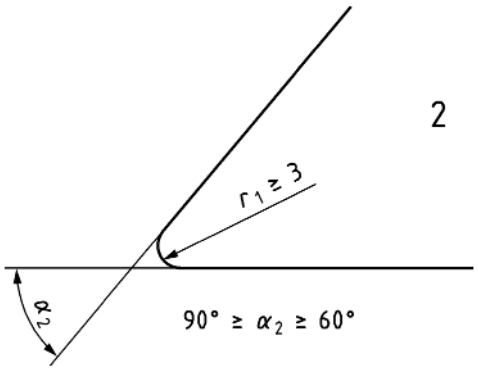


Key

2 splash area

Figure A.2.1 — Internal angle for splash area greater than or equal to 90°

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 A.2.2):

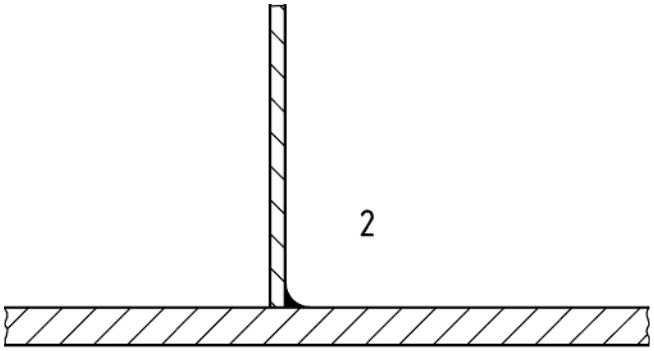


Key

2 splash area

Figure A.2.2 — Internal angle for splash area between 60° and 90°

When two perpendicular surfaces are welded together, the weld shall ensure tightness (see Figure A.2.3). A ground finish is acceptable.



Key

2 splash area

Figure A.2.3 — Internal surfaces for splash area (welded)

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

No particular requirements.

A.3.2 Surface assemblies and overlaps

A.3.2.1 General

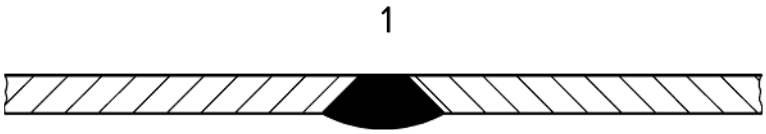
The sheet metal assembly methods shall take into account expansion and contraction due to temperature variations.

A.3.2.2 Surface assemblies and overlaps for food area

A.3.2.2.1 Surface assembly

Assembled surfaces are considered joined either:

— by a continuous weld (see Figure A.3.1);

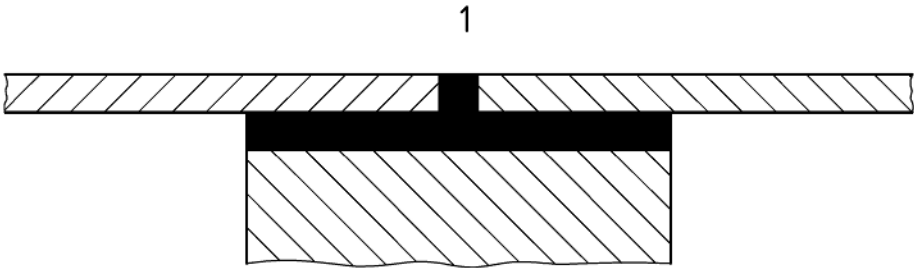


Key

1 food area

Figure A.3.1 — Surface assemblies for food area (welded)

— or by a continuous sealed and flushed joint (see Figure A.3.2).



Key

1 food area

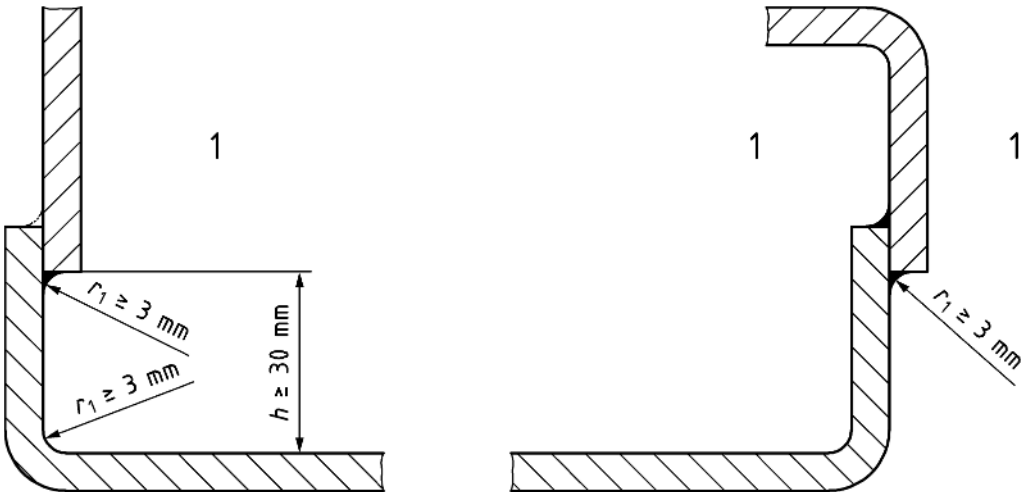
Figure A.3.2 — Surface assemblies for food area (sealed)

A.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 A.4.1):

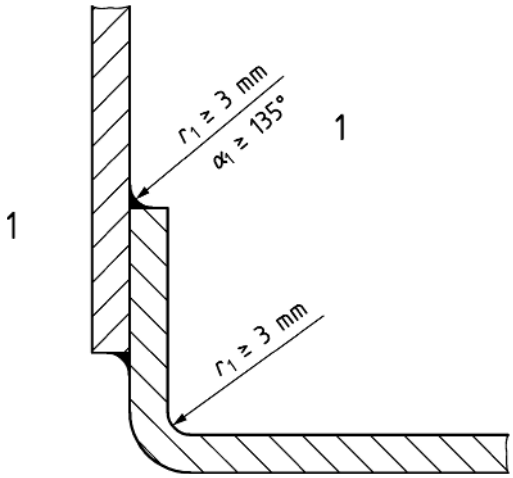


Key

1 food area

Figure A.4.1 — Surface overlapping for food area (welded)

If this is impossible to construct, connections shall be in compliance with the requirements concerning rounded areas in the food area (see A.3.1.2 and Figure A.4.2).



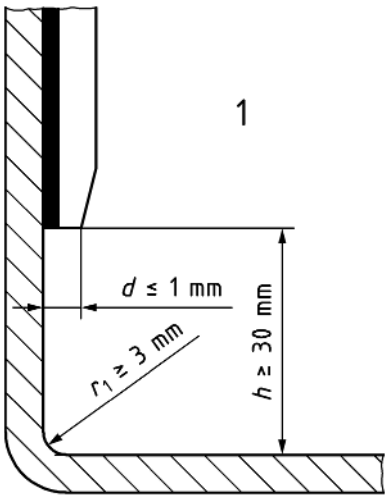
Key

1 food area

Figure A.4.2— Surface overlapping for food area (welded, exceptional)

— 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 A.4.3).



Key

1 food area

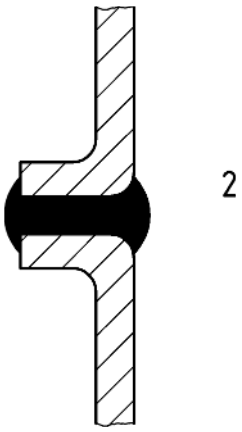
Figure A.4.3 — Surface overlapping for food area (sealed)

A.3.2.3 Surface assemblies and overlaps for splash area:

The surfaces may be:

— either grouted:

  — by means of a profile which cannot be pulled away and which is installed before assembly (see Figure A.5.1):

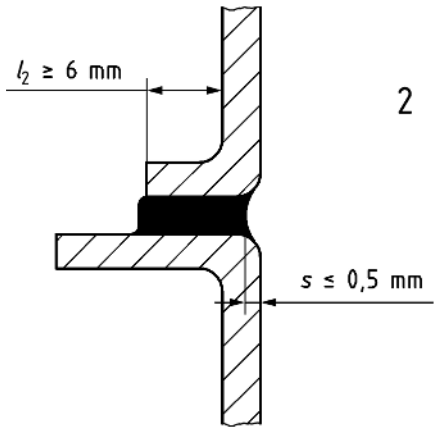


Key

2 splash area

Figure A.5.1 — Surface assemblies for splash area (by means of a profile)

  — by flush bonding (the folds of the part used for bonding shall have a flange length (l_2) greater than 6 mm and the flash of the bond shall not have a shrinkage (s) more than 0,5 mm), (see Figure A.5.2).

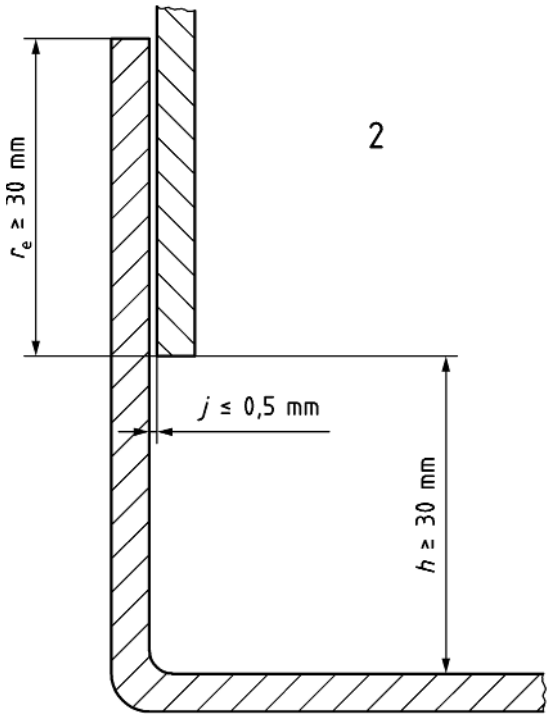


Key

2 splash area

Figure A.5.2 — Surface assemblies for splash area (by flush bonding)

— 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 A.5.3).



Key

2 splash area

Figure A.5.3 — Surface overlapping for splash area

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

No particular requirements.

A.3.3 Fasteners

A.3.3.1 Fasteners for food area

A.3.3.1.1 General

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

A.3.3.1.2 Spot-facing

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

— either construction shall comply with the Figure A.6 and the manufacturer in his instruction handbook can prescribe suitable cleaning facilities;

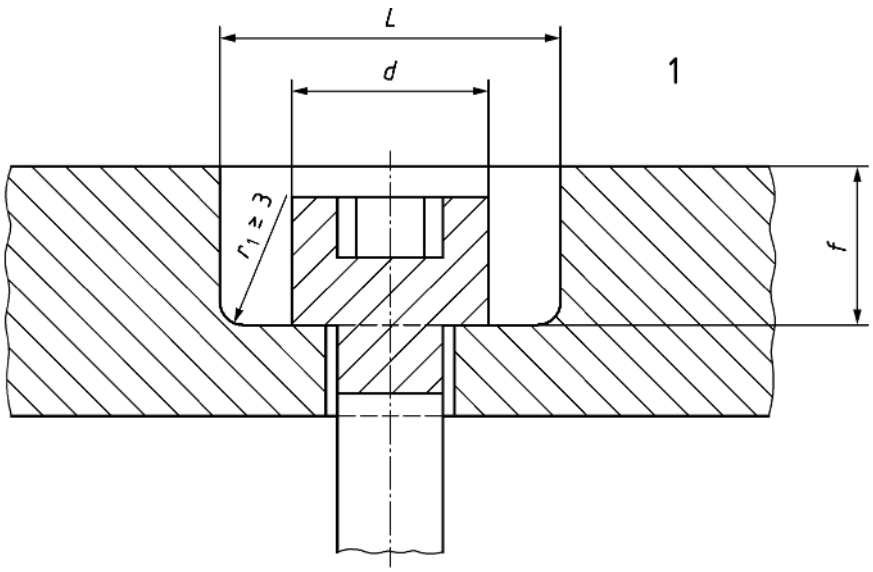


Figure A.6 — Spot-facing

— 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.

A.3.3.1.3 Pin drive systems

Pin drive systems shall only be authorized if they are solid and assembled as flush as possible. The manufacturer can establish an inspection procedure to ensure compliance with this requirement.

A.3.3.2 Fasteners for splash area

The fasteners shall be easily cleanable and shall be chosen from those illustrated in Figure A.7.

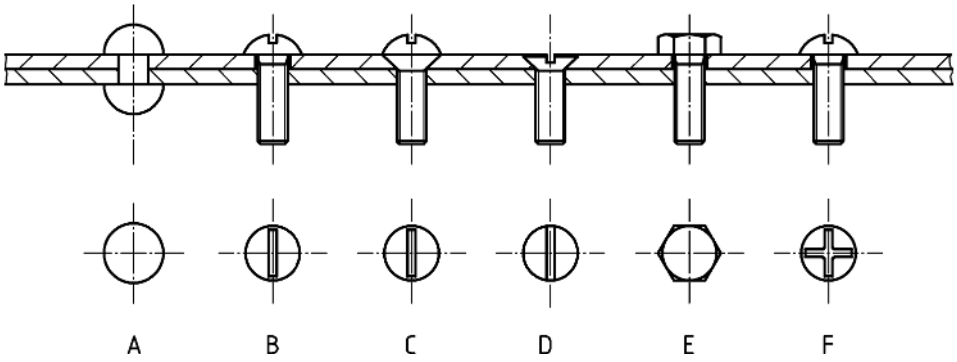


Figure A.7 — Fasteners for splash area

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 A.6 for the food area whereby the 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.

A.3.3.3 Fasteners for non-food area

No particular requirements.

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

A.3.4.1 Table-top machines

Table-top machines shall be designed to allow cleaning underneath and may be:

A.3.4.1.1 Portable (e.g. the force required is less than or equal to 250 N) by a single person once all the removable elements have been disassembled for cleaning: no requirements.

A.3.4.1.2 Tilting: There is no requirement if the force required for tilting is less than or equal to the maximum portable weight.

However, the equipment shall be provided with specific elements for the tilting movement to ensure stability in the tilted position (suitable feet, supporting means, etc.) and the tilting procedure shall be clearly specified in the instruction handbook.

A.3.4.1.3 Non-portable and non-tilting

— The machines are provided either with feet or with a base. To determine the minimum height (*H*) of the feet, the access distance (*P*) given in Table A.3 permitting the cleaning of the positioning surfaces shall be considered (see Figure A.8):

Table A.3 — Dimensions for bases

Dimensions in millimetres

$P \leq 120$	$H \geq 50$
$120 < P \leq 500$	$H \geq 75$
$500 < P \leq 650$	$H \geq 100$
$P > 650$	$H \geq 150$

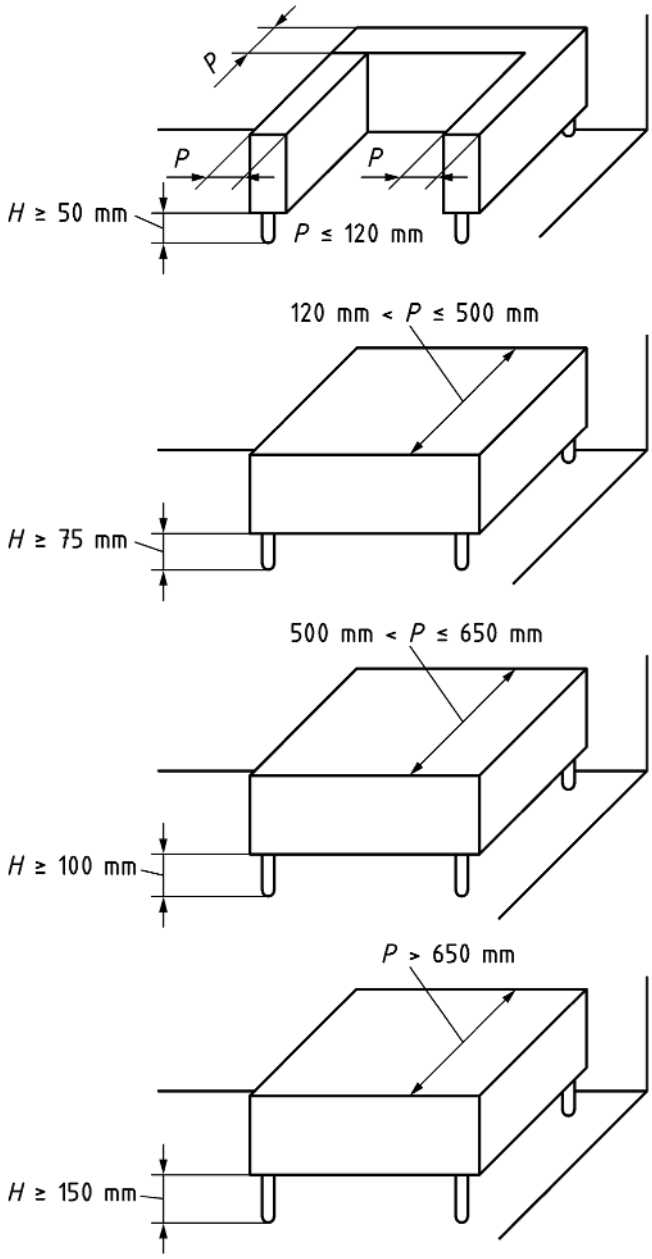


Figure A.8 — Machines with feet

— If the machine has no feet, it shall be placed on the working table with an interposed continuous and sealed joint.

The instruction handbook shall specify the jointing method.

A.3.4.2 Machines on the floor

A.3.4.2.1 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 A.9.1), or shall have their feet (*H*) higher than or equal to 150 mm.

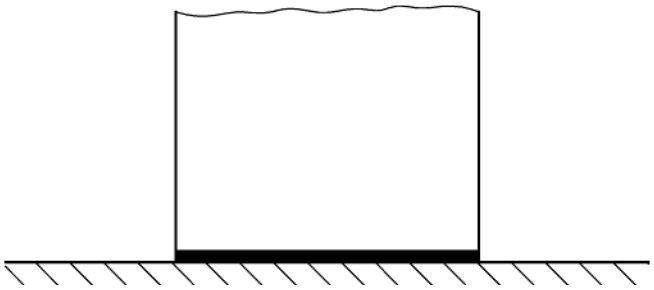


Figure A.9.1 — Machine standing on the floor

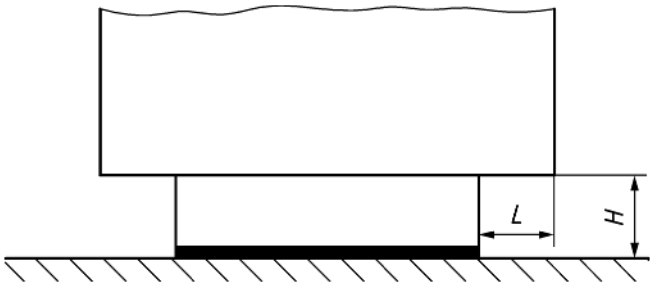


Figure A.9.2— Machine with protrusion

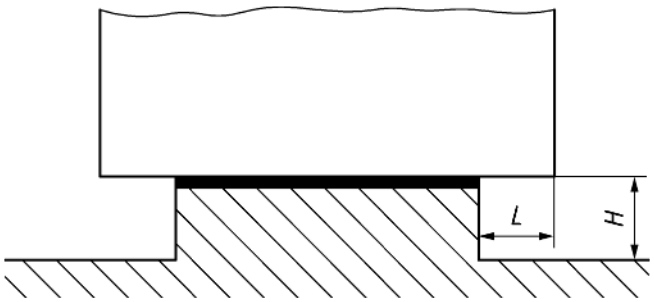


Figure A.9.3— Machine with a base

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 A.9.2).

If the foot surface is greater than 1 dm^2, the feet shall be considered to be a base (with interposed seal) (see Figure A.9.3).

A.3.4.2.2 Mobile machines

The castors shall be cleanable. An example is given in Figure A.10, where *b* is the greater width of the covering at the circumference of the wheel.

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

if $b > 25$ mm, then $a \geq 6$ mm

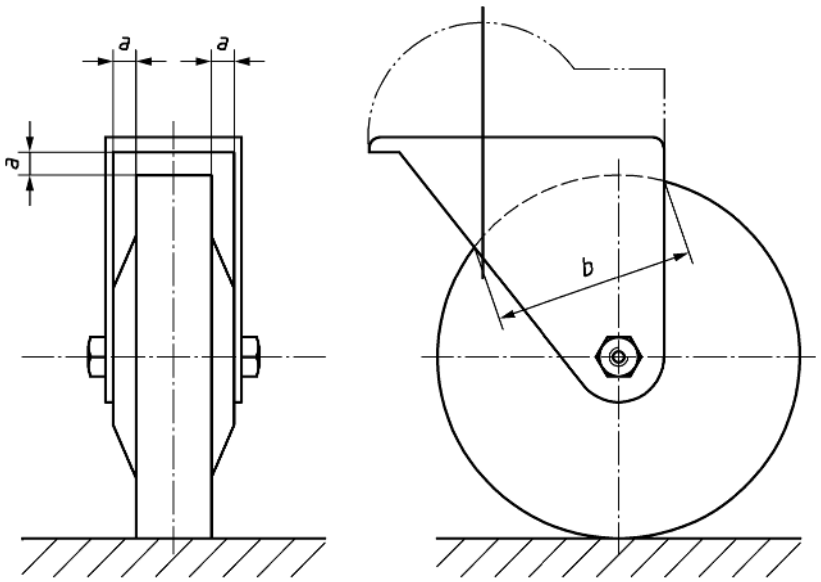


Figure A.10 — Castors

A.3.5 Ventilation openings

A.3.5.1 Ventilation openings for non-food area

Any 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.

A.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.

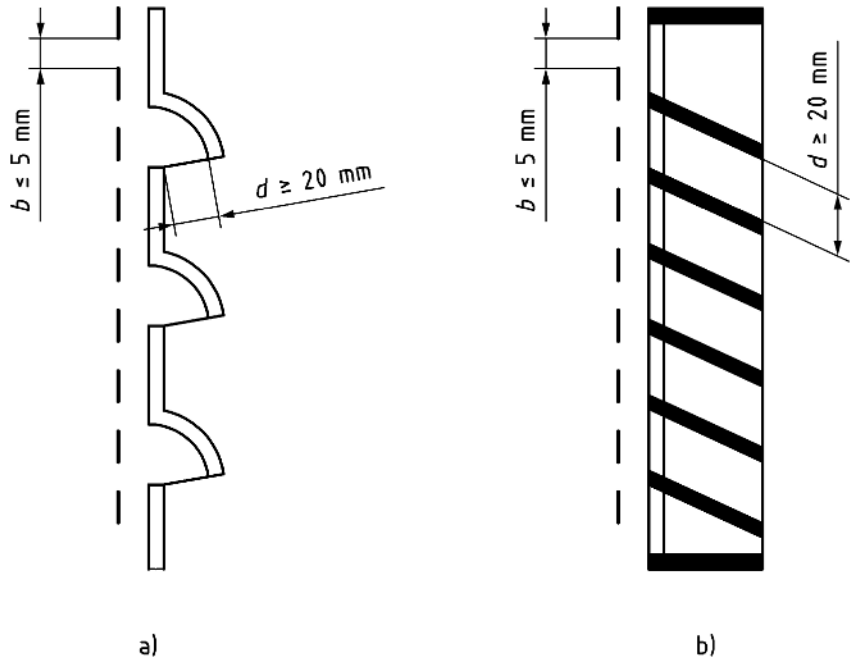


Figure A.11 — Ventilation openings for splash area

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 A.11).

A.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 removed;

— 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 A.12).

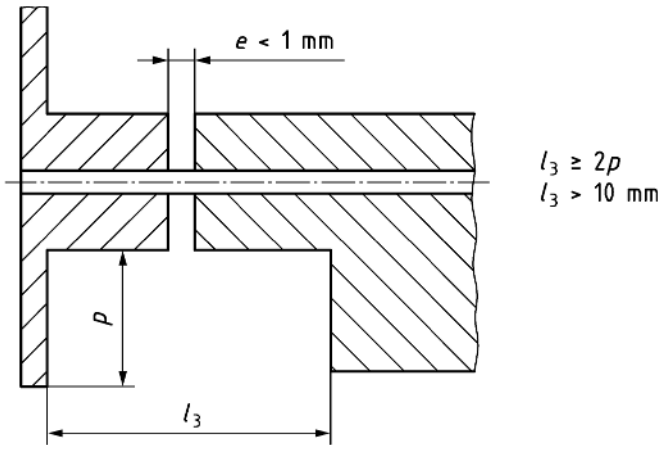


Figure A.12 — Hinges

A.3.7 Control panel

A.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.

A.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 A.13.1);

— 12,5 mm if their height *h* is less than or equal to 8 mm (see Figure A.13.2).

If the above requirements cannot be complied with, controls shall be protected by a cap (see Figure A.13.3).

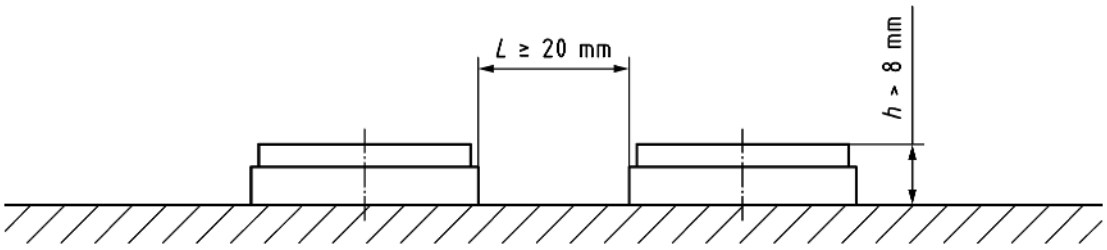


Figure A.13.1 — Control panel in the splash area with *h* > 8 mm

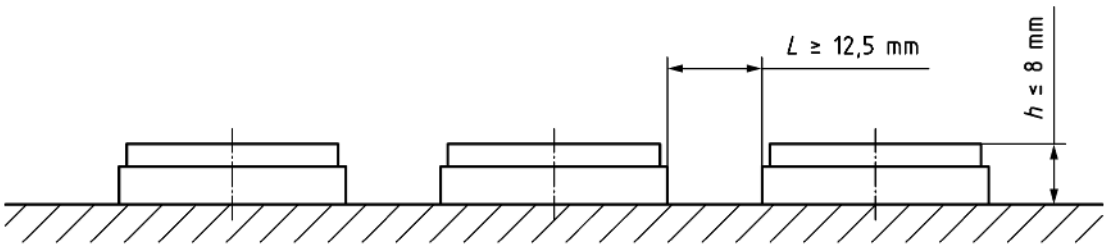


Figure A.13.2 — Control panel in the splash area with $h \leq 8$ mm

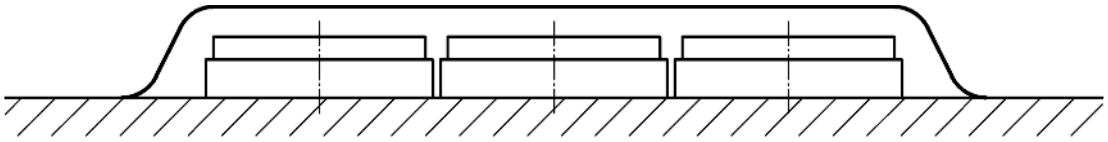


Figure A.13.3— Control panel in the splash area with a covering

Annex B
(normative)

Noise test code – Grade 2 of accuracy

B.1 General

This noise test code applies to dough sheeters.

B.2 Terms and definitions

Terms and definitions shall be in accordance with EN ISO 12001.

B.3 Installation and mounting conditions

The installation and mounting conditions are the same for the measurement of both sound power level and emission sound pressure level at the specified position and for declaration purposes.

The test environment suitable for the measurement of the emission sound pressure level and the sound power level (if measured according to EN ISO 3744:2010) 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. If the sound power level is measured according to EN ISO 3743-1 (see B.6) the test environment laid down in EN ISO 3743-1 applies.

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 or even by determining their sound power contribution by sound intensity measurements.

B.4 Operating conditions

During the determination of noise emission values (sound power or emission sound pressure level), the operating conditions of the machine shall be as follows:

— the machine shall operate without any product;

— if optional devices are fitted, they shall be in motion.

B.5 Measurements

The measurement time for sound pressure level measurements for the determination of the emission sound pressure level (see B.5) and of the sound power level (see B.6) shall be 30 s.

B.6 Emission sound pressure level determination

The determination of emission sound pressure level (A-weighted and, if relevant, C-weighted peak) shall be done in accordance with the EN ISO 11201.

The measurement shall be done at:

— 1,6 m height above the floor;

— 0,20 m ± 0,02 m in front of the control panel of the machine.

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.

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

B.7 Sound power level determination

The determination of the A-weighted sound power level shall be done using one of the following basic noise emission standards:

— EN ISO 3743-1 if the measurements are done in a test room with a volume greater than 40 m^3, with surfaces that are hard and sound-reflective. For rooms of volume less than and equal to 100 m^3 only machines whose largest dimension is less than or equal to 1 m may be tested. For rooms of volume greater than 100 m^3 only machines of largest dimension less or equal to 2 m may be tested;

— EN ISO 3744:2010 if the measurements are done in an essentially free field near one or more reflecting planes. The measurement surface shall be hemispheric.

B.8 Measurement uncertainties

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

The determination of the A-weighted sound power level according to EN ISO 3743-1 and EN ISO 3744:2010 result in standard deviations of reproducibility of equal to or less than 1,5 dB.

B.9 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.

B.10 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 the user requires to verify the declared values.

As a minimum, the following information shall be included:

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

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

3) description of the mounting and operating conditions used;

4) position for the determination for the emission sound pressure level at the workstation; and

5) 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.

B.11 Declaration and verification of noise emission values

The declaration of the noise emission values 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 noise declaration shall state that noise emission values have been obtained according to this standard and to the basic standards EN ISO 3743-1 or EN ISO 3744:2010 and 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 B of this standard) and/or from the basic standards.

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 noise emission values.

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 normative clauses of this standard confers within the limits of the scope of this standard, a presumption of conformity with the relevant 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] CEN/TR 15623, *Food processing machinery — Route map — Materials for food area*

[2] EN 60335-1, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1)*

[3] EN 60335-2-64:2000, *Safety of household and similar electrical appliances — Part 2-64: Particular requirements for commercial electric kitchen machines (IEC 60335-2-64:1997)*

[4] EN ISO 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1)*

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