BS EN 13870:2015

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Food processing machinery — Portion cutting machines — Safety and hygiene requirements

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National foreword

This British Standard is the UK implementation of EN 13870:2015. It supersedes BS EN 13870:2005+A1:2010 which is withdrawn.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.

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English Version

Food processing machinery - Portion cutting machines - Safety and hygiene requirements

Machines pour les produits alimentaires - Portionneuses - Prescriptions relatives à la sécurité et à l'hygiène

Nahrungsmittelmaschinen - Portionsschneidemaschinen - Sicherheits- und Hygieneanforderungen

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

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Contents

Page

European foreword

This document (EN 13870:2015) 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.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 13870:2005+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 13870:2005+A1:2010 are listed below:

— Clause 1: types of machines have been adapted to the current state of the art; pictures of the types of machines have been renewed; exclusion of automatic industrial slicing machines;

— Clause 3: clarify of some definitions and use of this wording in the document;

— Clause 4: transferred to a table;

— inclusion of automatic loading;

— better description of the requirements for protective equipment;

— better description of risk areas, such as inlet tunnel (including dimension table);

— new components have been added, such as pusher and rocker.

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 document 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 document.

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 General

This European Standard covers portion cutting machines and accessories.

This European Standard does not apply to automatic industrial slicing machines (see prEN 16743) and band saw machines (see EN 12268).

This European Standard defines requirements for the design and manufacture of portion cutting machines.

The machines covered by this European Standard are used for continuous portioning of fresh, smoked or frozen meat with and without bones or of similar products by separation by means of a blade.

This European Standard deals with all significant hazards, hazardous situations and events relevant to machines, appliances and machinery, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard deals with the hazards which can arise during commissioning, operation, maintenance and decommissioning of the machine.

The European Standard does not deal with the specific hazards of loading devices.

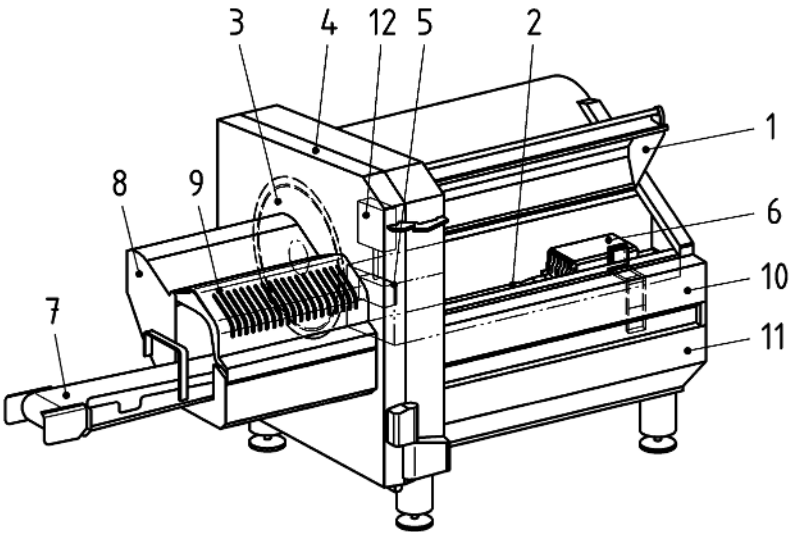
This European Standard is not applicable to portion cutting machines which are manufactured before the date of publication of this document by CEN.

1.2 Types of machinery

This European Standard covers the following types of machinery:

— portion cutting machines with manual loading (see Figure 1);

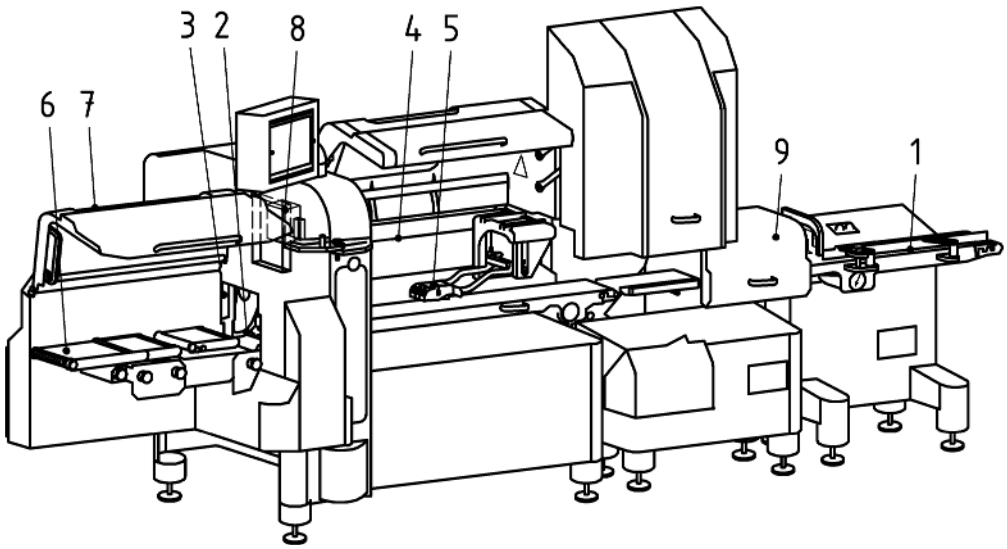
— portion cutting machines with automatic loading (see Figure 2).



Key

1	loading protection hood	7	discharge conveyor belt (optional)
2	product base	8	discharge chute
3	round/sickle blade	9	discharge chute hood
4	blade protection hood/cutting space	10	feed protection hood
5	cutting zone	11	machine housing
6	cutting material holder/feeding carriage	12	locking slide/hold-down unit (depending on machine type)

Figure 1 — Portion cutting machine with manual loading (exemplary embodiment)



Key

1	product base	6	discharge conveyor belt
2	blade	7	discharge chute hood
3	blade protection hood/cutting space	8	hold-down unit
4	machine housing	9	pre-weighing unit (optional)
5	cutting material holder/feeding carriage		

Figure 2 — Portion cutting machine with automatic loading (exemplary embodiment)

1.3 Machine construction

Portion cutting machines depending on the construction consist of: machine housing (machine frame), fixed or moving product bases, automatic or manually operated grippers, hold-down unit, blade housing, blade, discharge device, associated drives, electrical, hydraulic or pneumatic components.

Portion cutting machines in the scope of this document may be equipped with the following auxiliary components:

— loading aid;

— discharge conveyor belt;

— laying unit;

— measurement or scanning devices;

— scales;

— sorting station (e.g. rocker, pusher);

— movement devices (e.g. castors).

1.4 Intended use

The intended use (as defined in EN ISO 12100:2010, 3.23) of portion cutting machines as dealt with in this document is described in 1.1.

The product is manually placed on the product base or automatically fed to the product base with a loading device. The product is supplied to the blade by automatic or manually operated grippers or conveyor slide or belt and the cutting process begins. The portion falls onto a discharge conveyor or a laying unit.

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, *Safety of machinery — Ergonomic principles for design — Part 1: Terminology and general principles*

EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1005-1, *Safety of machinery — Human physical performance — Part 1: Terms and definitions*

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

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

EN 1672-2, *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 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 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413)*

EN ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414)*

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

EN ISO 11201:2010, *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 11201:2010)*

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

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

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

EN ISO 13855, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855)*

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 and definitions

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

3.1
laying unit
device for grouping of portions

3.2
discharge protection hood
fixed and/or movable guard at the discharge opening

3.3
discharge conveyor belt
device for transporting the portions away from the cutting zone

Note 1 to entry: The discharge conveyor belt also allows portions to be positioned in a simple arrangement.

3.4
discharge zone
area of the machine, in which the portion leaves the machine

Note 1 to entry: Depending on the design of the machine, this could be equipped with a discharge chute, a discharge shaft or a discharge conveyor belt.

3.5
automatic loading
the product is fed by a loading device to the product base and aligned there

3.6
loading aid
optional equipment at manual loading to lift the product to the level of the product base

Note 1 to entry: e.g. lifting arm.

3.7
loading protection hood / Loading protection door
movable guard with safety function around the feed area

3.8
inlet/outlet opening
opening through which the product enters or exits from the machine

3.9
grippers
device for holding and locating the product during the feed into the cutting zone

3.10
loading device
optional equipment at automatic loading to fed the product mechanically to the product base

3.11
manual loading
the product is placed by hand on the product base and aligned

3.12
machine stand/machine housing/machine frame
device for supporting machine parts

3.13
blade
device for cutting the product at the cutting frame

3.14
blade housing
housing in which the powered blade is moved

3.15
blade protection hood
movable guard with cutting function on the blade housing

3.16
hold-down unit
device to press down the product onto the product base

Note 1 to entry: This will ensure safe transport to the cutting zone and safe holding during the cutting process.

3.17
portion
processed product

3.18
product base
device for receiving the product to be cut in the feed area

Note 1 to entry: The product base can be implemented stationary or mobile, e.g. as feeding conveyor belt.

3.19
cutting zone
area of the machine, in which the product is cut

3.20
product
food to be processed before cutting

3.21
cutting frame
device which serves as a counter-edge to the blade in order to stabilize the product

Note 1 to entry: This is in order to achieve a smooth cut.

3.22
cutting shaft
area of the machine in which the product is supplied to the cutting zone

3.23
cut resistant gloves
personal protective equipment made from cut resistant material

Note 1 to entry: e.g. metallic thread reinforced fabric or Kevlar fabric.

3.24
sorting station
device for the vertical or horizontal sorting or sorting out of the portions after the scales

Note 1 to entry: e.g. rocker, pusher.

3.25
locking slide
device for closing the cutting shaft during the loading process

Note 1 to entry: The locking slide may possibly serve as a movable guard and/or as a limit stop for the product.

3.26
scales
device for weighing the portions

3.27
feeding area
area of the machine that receives the material to be cut by loading

Note 1 to entry: The machine can be loaded with the product manually or automatically.

3.28
feeding conveyor belt
transport conveyor for loading the portion cutter with product and/or for supply the cutting zone with product

4 List of significant hazards

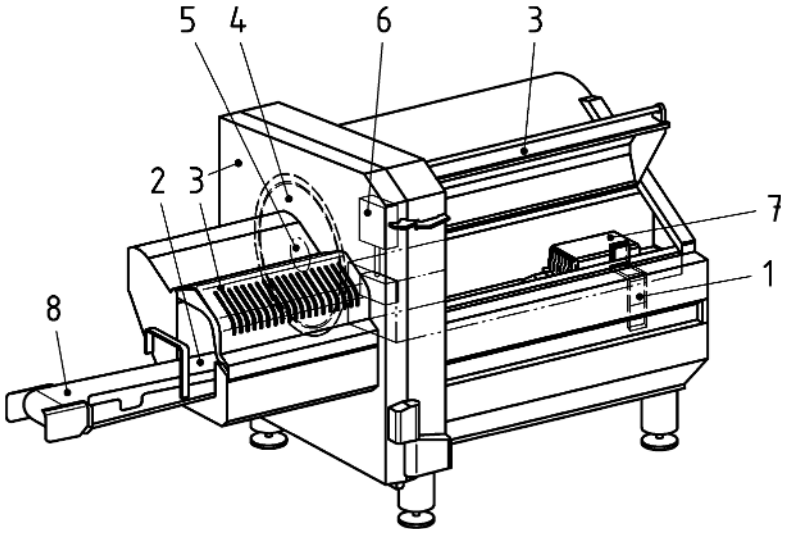
This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce risk.

Figures 3 and 4 show the significant hazard zones of portion cutting machines.

Table 1 — List of significant hazards

Hazards, hazardous situations and hazardous events	Location or cause	Clause/sub-clause in this European Standard
Mechanical hazards	General; Significant hazard zones (see Figures 3 and 4).	5.2.1
	Zone 1: Powered components in the feed zone; hazard due to crushing or entrapment of body parts or clothing between the powered components (e.g. product base, grippers, hold-down unit) in the supply area and stationary components of the portion cutter during cutting operation and during loading.	5.2.2
	Zone 2: Powered components in the discharge zone; hazard due to crushing, impacts or entrapment of body parts or clothing between the powered components in the discharge area and stationary components of the portion cutter.	5.2.3
	Zone 3: Movable guards; hazard due to crushing, shearing or impacts at hand operated movable guards; hazard due to crushing, shearing or impacts at powered movable guards; hazard due to impact at hoods and movable guards that swivel upwards and under which the operator has to enter in order to be able to perform activities.	5.2.4
	Zone 4: Blade protection; hazards due to cutting or punching when handling the blade or when working in the vicinity of the blade (e.g. cleaning, disassembly/assembly, settings, transport, maintenance); hazard due to cutting at the powered blade during cutting and during automatic loading; hazard due to cutting at the powered blade during manual loading; hazard due to cutting at the stationary blade during manual loading.	5.2.5
	Zone 5: Blade mounting; hazard due to ejected parts during operation, e.g. fracture of the blade or loosening of the blade mounting.	5.2.6
	Zone 6: Locking slide/hold-down unit; hazard due to crushing or shearing between the automatically moving locking slide/hold-down unit and stationary machine parts.	5.2.7
	Zone 7: Grippers; hazard to fingers or hands due to cutting-off or piercing by the automatic or manually operated grippers during manual loading.	5.2.8
	Zone 8: Transport conveyor belts; hazard due to crushing or entrapment between the entry points of the belt conveyors/transport belts and the drive and deflection pulleys at transport conveyor belts (e.g. feed belt, discharge belt).	5.2.9
	Sorting station; hazard due to crushing or impacts between moving parts of sorting station and stationary machine parts (see Figure 5).	5.2.10
	Drive components; hazard due to crushing or entrapment of body parts or clothing between drive elements (e.g. toothed belts, tooth lock washers, spindles, chains) in the machine housing.	5.2.11
Electrical hazards	Electric shock from direct or indirect contact with live components; external influences on electrical equipment (e.g. cleaning with water).	5.3

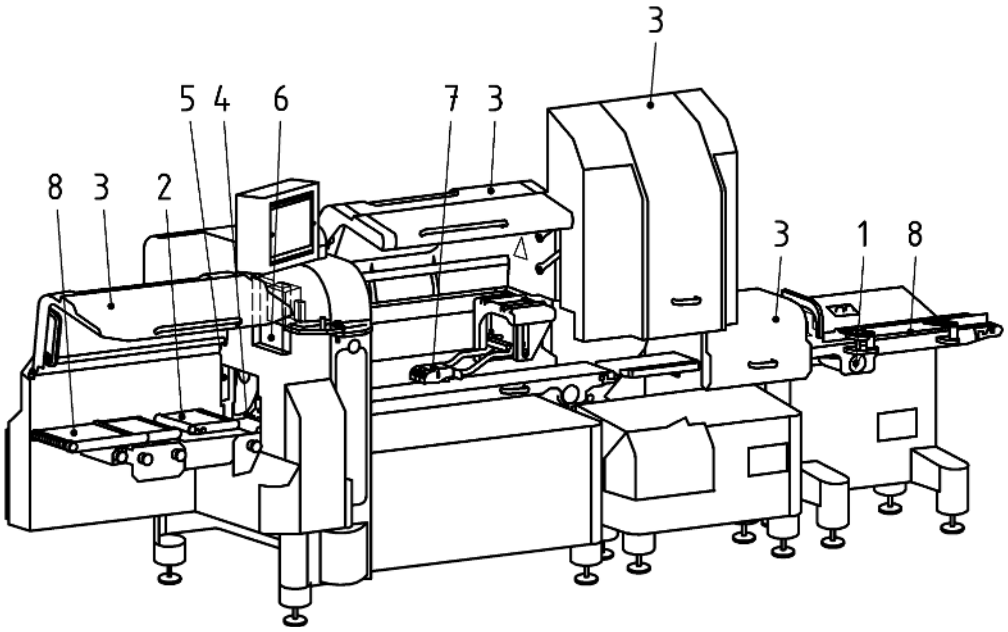
Hazards, hazardous situations and hazardous events	**Location or cause**	**Clause/sub-clause in this European Standard**
Hazards generated by hydraulic or pneumatic equipment	Hazard to operator from splashing by hydraulic fluid; hazard due to contamination of the product by hydraulic fluid; hazard to the body by mechanical injury due to malfunctions.	5.4
Hazards generated by loss of stability	Impact or crushing hazard if mobile cutting machine rolls away; impact or crushing hazard if portion cutting machine or the auxiliary component topples over; impact or crushing hazard when loading and unloading the machine from trucks and during transport within the company using a forklift, lifting platform, bridge trolley or crane.	5.5
Hazards generated by noise	Portion cutting machines generate noise which can result in hearing damage, in accidents due to interference with speech communication and interference with the perception of acoustic signals.	5.6
Hazard generated by neglecting ergonomic principles	Hazard of physical damage to the body due to unhealthy posture or excessive physical effort; hazard of physical damage to the body due to inadequate consideration of human anatomy when designing the machine.	5.7
Hazard generated by neglecting hygienic design principles	Spoilage of foodstuff; hazard to health of the consumer from food poisoning; hazard due to infection of the operator; contamination of foodstuff from residues of cleaning and disinfecting agents or operating resources (e.g. lubricating greases, hydraulic fluid); hazard due to toxic and allergic reaction of the operator (e.g. acid burns from cleaning and disinfecting agents); contamination of the food by foreign bodies originating from raw materials, machine parts or from other sources.	5.8



Key

1	zone 1	3	zone 3	5	zone 5	7	zone 7
2	zone 2	4	zone 4	6	zone 6	8	zone 8

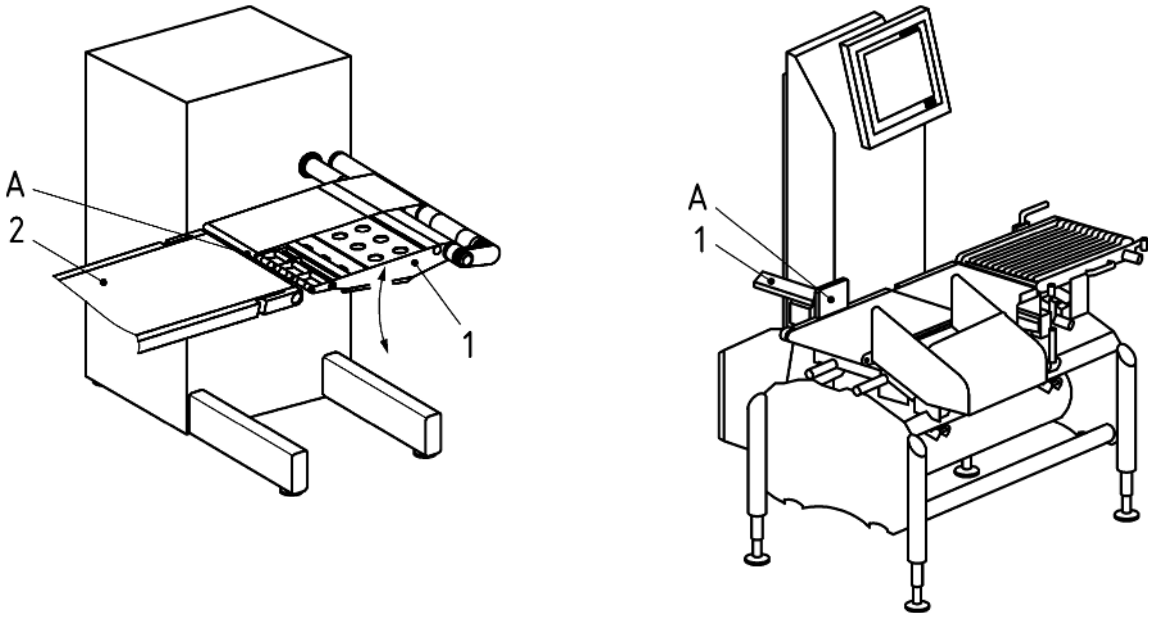
Figure 3 — Portion cutting machine with manual loading – hazard zones



Key

1	zone 1	3	zone 3	5	zone 5	7	zone 7
2	zone 2	4	zone 4	6	zone 6	8	zone 8

Figure 4 — Portion cutting machine with automatic loading – hazard zones



a) Example with rocker **b) Example with pusher**

Key

1	rocker/pusher
2	downstream component, e.g. transport conveyor
A	hazard point

Figure 5 — Hazard points at the sorting station

5 Safety and hygiene requirements and/or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective/risk reduction 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. Where the means of reducing the risk is by the physical arrangement or positioning of the machine the manufacturer shall include in the Information for use a reference to these means, and to any limiting value of the requirement, and, if appropriate, to the means of verification.

Where the means of reducing the risk is by a safe system of work, the manufacturer shall include in the Information for use details of the system and of the elements of training required by the operating personnel.

5.2 Mechanical hazards

5.2.1 General

Portion cutting machines shall be designed and constructed in accordance with Annex C and the conditions mentioned below.

The guards shall comply with EN 953:1997+A1:2009.

Fixing devices for fixed guards shall remain on the guards or on the machine if the guard is removed.

Unless otherwise stipulated in other sub-clauses, the interlocking systems of guards shall comply with EN ISO 14119:2013, 4.2, and the safety related components of the control system shall present at least a performance level “c” of EN ISO 13849-1.

The interlocking devices shall comply with EN ISO 14119:2013, 4.2 and 7.

5.2.2 Zone 1 – Powered components in the feed zone

5.2.2.1 Automatic loading

5.2.2.1.1. Access to the powered components in the feed zone (e.g. product base, grippers, hold-down unit) shall be protected. This is achieved by e.g. the following measures:

5.2.2.1.2. A guard can be implemented e.g. as described below:

— A guard closed on all sides comprising fixed guard and interlocking guard (e.g. loading protection hood).

— A guard open upwards comprising fixed guard (e.g. protective fence) and interlocking guard (e.g. loading protection door).

— Openings in the guards shall correspond to 5.2.2.1.4 or EN ISO 13857:2008, Table 4.

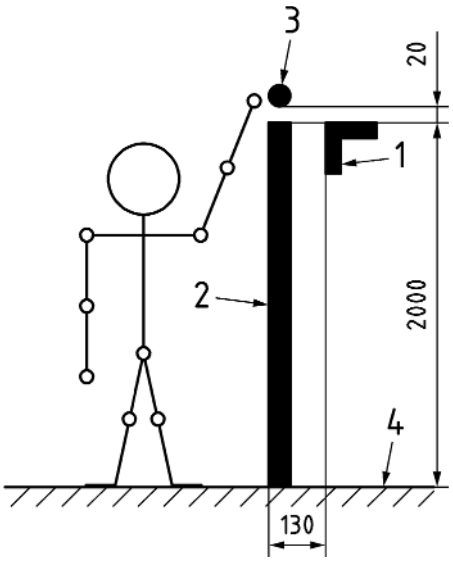
— Guards shall be interlocked. Interlocks shall correspond to the requirements of EN ISO 14119:2013, 4.3 (interlock with guard locking).

— It shall not be possible to reach in over a guard open upwards e.g. by the following measures:

  — Divergent to EN ISO 13857:2008, Table 2, if the guard is at a height of ≥ 1 600 mm to < 2 000 mm the safety distance up to the first hazard point can be ≥ 850 mm.

  — If the guard is at a height of ≥ 2 000 mm, a protective guard (e.g. photoelectric barrier, electronic or mechanical trip device) is mounted at a distance of ≤ 20 mm on the guard, the safety distance from the protective guard (in operated position) to the first hazard point can be ≥ 130 mm (see Figure 6).

Dimensions in mm



Key

1 hazard zone

2 guard

3 protective guard

4 reference level

Figure 6 — Reaching over the guard – safety dimensions

5.2.2.1.3. If non-contact protective equipment (e.g. active optoelectronic protective device (AOPD)) is used to prevent access to the hazard zone, it shall correspond to EN ISO 13855.

5.2.2.1.4. Inlet opening or inlet tunnel

An unclosed inlet opening or an inlet opening closable with an interlocking or protective guard can be implemented at the supply side for the automatic loading. A special form of the unclosed inlet opening is the inlet tunnel.

Unclosed inlet openings or inlet tunnels shall be designed so that the dimensions shown in Table 2 are complied with (see also Figure 7).

Table 2 — Dimensions of the inlet opening without interlocking guard

A	≥	1000	1000	1000	850	850	850	550	230
B	≤	280	250	230	200	180	150	120	30
C	≤	300	280	250	230	200	180	150	50
D	≤	330	300	280	250	230	200	180	50
E	≤	≤ 300	≤ 500	n.r.*	≤ 300	≤ 500	n.r.*	n.r.*	n.r.*

*n.r. = no requirements (dimensions in mm)

A safety distance to the hazard point

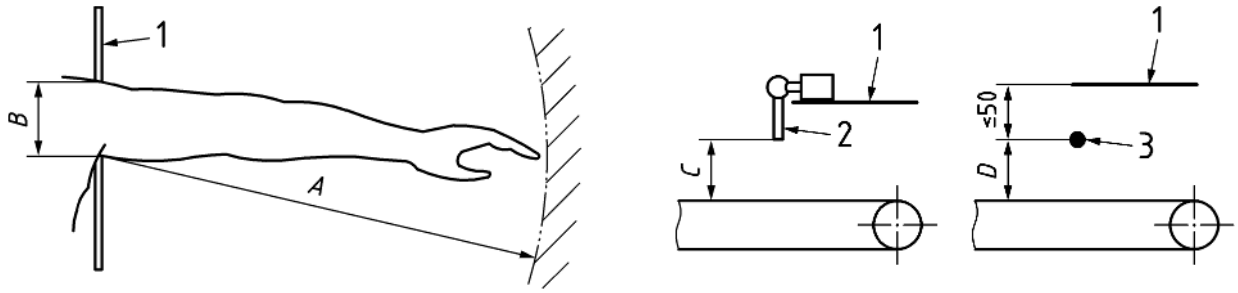
B opening height of the inlet opening

C opening height of the inlet opening in combination with a terminal strip

D opening height of the inlet opening in combination with one or more photoelectric barriers

E opening width of the inlet opening

Dimensions in mm



a) Unclosed opening **b) Inlet tunnel**

Key

1 safeguard

2 electronic or mechanical trip device

3 photoelectric barrier(s)

A safety distance up to the hazard point

B opening height of the inlet opening

C opening height of the inlet opening in combination with a terminal strip

D opening height of the inlet opening in combination with one or more photoelectric barriers

Figure 7 — Feed zone – Safety dimensions of inlet opening

If the inlet opening is closed by an interlocking guard (with or without guard locking), inspection openings and gaps in and around the guard shall correspond to the requirements of EN ISO 13857:2008, Table 4. The requirements from 5.2.4 (zone 3) shall be complied with for the interlocking guard.

5.2.2.2 Manual loading

If the loading protection hood is opened during the manual loading, access to the moving components in the feed zone (e.g. product base, grippers, hold-down unit) shall be protected. This is achieved by e.g. one of the following measures:

— The travel movement of the components during the manual loading may only occur as long as the control device is activated by the operator (jogging mode) or;

— if the travel speed of the powered components is reduced (maximum 0,5 m/s) and no hazard results due to sufficient space, the travel movement can occur automatically after starting the moving by the operator.

Information in the instruction handbook: The manufacturer shall describe the safety working procedures which the operator has to follow during the manual loading. These methods of working shall be a component of the training that the operator shall fulfil.

5.2.3 Zone 2 – Powered components in the discharge zone

5.2.3.1. Access to the hazard points in the discharge zone shall be protected during operation. This is achieved by e.g. the following measures:

— The guard shall be designed so that the safety requirements corresponding to 5.2.2.1, Zone 1, are complied with. This does not apply for the inlet areas of the conveyor belts/transport pulleys on transport conveyors, if these are implemented corresponding to 5.2.9.

— The inspection openings in the guards shall comply with EN ISO 13857:2008, Table 4. Inspection openings are not permissible in the flight range of the blade or of fragments of the blade.

— The protection hood in the discharge zone shall be designed so that the dimensions shown in Table 3 are complied with (see Figure 8).

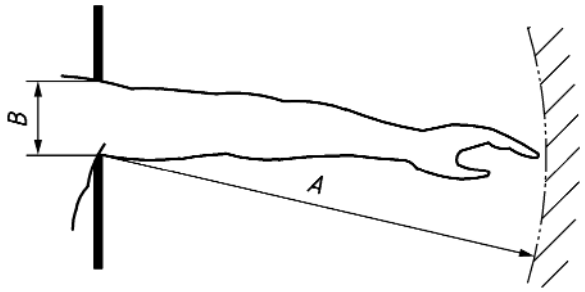
Table 3 — Dependency of the opening height B on the distance to the hazard point A

A	≥	1000	850	550	230
B	≤	200	150	85	30

(dimensions in mm)

A safety distance to the hazard point

B opening height at the front edge of the protection hood



Key

A safety distance to the hazard point

B opening height at the front edge of the protection hood

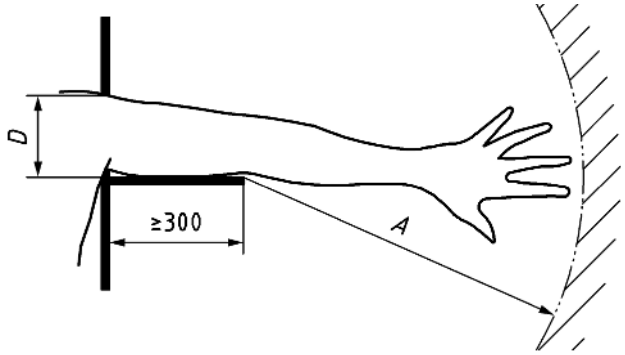
Figure 8 — Discharge zone – Safety dimensions

5.2.3.2. If the arm is supported by a limiting obstruction of minimum 300 mm during the side intervention into the protection hood, the following safety distances are necessary (see Figure 9):

— opening width (D) on the front of the protection hood ≤ 170 mm and

— safety distance (A) to the hazard point ≥ 550 mm.

Dimensions in mm



Key

A safety distance to the hazard point

D opening width on the front of the protection hood

Figure 9 — Discharge zone – Safety distance with limitation of the movement

If the outlet-side intervention from the underside cannot be protected by a guard (e.g. protective sheet), the discharge conveyor, laying unit or the downstream auxiliary component shall be designed so that the intervention is prevented. The openings and safety distances shall correspond to EN ISO 13857:2008, Table 4.

If the intervention is prevented by the downstream auxiliary component, it shall be ensured that the protection function of the auxiliary component is retained. This can be achieved e.g. by side guide plates, limit stops or interlocks.

5.2.4 Zone 3 – Movable guards

5.2.4.1 Manually operated guards

A handle shall be provided on the manually operated guard. A handle can be dispensed with if the guard is designed so that it can be securely held and operated.

The force required for lifting or lowering a guard may not exceed 250 N.

Movable guards shall be secured against falling down. This is achieved by e.g. the following measures:

— The movable guard shall be located far behind the dead centre in the open position.

— If the movable guard is not far enough behind its dead centre in the open position, e.g. a counterweight, a spring or a mechanical latching device shall prevent falling.

Guards that can assume their protection position without guard locking shall be locked with the mechanical drive. Normally, fixed guards, also those that are mobile in design for ergonomic reasons and only have to be opened for maintenance or repair and are not intended to be opened by the operator, are excepted from this.

5.2.4.2 Force-operated guards

As long as the hazards cannot be prevented by the design (e.g. advancing deflector), the risk of crushing in force-operated guards shall be protected e.g. by the following methods:

— To reduce the risk of crushing during normal closure of force-operated guards, one of the following requirements shall be complied with depending on the design.

  — The guard closes with a crushing force of maximum 135 N or an impact force of maximum 180 N and a speed of maximum 200 mm/s. Only in the work position, if the distance from the guard to the closing edge is ≤ 6 mm, is the guard locking (see 5.2.12.3) released. When locking with a locking force, this shall be minimum 200 N.

  — The guard closes with a crushing force of maximum 135 N or an impact force of maximum 180 N and a speed of maximum 200 mm/s. Only in the work position, if the distance from the guard to the closing edge is ≤ 25 mm, is the guard locking (see 5.2.12.3) released. When locking with a locking force, this shall be minimum 300 N. The distance up to the first hazard point shall be minimum 450 mm.

  — The guard closes with a speed of maximum 50 mm/s, if the distance from the guard to the closing edge is ≤ 200 mm. The closing speed shall not be more than 50 mm/s up to a minimum distance of 200 mm.

— No handle may be mounted on force-operated guards that are locked by a retaining force.

— If the drive energy fails (e.g. power failure, tube or hose breakage), the movement of the force-operated guard shall be interrupted if a crushing force of 135 N is exceeded. Safety relevant parts of the control shall correspond to the requirements from EN ISO 13849-1.

— Non-contact protective device as closing edge protection.

— In the case of safety guards that swivel upwards and under which the operator has to enter, the minimum height under the opened guard shall be 1 800 mm. Impact edges and corners may not have sharp edges.

— Information in the instruction handbook: The manufacturer shall describe the safety working procedures which the operator has to follow in the instruction handbook. These methods of working shall be a component of the training that the operator shall fulfil.

5.2.5 Zone 4 – Blade protection

5.2.5.1 General

Cutting tools have to be removed periodically. Cutting tools are sharp and special protective measures shall be taken. For such blades, designers shall provide means of attaching a tool to the blade to avoid hand contact: and a box, or surround guard, to protect against the sharp edges of the blade during handling and transportation. Explanations on the use of these protective means shall be included in the instruction handbook.

Injuries due to cutting or piercing when working with the blade or when the blade is stationary shall be prevented. This is achieved by e.g. the following measures:

— A blade protection shall be used for installation, removal and transport of the blade.

— The manufacturer shall describe the residual risks when working with the blade and during all work in the area of the blade, especially during cleaning and maintenance, in the instruction handbook. The use and handling of the blade protection shall be described in the instruction handbook.

— The instruction handbook shall indicate that cut resistant gloves have to be worn when working with the blade and during all work in the area of the blade. Data on the safe storage, transport, maintenance, cleaning and use of the blades shall be contained in the instruction handbook.

— The stationary blade may not move unintentionally when the housing is open and closed, e.g. by a braking device.

5.2.5.2 Cutting device and automatic loading

Access into the active area of the powered blade shall be prevented during cutting operation and during automatic loading. This is achieved by e.g. the following measures:

— The inlet-side access shall be prevented by the guards (e.g. loading protection hood, loading protection door).

  — For safety requirements, see 5.2.2.1 Zone 1.

  — The movable guards shall be locked with the machine drive. The interlocks shall correspond to the requirements from 5.2.12.

— The inlet-side access is prevented by non-contact protective device, e.g. active optoelectronic protective device (AOPD). These shall correspond to EN ISO 13855.

— The blade shall be installed in a blade housing with an interlocked blade protection hood. The interlocks shall correspond to the requirements from 5.2.12.

— The outlet-side access into the active range of the blade shall be prevented by guards.

  — Requirements for the guards, see 5.2.3 Zone 2.

  — The movable guards shall be locked with the machine drive. The interlocks shall correspond to the requirements from 5.2.12.

5.2.5.3 Manual loading for powered blade

Access to the active area of the powered blade shall be prevented during manual loading. This is achieved by e.g. the following measures:

— A locking slide separates the blade from the feed area during loading. The locking slide may only be opened if the loading protection hood/loading protection door is closed. The loading protection hood/loading protection door can only be opened if the locking slide is closed. The interlock shall correspond to the requirements of EN ISO 14119:2013.

— Openings in the locking slide (e.g. for hold-down unit) shall correspond to the requirements of EN ISO 13857:2008, Table 4.

5.2.5.4 Manual loading while blade is stationary

Access to the active area of the stationary blade shall be prevented during manual loading. This is achieved by e.g. the following measures:

— The blade shall be stopped with the normal stopping device before manual loading. The blade shall come to a standstill in a position in which direct access to the cutter is not possible. The requirements of EN ISO 13857:2008 apply in respect to this. The loading protection door shall be locked with the blade drive. The interlock shall correspond to the requirements from EN ISO 14119:2013, 4.2.

5.2.6 Zone 5 – Blade mounting

The blade housing and the blade protection hood shall be designed so that a penetration of ejected parts (e.g. blade or parts thereof) is prevented. Exceptions to this are the outlet opening, the inlet opening and, possibly, the opening towards the ground as an outlet for residual items. A deformation of the blade housing and the blade protection hood by ejected parts is permissible.

The reliability of the design measures shall be determined by practical trials, e.g. collision or fracture tests, and documented.

The manufacturer shall describe the blade mounting, the fastening material, the residual risks and the operator training in the instruction handbook.

5.2.7 Zone 6 – Locking slide / Hold-down unit

Access shall be prevented when opening and closing the locking slide. This is achieved by e.g. the following measures:

— Feeding-side access to the locking slide to be opened or closed shall be prevented by the closed loading protection hood / loading protection door. For safety requirements, see 5.2.5.3.

— Outlet-side access to the locking slide to be opened or closed shall be prevented by movable guards. For safety requirements see 5.2.3 Zone 2.

5.2.8 Zone 7 – Grippers

The grippers can be closed automatically or by manually activating a control. Access to the area of the closing grippers shall be ensured during manual loading. This is achieved by e.g. the following measures:

— For safety requirements see 5.2.2.2.

— Information in the instruction handbook: The manufacturer shall describe the procedures for the manual loading, the residual risks and the operator training in the instruction handbook. The instruction handbook shall indicate that the product is not introduced by hand into the intervention area of the grippers.

Access to the gripper needles shall be prevented during disassembly/assembly of the grippers. This is achieved by e.g. the following measures:

— Information in the instruction handbook: The manufacturer shall describe the procedures for safe disassembly/assembly of the grippers, the residual risks and the operator training in the instruction handbook. The instruction handbook shall indicate that the grippers may not be touched in the area of the gripper needles.

5.2.9 Zone 8 – Transport conveyor belts

Access to the inlet area of the conveyor belts/transport belts and the drive and deflection pulleys shall be prevented if the crushing force exceeds 135 N. This is achieved by e.g. the following measures:

— A fixed guard (e.g. side cover, guard) shall be provided at the conveyor frames.

— The gap between the guard and the transport conveyor or the deflection device shall not exceed 6 mm.

5.2.10 Sorting stations

If access to the crushing or impact edge, e.g. rocker or pusher, is not protected by guards, the hazard point shall be secured by e.g. the following measures:

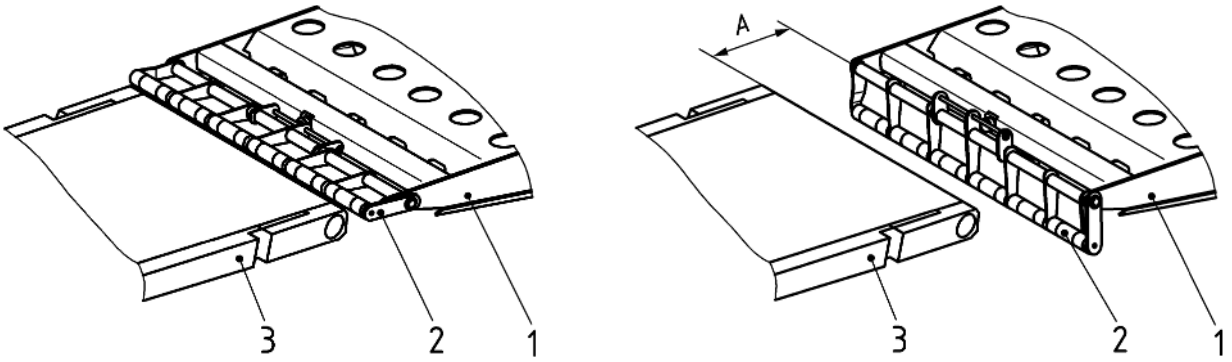
— The crushing force may not exceed 135 N.

— The impact force may not exceed 180 N.

If a crushing force of 135 N is exceeded:

— at the rocker the transfer point between the rocker and the downstream component shall be designed so that the end piece of the rocker folds upwards or downwards if a force is applied and hence releases a space of minimum 60 mm (A) (see Figure 10);

— at the pusher the distances by the movement of the pusher and the other components shall not be less than 60 mm (A) (see Figure 10).



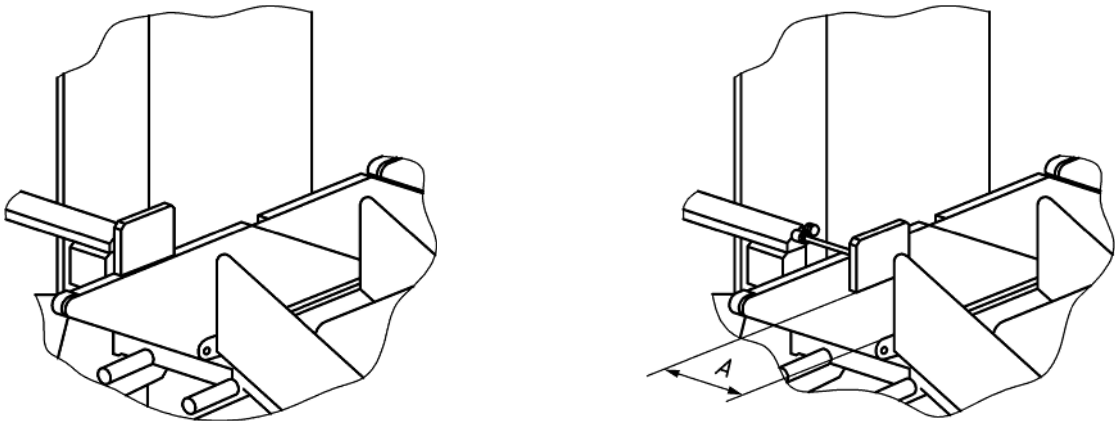
a) End piece of the rocker in normal position

b) Folded end piece owing to force application by component

Key

1 rocker
2 folding end piece
3 downstream component
A space ≥ 60 mm

Figure 10 — Transfer point between rocker and downstream component



a) Pusher in the passive state **b) Pusher in the extended state**

Key

A space ≥ 60 mm

Figure 11 — Pusher

5.2.11 Drive components in the machine housing

Access to hazard points of the drive mechanism shall be prevented. This is achieved by e.g. the following measures:

— Guards (e.g. housing covers, doors) shall be provided in front of the drive mechanism. The guards can be fixed, corresponding to the requirements of EN 953:1997+A1:2009, 3.2, or movable or interlocked, corresponding to the requirements of EN 953:1997+A1:2009, 3.3.

  — Fixed guards may not remain in a closed position without their fixing devices.

— If guards have to be removed, e.g. for changing the work process, these shall be locked.

  — For requirements for the interlocking of the guards see 5.2.

  — Openings in the guards shall correspond to the requirements from EN ISO 13857:2008, Table 4.

5.2.12 Interlocks of guards for preventing access to the moving blade

5.2.12.1 General

Movable guards that prevent access to the blade shall either be interlocking guards according to EN 953:1997+A1:2009, 3.5, or interlocking guards with guard locking according to EN 953:1997+A1:2009, 3.6.

The guards and their interlock shall correspond to 5.2 and the following sub-clauses.

If the machine is stopped with the normal stopping device, the blade shall come to a standstill in which the cutter of the blade is located outside the cutting shaft. If a part of the cutter protrudes, e.g. in the case of large blades, into the cutting shaft, the intervention of the feed area shall be ensured if the hazard point cannot be clearly recognized. This is achieved e.g. by a cover and/or by describing the residual risk in the instruction handbook.

The parts concerning the interlock shall be designed according to performance level “c” of EN ISO 13849-1.

5.2.12.2 Interlocks without guard locking

The following conditions shall be fulfilled for locking devices without guard locking:

— A braking device shall bring the blade to a standstill in ≤ 0,15 s:

  — if the guard is opened by > 10 mm, measured at the front edge;

  — after activating the emergency stop (if present);

  — in the event of power failure.

— Parts of the control relating to the interlock shall be provided corresponding to performance level "d" with an $MTTF_d$ "high" according to EN ISO 13849-1.

5.2.12.3 Interlocks with guard locking

The following conditions shall be fulfilled for locking devices with guard locking:

— The braking device shall be triggered.

— Guards shall be closed, locked and detained until the blade drive is at a standstill. The duration of the guard locking depends on the actual standstill of the blade drive (standstill monitoring). A control of the guard locking device via a time control is not permissible. If the drive energy fails, the guard locking device should be able to be unlocked after the drives stop if a contamination of the food (e.g. bacterial growth) can be inhibited by this. This is achieved by e.g. one of the following measures:

  — The guard locking device can be unlocked manually using a tool after the drives stop.

  — Standstill monitoring at the drives so that the guard locking device is automatically unlocked if the movements are not hazardous for the operator.

— Alternatively, delay devices corresponding to the requirements from EN ISO 14119:2013, F.5, can be used. These delay devices shall be equipped with a head that does not fit into a standard tool (e.g. power-driven screwdriver). The required time between the switch opening and release of the guard shall be longer than the stopping time of the blade (assumption: 1 revolution = 1 second).

— Interlocking guards with guard locking that are provided with grippers in order to be opened by hand shall be detained with a locking force of minimum 500 N.

5.3 Electrical hazards

5.3.1 General

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

5.3.2 Emergency stop

Machines shall be designed with one or more emergency stops, unless the risk assessment carried out by the manufacturer allows to establish that such a device would not reduce the stopping time required to deal with the risk to be taken.

If no emergency stop is installed, the normal off switch shall be easily accessible from the position of the operator.

5.3.3 Protection against water ingress

5.3.3.1 IP- degrees of protection

Electrical operating components shall comply with the following degrees of protection in accordance with EN 60529:

— IP X5 External electrical operating components:

  — on the machine,

  — on the control box enclosure on the machine,

  — on the control box enclosure located in the process room,

— IP X3 Internal electrical operating components:

  — in the machine with enclosed housing with the degree of protection IP X5 and open lower surface,

  — Protection against direct and indirect impact of a water jet shall be ensured,

— IP X2 Internal electrical operating components:

  — in a machine with completely enclosed housing with the degree of protection IP X5,

  — Protection against condensate water shall be provided,

  — in the control box enclosure,

— IP X0 Internal electrical operating components:

  — in a machine with completely enclosed housing with the degree of protection IP X5,

  — Protection against water condensation shall be provided, and the safety of fingers and the back of hand shall be ensured.

5.3.3.2 Hoods

If it is foreseeable that portion cutting machines and auxiliary components will be cleaned using a pressurized water jet, a penetration of water into the internal electrical operating components shall be prevented. This may be achieved e.g. by the following measures:

— The electrical operating components shall be covered by hoods. Reference shall be made to use of the hoods in the instruction handbook. Hoods covering the external operating components may be lifted for actuating ON- and OFF-switches. Hoods shall not, when closed, restrict the use of the OFF-push button.

— Hoods can be omitted if using membranes keypads, membrane switches or similar switches that are suitable for cleaning with pressurized water.

NOTE It is not envisaged that portion cutting machines and auxiliary components be cleaned with pressurized water. However, it is difficult to guarantee that this method is never applied in practice and that the requirements contained in this clause reduce the electrical hazards.

5.3.3.3 ON- and OFF-switch

A least one ON-switch - and at least one OFF-switch shall be provided in a portion cutter. The switches shall be located on the operator side of the machine. The ON-switch shall be protected against unintentional start-up (e.g. by means of a protective collar, installation location, activation duration etc.). Supplementary to the OFF-switch, the main switch, which does not have to be located on the operator side, can apply as an OFF-switch for the machine.

5.4 Hydraulic and pneumatic hazards

The hydraulic and pneumatic equipment shall comply with the following standards:

— EN ISO 12100:2010, 6.2.10;

— EN ISO 4413;

— EN ISO 4414.

The bursting pressure of the hydraulic hoses shall be four times the maximum pressure under operating conditions.

The instruction handbook shall give details of the maximum operating pressure.

5.5 Hazard from loss of stability

— Portion cutting machines (fixed and mobile) shall be designed to be stable under normal operating conditions.

  — For portion cutters, which are not fixed on the floor there shall be a sufficient safety of tilting.

  — Mobile portion cutting machines shall be designed not to roll, slip, or tip over under normal operating conditions. This can be achieved e.g. by the type of the machine, the position of the point of gravity (castors and position of feet).

  — Mobile portion cutting machines shall not tip over. There shall exist e.g. minimum 2 support rollers (or legs) and 2 pivot castors with locking devices to prevent them rolling and/or turning.

— The manufacturer shall give detailed information on the foundation load and the fixation in the instruction handbook. The use of the locking device and the quality of the floor shall be described.

— Machines tested in accordance with Table 4 shall not roll, slip, or start tilting at their location.

5.6 Noise reduction

Noise reduction shall be an integral part of the design process thus specifically taking into account measures at source as given in EN ISO 11688-1. The success of the applied noise reduction measures is assessed on the basis of the actual noise emission values (see Annex A) in relation to other machines of the same family.

5.7 Ergonomic requirements

Attention shall be paid to the ergonomic principles and requirements described in 5.2.9, as well as in EN ISO 12100:2010, 6.2.8, EN 614-1 and EN 1005-1 to EN 1005-3. Any information for the user which is relevant for achieving the ergonomic objectives shall be contained in the instruction handbook.

Removable components, e.g. blades and hoods, shall be designed such that an active force of < 250 N.

On manually activated guards, the handle shall be designed and arranged so that an active force of < 250 N is necessary.

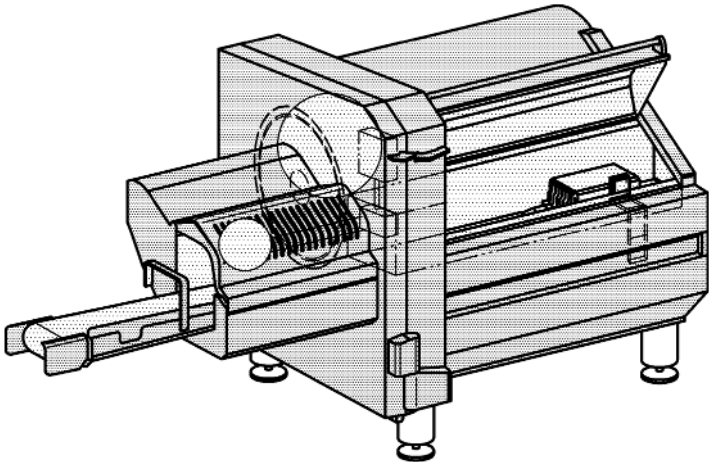
Portion cutters with removable parts weighing more than 25 kg shall be provided with lifting devices and a transport car enabling installation and removal as well as transport of these components without manual lifting, or in the instruction handbook shall state that parts weighing over 25 kg have to be installed or removed with the help of a second person.

5.8 Hygiene and cleaning

5.8.1 General

The design of the machines shall be in accordance with EN 1672-2 and with the requirements laid down below as well as in accordance with Annex B.

For hygiene areas, see Figures 12 and 13.



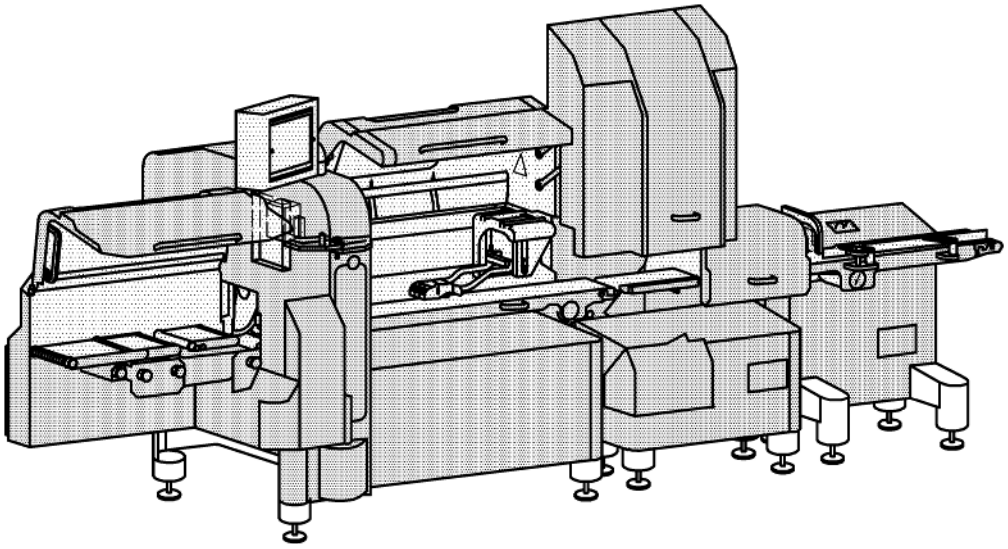
Key

food area

splash area

non-food area

Figure 12 — Example of hygiene areas in the portion cutting machine with manual loading



Key

food area

splash area

non-food area

Figure 13 — Example of hygiene areas in the portion cutting machine with automatic loading

5.8.2 Food area

The food area comprises the surfaces coming into contact with the food and from which the food or other substances find their way back into the food under normal application conditions through draining, dripping, flowing out or running out (see Figures 12 and 13).

The following components are defined according to EN 1672-2 and regarded as the food area:

— feeding conveyor belt;

— product base;

— grippers;

— hold-down unit;

— locking slide;

— blade;

— blade protection;

— inside of blade protection, blade housing;

— cutting shaft;

— cutting frame;

— transport conveyor surfaces;

— control elements;

— areas and components above the product route, e.g. photoelectric barriers;

— product limit stops;

— laying screen.

5.8.3 Splash area

The splash area comprises the surfaces onto which a part of the food can splash or along which it can flow under application conditions and not find its way back into the food (see Figures 12 and 13).

The following components are defined according to EN 1672-2 and regarded as the splash area:

— guards, outside,

— vertical housing surfaces, outside

— machine housing, outside.

5.8.4 Non-food area

The non-food area comprises all areas other than those defined above (see Figures 12 and 13).

The following components are defined according to EN 1672-2 and regarded as the non-food area:

— all other areas e.g.:

  — machine feet;

  — interior of the machine housing.

5.8.5 Surface condition

The design of the surface shall correspond to the requirements of EN 1672-2.

The maximum surface roughness values shall comply with the requirements of Annex B.

5.8.6 Cleaning

In the food industry the risk from cleaning is increased due to the need for operators to clean the danger zones so frequently including removal of blockages, assisting product flow, cleaning between processing different products during a working day, and gaining access to the machine parts for a thorough clean to meet the hygiene needs as required throughout or at the end of a working day.

Hazards commonly arise from the cleaning processes or substances used to obtain the hygiene condition needed. Where hazardous chemicals are used, e.g. concentrated caustic solutions, the food machine shall be designed so that the substance is handled, diluted, used and recovered in an enclosed system (e.g. cleaning in place) which removes the operator from contact. Where contact is unavoidable, the instructions to the user shall include appropriate information on the need to select and use suitable personal protective equipment and any other protective recommendations.

All surfaces in the food area shall be easy to clean and disinfect. They shall be designed such that cleaning liquids can run off freely.

Additional devices in the cutting zone, e.g. grinding unit or optical equipment, shall be designed so that they correspond to the requirements of EN 1672-2.

Some parts in the food area, e.g. cutting frame, are not easy to clean. The manufacturer shall provide special notes in the instruction handbook in respect to the cleaning, the adequate removal of cleaning and disinfecting agents and the exclusive use of suitable cleaning and disinfecting agents (see 7.2).

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. All safety measures of Clause 5 contain self-evident criteria of acceptance.

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 the verification.

Table 4 — Verification

Clause	Test method
5.2.2.1	Measurement of dimensions Verification of circuit diagram Functional test Visual inspection of the interlocking device
5.2.2.2	Measurement of travel speed Functional test Visual inspection of the interlocking device Verification of circuit diagram Checking the instruction handbook
5.2.3	Measurement of dimensions Verification of electric circuit diagram Visual inspection of the interlocking device
5.2.4.1	Measurement of dimensions and forces Functional test
5.2.4.2	Measurement of dimensions and forces Measurement of travel speed Functional test Verification of circuit diagram Checking the instruction handbook
5.2.5	Measurement of dimensions Functional test Visual inspection of the interlocking device Checking the electrical and pneumatic circuit diagram
5.2.6	Checking the instruction handbook
5.2.7	Visual inspection of the interlocking device Functional test Inspection
5.2.8	Functional test Measurement of travel speed Checking the instruction handbook

Clause	Test method
5.2.9	Measurement of dimensions Inspection
5.2.10	Measurement of the forces Functional test Inspection
5.2.11	Checking the interlocking device Inspection
5.2.12	Functional test of the EMERGENCY STOP (if provided) Functional test in the event of a power failure Measurement of stopping time Functional test of guard Visual inspection especially standstill monitoring
5.3	The tests shall be carried out according to EN 60204–1:2006, Clause 18 on every machine (individual machine) Verification of degrees of protection (type)
5.4	Verification of hydraulic/pneumatic circuit diagram (type) Looking in instruction handbook (type) Visual inspection (individual)
5.5	Calculation or standing test on a plane with an inclination of 10°. The wheels shall be locked in the case of an unfavourable wheel position for portion cutters (type) Functional test (individual machine) Visual inspection (individual)
5.6	Noise emission measurement according to Annex A (type)
5.7	Measurement of the forces Functional test Inspection
5.8	Measurement of surface roughness Measurement of radii and grooves Visual inspection especially of welds
7.2	Examination of documentation to verify that the required information is provided (type)

7 Information for use

7.1 General

The information for use shall fulfil the requirements according to EN ISO 12100:2010, 6.4. An instruction handbook shall be provided.

7.2 Instruction handbook

The instruction handbook shall contain at least the following information.

a) Information in respect to the transport and storage:

— of the machine;

— of the auxiliary components;

— of the blade;

— information on the dimensions and weight.

b) Information relating to the installation of the machine:

— information on the space required for the operation of the machine;

— information on permissible environmental influences;

— information on how to connect the machine to the electric, hydraulic, pneumatic or gas supply including necessary safety devices;

— description concerning the use of the locking device of the castors.

c) Information about the machine:

— detailed description of the machine and its components;

— description of the intended use of the machine;

— description of the foreseeable misuse;

— description of the machine and auxiliary components, the guards and other safety devices;

— description of the residual risks that could not be fully remedied, e.g. grippers during manual loading;

— the instruction handbook shall contain the following information regarding airborne sound emissions, determined and explained according to Annex A of this European standard:

  — 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 shall be indicated;

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

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

  If noise 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.

— Information on the electrical installation (see EN 60204-1:2006, Clause 17) and the circuit diagram or information on the compartments (e.g. pockets) in the machine.

d) Information in regard to the normal operating conditions of the machine:

— instructions for commissioning;

— instructions for setting and adjustment;

- information on devices which stop the machine;
- information on residual risks, and recommended personal protective equipment, e.g. cut-resistant gloves;
- information on particular risks which may arise in certain applications;
- information on prohibited uses;
- information on sharpening the blade;
- information on the routine verification of the protection and interlocking devices before using the machine;
- description of how portion cutting machines can be handled safety in the event of faults.

e) Information relating to cleaning:

- cleaning method;
- cleaning agent with reference to safety data sheet of manufacturer;
- disinfecting method;
- disinfecting agent with reference to safety data sheet of manufacturer;
- rinsing agent and application time to avoid toxic hazards;
- removal and disposal of materials used in cleaning.

f) Information relating to maintenance:

- description of the implementation and frequency of the inspections and maintenance work with consideration of conduct;
- information on the lubricants used;
- specification for the spare parts used if these have an effect on the operator's health and safety;
- drawings that are required to carry out these tasks;
- circuit diagrams.

g) Information on the training and the standard of the training:

- Operators should be trained in the dangers associated with the use and cleaning of portion cutting machines and with the precautions to be observed. Information shall be given in the instruction handbook that specifies the elements of training and the standard of training required.

It is recommended that operating personnel should be instructed during installation by a representative of the manufacturer or the supplier of the machine.

7.3 Marking

At least the following information shall be provided permanently in a recognizable and clearly legible form:

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

— designation of the machinery;

— model series or type designation;

— if applicable, serial number;

— Mandatory marking[1)];

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

— rating information, including supply voltage and frequency, power rating;

— short-circuit current.

For reasons of hygiene, an easily accessible and visible area in the machine housing is possible as an attachment location.

However, an identification (manufacturer name or type designation) shall be mounted on the outside of the machine housing.

The attachment location of the type plate shall also be described in the instruction handbook.

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 Directive.

Annex A
(normative)

Noise test code for portion cutting machines (grade 2)

A.1 Determination of the emission sound pressure level

EN ISO 11201:2010, grade 2, shall be applied in order to determine the emission sound pressure level. The measurements shall be taken at the normal operator position:

— 0,5 m from the operator side at the normal operator workstations;

— 1,55 m height above the ground;

— The microphone shall be orientated towards the machine.

If it is required to determine the sound power level of portion cutters EN ISO 3744:2010 should be applied.

A.2 Installation and mounting conditions

The test field shall be in accordance with EN ISO 11201:2010, Clause 6. It shall be laid out according to EN ISO 3744:2010, Annex A.

NOTE In free-field tests, the environmental correction factor K_2 is assumed to be equal or smaller than 0,5 dB and is therefore negligible.

The machine to be tested shall be placed on a reflective acoustically hard floor.

An elastic connection shall be mounted between the machine and the supporting area so that both the transmission of the vibration onto the support as well as the response to the noise source are minimized. The machine should stand on this horizontal area and be located at a sufficient distance from every reflective wall or ceiling or any other object in accordance with EN ISO 3744:2010.

A.3 Operating conditions

The measurement shall be carried out with the machine running without product at its maximum speed.

A.4 Measurement

The A-weighted time-averaged emission sound pressure level shall be measured.

The measuring instruments shall be in accordance with EN ISO 11201:2010, Clause 5 and 10.2.1.

The measurement shall be carried out over a complete work cycle of more than 15 s whereby stopping shall be excluded.

A.5 Information to be recorded

The information shall be in accordance with EN ISO 11201:2010, Clause 12.

All deviations from this noise test code and from EN ISO 11201:2010 shall be documented together with the technical justification for these deviations.

A.6 Information to be reported

The information to be included in the report is at least 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:

— reference to the basic noise emission standard EN ISO 11201:2010,

— description of the mounting and operating conditions used,

— location for the determination of the emission sound pressure level at the workstation,

— the noise emission value obtained.

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

A.7 Declaration and verification of the 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 emission sound pressure level L_{pA} at the workstation and the respective uncertainty K_{pA}. The uncertainty K_{pA} is assumed to be 2,5 dB.

The noise emission value shall be rounded to the next higher decibel.

The noise declaration shall state that the noise emission value has been obtained according to this noise test code and to the basic standard EN ISO 11201:2010, grade 2. If this statement is not true, the noise declaration shall indicate clearly what the deviations are.

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)

Design principles to ensure cleanability of portion cutting machines and their auxiliary components

B.1 General

The requirement of EN 1672-2 shall be complied with. Additional information can be found below.

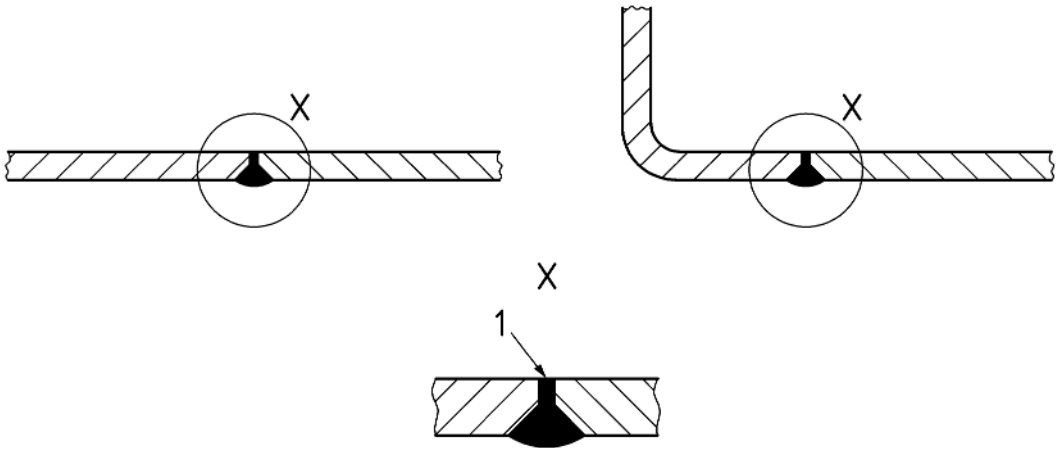
B.2 Terms and definitions

B.2.1 General

The following terms and definitions of EN 1672-2 apply for the application of this annex:

B.2.2 Closely joined surfaces

Surfaces are joined closely if product particles cannot be trapped in small crevices which makes them difficult to be removed and causes a contamination hazard (see Figure B.1).



Key

1 smooth surfaces

Figure B.1 — Smooth surfaces – Food area

B.2.3 Easy to clean

Machines are designed and constructed such that it is possible to remove dirt with a simple cleaning method e.g. cleaning agent and water (see Figure B.1).

B.3 Materials of construction

B.3.1 General

Materials of construction shall comply with EN 1672-2.

B.3.2 Materials for food area

All statutory requirements for materials and objects in contact with food shall be fulfilled, both the general requirements as well as those for special materials, e.g. plastics. The blade need not be corrosion-resistant. Measures for the prevention of corrosion shall be described in the instruction handbook.

B.4 Design

B.4.1 General

Surfaces and components in the various areas shall meet the following requirements:

B.4.2 Food area

B.4.2.1 Surfaces: The surfaces in the food area shall be smooth and free of depressions and scratches (see Figure B.1).

B.4.2.2 Inside corners: The angle formed by the intersection of two surfaces shall be ≥ 90° and have a radius of ≥ 3,0 mm (see Figure B.2).

Smaller radii are admissible if no other solutions can be found for reasons of process engineering, manufacturing technology (e.g. weld seam) or economic feasibility (see Figure B.2).

Dimensions in mm

Key

a radius machining operation bent blade

b radius welding seam

Figure B.2 — Angles and radii in food area

For reasons of process engineering, machine components e.g. material holder, may have depressions, grooves and corners of smaller dimensions. The material holder shall be easy to clean.

An angle ≥ 135° without radii is admissible. The distance between two edges shall then be ≥ 8,0 mm (see Figure B.3).

Dimensions in mm

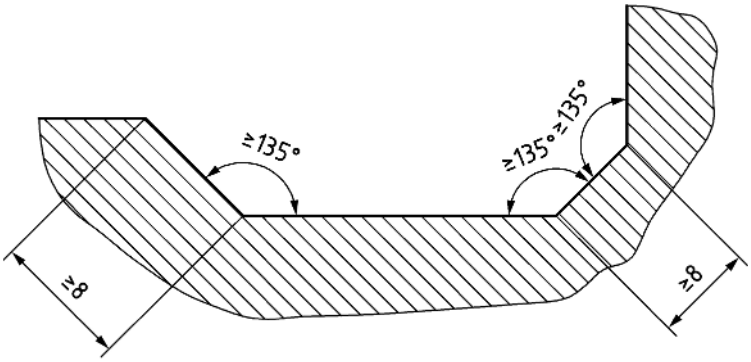


Figure B.3 — Angle in food area

If a corner is formed by the intersection of three surfaces, the angles shall be ≥ 90° and the radii ≥ 6,0 mm. Angles ≥ 135° without radii are admissible (see Figure B.4).

Dimensions in mm

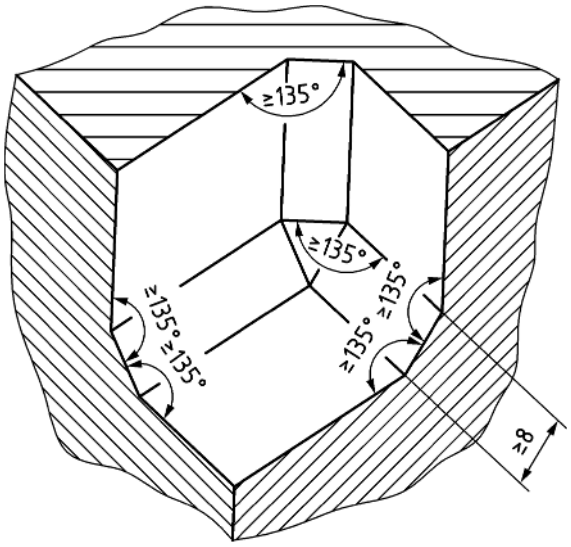


Figure B.4 — Adjoining surfaces in food area

B.4.2.3 Grooves may be used if the inner radius is ≥ 3,0 mm and the depth < 0,7 times the radius.

B.4.2.4 Joints and seams shall be welded or sealed and as smooth as the connected surfaces (see Figure B.1).

B.4.2.5 The surface roughness *Rz* shall be ≤ 25 µm. Whenever technically feasible, *Rz* ≤ 16 µm shall be selected.

B.4.3 Splash area

B.4.3.1 Surfaces shall be smooth (see Figure B.1).

B.4.3.2 Inside corners: The angle formed by the intersection of two surfaces shall be ≥ 80° and have a radius ≥ 3,0 mm.

If a corner is formed by the intersection of three surfaces, the corner formed by the intersection of two surfaces shall have a radius ≥ 6,0 mm. No requirements apply to the radius for the joining points of the third surface.

Angles ≥ 110° without radii are admissible.

B.4.3.3 Grooves may be used if the inner radius is ≥ 3,0 mm and the depth < 1,0 times the radius.

B.4.3.4 Openings are permissible if they go right through and have a diameter ≥ 16 mm. Gaps are admissible provided that the gap has a minimum width of 16 mm, the depth is no more than 16 mm and the gap is open.

B.4.3.5 Joints and seams shall be welded or continuously sealed. This requirement does not apply if these joints are formed by overlapping sheet metal surfaces from the top to the bottom in a vertical plane such that there are no horizontal corners in which dirt may be trapped. The overlap shall be ≥ 12 mm. Joints which do not overlap shall be easily separated for cleaning purposes.

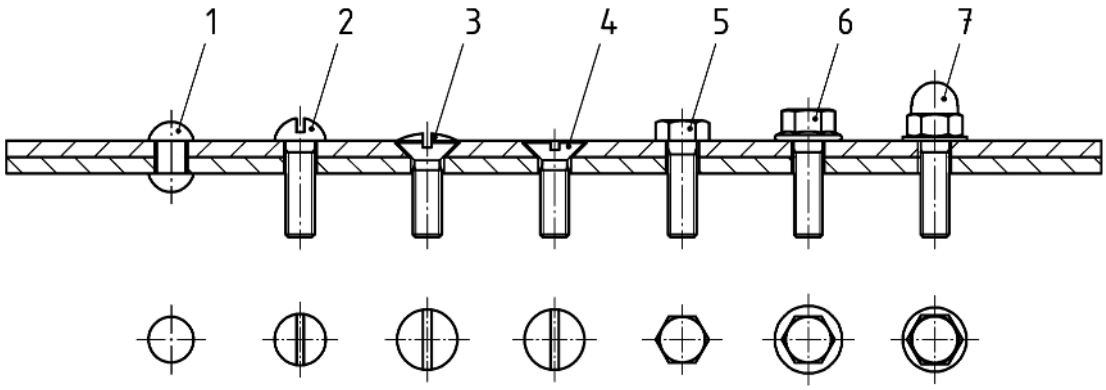
B.4.3.6 Methods of fastening: Screws, bolts and rivets with a low head profile and the design shown in Figure B.5 may be used only if other methods of fastening are not feasible and if they are easy to clean.

The following types of screws shall not be used:

— Phillips screws;

— Allen screws,

— screws of a diameter < 3 mm.



Key

1 saucer-head screw

2 cup-head screw

3 tallow-drop screw with slot

4 countersunk-head screw with slot

5 hexagon-head flat screw

6 hexagon-head flange screw

7 cap screw

Figure B.5 — Admissible joining elements – head profiles

B.4.3.7 The surface roughness shall comply with the requirements of B.4.2.5.

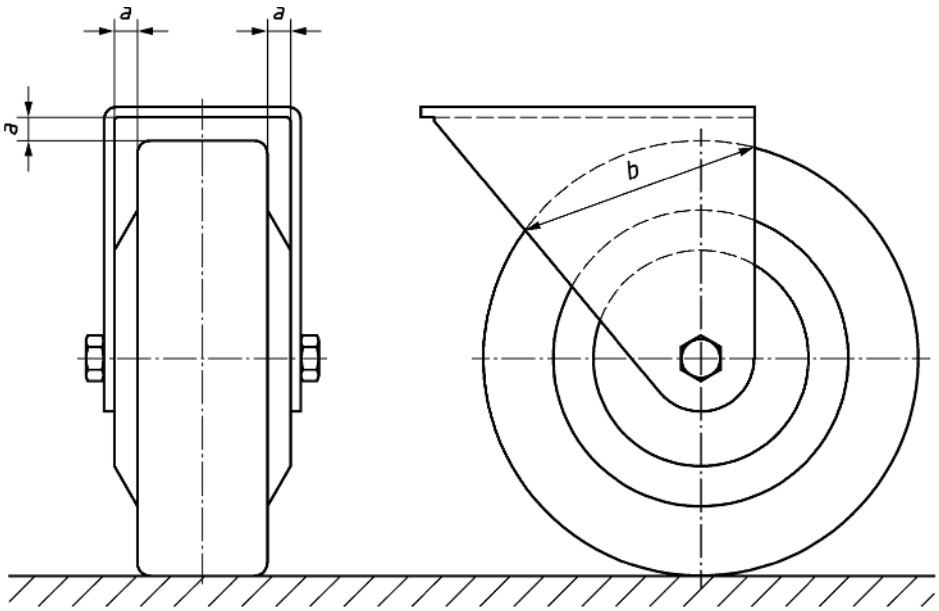
B.4.4 Non-food area

Surfaces shall be smooth as far as possible. Grooves, corners, holes, gaps and joints shall be avoided as far as possible. Closed hollow spaces shall be sufficiently wide to allow thorough cleaning and, where required, disinfection.

B.4.5 Floor-type machines

B.4.5.1 Wheel-mounted machines

Castors should be cleanable (see Figure B.6).



Key

$b < 25$ mm $a \geq 3{,}5$ mm

$b > 25$ mm $a \geq 6$ mm

b is the largest dimension of coverage on the circumference of the wheel

Figure B.6 — Castors – Dimensional examples

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 one means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

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.

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