BS EN 12331:2015

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Food processing machinery — Mincing machines — Safety and hygiene requirements

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National foreword

This British Standard is the UK implementation of EN 12331:2015. It supersedes BS EN 12331:2003+A2:2010 which is withdrawn.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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Machines pour les produits alimentaires - Hachoirs - Prescriptions relatives à la sécurité et à l'hygiène

Nahrungsmittelmaschinen - Wölfe - Sicherheits- und Hygieneanforderungen

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European foreword

This document (EN 12331:2015) 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of an identical text or by endorsement, at the latest by March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.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 12331:2003+A2:2010.

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 12331:2003+A2:2010 are listed below:

— same pictures have been renewed and renumbered;

— Clause 2: EN 1088 replaced by EN ISO 14119;

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

— Clause 4: transferred to a table;

— 5.2.5.1: inclusion of a note that under certain conditions the combination of specific hole plates diameter with specific hole diameter represents a securing element;

— Bibliography: with respect to 5.2.4.2 the standards DIN 9810 and UNI 11303 were added.

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 hazardous 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 This European Standard specifies requirements for the design and manufacture of mincing machines (see Figures 1a and 1b) used in a stationary position.

The machines covered by this European Standard are used for size reduction of fresh or frozen meat, meat products and fish (hereinafter referred to as product) by cutting in a set of cutting tools.

Mincing machines for domestic uses are not included in this European Standard. Filling mincers are covered by EN 12463 "Food processing machinery – Filling machines and auxiliary machines – Safety and hygiene requirements".

This European Standard applies only to machines that are manufactured after the date of issue of this European Standard.

Mincing machines in connection with using a hold-to-run foot switch are not covered by this European Standard.

This European Standard covers:

— mincing machines used in shops and preparation rooms;

— mincing machines used in kitchens where sausages are prepared;

— mincing machines used industrially;

— accessories.

The extent to which hazards are covered, is indicated in this European Standard. For other hazards which are not covered by this European Standard, machinery should comply with EN ISO 12100:2010 where applicable.

This European Standard is not dealing with specific requirements for the control of mincing machines with foot switch.

1.2 This European Standard covers the following types:

— mincing machine with feed tray, feed intake and pusher, diameter ≤ 52 mm on feed intake (see Figure 3);

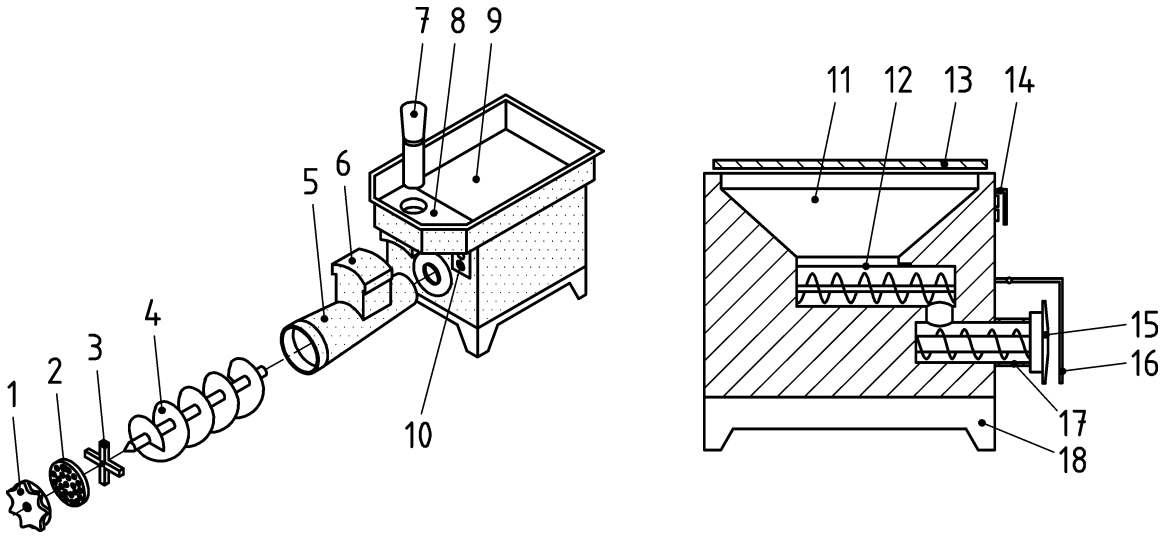
— mincing machine with feed tray, feed intake, restrictor plate and pusher, diameter > 52 mm on feed intake (see Figure 4);

— mincing machine with feed intake hopper and cover, screw conveyor, with [1)] or without mixing screw in feed intake hopper (see Figure 5);

— mincing machine with feed intake hopper, with or without cover, screw conveyor, with [1)] or without mixing screw in the feed intake hopper, with loading device (continuously or discontinuously).

Mincing machines comprise a machine base, a worm casing with a worm, a feed tray (with feed intake) or a feed intake hopper, a screw conveyor (and sometimes an additional mixing screw in the feed intake hopper), a set of cutting tools, a lock nut, a loading device, a drive motor and – depending on machine type – electrical, hydraulic and pneumatic components. They will also have various safeguarding devices as examples in Clause 5.

1) In this case, EN 13570 should be taken into consideration.



a) Mincing machine with feed tray and restrictor plate

b) Mincing machine with feed intake hopper, cover and screw conveyor

Key

1	lock nut	6	feed intake	11	feed intake hopper	15	lock nut
2	hole plate	7	pusher	12	screw conveyor	16	protective hood
3	blade	8	restrictor plate	13	cover	17	worm
4	worm	9	feed tray	14	on-/off-switch with protective hood	18	machine rack
5	worm casing	10	on-/off-switch				

Figure 1 — Arrangement of a mincing machine

Mincing machines may be equipped e.g. with

— an extraction claw,

— an ejector or extractor,

— a protective hood over the discharge outlet,

— a cover over the inlet opening of the feed intake hopper,

— a transport carriage for the lock nut, the set of cutting tools, the worm and the screw conveyor,

— a lifting device for the lock nut, the set of cutting tools, the worm and the screw conveyor,

— a loading device.

1.3 Intended use

The product is fed manually or by means of the loading device into the mincing machine. The product is fed to the worm either by means of a pusher or a screw conveyor and size reduced in the set of cutting tools.

It is not intended that mincing machines are cleaned with pressurized water. However, it is to be foreseen that it is difficult to guarantee that this method will never be used in practice. In order to deal with this eventuality, the requirements of 5.3.4 should apply.

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

This European Standard specifies the hazards which can arise during commissioning, operation, cleaning, use, maintenance and decommissioning of the machine.

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 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 614-1, *Safety of machinery — Ergonomic design principles — 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 1672-2:2005+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 61496-1, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1)*

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 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

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 13849-1:2008, *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 and definitions

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

3.1
platform
accessible standing area

3.2
worm
rotating screw-shaped component in the worm casing for product transport to the set of cutting tools

3.3
step
interlocked standing area

3.4
ejector/extractor
device for detaching the set of cutting tools and the worm

3.5
extraction claw
tool for detaching the set of cutting tools and the worm

3.6
loading device
device for the lifting and tilting of transport cars and containers

3.7
container
device for holding products to be processed

3.8
cover
movable device with safety function

3.9
feed intake
housing between the feed tray and the worm casing

3.10
feed intake hopper
container for holding the products to be processed with safety function

3.11
locking device
device for locking the trolley or container in the load bearing device

3.12
trolley
movable device for holding the products to be processed

3.13
design dimension
sum of dimensions measured from the floor, in the case of steps, intermediate steps or platforms from the standing place to the hopper edge and from the hopper edge to the first danger point in the feed intake hopper (see Figures 6 and 7)

3.14
cooling mincer
machine with a cooling device for the feed intake and the worm casing

3.15
light barrier/light curtain
optical-electrical safety component

3.16
hole plate
fixed plate with bores

3.17
mixing screw
rotating screw-shaped component in the feed intake hopper above the screw conveyor for mixing the product

3.18
blade
cutting tool with one or several blades

3.19
feed tray
container for holding the product to be processed

3.20
mechanical bar
movable device with safety function

3.21
worm casing
casing for holding the worm and the set of cutting tools

3.22
cutting chamber
chamber inside the worm casing for holding the set of cutting tools

3.23
set of cutting tools
rough-cutter, blade and hole plate for size reduction of product

3.24
protective grid
movable device on the feed intake hopper mouth

3.25
protective hood
movable device on the discharge outlet

3.26
restrictor plate
stationary non-detachable device above the feed intake

3.27
pusher
device used to push the product further in the feed intake

3.28
screw conveyor
rotating screw-shaped component in the feed intake hopper for product transport to the worm

3.29
transport carriage
movable device for holding the lock nut, set of cutting tools, worm and screw conveyor

3.30
lock nut
device for locking the set of cutting tools in the cutting chamber

3.31
preparation room
room for preparation of sale products

4 List of hazards

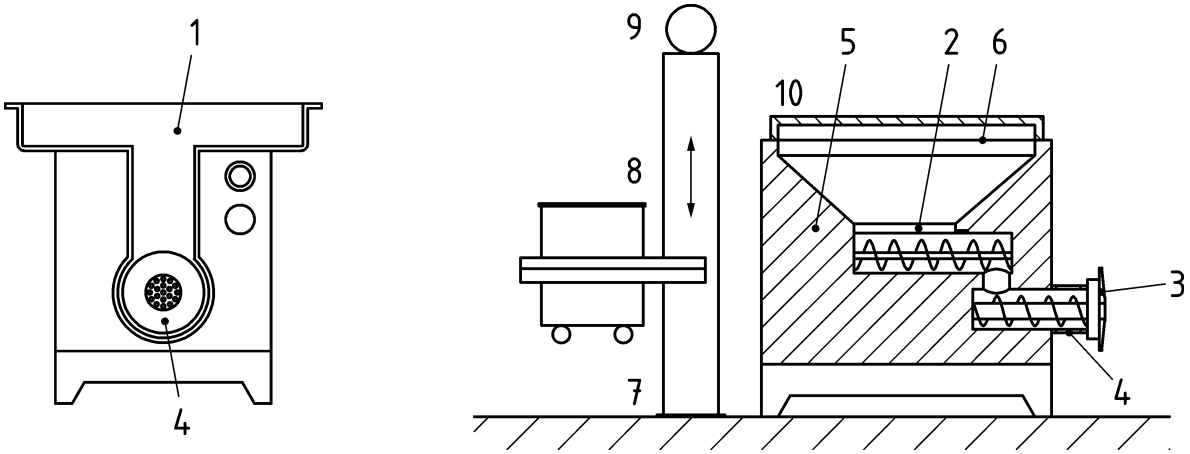
This clause contains the hazards, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce risk.

Figure 2 shows the significant hazard zones of mincing 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 Figure 2).	5.2.1
	Zone 1: Mincing machines with feed intake and worm; rotating screw conveyor at the end of the feed intake (see Figure 2a)); hazards of entanglement, shearing or severing of fingers or hand.	5.2.2
	Zone 2: Mincing machines with feed intake hopper and screw conveyor/mixing screw; rotating screw conveyor or mixing screw in the feed intake hopper (see Figure 2b)); hazards of entanglement, shearing or severing of fingers, hand or forearm.	5.2.3
	Zone 3: Discharge outlet on mincing machines; rotating blade behind the hole plate at the discharge outlet (see Figure 2b)); hazards of shearing of fingers.	5.2.4
	Zone 4: Removal of worm and set of cutting tools; worm casing with worm and set of cutting tools at discharge outlet (see Figures 2a) and 2b)); hazard of crushing to hands and feet during installation and removal.	5.2.5
	Zone 5: Drive mechanism; drive of worm, screw conveyor and mixing screw (see Figure 2b)); hazards of crushing, shearing or entanglement to fingers or hand.	5.2.6
Mechanical hazards	Zone 6: Machine components, e.g. cover over hopper edge; unintentional shutting and intentional closing of the cover (see Figure 2b)); hazards of crushing to fingers or hand.	5.2.7
	Loading device on mincing machines (see Figure 2b)); Zone 7: Space below transport carriage or container; hazards of trapping or crushing on floor level during descent to the body; hazards of impact during uncontrolled descent e.g. In the case of mechanical upsets to the body; Zone 8: Path of movement of transport carriage and container; hazards of impact from moving components to the body; hazards of crushing or shearing between moving and stationary components of fingers or hand; Zone 9: Drive elements and (where used) pulleys, chains or wire ropes; hazard of drawing-in, shearing, crushing or entanglement of fingers or hand; Zone 10: Discharge area; hazards of impact or crushing from load-bearing device to finger or hand.	5.2.8
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 generated by loss of stability	Hazard of impact or crushing, if the machine or the loading device topples over to the body.	5.4
Hazards generated by noise	Mincing 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.	5.5

Hazards, hazardous situations and hazardous events	**Location or cause**	**Clause/sub-clause in this European Standard**
Hazards from use of gases and direct steam	Hazard of suffocation or of hot or cold burns by leakage of gases such as e.g. carbon dioxide (CO_2), nitrogen (N_2) or direct steam.	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



a) Mincing machine with feed intake **b) Mincing machine with feed intake hopper**

Key

1	zone 1	4	zone 4	7	zone 7
2	zone 2	5	zone 5	8	zone 8
3	zone 3	6	zone 6	9	zone 9
				10	zone 10

Figure 2 — Danger zones

5 Safety requirements and/or 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.

Where the means of reducing the risk is by the arrangement or positioning of the installed machine, the manufacturer shall include in the Information for use a reference to the reduction means to be provided, 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 safety

5.2.1 General

The machines shall be designed and constructed in accordance with the conditions mentioned below.

The interlocking systems of guards shall comply with EN ISO 14119:2013, 4.2, and the safety-related parts of the control system shall comply with EN ISO 13849-1:2008.

In addition interlocking systems shall be designed to satisfy all of the following features:

— to fulfil hygienic requirements,

— to protect against mechanical damages,

— to protect against the effects of cleaning and disinfecting materials,

— to protect against the effects of cleaning fluids (water),

— to protect against tampering by simple methods,

— to be contained in the machine casing and comply with EN ISO 14119:2013, Clause 7.

In the instruction handbook, the manufacturer shall indicate the daily verification of the interlocking device.

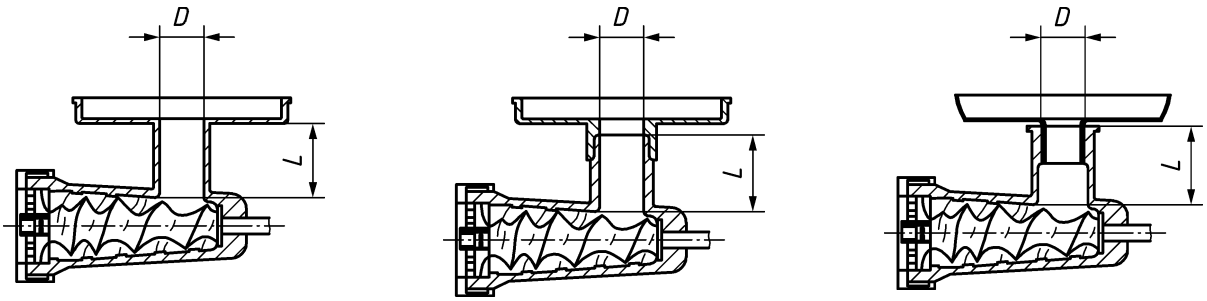
Fixing systems of fixed guards shall remain attached to these guards or to the machine when the guards are removed.

5.2.2 Zone 1 – Measures at mincing machines with feed intake and worm

Access to the worm in the feed intake shall be protected. This may be achieved e.g. by the following measures (see Figure 3):

On the feed intake, the distance L between the upper feed intake edge and the worm shall be

- $L \geq 100$ mm on mincing machines with intake diameter $D \leq 46$ mm;
- $L \geq 120$ mm on mincing machines with intake diameter $46 \text{ mm} < D \leq 52$ mm.



a) Fixed feed tray **b) Removable feed tray** **c) Removable feed tray**

Figure 3 — Feed intake without restrictor plate — Safety dimensions

On mincing machines with a removable feed tray, the dimensions specified on the feed intake shall be adhered to even when the feed tray has been removed (see Figure 3b) and Figure 3c)). If the dimensions specified are not complied with, the feed tray shall be interlocked.

The interlocking system of the removable feed tray shall comply with 5.2.1 and the safety-related parts of the control system shall present at least a Performance Level "d" defined with an $MTTF_d$ "high" in accordance with EN ISO 13849-1:2008.

A pusher shall be supplied with the machine (see Figure 1a)).

On mincing machines with a feed intake with diameter > 52 mm, a restrictor plate shall be provided. Mounting of a fixed restrictor plate shall be in accordance with EN ISO 12100:2010, 3.27.1 (see also EN 953:1997+A1:2009, 3.2 and 6.4.2). If the restrictor plate is removable, it shall be provided with an interlocking device. Openings in the restrictor plate shall have a diameter ≤ 52 mm.

The interlocking system of the removable restrictor plate shall comply with 5.2.1 and the safety-related parts of the control system shall present at least a Performance Level "d" defined with an $MTTF_d$ "high" in accordance with EN ISO 13849-1:2008.

The dimensions and arrangement of the restrictor plate shall be in accordance with Figure 4a) and Figure 4b).

When the mincing machine is running empty, the worm shall come to a standstill within 2 s after removal of, in one case the removable feed tray, or in the other case, the removable restrictor plate.

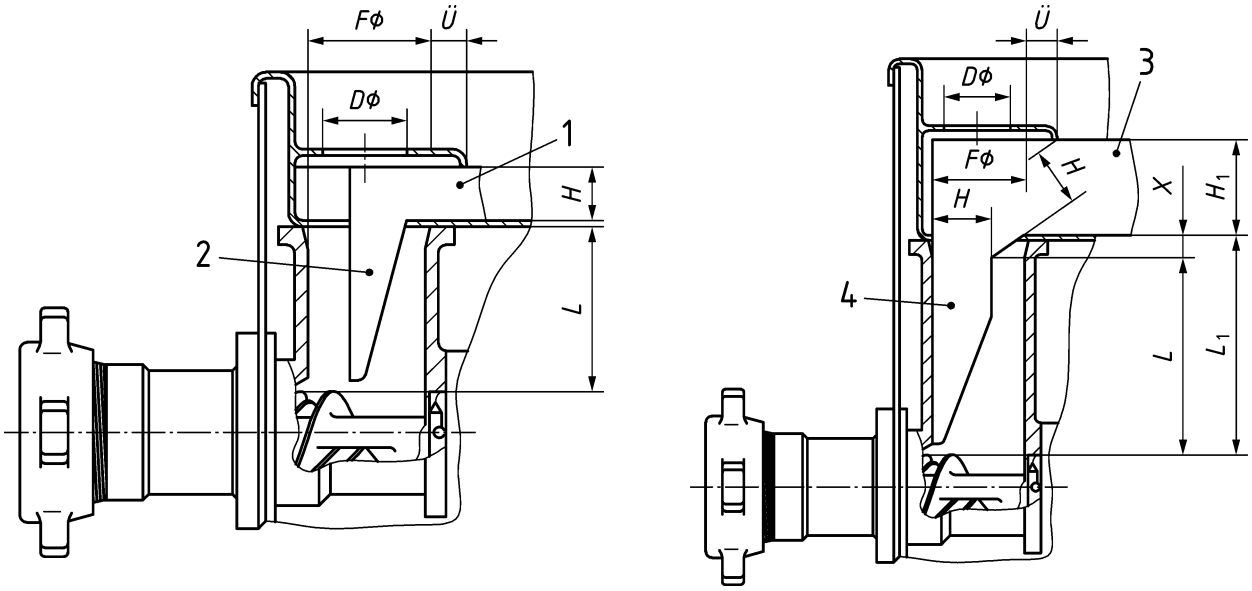
The distance *H* (feed tray to lower edge of restrictor plate) shall be ≤ 40 mm based on an assumed metacarpus diameter of 40 mm.

The projection *Ü* (outer edge of restrictor plate to feed intake edge) shall be ≥ 40 mm (see Figure 4a)).

The safety distance L_1 results from the dimension *L* = 230 mm (length of hand to wrist) + dimension *x*.

Dimension *x* results from dimensions *Ü* (projection), distance H_1 (feed tray to lower edge of restrictor plate) and *F* ∅ (feed intake diameter) with an assumed forearm and wrist diameter of 40 mm.

Distance H_1 (feed tray to lower edge of restrictor plate) shall be ≤ 120 mm, and projection *Ü* (outer edge of restrictor plate to feed intake edge) shall be ≥ 40 mm (see Figure 4b)).



a) Safety dimensions for middle hand and fingers

b) Safety dimensions for forearm and hand

Key

1 middle hand
2 finger
H ≤ 40 mm
L ≥ 120 mm
Ü ≥ 40 mm
D ≤ 52 mm
F ≤ 85 mm

3 forearm
4 hand
H = 40 mm
H_1 ≤ 120 mm
L ≥ 230 mm
Ü ≥ 40 mm
D ≤ 52 mm
F ≤ 200 mm

Figure 4 — Feed intake with restrictor plate

5.2.3 Zone 2 – Measures at mincing machines with feed intake hopper and screw conveyor

5.2.3.1 General

Access to the danger zones at the screw conveyor in the feed intake hopper shall be prevented or made safe. This may be achieved by one of the following measures:

— the design (e.g. closed feed intake hoppers) including a closed loading device for products (e.g. feed screw, pipeline with pump) (see 5.2.3.2);

— the use of guards (e.g. a cover), see EN 953:1997+A1:2009 (see 5.2.3.3);

— the use of electro-sensitive protective devices (e.g. light barrier), see EN ISO 12100:2010 (see 5.2.3.4);

— the use of fixed guards (e.g. fence), see EN 953:1997+A1:2009 (see 5.2.8.2.4);

— the use of adequate safety distances, design and additional measures (see 5.2.3.4.2).

5.2.3.2 Design with closed feed intake hopper

The feed intake hopper and the loading device shall be designed to be completely closed (connection of machines), or the openings shall comply with EN ISO 13857:2008, Table 4. The disconnection point shall be protected by an interlocking system.

The interlocking system of the disconnection point shall comply with 5.2.1, and the safety-related parts of the control system shall present at least a Performance Level "c" defined in accordance with EN ISO 13849-1:2008.

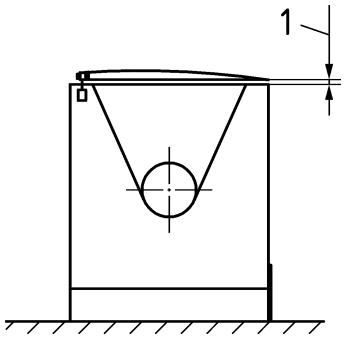
The manufacturer shall indicate in the instruction handbook that the cover of the hopper opening shall not be walked on.

5.2.3.3 Design with cover over feed intake hopper

At the feed intake hopper, there shall be a cover. The cover shall be interlocked. The slamming of the cover shall be avoided (see 5.2.7.1). If the mincing machine is running empty, the screw conveyor has to come to a standstill within 4 s after raising the front edge of the cover 50 mm (opening distance, see Figure 5).

The interlocking device of the movable cover shall comply with 5.2.1, and the safety-related parts of the control system shall present at least a Performance Level "c" defined in accordance with EN ISO 13849-1:2008.

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



Key

1 interlocked cover, opening distance

Figure 5 — Mincing machine with feed intake hopper and cover — Safety dimensions

5.2.3.4 Design with additional measures on feed intake hopper

5.2.3.4.1 General

On mincing machines which cannot use an interlocked cover or a light barrier because they would be interrupted by continuous working, the following measures are necessary:

5.2.3.4.2 Safety distances

The design dimension (see 3.13), measured from the floor (standing area), shall be ≥ 2 250 mm. This is only possible in connection with additional measures in 5.2.3.4.3. There the distance from floor to upper edge of mechanical bar or light barrier shall be H1 > 1 600 mm. The distance from the standing area, from steps, and platforms up to the hopper edge shall be > 1 100 mm (see Figure 7).

5.2.3.4.3 Additional measures

With a height of > 1 500 mm, a view into the feed intake hopper (e.g. by means of a mirror, fill level indication) shall be possible.

The outside walls shall be designed (e.g. vertical and smooth) to prevent the operator climbing on the machine. This also applies to one of the following measures:

a) Interlocked step

If danger points in the feed intake hopper can be reached from steps or platforms (not coming up to 2 250 mm) the steps or treads of platforms shall be interlocked. When the mincing machine is running empty, the screw conveyor shall come to a standstill within 4 s after the interlocking system has been actuated and the step moved into its protected position.

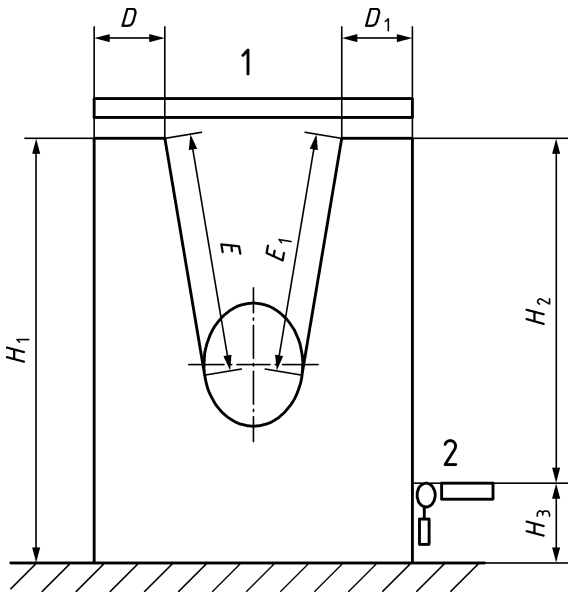
The interlocking system of the movable step shall comply with 5.2.1 and the safety-related parts of the control system shall present at least a Performance Level "c" defined in accordance with EN ISO 13849-1:2008.

The standing area of steps shall have a width ≥ 500 mm and a length ≥ 400 mm and a toe rail of a height of 15 mm. If the standing area is < 500 mm above ground, an area of a width ≥ 400 mm and a length ≥ 350 mm is sufficient. The standing area shall be of the non-slip type.

Platforms shall have an accessible area of a width $B \geq 500$ mm. The length of the platform shall correspond to the length of the hopper (see Figures 6 and 7).

Platforms which are located > 500 mm above ground shall be fitted with safety devices to prevent falls. Intermediate steps, stairs or ladders and grab handles shall be provided if the step-up height to the step or to the platform is > 500 mm. The standing areas and treads shall be sufficiently large and of the non-slip type and arranged at identical distances from one another.

The standing area of the intermediate step shall have a width of ≥ 300 mm and a length of ≥ 200 mm. Treads of ladders shall have a length of ≥ 500 mm and a width of ≥ 80 mm. A ladder shall be arranged at an angle of < 70° to the horizontal.



Key

1 mechanical trip bar

2 interlocked step

H_1	≥ 1 600 mm
H_2	≥ 1 100 mm
H_3	≥ 500 mm with intermediate step
$H_1 + D_1 + E$	≥ 2 250 mm
$H_3 + H_2 + D_1 + E_1$	≥ 2 250 mm

Figure 6 — Mincing machine with open feed intake hopper, mechanical trip bar, light barrier and interlocked step at the operator side — Safety dimensions

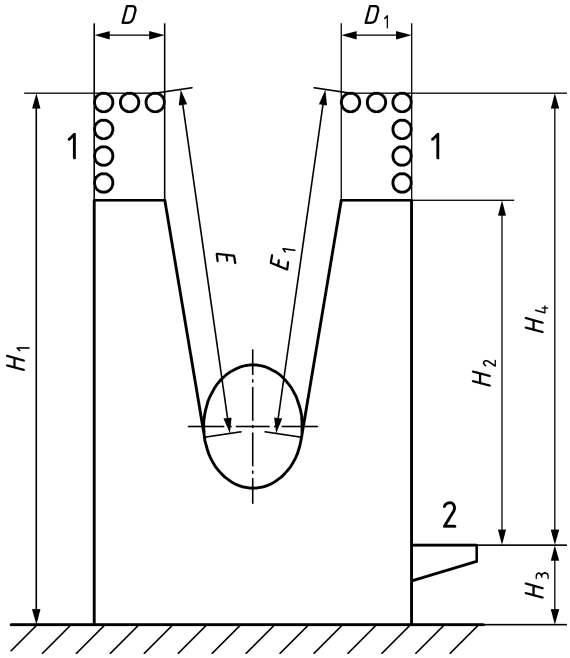
b) Mechanical trip bar/light barrier or movable protective grid at hopper edge, running round all sides

At the hopper edge there shall be at all sides a mechanical trip bar, or a light barrier, or a protective grid with a trip function (see Figures 6 and 7). The design dimension from the standing area (floor or fixed step or fixed platform) across the upper edge of the protection equipment at the hopper edge up to the next hazard point in the hopper shall be > 2 250 mm.

The dangerous equipment in the hopper shall, if the mincing machines is running empty, come to a standstill within 3 s by using hole plates < 160 mm Ø and 4 s by using hole plates ≥ 160 mm Ø.

The interlocking of the mechanical trip bar or the movable protective grid shall comply with 5.2.1, and the safety-related parts of the control system shall present at least a Performance Level “c” defined in accordance with EN ISO 13849-1:2008.

The design of the light barrier shall be in accordance with ESPE type 2 of EN 61496-1.



Key

1 light barrier or movable protective grid

2 platform fixed

$H_1 \geq 1\,600$ mm

$H_2 \geq 1\,100$ mm

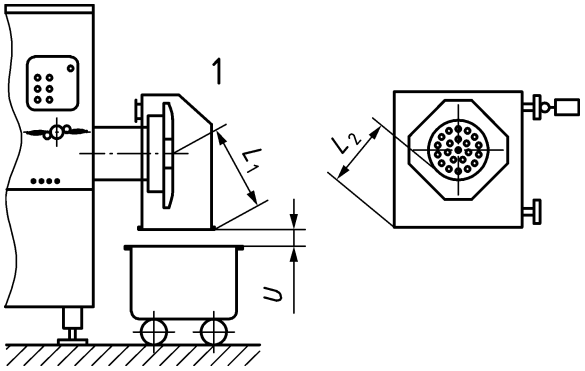
$H_3 \geq 500$ mm with intermediate step

$H_4 \geq 1\,600$ mm

$H_1 + D + E \geq 2\,250$ mm

$H_4 + D_1 + E_1 \geq 2\,250$ mm

Figure 7 — Mincing machine with open feed intake hopper, protective grid and fixed step at the operator side — Safety dimensions



Key

1 protective hood

L_1 ≥ 1,8 x D

L_2 ≥ 1,2 x D

U ≤ 50 mm

Figure 8 — Discharge outlet on mincing machines — Protective hood

5.2.4 Zone 3 – Discharge outlet on mincing machines

5.2.4.1 General

The access to the danger zone on the blade behind the last plate at the outlet side shall be protected or prevented. This may be achieved by one of the following measures:

— the design of the plate (see 5.2.4.2);

— using a guard, e.g. protective hood (see 5.2.4.3).

5.2.4.2 Design of the plate

The diameter of the holes in the last plate towards the outlet shall be ≤ 8 mm. The thickness of the last plate shall be ≥ 5 mm.

The last plate towards the outlet and the worm-housing shall be designed so that only a plate as described above can be put into the worm-housing at the outlet side.

The manufacturer has to indicate in the instruction handbook, that the last plate towards the outlet is not allowed to be ground thinner than 5 mm thickness.

5.2.4.3 Design of the protective hood

If it is intended to use plates with holes > 8 mm diameter, a protective hood shall be fitted to the outlet. The protective hood shall have a projecting length in working direction $L_1 \geq 1{,}8 \times D$ (D = diameter of the hole plate in mm) and a lateral projecting length of $L_2 \geq 1{,}2 \times D$.

The manufacturer has to indicate in the instruction handbook, that the distance U between the transport carriage or the container and the protective hood shall be ≤ 50 mm (see Figure 8). The knife shall come to a standstill within 2 s after opening the protective hood by 50 mm at the point of maximum movement. The protective hood shall be interlocked.

The interlocking of the movable protective hood shall comply with 5.2.1 and the safety-related parts of the control system shall present at least a Performance Level "c" defined in accordance with EN ISO 13849-1:2008.

5.2.5 Zone 4 – Removal of worm and set of cutting tools

5.2.5.1 Prevention of starting / functioning during removal of worm and cutting tools

Provisions shall be made for preventing starting or functioning of the machine during removal of the worm and / or the set of cutting tools.

Acceptable solutions are for example one of the following:

— a protective hood according to 5.2.4.3. This solution can also be used for machines with plates with holes < 8 mm;

— interlocking of the end holes plate with the drive of the cutting tools (interlocking see 5.2.4.3);

— mechanical interlocking of the end holes plate with the drive of the cutting tools (causing declutching when the end holes plate is removed from its housing).

In case one of the last two options is adopted particular attention shall be given to the reliability of the interlocking, taking account of possible malfunctioning by the presence of product.

NOTE The combined use of hole plates with a diameter ≤ 106 mm and holes ≤ 8 mm, movable worm casing and adequate instructions for dismantling and disconnecting is also an acceptable solution.

5.2.5.2 Loosening / extraction of the worm and cutting tools set

With the exception of machines with a holes plate diameter ≤ 106 mm having a removable worm casing, all mincing machines shall be equipped with means for easy loosening/extraction of the worm and cutting tools set (an ejector or knockout system, or an extractor system, e.g. with lever or screw).

The design of this system shall be such that in normal foreseeable conditions of use the forces required for loosening/extracting the worm are within the limits fixed in EN 1005-3.

NOTE In case of a machine with a holes plate diameter ≤ 106 mm having a removable worm casing it is considered acceptable to loosen the worm and cutting tools set by knocking without special provisions.

5.2.6 Zone 5 – Drive system

Access to danger zones on the drive system shall be prevented. This may be achieved e.g. by the following measures:

Guards (cover over casing) in accordance with EN 953:1997+A1:2009, 3.2, shall be provided on the drive mechanism. The covers may be fixed or removable and interlocked.

If covers are removable, e.g. for changing the operating process or for the purpose of cleaning, they shall be interlocked.

For safety requirements relating to the interlocking system of cover over the casing see 5.2.3.3.

5.2.7 Zone 6 – Machine components e.g. cover over hopper edge

5.2.7.1 Manual operation

The force required to raise or lower the cover shall not exceed 250 N.

Movable machine components (e.g. cover) shall be prevented from slamming shut. This may be achieved e.g. by the following measures:

On non-powered covers, e.g. a counterweight or a spring shall be provided if, when open, they do not swing back sufficiently to a position behind their top dead centre. The cover shall be provided with a grab handle.

5.2.7.2 Powered operation

The measuring point shall be located at the largest opening width of the cover. In the event of a drive failure (e.g. pipe or hose break), the movement of the cover shall be stopped.

The control unit for lowering the cover shall be designed as a hold-to-run control.

Lowering of the cover shall be carried out so that when the distance to the front edge of the bowl is less than 200 mm, the lowering speed shall not exceed 50 mm/s.

5.2.8 Zone 7 to 10 – Mincing machines with loading devices

5.2.8.1 General

Loading devices of various designs exist, including those with

— fixed lifting arms for holding the trolley,

— lifting arms which allow the trolley to swivel in a gondola and thus remain horizontal,

— a vertical pillar mast with forks for holding trolleys or containers.

They shall meet the appropriate following requirements.

5.2.8.2 Special requirements relating to loading devices on mincing machines

5.2.8.2.1 Positioning

Loading devices, whether they are free standing or connected to the mincing machine, shall be designed in such a way that they are stable.

This may be achieved e.g. by:

— use of a hold-to-run control for the lowering of the load bearing device or

— use of gravity only for lowering the load-bearing device or

— a special device on the machine or loading device so that powered descent of the load bearing device onto an obstruction cannot cause instability. This may be e.g. a level switch, to automatically stop the descent.

Use of the loading device shall not permit excess load to be applied to the load-bearing components or the loading device on the floor. This can e.g. be achieved by a slip clutch or an overload cut-out to automatically stop the descent.

5.2.8.2.2 Load bearing device

Load bearing devices shall be designed to prevent trolleys or containers from falling off (e.g. by means of a locking device). The distance between the load bearing device and the machine base shall be > 120 mm and the distance between the trolley or load-bearing device and the hopper edge > 25 mm. If the hopper wall with a height H1 ≥ 1 600 mm is opened by the dimension of load bearing device including container from the side, the load-bearing device is acting, there should not be any crushing or shearing points (dimensions relating to EN 349 shall be kept). When using a hold-to-run control to operate the lift tilt device it is permitted to use a smaller distance than mentioned in EN 349. The height of the hopper wall in this place shall ensure a design dimension to the danger zones inside the hopper ≥ 2 250 mm.

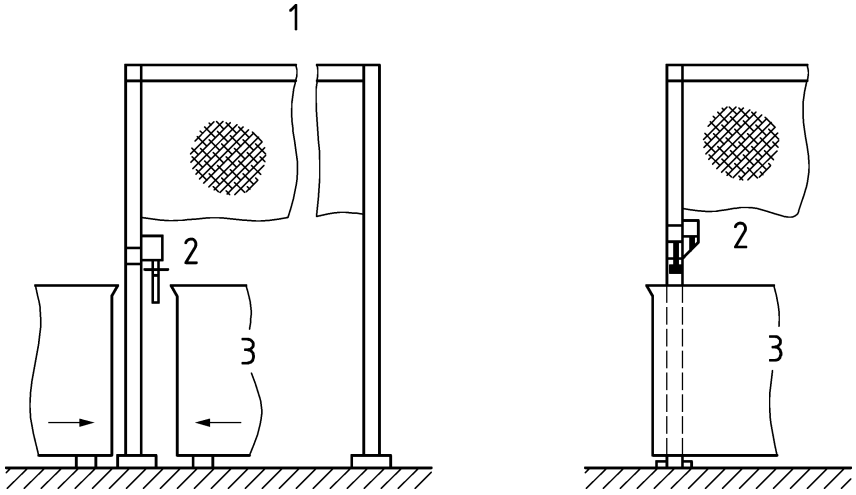
5.2.8.2.3 Mast-type loading device

The danger points between the load bearing device and the mast on the side opposite the load bearing device shall be protected if the distance between the load bearing device and the mast is < 120 mm. If the tilt range of the load bearing device is > 2 000 mm or more above the floor, no guarding is required if the distance between the load bearing device and the mast is > 60 mm.

5.2.8.2.4 Loading devices for feed height > 2 500 mm

The path of movement of the load bearing device, with the exception of the run-in and run-out opening, shall be protected by means of a guard (e.g. a protective fence). An electro-sensitive protective device (e.g. a light barrier, mechanical trip bar or trip vane) shall be placed on the upper edge of the run-in and run-out opening to prevent lifting of incorrectly positioned trolleys or containers (see Figure 9).

For requirements relating to the interlocking system of the mechanical trip bar or mechanical trip flap as well as the light barrier see 5.2.1 and 5.2.3.4.



Key

1 protective fence

2 pivoting trip bar / trip vane

3 container

Figure 9 — Safety device for container position

5.2.8.2.5 Lowering velocity of load bearing device

The lowering velocity shall be ≤ 0,4 m/s when it is controlled by a hold-to-run control.

The lowering velocity shall be ≤ 0,1 m/s when the lowering motion is controlled automatically or without a hold-to-run control. In this case, the last 0,5 m until the trolley or container touches the floor shall be controlled by a hold-to-run control.

5.3 Electrical hazards

5.3.1 General

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

5.3.2 Stopping function of switching devices

The stopping function of switching devices shall be in accordance with Category 0 of EN 60204-1:2006, 9.2.2.

5.3.3 Emergency stop-device

In general mincing machines do not require an emergency stop device. Nevertheless, if the risk assessment to be carried out by the manufacturer results in the conclusion that such a device would reduce the stopping time, the machine shall be fitted with an emergency stop device.

If no emergency stop device is fitted, the normal OFF-switch shall be easily reachable from the operator position.

5.3.4 Protection against water ingress

5.3.4.1 IP degrees of protection

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

— IPX5 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.

— IPX3 Internal electrical operating components

  — in the machine with enclosed housing with the degree of protection IPX5 and open lower surface. Protection against direct and indirect impact of a water jet shall be ensured.

— IPX2 Internal electrical operating components

  — in a machine with completely enclosed housing with the degree of protection IPX5. Protection against condensate water shall be provided.

  — in the control box enclosure.

— IPX0 Internal electrical operating components

— in a machine with completely enclosed housing with the degree of protection IPX5. Protection against condensate water shall be provided, and the safety of fingers and the back of hand be ensured.

5.3.4.2 Hoods

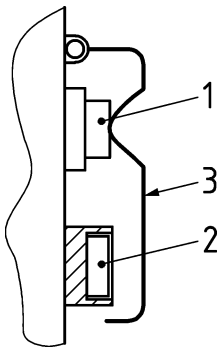
Cleaning by pressurized water shall not cause ingress of water into the external electrical operating components.

This may be achieved e.g. by the following measures:

— the electrical operating components shall be covered by hoods (a statement indicating their use shall be included in the instruction handbook), or

— membrane switches or similar switches shall be used, suitable for cleaning with pressurized water or a pressure cleaning apparatus.

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-switch (see Figure 10).



Key

1 off

2 on

3 protection hood (off)

Figure 10 — ON-/OFF-switch with hood

5.3.5 ON- and OFF-switch

On mincing machines, ON- and OFF-switches shall be provided. The switches shall be arranged on the operator side of machines. The ON-switch shall be protected against unintentional switch-on (e.g. protective collar).

5.3.6 Safety requirements related to electromagnetic phenomena

The machines shall have sufficient immunity from electromagnetic disturbances to enable them to operate safely as intended and not fail to danger when exposed to the levels and types of disturbances intended by the manufacturer.

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

5.4 Hazards from loss of stability

Mincing machines shall be designed not to tilt, slip, or fall over under all operating conditions. The instruction handbook shall give details of the foundation load and the type of floor fixing, or, for non-fixed mincing machines, the floor load and recommended flooring surfaces.

Machines tested in accordance with Table 1 shall not start tilting or slipping at their location.

5.5 Noise reduction

When designing mincing machines with open feed intake, the information and technical measures to control noise at source given in EN ISO 11688-1 shall be taken into account.

The most important cause for generation of airborne sound at a mincing machine with open feed intake is crushing of blocks of frozen product.

The success of the applied noise reduction measures is assessed on the basis of the actual noise emission values (see Clause 6 and Annex A) in relation to other machines of the same family.

5.6 Hazards from use of gases (N_2, CO_2 and steam)

Mincing machines designed for use with e.g. CO_2, N_2 or direct steam shall be equipped with an impervious cover. This cover may also be used as a guard.

Supply of gases (CO_2, N_2 or direct steam) shall be fitted with an inlet valve that is interlocked in such a way that no gas or direct steam supply is possible when the cover is open. The inlet valve shall be clearly marked and positioned so as to be easily accessible.

The design shall be such that no pressure increase is possible. The cover may be kept in position by its own dead weight or mechanically. Supply of CO_2, N_2 or direct steam shall only be possible if the locking mechanism is working.

Mincing machines designed for use of gases – e.g. CO_2, N_2 or direct steam – shall be fitted with a device for purging the gases into the external atmosphere by five air changes prior to opening the cover.

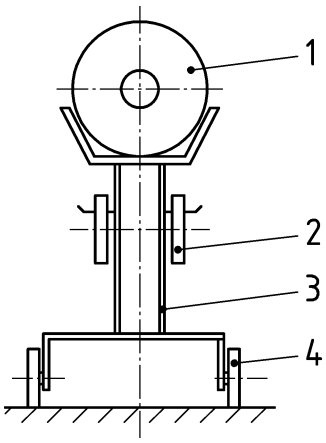
5.7 Ergonomic requirements

Attention shall have to be paid to the ergonomic requirement described in EN ISO 12100:2010, 6.2.8, as well as in EN 614-1, EN 1005-1, EN 1005-2 and EN 1005-3. Any information for the user that is relevant for achieving the ergonomic objectives shall be contained in the instruction handbook.

On mincing machines with a hand-operated cover over the feed intake hopper, the grab handle shall be designed and located such that an operating force < 250 N is required.

On mincing machines with an ejector or extractor, these shall be designed such that an operating force < 250 N is required.

On mincing machines with parts of the set of cutting tools and worms weighing > 25 kg, lifting devices and transport carriages at the same height shall be provided which make it possible to install, remove and transport these parts without manual lifting (see Figure 11).



Key

1 screw conveyor

2 hole plate / blade

3 transport carriage

4 pedestal rollers with fasteners

Figure 11 — Transport carriage for worm and screw conveyor

On mincing machines with a feed intake hopper and a height > 1 400 mm, steps or platforms shall be provided for operating, setting-up and cleaning procedures that cannot be done from the floor. The distance from the standing area of steps or platforms to the hopper edge shall be < 1 200 mm (see also 5.2.3.4.3).

On mincing machines with a feed intake hopper, a loading device shall be provided if the distance from the standing area to the hopper edge is > 1 400 mm.

5.8 Hygiene and cleaning

5.8.1 General

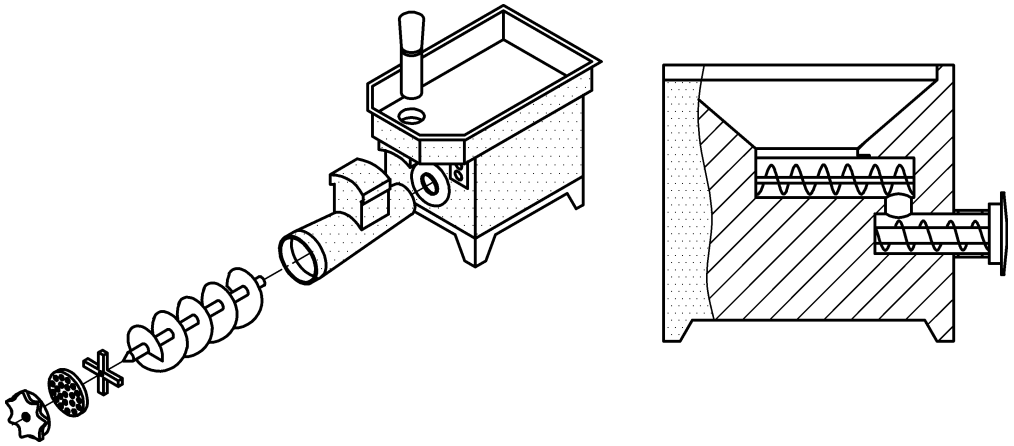
In the food industry the risk from cleaning is increased due to the need for operators to clean the danger zones so frequently, including removal of blockages, assisting product flow and cleaning between different products during a working day and gaining access to the machine parts for a thorough clean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

The instruction handbook shall warn of the possible adverse effects on operators from allergic reactions, irritation, toxic or microbiological to materials being processed or recommended for use for cleaning.

The instruction handbook shall give information relating to the passage of product in cooling mincers.

The design of the machine shall be in accordance with EN 1672-2:2005+A1:2009 and with the requirements laid down below as well as in accordance with Annex B.

For hygiene areas, see Figure 12.



Key

food area

splash area

non food area

Figure 12 — Hygiene areas on mincing machines

5.8.2 Food area

The following components are defined according to EN 1672-2:2005+A1:2009 and regarded as food area:

— feed tray, inside;

— feed intake, inside;

— restrictor plate;

— feed intake hopper, edge and inside;

— worm casing, inside;

— screw conveyor;

— worm;

— rough-cutter;

— blade;

— hole plate;

— lock nut;

— closed cover, inside;

— cover of lattice rods or perforated plate, inside and outside;

— electro-sensitive protective device;

— protective grid;

— closed protective hood, inside;

— protective hood of lattice rods or perforated plate, inside and outside;

— pusher.

5.8.3 Splash area

The following components are defined according to EN 1672-2:2005+A1:2009 and regarded as splash area:

— machine casing, outside;

— worm casing, outside;

— closed cover, outside;

— closed protective hood, outside;

— transport carriage.

5.8.4 Non-food area

The non-food area comprises all other surfaces:

— step;

— platform;

— lifting device;

— loading device;

— all other surfaces.

5.8.5 Surface conditions

The surface design shall comply with the requirements of EN 1672-2:2005+A1:2009.

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

5.8.6 Cleaning

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

Some components in the food area, e.g. hole plates, worm casing and screw conveyor, are not easy to clean. Specific information on cleaning, the adequate removal and disposal of cleaning and disinfecting agents shall be given in the instruction handbook (see 7.2).

6 Verification of safety requirements and/or 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 2 — Verification

Clause	Test method
5.2.2	Measurement of dimensions Verification of interlocking devices Measurement of stopping time Functional test with ON / OFF-switch Verification of electrical circuit diagram Visual inspection of perfect junction of feed tray and restrictor plate Visual inspection especially of interlocking devices with removable feed tray and restrictor plate
5.2.3	Measurement of dimensions Measurement of stopping time Functional test with cover, step, mechanical bar, protective grid, light barrier Verification of electrical circuit diagram Visual inspection
5.2.4	Measurement of dimensions Measurement of stopping time Functional test with ON-switch and protective hood Verification of electrical circuit diagram Visual inspection
5.2.5	Measurement of dimensions Functional test with ejector and extractor Visual inspection
5.2.6	Verification of the interlocking device Visual inspection
5.2.7	Measurement of dimensions Verification of closing time
5.2.8	Measurement of dimensions Verification of tilt safety Verification of lowering velocity
5.3	The tests according to EN 60204–1:2006, Clause 18, shall be carried out on each machine. Verification of IP-degree
5.4	Calculation or standing test on a plane with an inclination of 10° and application of a horizontal load. Functional test Visual inspection
5.5	Noise reduction
5.7	Measurement of forces Functional test Visual inspection
5.8	Measurement of surface roughness, radii and grooves Visual inspection especially of welding seams
7.1	Verification of data

7 Information for use

7.1 General

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

7.2 Operating instruction

The instruction handbook shall at least contain the following information:

a) Information relating to transport, installation and storage

- of the machine;
- of the hole plates and cross blades.

b) Information relating to commissioning

- mounting and installation conditions;
- for the loading device:
  1) where relevant, at test report detailing the static or dynamic tests carried out or
  2) for devices assembled at the users premises, the instructions for performing the static and dynamic tests necessary for the verification of the fitness for use.

c) Information relating to the machine

- description of the machine, guards and safety devices;
- description of hazards, e.g. on mincing machines with feed intake hoppers, which cannot be fully eliminated by safety devices, e.g. hazards at an open feed intake, generation of noise etc.
- the instruction handbook (and any sales literature describing the performances of the machine) shall contain the following information on airborne noise emissions, determined and declared in accordance with Annex B 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 fact 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).

  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.

- Information on the electrical installation (see EN 60204-1:2006, Clause 17) and the electrical circuit diagram or information to deposition (e.g. bag) internal the machine.

d) Information relating to normal operating conditions

- description of the use of operating elements which effect standstill of the machine;
- description of the use of the pusher;
- description of the use of the interlocked cover, step, mechanical bar, protective grid and the light barrier on the hopper edge;
- description of the use of the protective hood over the discharge outlet and their distance to the edge of the used trolley or container;
- description of routine verifications of protective and interlocking devices;
- information that the temperature shall be < + 7 °C on the feed intake and screw casing of cooling mincers with a hole plate diameter < 100 mm and that the product shall not be stored in the feed tray;
- information about the instructions for mincing frozen product, e.g. transportation of blocks of frozen product, and wearing of personal protective equipment, e.g. hearing protection above 85 dB(A), protective gloves;
- description of the requirement that plates with holes ≤ 8 mm are not allowed to be ground to less than 5 mm thickness.

e) Information relating to cleaning

- description of the
  - 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;
- description of rules of action during cleaning and disinfection operations and wearing of personal protective equipment;
- description of use of hoods over external electrical operating components when the machines are cleaned with pressurized water and how to clean the operating components protected by the hood during cleaning;
- description of removal of the set of cutting tools, worm and screw conveyor as well as wearing metal-fibre reinforced protective gloves;
- description of removal and installation of protective devices for cleaning purposes.

f) Information relating to maintenance

- description of execution and frequency of inspections and maintenance actions, taking account of rules of action;
- description of lubricants used;
- drawings which enable personnel to carry out these tasks;
- the specifications of the spare parts to be used, when these affect the health and safety of operators;
- circuit diagrams.

g) Operator training

Operators should be trained in the safe use and cleaning of mincing machines and with the precautions to be observed. Information should be given which specifies the elements 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

Mincing machines shall be marked permanently and legibly with at least the following information on its rating plate:

- the business name and full address of the manufacturer and, where applicable, his authorized representative;
- designation of the machinery;
- designation of series or type;
- serial number;
- mandatory marking[2)];
- the year of construction, that is the year in which the manufacturing process is completed;
- rating information, including supply voltage and frequency, power rating.

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)

Noise test code for mincing machines (grade 2)

A.1 Emission sound pressure level determination

The A-weighted emission sound pressure level at the workstation shall be determined according to EN ISO 11204:2010, following the requirements for grade 2.

Because there is no specific work station for the operator, the measurement shall be done in a distance of 0,5 m behind the discharge in the axis of the discharge opening. The microphone shall be located at this position in a height of 1,60 m above the ground and directed towards the machine.

If it is required to determine the sound power level of a mincing machine, EN ISO 3744 should be applied. The parallelepiped measurement surface should then be chosen.

A.2 Installation and mounting conditions

A table-top mincing machine to be tested shall be placed on the test table described in EN ISO 11204:2010, Annex E.

All the other mincing machines shall be installed on a reflecting floor for the test. The test field shall meet the requirements of EN ISO 11204:2010, 5.6, for grade 2 measurements.

A.3 Operating conditions

The measurement of noise emission of the machine is done at maximum speed under no load.

A.4 Measurement

The machine shall be run-in for a period of 5 min (warm-up time) before starting the measurement. The measurement instruments shall be in compliance with Clause 5 and EN ISO 11204:2010, 10.2.1.

The measuring time shall be at least 15 s.

A.5 Information to be recorded

The information to be recorded shall comply with EN ISO 11204:2010, Clause 12.

All deviations from noise test code and from EN ISO 11204:2010 shall be documented together with the technical justification for these deviations.

A.6 Information to be reported

The information to be reported shall comply with EN ISO 11204:2010, Clause 13.

As a minimum, the following information shall be included:

— reference to EN ISO 11204:2010;

— description of the operation and installation conditions during the measurement;

— location of the microphone position;

— the determined A-weighted emission sound pressure level;

— confirmation that all requirements of this noise test code have been fulfilled, or, if this is not the case, any unfulfilled requirements shall be identified.

A.7 Declaration and verification of the noise emission values

The noise emission value shall be declared according to the two number declaration of EN ISO 4871 thus declaring the emission sound pressure level L_{pA} at the workstation resp. at the specified location and uncertainty K_{pA}. K_{pA} is assumed to be 2,5 dB.

The noise emission value shall be rounded to the nearest decibel.

The noise emission declaration shall explicitly state that the emission values have been measured according to the specification of this noise test code as well as to EN ISO 11204:2010.

If this is not the case, it shall be explicitly mentioned which deviation with regard to EN ISO 11204:2010 exists.

The verification shall be carried out according to EN ISO 4871 and under the same mounting, installation and operating conditions as those which were applied to the original determination of the noise emission values.

NOTE Additional noise emission values can be indicated in the declaration.

Annex B
(normative)

Design principles to ensure cleanability of mincing machines

B.1 Definition

For the purpose of this annex, the following definitions shall apply:

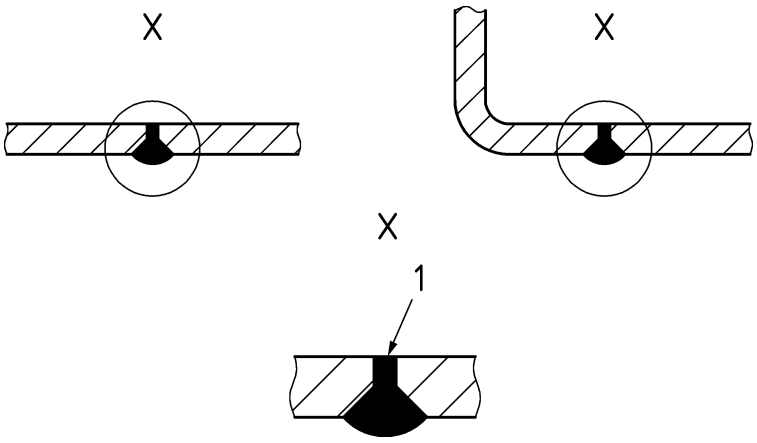
B.1.1 Food area: Area comprising surfaces which will come into contact with foodstuff; the food area also comprises those surfaces with which the foodstuff may come into contact under normal operating conditions and returns into the main product stream (see Figure 12).

B.1.2 Splash area: Area comprising surfaces on which part of the foodstuff may splash or flow along under normal operating conditions and does not return into the main product stream (see Figure 12).

B.1.3 Non-food area: All other areas not specified above (see Figure 12).

B.1.4 Joined surfaces: Surfaces should be joined such that product particles cannot be trapped, can be easily removed and do not cause a contamination hazard (see Figure B.1).

B.1.5 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 pressurized water (see Figure B.1).



Key

1 smooth surfaces

Figure B.1 — Smooth surfaces — Food area

B.2 Materials

B.2.1 General

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

B.2.2 Type of materials

B.2.2.1 Materials for food area

All valid general and -related to specific materials, e.g. plastics- specific legal requirements for materials and articles in contact with food shall be met (see EN 1672-2:2005+A1:2009, 5.3.1).

B.2.2.2 Materials for splash area

See EN 1672-2:2005+A1:2009, 5.3.2.

B.2.2.3 Non-food area

See EN 1672-2:2005+A1:2009, 5.3.3.

B.3 Design

B.3.1 General

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

B.3.2 Food area

B.3.2.1 The surfaces in the food area shall be smooth and free of depressions (see Figure B.1).

B.3.2.2 **Inside corners**: The angle formed by the intersection of two surfaces shall be ≥ 90° and have a radius of ≥ 3 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. welding seam) or economic feasibility (see Figure B.2).

Key

a radius machining operation, bent blade

b radius welding seam

Figure B.2 — Angles and radii in food area

Parts of machines, e.g. hole plates, blades conveyors can have recesses, grooves and corners with smaller radii due to product manufacturing necessities. The parts should be easy to clean.

A corner with an angle of ≥ 135° without a radius is permissible. The distance between two edges shall be ≥ 8,0 mm (see Figure B.3).

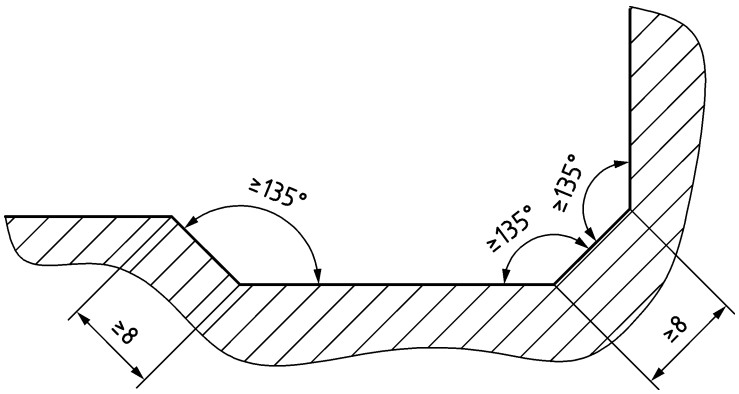
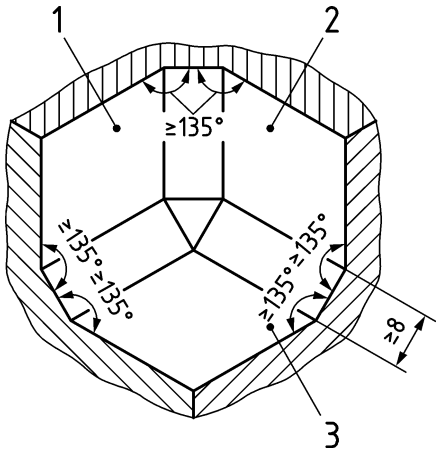


Figure B.3 — Angles in food area

Should a corner be formed by the intersection of three planes, then the corners formed shall have angles of ≥ 90° and radii of ≥ 6 mm, also corners with an angle of ≥ 135° are permitted without a radius (see Figure B.4).



Key

1 surfaces a

2 surfaces b

3 surfaces c

Figure B.4 — Adjoining surfaces in food area

B.3.2.3 **Grooves** may be used if the inner radius is ≥ 3 mm and the depth < 0,7 times the radius.

B.3.2.4 **Joints and seams** shall be welded or sealed and as smooth as the connected surfaces (see Figure B.1).

B.3.2.5 **The surface roughness** shall be Rz ≤ 25 µm according to EN ISO 4287. In those areas where it is technically possible Rz ≤ 16 µm should be selected.

B.3.3 Splash area

B.3.3.1 Surfaces shall be smooth (see Figure B.1).

B.3.3.2 Inside corners: The angle formed by the intersection of two surfaces shall be ≥ 80° and have a radius ≥ 3 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 mm. No requirements apply to the radius for the joining points of the third surface.

Angles ≥ 110° without radii are admissible (see Figure B.4).

B.3.3.3 Grooves may be used if the inner radius is ≥ 3 mm and the depth < 1,0 times the radius.

B.3.3.4 Openings are permissible if they go right through and have a diameter ≥ 16 mm. Spaces are allowed in the case, that the space has a minimal width of 16 mm, the depth is not more than 16 mm and the space is open.

B.3.3.5 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. For information see EN 1672-2:2005+A1:2009, Annex B.

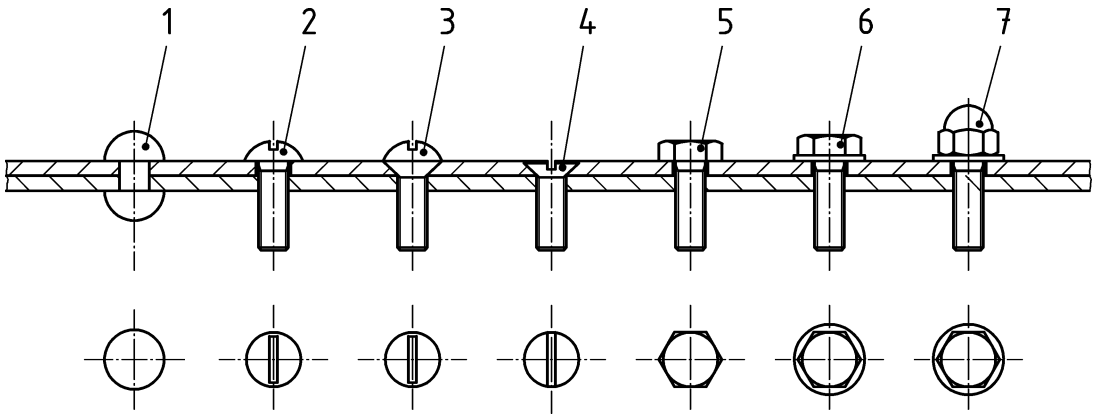
B.3.3.6 Fastening methods: Screws and rivets with low profile heads and of the types shown in Figure B.5 may be used only when other fastening methods are impracticable and they are easy to clean (see Figure B.5).

The following types of screws shall not be used:

— cross head recessed screws,

— hexagon socket head cap screws,

— screws with a diameter < 3 mm.



Key

1 round head

2 slotted oval head

3 slotted raised countersunk head

4 slotted countersunk head

5 hexagon head

6 hexagon head with flange

7 hex domed head

Figure B.5 — Admissible fasteners — Head profiles

B.3.3.7 The surface roughness shall comply with the requirements of B.3.2.5.

B.3.4 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.

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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