BS EN 15467:2014

BSI Standards Publication

Food processing machinery — Fish heading and filleting machines — Safety and hygiene requirements

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National foreword

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

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

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

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Nahrungsmittelmaschinen - Fischköpf- und -filetiermaschinen - Sicherheits- und Hygieneanforderungen

This European Standard was approved by CEN on 25 October 2014.

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Foreword

This document (EN 15467:2014) has been prepared by Technical Committee CEN/TC 153 “Machinery intended for use with foodstuffs and feed”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2015 and conflicting national standards shall be withdrawn at the latest by June 2015.

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

This document 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.

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

Introduction

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

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

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

1 Scope

This European Standard specifies the safety and hygiene requirements for the design and construction of automatic fish heading and fish filleting machines, and using knives.

This European Standard applies to machinery and equipment for the heading and filleting of fish in the fish processing industry. This European Standard deals with all significant hazards, hazardous situations, and events relevant to fish heading and filleting machines when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4). It deals with the hazards during the following phases of the intended use: assembly and installation, commissioning, setting and adjusting, operation, cleaning, fault finding, and maintenance.

When drawing up this European Standard, the following assumptions were made:

— only trained adult persons operate the machines;

— the machines are used in workplaces with an illumination level that can be reasonably expected in such places.

This European Standard is not applicable to fish heading and filleting machines that are manufactured before the date of its publication as an EN.

2 Normative references

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

EN 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 614-1:2006+A1:2009, *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 1037, *Safety of machinery - Prevention of unexpected start-up*

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*

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

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

EN 61496-1, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1)*

EN ISO 3744, *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)*

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 4414:2010)*

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 13732-3, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 3: Cold surfaces (ISO 13732-3)*

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

EN ISO 13850, *Safety of machinery - Emergency stop - Principles for design (ISO 13850:2006)*

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

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)*

EN ISO 14122-1, *Safety of machinery - Permanent means of access to machinery - Part 1: Choice of fixed means of access between two levels (ISO 14122-1)*

EN ISO 14122-2:2001, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2001)* [1)]

EN ISO 14122-3, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3)*

EN ISO 14122-4, *Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders (ISO 14122-4)*

1) This document is impacted by the amendment EN ISO 14122-2:2001/A1:2010.

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 General

3.1.1
filleting
process consisting of the removal of spine/spinal cord and/or collarbones from fish

3.1.2
splitting
cutting of fish into fillets with the spine on one of the filets, or the spine divided on both fillets

3.1.3
heading
de-heading process includes V-cutting, flat-cutting, round-cutting, and guillotine-cutting

3.1.4
nobbing
cutting off the head and pulling out the intestines

3.1.5
gutting
removal of the intestines from fish

3.1.6
in-feed
part of the machine where the product is placed and subsequently fed to the machine

3.1.7
knife
cutting tool with a sharp firm or corrugated cutting edge, intended for cutting of meat, bone and similar parts of a fish

Note 1 to entry: The knife may be:

– stationary,

– reciprocating,

– rotating circular,

– or an endless blade.

3.1.8
knife-holder (blade removing device)
device to make the knife safe to grasp during mounting and dismounting

Note 1 to entry: The knife-holder may be an integrated part of the knife or detachable.

3.1.9
knife-edge guard
device guarding the knife-edge during the mounting and dismounting of the knife

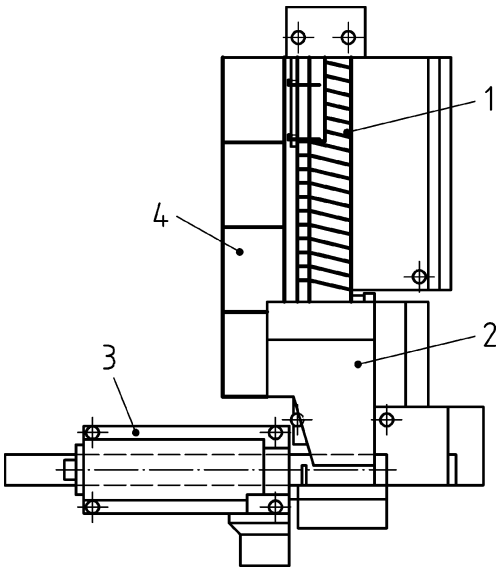
Note 1 to entry: A knife-edge guard may be a detachable or an integral part of the machine.

3.1.10
knife-carrier
device that protects the operator and guards the knife during transport and storage

3.1.11
processing
action that covers one or more of the following terms: filleting, splitting, heading, nobbing, gutting and similar handling

3.2
tray in-feed machine
processing machine usually with one or two endless chains mounted with fixed trays transporting and positioning the fish through the processing

Note 1 to entry: The fish may be placed manually or automatically in the fixed trays.



Key

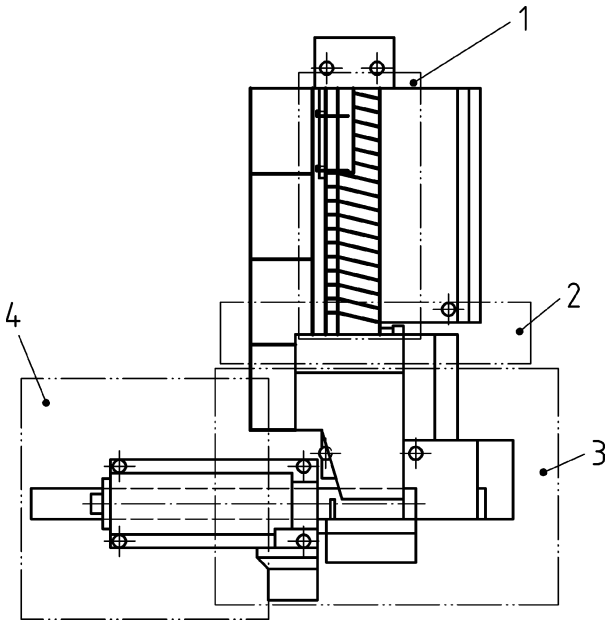
1 one or two chains with fixed trays

2 processing unit (de-heading, filleting, nobbing, gutting, etc.)

3 transfer or discharge

4 operator's platform

a) Example of a tray in-feed machine



Key

1 in-feed area: The area where the fish is placed in the tray, either manual or by a feeding machine

2 entrance to processing area: The area where the tray-chain and fish moves into the processing area

3 processing area

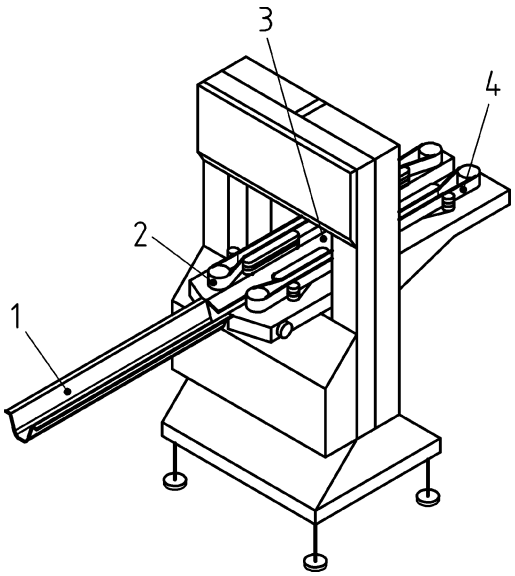
4 transfer and/or discharge area: The area where the processed fish and the offal leaves the machine

b) Tray-fed machine – Hazard areas

Figure 1 — Tray in-feed machine

3.3
belt in-feed machine
processing machine, usually with two parallel endless belts

Note 1 to entry: The fish is placed between the belts and is fed to the machine.



Key

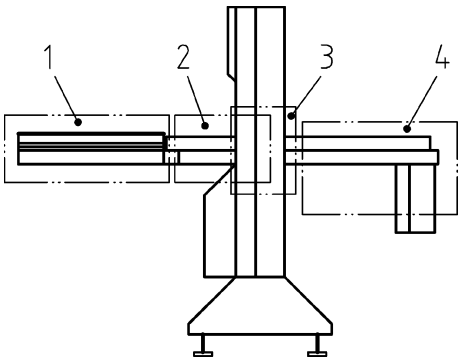
1 in-fed slide

2 parallel belts

3 processing area

4 transfer or discharge end

a) Example of a belt-fed machine



Key

1 in-feed area: the area where the fish manually is placed between the feeding belts

2 entrance to processing area: the area where the feeding belts and fish moves into the processing area

3 processing area

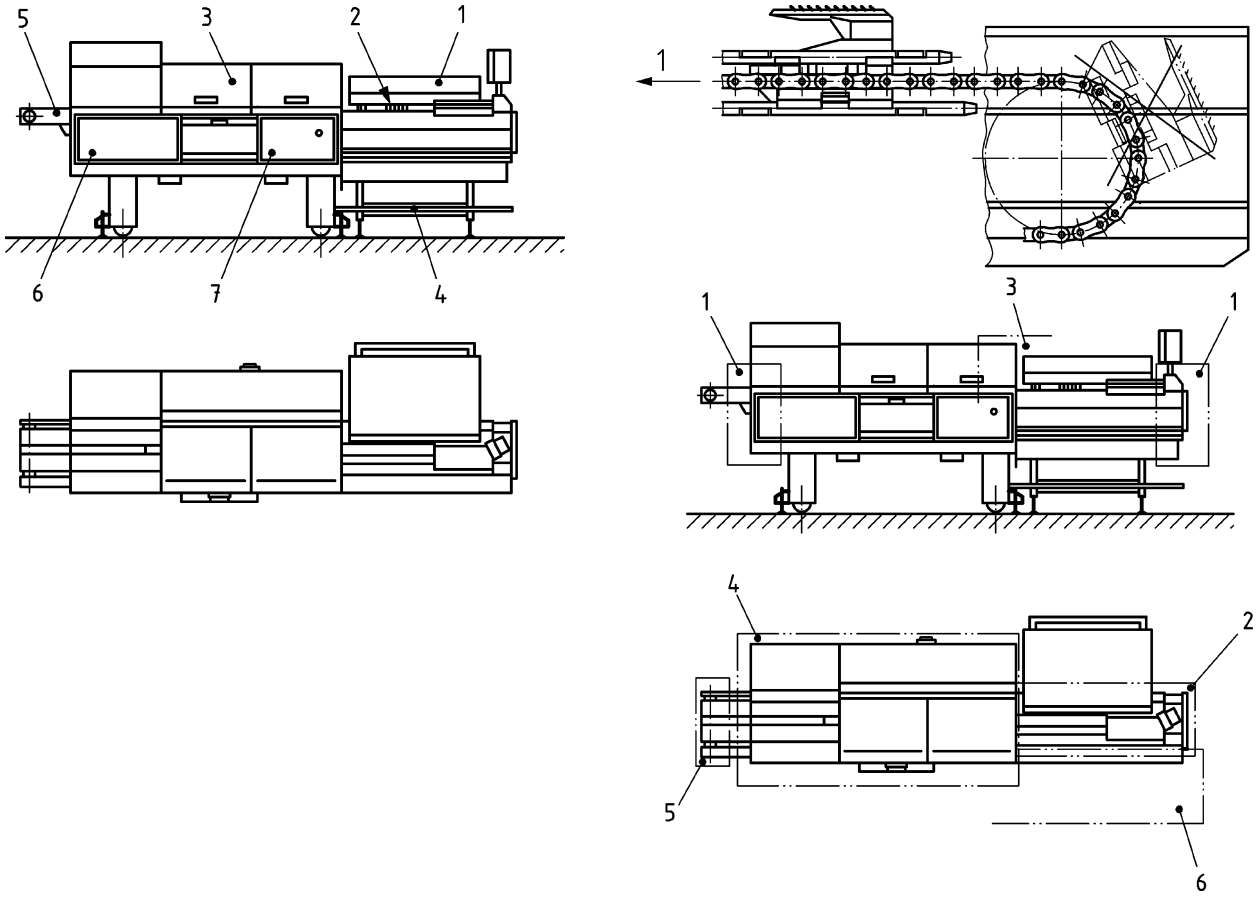
4 transfer and/or discharge area: the area where the processed fish and the offal leaves the machine

b) Belt in-feed machines – Hazard areas shown without guards

Figure 2 — Belt in-feed machine

3.4
saddle type machines
machine comprising an endless chain of saddles

Note 1 to entry: The saddles are used to transport the fish through the machine.



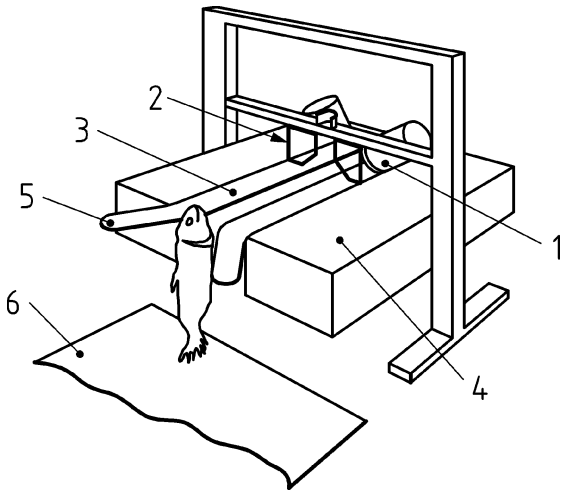
Key		Key	
1	tray for fish to be processed	1	saddle turning area: the area where the chain with saddles moves up to the feeding area or downward for return
2	handling unit, chain with moving saddles	2	in-feed area: the area where the fish manually is placed on a saddle
3	processing unit (measuring, positioning, filleting, scraping, etc.)	3	entrance to processing area: the area where the feeding belts and fish move into the processing area
4	operators platform	4	processing area
5	discharge unit (end of chain with moving saddles)	5	transfer discharge area: the area where the product is delivered to further operations and the saddles turn downwards and return to the saddle turning area 1
6	machine frame	6	operator's position
7	discharge unit for offal		

a) Example of a saddle type machine **b) Saddle type machines – Hazard areas**

Figure 3 — Saddle type machines

3.5
header machines
a machine for de-heading of fish

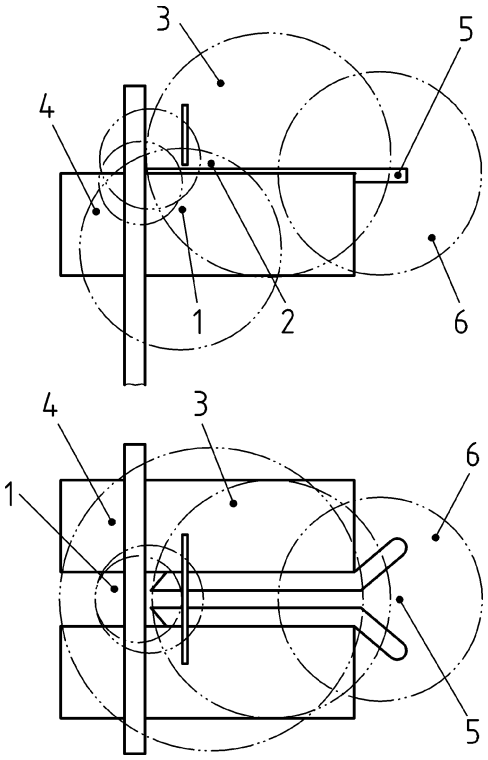
Note 1 to entry: The fish is manually positioned between feed belts, which hold and move the fish through a cutting device.



Key

1 cutting device
2 a trip device
3 feed belt(s)
4 table and cover for transmissions
5 guide plate(s)
6 operators position

a) Example of a heading machine



Key

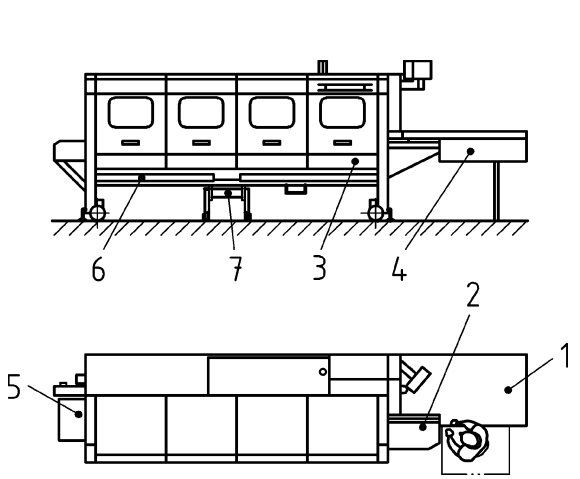
1 knife area: the area where the rotating knives and stationary knifes are situated
2 processing area
3 in-feed area: the area where the fish is moved forwards by the fed belt. the in-feed area starts at the fish insert opening and ends at the knives
4 transmission area: gears, belt drives, shafts etc.
5 fish insert area: the opening where the fish manually is positioned to the in-feed area
6 operator's workplace: the area in front of the header, where the operator stands for normal operation

b) Header – Hazard areas

Figure 4 — Header

3.6
tail clamp machine
a processing machine where the fish is placed by the tail in a clamp designed to draw the fish through the machine

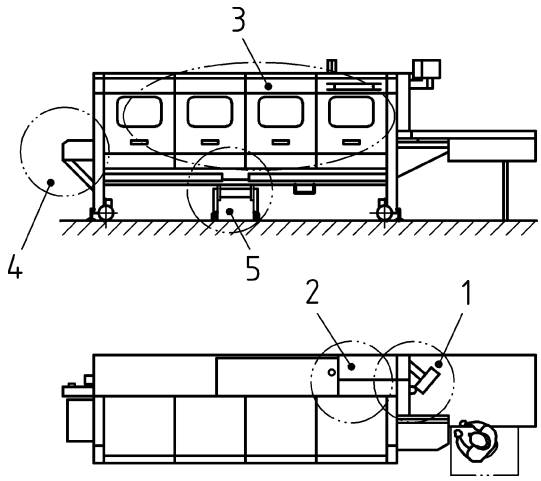
Note 1 to entry: Tail clamp machine may have the following elements:



Key

1 tray for fishes to be processed
2 feeding area, for manual positioning of the fish
3 processing unit (positioning, measuring, cutting, cleaning)
4 operator's place
5 discharge unit
6 machine frame
7 discharge for offal

a) Example of a tail clamp machine



Key

1 in-feed area: the area where the fish-tail is positioned in the clamps
2 entrance to processing area. the area where the feeding belts and fish moves into the processing area
3 processing area: the area where measuring, positioning, cutting, scraping etc. takes place
4 discharge area
5 discharge area for offal

b) Tail-clamp machines – Hazard areas

Figure 5 — Tail clamp machine

4 List of significant hazards

4.1 General

Clause 4 contains all the significant hazards, hazardous situations and events, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

4.2 Tray in-feed machines – Specific mechanical hazards

4.2.1 In-feed area

— Entanglement, drawing in or trapping hazard by moving trays;

— crushing or shearing hazard between two trays.

4.2.2 Entrance to processing area

— Drawing-in or trapping hazard by the moving trays.

4.2.3 Processing area

— Cutting, shearing or crushing hazard by rotating knives, rotating wheels, etc.

4.2.4 Transfer or discharge area

— Crushing and drawing-in hazard between two trays, belt drive or transport chain;

— stabbing or puncture hazard by belts and transport chains with sharp nails;

— cutting hazard by knives.

4.3 Belt in-feed machines – specific mechanical hazards

4.3.1 In-feed area

— Drawing-in hazard between belts and pulleys and belt supports.

4.3.2 Entrance to processing area

— Drawing-in hazard by moving belts.

4.3.3 Processing area

— Cutting hazard during processing;

— cutting hazard at cleaning and replacement of knives;

— drawing-in hazard between a belt and its supports.

4.3.4 Transfer and discharge area

— Drawing-in hazard between a belt and driving wheel, between belt and supports, and between two belts.

4.4 Saddle filleting machines – specific mechanical hazards

4.4.1 Saddle turning area

— Drawing-in hazard by the moving saddles;

— crushing hazard between a saddle and machine parts, and between two closing chain/saddle parts.

4.4.2 In-feed area

— Hazards generated by unhealthy body postures.

4.4.3 Entrance to cutting area

— Drawing-in hazard by a saddle;

— squeezing hazard between a saddle and fixed machine parts.

4.4.4 Processing area

— Cutting, severing and crushing hazards by the rotating knives and wheels during processing;

— cutting hazard on knives during cleaning and replacement;

— puncture hazard by belts and chains with sharp nails;

— ejection of liquid and remains of meat.

4.4.5 Transfer/discharge area

— Drawing-in hazard by the moving saddles;

— shearing and crushing hazards by running belts and pulleys and chains;

— ejection of liquid and remains of meat;

— puncture hazard by sharp nails on belts and chains.

4.5 Heading machine – specific mechanical hazards

4.5.1 Knife area

— Cutting hazard by rotating knives, stationary knives, replacement of knives;

— entanglement and drawing-in hazard by rotating shafts.

4.5.2 Cutting area

— Cutting hazard by rotating and stationary knives.

4.5.3 In-feed area

— Drawing-in hazard by moving feeding belts;

— stabling/puncture hazard by spiked bets;

— crushing hazard by V-belt drives and chain drives.

4.5.4 Transmission area

— Crushing hazard by V-belt drives, gears and chain-drives;

— stabbing/puncture hazard by spiked belts.

4.5.5 Fish insert area

— Drawing-in hazard by moving feeding belts;

— stabbing/puncture hazard by spiked belts.

4.5.6 Operator's workplace

— Slip and fall hazard by slippery ground;

— hazards generated by unhealthy body postures.

4.6 Tail clamp machines – specific mechanical hazards

4.6.1 In-feed area

— Crushing hazard by the moving table.

4.6.2 Entrance to processing area

— Drawing-in hazard by the tail clamps.

4.6.3 Processing area

— Cutting hazard by rotating knives;

— entanglement and drawing-in hazard by running chains, rotating wheels and moving tools.

4.6.4 Discharge area

— Drawing-in hazard between belt and rotating roll;

— crushing between belt and support, and between fish and cover.

4.6.5 Discharge area for offal

— Impact hazard by frame and cover during cleaning.

4.7 Electric hazards

— Electric hazard from direct or indirect contact with live electric parts.

4.8 Hazard generated by noise

— Heading and filleting machines may generate noise, which may result in tinnitus, permanent loss of hearing, stress.

4.9 Hazards from non-compliance with ergonomic principles

— Unhealthy posture or excessive physical effort;

— inadequate consideration of human anatomy of hand/arm or foot/leg during machine design;

— thermal hazards caused by (low) surface temperature of the machine.

4.10 Hazards from non-compliance with hygienic principles

— Microbiological causes: hazard of damage to health of the consumer from entrapped items originating from raw materials, machine parts or other sources causing harm to consumer (food poisoning);

— chemical causes: contamination of foodstuff through residues of cleaning and disinfecting agents causing harm to consumer;

— microbiological effects on the operator by contact with contaminated parts of the machine or product.

4.11 Hazards from loss of stability

— Hazards by impact or crushing if the machine topples over.

4.12 Fall hazards

— Fall from an elevated working platform;

— slip hazard from wet or contaminated floor.

4.13 Failure of the control system

Hazard due to failure or malfunction of the control system.

4.14 Failure of the power supply

— Hazards generated by unexpected dangerous movements.

4.15 Hydraulic and pneumatic hazards

— Hazards generated by fluid ejection, hose breakage.

4.16 Hazards during interventions

— Hazards generated by intervention on a machine that is not in a safe state.

4.17 List of significant hazards

Table 1 — List of significant hazards

Clause/subclause with hazard	Location or cause	Clause/subclause with requirements
4.2.1	In-feed area	5.3.1,5.3.2
4.2.2	Entrance to processing area	5.3.3
4.2.3	Processing area	5.3.4
4.2.4	Transfer or discharge area	5.3.5
4.3.1	In-feed area	5.4.2
4.3.2	Entrance to processing area	5.4.3
4.3.3	Processing area	5.4.4
4.3.4	Transfer and discharge area	5.4.5
4.4.1	Saddle turning area	5.5.1
4.4.2	In-feed area	5.5.2
4.4.3	Entrance to cutting area	5.5.3
4.4.4	Processing area	5.5.4
4.4.5	Transfer/discharge area	5.5.5
4.5.1	Knife area	5.6.1
4.5.2	Cutting area	5.6.2
4.5.3	In-feed area	5.6.3
4.5.4	Transmission area	5.6.4
4.5.5	Fish insert area	5.6.5
4.5.6	Operators workplace	5.10, 5.12
4.6.1	In-feed area	5.7.1
4.6.2	Entrance to processing area	5.7.2
4.6.3	Processing area	5.7.2
4.6.4	Discharge area	5.7.3
4.6.5	Discharge area for offal	5.7.3
4.7	Electric hazards	5.8
4.8	Hazard generated by noise	5.9
4.9	Hazards from non-compliance with ergonomic principles	5.10
4.10	Hazards from non-compliance with hygienic principles	5.11
4.11	Hazards from loss of stability	5.12
4.12	Fall hazards	5.12
4.13	Failure of the control system	
4.14	Failure of the power supply	
4.15	Hydraulic and pneumatic hazards	
4.16	Hazards during interventions	

5 Safety requirements and / or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of Clause 5. 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 European Standard.

5.2 General requirements

5.2.1 General

Access to moving parts and other danger points shall be prevented by guards or protective devices. Safety related parts of the control system shall offer a performance level that is proportional to the relevant risk level. The design of the machine and its control system shall ensure safety during all phases of its use, including operation, cleaning, maintenance, and fault finding. Specific operation modes shall be provided if necessary. Provisions shall be made for the safe handling of knives during mounting, dismounting and transport.

5.2.2 Guards

As far as not stated otherwise in the specific requirements of 5.3 to 5.7, guards for preventing access to moving parts and other danger points shall be fixed or moving guards selected in accordance with EN 953:1997+A1:2009, Clause 6. Guards shall be movable and interlocking if they have to be opened frequently (i.e. more than once per working day). Guards shall be designed and constructed in accordance with EN 953:1997+A1:2009, Clause 5. Safety distances shall be in accordance with EN ISO 13857:2008, Clause 4, while for distance guards, EN ISO 13857:2008, Table 1, shall be used. The fixing means of fixed guards shall remain attached to the guards or to the machinery when the guards are removed. Movable guards shall be interlocking in accordance with EN ISO 14119. Movable guards preventing access to moving parts directly involved in the process shall be interlocking with guard locking if the stopping time is such that without locking the operator can reach the moving parts before they are at stand-still. Guard locking shall comply with EN ISO 14119:2013, 5.7.

5.2.3 Protective devices

As far as not stated otherwise in the specific requirements of 5.3 to 5.7, protective devices for preventing access to moving parts and other danger points shall comply with the relevant standards. Pressure sensitive edges or trip bars shall be in accordance with the requirements of EN ISO 13856-2 for Category 1 or higher.

Opto-electronic protective devices shall be in accordance with the requirements of EN 61496-1 for Category 2 or higher. Protective devices shall be positioned in accordance with EN ISO 13855.

5.2.4 Control systems

5.2.4.1 General

Control systems shall comply with the following general requirements:

— for electrical system: 5.2.2 of this European Standard and EN 60204-1:2006, Clause 9 ;

— for hydraulic systems: the requirements of EN ISO 4413;

— for pneumatic systems: the requirements of EN ISO 4414.

5.2.4.2 Mode selection

Where, for setting, teaching, process changeover, fault-finding, cleaning or maintenance of the machine, a guard has to be displaced or removed and/or a protective device has to be disabled, and where it is necessary for the purpose of these operations for the machinery or part of the machinery to be put in operation, safety of the operator shall be achieved using a specific control mode in accordance with EN ISO 12100:2010, 6.2.11.9.

Machines designed for several operating modes or which can be operated by means of various safety devices operating at different levels shall be equipped with mode selection devices in accordance with EN ISO 12100:2010, 6.2.11.10. A provision shall be made for restricting the use of the mode selection devices or the use of some of the modes to designated operators by the use of a lock or an alternative means such as an access code. The selection of a particular mode shall not initiate operation. Separate actuation by the operator shall be required.

5.2.4.3 Safety-related parts of the control system

Unless otherwise stated in other clauses of this European Standard, parts of the control system related to safety functions shall comply with at least performance level “c” of EN ISO 13849-1:2008.

When, for short-term interventions, complete supply disconnection is not possible (see also 5.2.5), the safety-related pulse blocking, monitoring or similar control functions for preventing unexpected start-up are achieved with electrical or electronic control systems, these shall comply with at least performance level “d” of EN ISO 13849-1:2008. The manufacturer shall ensure that the instruction handbook emphasises that these methods of preventing the unexpected start-up of drives are only suitable for short duration machine interventions and are not a substitute for safe isolation procedures (see Clause 7).

5.2.4.4 Emergency stop

The machines shall have at least one emergency stopping device, stopping all dangerous movements as fast as possible. The manufacturer shall carry out a risk assessment for defining the need for complementary emergency stopping devices and their location (e.g. at the operator's station(s) and/or at out-feed/in-feed sides) and for defining possible additional safety measures. The parts of the control system related to the emergency stopping shall be not less than performance level “c” in accordance with EN ISO 13849-1:2008.

The emergency stop shall meet the requirements of EN ISO 13850. Electrical emergency stops shall comply with EN 60204-1:2006, 9.2.5.4.2.

5.2.4.5 Pneumatic and hydraulic systems

Equipment of hydraulic and pneumatic systems shall satisfy EN ISO 12100:2010, 6.2.10, EN ISO 4413 and EN ISO 4414.

5.2.5 Safety requirements related to electromagnetic phenomena

The machines shall have sufficient immunity in relation with electromagnetic disturbances to enable them to operate safely as intended and not fail to danger when exposed to the levels and types of disturbances for the intended use of the machine.

The manufacturer shall select or design, install and wire the equipment and sub-assemblies taking account of the recommendations of the suppliers of the sub-assemblies (see EN 61000-6-1 or EN 61000-6-2).

5.2.6 Failure of the power supply

Appropriate provisions shall be provided, taking into account the requirements of EN 1037, EN ISO 4413, EN ISO 4414 and EN 60204-1:2006, against all hazards related to failure of the power supply, including

irregularities, unexpected reconnection after interruption of the power supply or when the control circuit has been switched off.

After above mention failure, start-up of the machine should only be possible by delivered action.

5.2.7 Handling of the machines and machine parts

Machines and their auxiliary equipment shall be constructed and equipped in such a manner that they can be safely transported. The requirement is met by providing points for fitting the transport means and a machine frame design which allows the use of a fork lift truck or a roller truck. Any special equipment or procedure required for safe transportation or installation of the machine shall be supplied with the machine, and described in the instructions for use.

5.2.8 Supply disconnecting devices

Machines shall have lockable devices for isolating them from all their energy sources. Electrical devices shall comply with EN 60204-1:2006, 5.3. Hydraulic devices shall comply with EN ISO 4413 and pneumatic devices with EN ISO 4414.

5.2.9 Knife handling

5.2.9.1 Knife-edge guard

When opening the guard for the knife/processing area (see 5.3 to 5.7) direct unintentional contact to the knife-edge shall be prevented by a knife-edge guard or an equivalent protection shall be achieved by the design of the machine elements and the positioning of the knife.

If required for technical reasons the knife-edge guard can be detachable but the design shall consider measures for preventing as much as possible operating without the guard (measures to be completed as necessary by the information for use).

Knife-edge guards shall, if detachable, be easy to attach and detach and shall maintain their guarding ability when hit or pressed by a hand or an arm.

5.2.9.2 Knife-holder

It shall be possible to handle the knife during mounting and dismounting without risk of contact with the knife-edge.

This is achieved:

— when the knife is shaped to make a firm grip possible on the side opposite to the knife-edge; or

— when the machine has a loose holding device capable of holding the knife; or

— when the machine has a knife-holder, which can be fastened to the knife by means of screws, magnet or a similar reliable solution, e.g. a pair of pliers which retain its grasp on the knife.

Handles and grips for holding the knife shall be adapted to the weight and form of the knife. Form and position of the handles and grips shall allow holding the knife with the knife-edge directed away from the person.

5.2.9.3 Knife-carrier

Each machine shall be provided with a knife-carrier for storing and transportation of the knife/knives. The knife-carrier shall protect persons against contact with the knife-edge during transport and storing. This does not apply to long band knives > 1 500 mm.

5.3 Specific mechanical requirements for tray in-feed machines

5.3.1 Moving trays

Moving trays shall have no sharp angles or sharp edges.

5.3.2 Danger points in the tray turning zone

In the tray-turning zone all danger points of the moving chain of trays shall be avoided.

The hazards are considered to be avoided when:

— the maximum opening of the gap is 4 mm between fixed and moveable parts; or

— danger points are safeguarded in accordance with 5.2.

5.3.3 Entrance to the processing area

Means of safeguarding for drawing-in shall be provided, e.g.:

— a trip device stopping the movement before any dangerous parts or areas can be reached; or

— restricted size of opening to the processing area.

5.3.4 Processing area

Access to the processing area shall be prevented. This can be achieved by the use of fixed guards, movable interlocked guards, a combination of both or the use of interlocking guard with guard locking.

The cutting tool shall come to a standstill within 2 s after the interlocking switch of the movable guard has been actuated or the guard shall be an interlocking guard with guard locking. The interlocking device shall be activated before the guard is opened more than 50 mm.

5.3.5 Discharge or transfer area

Shearing points and drawing-in points at the tray turning shall be guarded in accordance with 5.2.

The hazards are considered to be avoided when:

— the maximum opening of the gap is 4 mm; or

— danger points are safeguarded with guards or protective devices.

5.4 Specific mechanical requirements for belt in-feed machines

5.4.1 General requirements

Transmissions, drawing-in between belt and driving wheel, drawing-in between belt and supports, drawing-in between belts shall be safeguarded in accordance with 5.2 by:

— a fixed guard;

— a movable interlocked guard if the stop time is less than 2 s; or

— a movable interlocked guard with guard locking.

5.4.2 Feeding area

Drawing-in risks in the feeding area shall be avoided by design or safeguarding in accordance with 5.2.2.

5.4.3 Entrance to the processing area

Means of safeguarding for drawing-in risks shall be provided, e.g.:

— a trip device stopping the movement before any dangerous parts or areas can be reached; or

— restricted size of opening to the processing area.

5.4.4 Processing area

Access to the processing area shall be prevented. This can be achieved by the use of fixed guards, movable interlocked guards, a combination of both or the use of interlocking guard with guard locking.

The cutting tool shall come to a standstill within 2 s after the interlocking switch of the guard has been actuated or the guard shall be an interlocking guard with guard locking. The interlocking device shall be activated before the guard is opened more than 50 mm.

5.4.5 Transfer and/or discharge area

Access to transmissions, driving wheel, drawing-in between belt and supports, drawing-in between belts, and other dangerous transmission parts shall be prevented by one or more of the following, in accordance with 5.2:

— a fixed guard;

— a moveable interlocked guard if the stop time is less than 2 s or a moveable interlocked guard with guard locking;

— a trip device, which stops the machine;

— a pressure-sensitive protective device;

— an electro-sensitive protective equipment.

Return rollers at the out-feed side of the belt, shall be designed in such a way that there is no drawing-in effect.

5.5 Specific mechanical requirements for saddle type machines

5.5.1 Saddle turning area

In the saddle turning areas, the drawing-in points and shearing points caused by the moving chain of saddles shall be avoided by design or safeguarded.

The hazards are considered to be safeguarded if:

— the minimum gaps of EN 349:1993+A1:2008, Table 1, are achieved; or

— drawing-in points are safeguarded by the use of nip guards directly at the drawing-in point. The remaining gap shall be max. 4 mm;

— guarding in compliance with EN ISO 13857:2008, Tables 2, 3 and 4; or

— photo-electric devices.

Moveable guards for adjusting or for cleaning purposes shall be interlocked.

5.5.2 Feeding area

Sharp angles, spikes and edges that may hook and draw in clothes, gloves or fingers shall be avoided by design or guarded in accordance with 5.2.

The operating instructions shall give warnings to the operator against wearing loose sleeves.

5.5.3 Entrance to processing area

The size of the in-feed and discharge openings into the processing area shall be in accordance with EN ISO 13857:2008, Table 3.

The in-feed opening into the processing area shall be safeguarded by a trip device or a similar automatic stopping device.

5.5.4 Processing area

The cutting tools and similar hazards shall be safeguarded by a guard covering the processing area from the in-feed opening to the discharge opening.

Movable guards shall be interlocked, and the cutting tool shall come to a standstill within 2 s after actuation of the interlocking switch of the guard. If the tool cannot come to a standstill within 2 s, the guard shall be interlocking guard with guard locking.

5.5.5 Transfer or discharge area

In the saddle turning area all drawing-in points and shearing points caused by the moving chain and saddles shall be avoided by design or safeguarded. This can be achieved by one or more of the following:

— a minimum gap of 50 mm is provided where there is a risk of fingers and hands being caught;

— a minimum gap of 120 mm is provided where there is a risk of an arm being caught;

— drawing-in points are safeguarded by the use of nip guards directly at the drawing-in points with a remaining gap of max. 4 mm;

— guards or photoelectric devices.

5.6 Specific mechanical requirements for heading machines

5.6.1 Knife area

The cutting edge of the knives shall be guarded against unintentional contact. This is achieved when all sections of the knife, which is not in use for the cutting, are guarded in accordance with 5.2.

5.6.2 Cutting area

The cutting section of the knives shall be covered by a self-closing guard or an automated guard that is only open when a fish approaches the cutting section of the knives. The guard shall, when closed, protect against unintentional contact.

The cutting section of the knives shall be positioned in a way that the operator is restricted to direct access to the cutting section of the knives.

This can be achieved by:

— a minimum of 500 mm horizontal distance between the knives and the operator, restricted by either the table or a barrier; and

— a trip device positioned minimum 100 mm horizontal distance from the knives with a maximum of 50 mm horizontal movement for activation.

NOTE The horizontal distance between the in-feed rails will vary from a minimum 50 mm and wider when a fish is fed. When a fish is passing the in-feed rails then the fish will perform a barrier restricting access to the knives.

5.6.3 In-feed area

A trip device in accordance with 5.2 shall prevent operator access to the drawing-in zone of the in-feed belts. The opening left for the passage for the fish shall be as small as possible.

The risk of punctures by spikes in the in-feed belts shall be reduced by:

— a minimum 25 mm distance between two opposite ends of the spikes;

— the end of the spikes situated at least 60 mm under the upper part of the in-feed rails;

— the clamping force between the two spiked belts is less than 40 N;

— the in-feed speed of the feed belts is 0,5 m/s or less;

— the height of the table over the in-feed rails is between 950 mm and 1050 mm over the operator's standing floor.

5.6.4 Transmission area

Transmission parts, e.g. belt drive, chain drive, gear, shall be guarded in accordance with 5.2.

5.6.5 Fish insert area

The guide-plates shall extend minimum 300 mm in front of the area with protruding spikes.

5.7 Specific mechanical requirements for tail clamp machines

5.7.1 Feeding area

The moving positioning tail table shall be designed without any squeezing points.

Access to the danger points of the chain with tail clamp support shall be prevented by the use of fixed or movable guards in accordance with 5.2.

5.7.2 Processing area

A trip device shall be positioned in front of the opening to the processing area. The trip device shall be positioned by the top and both sides of the in-feed opening.

The cutting tools and similar hazards shall be safeguarded by a guard covering the processing area from the in-feed opening to the discharge opening. At the in-feed side, the guard shall extend at least 500 mm before the cutting tools.

Movable guards shall be interlocked, and the cutting tool shall come to a standstill within 2 s after actuation of the interlocking switch of the guard. If the tool cannot come to a standstill within 2 s, the guard shall be interlocking guard with guard locking.

5.7.3 Discharge area

Access to transmissions, driving wheel, cutting tools, drawing-in between belt and supports, drawing-in between belts and other dangerous machine parts shall be prevented by one or more of the following, in accordance with 5.2:

— a fixed guard;

— a moveable interlocked guard if the stop time is less than 2 s, according to 5.2, or a moveable interlocked guard with guard locking;

— a trip device;

— a pressure-sensitive protective device;

— an electro-sensitive protective equipment.

Return rollers at the out-feed side of the belt shall be designed in such a way that there is no drawing-in effect.

5.8 Electric hazards

Electrical equipment of the machine shall comply with EN 60204-1:2006. Electrical enclosures shall comply with at least IP 65 according to EN 60529. For areas where high-pressurised water is used for the cleaning a higher IP-class can be required.

5.9 Noise reduction

Noise reduction shall be an integral part of the design process, thus taking into account measures at the 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.

5.10 Compliance with ergonomic principles

5.10.1 General

The machines shall be designed and constructed in accordance with the ergonomic principles of EN 614-1:2006+A1:2009.

In relation to the operator’s workspace, the height of the working platform shall be manually or mechanically adjustable to ensure a working posture for the hands between 950 mm and 1200 mm higher than the level of the platform.

If the operator is likely to lean against a surface with temperature below the threshold limits defined in EN ISO 13732-3, means of insulation shall be provided.

5.10.2 Heading machines

The guide plates of the in-feed rails shall diverge to allow for easy position of the fish in the opening.

5.11 Compliance with hygienic principles

The hygienic principles of machinery design are stated in EN 1672-2. For the application of EN 1672-2, the areas are defined as follows.

Food areas:

— in-feed and out-feed belts for product,

— processing area,

— out-feed area for product,

— discharge for product,

— in-feed area.

Splash areas:

— discharge area for offal,

— the outside of screens for processing areas.

Non-food area:

— any area not specified above.

Ejection of liquids and remains from the cutting process shall be avoided as far as possible.

The surface roughness shall be $R_z \leq 25$ µm. In those areas where it is technically possible $R_z < 16$ µm should *be selected.*

Where working platforms, gangways, stairs etc. pass over a food processing part of the machine a tray under the access way shall be provided to hinder spillage on the machine. The tray shall extend 200 mm or more to each side of the means of access.

5.12 Fall hazards

The standing surface which is a part of the machine shall have a durable slip-resistant surface according to EN ISO 14122-2:2001, Annex A. The surface shall enable the passage of liquids, offal, etc.

Stairs shall comply with EN ISO 14122-3. Working platforms shall meet the requirements of EN ISO 14122-1, EN ISO 14122-2, EN ISO 14122-3 and EN ISO 14122-4.

Platforms higher than 0,5 m shall have a bar behind the operator. The height of the bar shall be 900 mm to 1 000 mm over the standing level.

Means of access shall not create risks due to decreased distances to hazards.

6 Verification of safety requirements and/or measures

Clause 6 contains the methods for verification of the conformity of the machine with the requirements of Clause 5.

Criteria for acceptance are contained in Clause 5. The verification can be made as a visual (V), measurements (M), design verification (D) or functional test (FT), see Table 2.

Table 2 — Verification of safety requirements and/or measures

Clause	Test method	Clause	Test method	Clause	Test method
5.2.1	FT	5.3.5	M/V	5.7.2	FT/M
5.2.2	FT/M/D	5.4.1	V	5.7.3	V/FT
5.2.3	D/FT	5.4.2	V	5.8	D
5.2.4.1	D	5.4.3	M/FT	5.9	D/M
5.2.4.2	FT	5.4.4	FT/M	5.10	D/M
5.2.4.3	D	5.4.5	M/FT	5.11	V/M
5.2.4.4	D/FT	5.5.1	M/FT	5.12	D
5.2.6	D/FT	5.5.2	D/V		
5.2.7	D	5.5.3	M/FT		
5.2.8	D	5.5.4	FT/M		
5.2.9.1	D/FT	5.5.5	M/FT		
5.2.9.2	FT	5.6.1	FT		
5.2.9.3	V	5.6.2	M		
5.3.1	D	5.6.3	M		
5.3.2	M	5.6.4	V		
5.3.3	FT/M	5.6.5	V/M		
5.3.4	V/M	5.7.1	V		

7 Information for use

7.1 General

Information for use has to be provided according to EN ISO 12100:2010, 6.4, and the additional requirements formulated in Clause 7.

7.2 Signal and warning devices

The manufacturer shall provide signals and/or warning signs for the residual hazards of the machine. Warning signs shall comply with EN 61310-1.

7.3 Instruction handbook

7.3.1 General

An instruction handbook shall be provided in accordance with EN ISO 12100:2010, 6.4.5, containing the following specific elements.

7.3.2 Information for mounting and dismounting of the knife

Information shall be given for:

— the correct mounting and dismounting of the knife;

— the use of the knife-edge guard (if feasible);

— the positions for grips on the knife or the use of a knife-holder (if feasible);

— the use of a knife-carrier for transport and storage;

— hygienic cleaning of the knife/knives.

If the cleaning procedure presupposes the knives to be detached, information shall be given for the cleaning procedure.

The operator instructions shall state that no loose clothes shall be worn.

7.3.3 Information on assembling

Information on the correct assembling and positioning of the machine shall be given. If other supports are to be used, guidance shall be given. Information of risks due to hazards from gangways and near standing machinery shall be given.

7.3.4 Safety during interventions such as setting, troubleshooting and maintenance

Information shall be given concerning the precautions to be taken during interventions such as setting, troubleshooting and maintenance, which can be made with the machine at standstill. In principle, these precautions include at least the following main elements:

a) isolation of the machine from all energy sources using a supply disconnecting device;

b) measures against premature reconnection, e.g. by locking of the supply disconnecting device in “0”-position;

c) measures for dissipating all remaining or stored energy;

d) verification of the safe (“zero energy”) state of the machine.

If these precautions are not possible for technical reasons, the manufacturer shall define alternative measures and/or procedures.

7.3.5 Additional information

The specifications of the spare parts to be used when these affect the health and safety of operators.

7.4 Marking

The equipment shall be marked legibly and indelibly with at least the following particulars:

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

b) designation of the machinery;

c) mandatory marking[2)];

d) designation of series or type;

e) serial number, if any;

f) year of construction that is the year in which the manufacturing process is completed;

g) rating information.

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 fish filleting 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.

The measurement shall be taken at the normal operator position:

— height of 1,6 m above the floor;

— 1 m in front of the needle station of the machine with the microphone oriented towards the machine.

In case that the A-weighted emission sound pressure level exceeds 80 dB(A) or in any other reason which would require to determine the sound power level of a machine, EN ISO 3744 should be applied. The parallelepiped measurement surface should then be chosen.

A.2 Installation and mounting conditions

The machine to be tested shall be installed on a reflecting floor in a test field according to EN ISO 11204:2010, 6.2, and meet the requirements for grade 2 measurements.

A.3 Operating conditions

The measurement of the noise emission of the machine is taken 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 EN ISO 11204:2010, 10.2.1, section 5.

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 this 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 point of the microphone position;

— determined A-weighted emission sound pressure level at the workstation;

— 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 values shall be declared according to the dual number declaration of EN ISO 4871. Thus in cases where the emission sound pressure level L_{pA} exceeds 70 dB(A) at the workstation, its value and the uncertainty K_{pA} have to be declared. 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 value has been measured according to the specification of this noise test code as well as to EN ISO 11204:2010, grade 2.

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.

Additional noise emission values can be given in the declaration.

Annex ZA
(informative)

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

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

Bibliography

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

[2] EN 61000-6-2, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments*

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