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Stroji za predelavo hrane - Osnovni koncepti - 1. del: Varnostne zahteve

Food processing machinery - Basic concepts - Part 1: Safety requirements

Nahrungsmittelmaschinen - Allgemeine Gestaltungsleitsätze - Teil 1: Sicherheitsanforderungen

Machines pour les produits alimentaires - Notions fondamentales - Partie 1: Prescriptions relatives à la sécurité

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1672-1:2014) 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of an identical text or by endorsement, at the latest by April 2015 and conflicting national standards shall be withdrawn at the latest by April 2015.

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Introduction

Food processing machines are used extensively in Europe, in domestic, catering and industrial applications. They present many health and safety hazards and have the potential to cause serious injury.

At the time of publication of this European Standard there exist about 50 European C-standards for all kinds of food processing machinery. Yet, some food processing machines are so specific and their variety is so large that it is not possible to sufficiently cover all types by machine-specific standards. EN 1672-1 therefore addresses those food processing machines that are not covered by one of the machine-specific standards that are listed in Annex C.

The extent to which hazards are covered by this document is indicated in the Scope and Clause 4.

1 Scope

This European Standard deals with the significant hazards, hazardous situations and events relevant to commercial and industrial food processing machines as defined in Clause 3 when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This European Standard deals with the significant hazards, hazardous situations and events that occur during transport, assembly and installation, commissioning, setting, teaching, programming, process changeover, operation, cleaning, fault finding and maintenance.

This European Standard deals with those risks which occur commonly in food processing machines and for which common technical requirements can be set which can be applied at all (or most) machines which have that particular hazard.

Exclusions:

This European Standard is not applicable to the following machines:

— food processing machines intended for domestic use;

— food processing machines covered by the machine-specific standards listed in Annex C;

— packaging machines;

— machines used in the agricultural and animal rearing sectors.

This European Standard does not deal with the hygiene risks to the consumer of the food product handled in the food processing machine. These risks are dealt with in EN 1672-2:2005+A1:2009.

This European Standard is not applicable to food processing machines that were manufactured before the date of its publication as a European Standard.

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 574:1996+A1:2008, *Safety of machinery — Two-hand control devices — Functional aspects — Principles for design*

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

EN 619:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 620:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for fixed belt conveyors for bulk materials*

EN 626-1:1994+A1:2008, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

EN 894-1:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3:2000+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

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

EN 1037:1995+A1:2008, *Safety of machinery — Prevention of unexpected start-up*

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN 61310-3:2008, *Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators (IEC 61310-3:2007)*

EN 61496-1:2013, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2012)*

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

EN ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 7010:2012, *Graphical symbols — Safety colours and safety signs — Registered safety signs (ISO 7010:2011)*

EN ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

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 12001:2009, *Acoustics — Noise emitted by machinery and equipment — Rules for the drafting and presentation of a noise test code (ISO 12001:1996)*

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

EN ISO 13732-1:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13732-3:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces (ISO 13732-3:2005)*

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 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

EN ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

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 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

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

EN ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

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
food processing machine
machine used for the production of food

3.2
commercial or industrial food processing machine
food processing machine intended by the manufacturer to be used in a place of work

Note 1 to entry: Some machines of this type may also have a domestic use.

3.3
household appliance
food processing machine intended by the manufacturer for domestic use

3.4
food
substance intended to be orally consumed by either humans or animals

3.5
product
ingredient, component or material processed in a food processing machine to produce a food

3.6
cutting device
cutting tool with a sharp blunt or corrugated cutting edge, intended for cutting food

Note 1 to entry: The cutting device may be stationary, reciprocating, rotating or an endless blade.

3.7
cutting device holder
component designed to allow the cutting device to be held during mounting and dismounting

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

3.8
cutting device edge
device designed to guard the sharp edge of the cutting device during the mounting and dismounting of the cutting device or during other machine intervention

Note 1 to entry: A cutting device edge guard may be detachable or an integrated part of the machine.

3.9
cutting device carrier
component designed to protect the operator and the cutting device during transport and storage

4 List of significant hazards

4.1 General

This clause lists the wide range of hazards, hazardous situations and events that can be found on food processing machines and their associated equipment.

The manufacturer of a food processing machine can use this list of hazards to help identify the hazards on his machine and then find appropriate safety requirements for each of these hazards in the corresponding subsections of Clause 5 of this European Standard.

If the manufacturer identifies hazards on his machine that are not listed in this clause, he shall assess these hazards by using the principles detailed in EN ISO 12100:2010.

The hazards on a particular food processing machine can vary depending on the product being processed and any ancillary equipment that may be supplied with or connected to the machine.

4.2 Mechanical hazards

4.2.1 Moving parts

4.2.1.1 General

Most food processing machines, whether intended for commercial or industrial use, incorporate mechanical mechanisms, which can cause moderate or disabling injuries. Typical mechanical hazards caused by moving parts on food processing machines include:

a) crushing hazards – e.g. caused by tools or drive mechanisms, gears and chains and sprockets;

b) shearing hazards – e.g. caused by tools or transfer mechanisms, rotary valves, dividing mechanisms;

c) cutting hazards – e.g. caused by cutting devices during operation, machine intervention, cleaning and handling, sheet metal edges that have not been deburred;

d) entanglement hazards – e.g. caused by mixing tools, rotating shafts;

e) drawing-in and trapping hazards – e.g. caused by milling or gauging rollers, drive rollers on belt conveyors;

f) impact hazards – e.g. caused by unsupported lids or covers, small machines falling off work surfaces;

g) stabbing and puncture hazards – e.g. caused by brine injectors;

h) friction and abrasion – e.g. caused by conveyor belts, drive belts;

i) ejection of parts hazards – e.g. caused by products in rotating bowls, break-up of high speed rotating components.

4.2.1.2 Risks arising from frequent operator intervention

4.2.1.2.1 General

On food processing machines, the risks from moving parts are increased in comparison to similar machinery used in other industries because of the need for frequent operator intervention. There is a need for frequent intervention into danger zones to remove blockages, to assist product flow (especially the last piece of a product run), to clean between different product runs and to gain access to the machine parts for a thorough cleaning to meet food hygiene requirements.

4.2.1.2.2 Openings in machines

There is a risk from danger zones on food processing machines, when operators reach into infeed, outfeed, by-product outlet and inspection openings to load product, unload product, and assist product flow and to clean the machine.

4.2.1.2.3 Reaching over guards

There is a risk from danger zones on food processing machines, when operators stand on parts of machines or mobile steps and reach over guards to assist product flow or to clean the machine while the machine is running.

4.2.1.3 Risks which may arise from hygienic design features

Design features that make a food processing machine easy to clean can expose operators to hazards on the machine if they are not correctly designed.

4.2.1.4 Quick release fixings

Quick release fixings that can be undone without the use of tools are frequently fitted to food processing machines so that machines can be dismantled quickly for cleaning. A risk may arise if the removal of quick release fittings allows access to danger zones.

4.2.1.5 Cleaning space under machines

There is a risk from danger zones on food processing machines, if operators kneel on the floor and reach under guards to clean the machine or the floor under the machine when the machine is in motion. As shown in Figure 1 this risk is increased if an open design structure has been used to allow food to fall freely through the machine's mechanisms onto the floor.

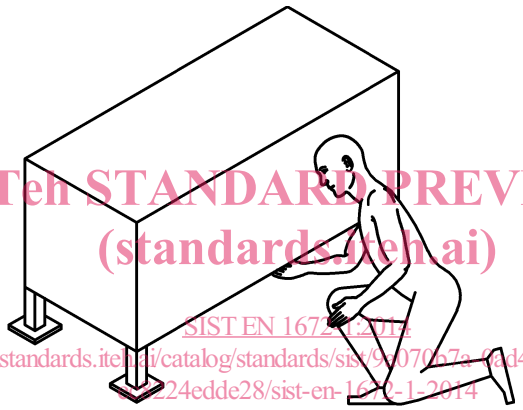

Figure 1 — Cleaning under food processing machinery

4.2.1.6 Spillage trays

Food processing machines may be fitted with trays to collect spillages of food from the machine. It is good hygienic design practice for spillage trays to be easily removable so that product can be emptied frequently; however, when the trays are removed, the operator may be exposed to danger zones on the machine.

4.2.2 Hazards caused by high pressure fluids

Some food processing machines incorporate pneumatic or hydraulic systems. Pneumatic and hydraulic equipment presents crushing, shearing, ejection of parts, explosion and injection of fluids hazards. Stored energy in pneumatic or hydraulic systems may cause mechanisms to move unexpectedly even when power supplies are disconnected. In addition, hydraulic oil and pneumatic lubricating oil present a potential fire hazard and can contaminate the food.

Some food processing machines use high-pressure water to cut or dislodge food products. These high-pressure jets can cause cutting injuries.

4.2.3 Stored energy

Many food processing machines including retorts and cookers contain stored energy. This energy may be mechanical, gravitational, hydraulic, pneumatic, steam, over-pressure or vacuum. Hazards occur if components containing the energy fail or if the energy is released in an uncontrolled way during loading, unloading, cleaning or maintenance.

4.2.4 Slip, trip and fall hazards resulting from the design of the machine

4.2.4.1 Slip hazards

The nature and the form of many foods, the oils and fats used in food processing and the wet nature of some processes makes slipping on spilt substances a particular hazard in premises where food is prepared. Slipping hazards will occur if the design of the machine permits materials to spill out, overflow or otherwise escape from the machine. Runoff water and detergents used for cleaning can also make surfaces slippery.

4.2.4.2 Trip hazards

Trip hazards may arise on food processing machines where there are pipes or cables trailing on the floor or assemblies positioned at low level.

4.2.4.3 Hazard of falling from a height

There is a risk of people falling from a height if it is necessary to operate, clean or maintain a machine above floor level. The risk of falling is increased if the surface used for standing or walking at a height is covered with food products, oil, fats, water or detergents.

4.2.5 Loss of stability

If food processing machines become unstable and move unexpectedly or fall over they can cause crushing and impact injuries. Circumstances in which loss of stability can occur include the following:

a) While the machine is in operation or being cleaned, for example:

   1) if someone rests a container full of product on the edge of the feed hopper;

   2) if the machine is loaded with product unevenly;

   3) if someone stands on the machine.

b) While the machine is being moved, for example:

   1) if the manufacturer's lifting and moving instructions are not followed;

   2) on machines fitted with wheels if the machine is moved on a slope or uneven surface.

4.3 Electrical Hazards

4.3.1 Electrical equipment

Electrical equipment on the machine generates a potential electric shock and burn hazard.

In the presence of combustible materials there is a potential fire hazard. Electrical systems may act as an ignition source. In the presence of flammable substances or products that may create explosive atmospheres, this could give rise to an explosion hazard.