SLOVENSKI STANDARD
SIST EN 13390:2002+A1:2010

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Stroji za predelavo hrane - Stroji za izdelavo kolaļ ev - Varnostne in higienske zahteve

Food processing machinery - Pie and tart machines - Safety and hygiene requirements

Nahrungsmittelmaschinen - Tortelettmaschinen - Sicherheits- und Hygieneanforderungen

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

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67.260	Tovarne in oprema za živilsko industrijo	Plants and equipment for the food industry

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EUROPEAN STANDARD

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Food processing machinery - Pie and tart machines - Safety and hygiene requirements

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

Nahrungsmittelmaschinen - Tortelettmaschinen - Sicherheits- und Hygieneanforderungen

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Foreword

This document (EN 13390:2002+A1:2009) 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of an identical text or by endorsement, at the latest by June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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This document includes Amendment 1 approved by CEN on 1 November 2009.

This document supersedes EN 13390:2002.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

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 ⟨A1⟩ EU Directive(s) ⟨A1⟩.

⟨A1⟩ For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

⟨A1⟩ *deleted text* ⟨A1⟩

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

[A1] This European Standard is a type C standard as stated in EN ISO 12100.

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

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard. [A1]

1 Scope

This standard specifies safety and hygienic design requirements for the manufacture of machines used for the production of pies, tarts, pasties, en croute products and other similar items where the pastry cases are formed by the closing under pressure of one or more forming heads. The standard applies to the following three basic types of machine:

— machines where operators hands enter hazard zone 1 (see [A1] 4.2 [A1]) at each cycle;

— machines which are loaded outside hazard zone 1;

— automatic machines.

Figure 1, 2 and 3 illustrate examples of these.

Automatic loading devices are not covered by this standard.

This standard applies to electrically, pneumatically and hydraulically powered machines. Manually operated machines are excluded from the scope of this standard.

[A1] *deleted text* [A1]

[A1] This standard covers the technical safety requirements for the transport, installation, operation, cleaning and maintenance of these machines (see 5.2 and 5.3 of EN ISO 12100-1:2003).

This standard deals with all significant hazards, hazardous situations and events relevant to pie and tart machines, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4). [A1]

Flour dust is not a significant hazard at pie and tart machines.

A noise test code is included in annex B to assist manufacturers to measure noise level for the purpose of the noise emission declaration.

This document in not applicable to pie and tart machines which are manufactured before the date of publication of this document by CEN.

2 Normative references

〈A1〉 The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 614-1:2006, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

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

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1672-2:2005, *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 60204:2005, modified)*

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

EN ISO 3744:2009, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*

EN ISO 4287:1998, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997)*

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

EN ISO 11201:2009, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995, including Cor 1:1997)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

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 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

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)* A1

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in A1 EN ISO 12100-1:2003 A1 and the following terms and definitions apply.

3.1
platform
mould into which the die presses, which is mounted on a supporting surface (see Figure 2)

3.2
platen
mould into which the die presses, which is integral with the supporting surface

3.3
die
shaped tool for pressing the pastry into the desired shape with the corresponding platform or platen. It can be heated

3.4
false table
device, shaped and dimensioned to fill the openings between the platforms on a rotating table machine through which access to hazard zone 1 may be gained (see Figure 6)

3.5
table frame
series of radial webs, located between platforms, shaped and dimensioned to close the gap between the lower edge of the guard and the upper surface of the rotating table on which the platforms are located (see Figure 5)

3.6
blocking
forming the pastry base

3.7
sheeter
device for dispensing sheets of dough e.g. a hopper with a set of rollers at its base (see Figure 7)

3.8
crimping
sealing the lid to the base

3.9
docking
piercing the pastry with a spike

3.10
tamping
levelling the filling

3.11
depositor
device for dispensing a measured quantity of product (pastry or filling), usually comprising a hopper and a cut off device

4 List of significant hazards

A1

4.1 General

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of machinery, and which require action to eliminate or reduce the risk. A1

4.2 Mechanical hazards

The significant mechanical hazards are:

— crushing;

— cutting;

— severing;

— shearing;

— drawing in;

— trapping;

— loss of stability.

The examples shown in Figures 1, 2 and 3 illustrate eight danger zones associated with the first six hazards:

Zone 1: Zone between closing die and platform or platen
Hazard of crushing, to upper parts of the body, for example during blocking or crimping

Zone 2: Depositor cut off device
Hazards of cutting or severing, to upper parts of the body

Zone 3: Inrunning rollers of the sheeter
Hazard of drawing in, to upper parts of the body

Zone 4: Guillotine (where fitted)
Hazard of cutting, to upper parts of the body

Zone 5: Any moving table or conveyor and fixed parts
Hazard of shearing, to any part of the body

Zone 6: Conveyor nip points
Hazards of drawing in and crushing, to upper part of the body

Zone 7: Ejector unit
Hazard of trapping, to upper parts of the body

Zone 8: Drive mechanisms
Hazards of drawing in, crushing, cutting or severing, to any part of the body

4.3 Electrical hazards

Hazard of electric shock from direct or indirect contact with live components. Hazard of external influences on electrical equipment, e.g. cleaning with water.

4.4 Thermal hazard

Hazard of burning from hand contact with heated dies or platforms or hot external machine components.

4.5 Hazards generated by neglecting hygienic design principles

Neglecting hygienic principles can create unacceptable modification of foodstuff and therefore a risk to human health, i.e. through physical, chemical or microbial contamination.

4.6 Hazards generated by neglecting ergonomic principles

The hazard of unhealthy posture or excessive effort relating particularly to repeated hand and arm movements during loading and unloading of hand fed machines and manual loading of depositors and sheeters.

4.7 Hazards generated by noise

Pie and tart machines can generate airborne noise which can result in hearing damage, in accidents due to interference with speech communication and in interference with the perception of acoustic signals.

5 Safety and hygiene requirements and/or protective measures

〈A1〉

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 12100-2 for relevant but not significant hazards, which are not dealt with by this document.

For hazards which are to be reduced by the application of the type B-standards such as EN 294, EN 349, EN 614-1, EN 953, EN 982, EN 983, EN 1088, EN 60204-1, EN 60529, EN ISO 12100, EN ISO 13732-1 and EN ISO 13849-1, the manufacturer shall carry out a risk assessment to establish the requirements of the type B-standard. This specific risk assessment shall be part of the general risk assessment of the machine.

Unless otherwise specified, interlocking guards shall be at least interlocking without guard locking as defined in EN 1088:1995, 4.2.1 and they shall comply with EN 1088:1995, Clauses 5 and 6.

Unless stated otherwise, the safety related parts of the control systems shall present at least a performance level c defined in accordance with EN ISO 13849-1:2008.

When fixed guards, or parts of the machine acting as such, are not permanently fixed e. g. by welding, their fixing systems shall remain attached to the guards or to the machinery when the guards are removed. 〈A1〉

5.2 Mechanical hazards

Pneumatically operated machines shall be designed and use components to meet the requirements of EN 983:1996. Hydraulic machines shall comply with EN 982:1996.

Where reference is made to interlocking devices throughout clause 5, they shall comply with 4.2.1, 5 and 6 of EN 1088:1995.

〚A1〛 Unless stated otherwise, the safety related parts of the control systems shall present at least a performance level c defined in accordance with EN ISO 13849-1:2008. 〚A1〛

All guards shall be constructed in accordance with EN 953:1997 in particular clauses 6 and 7.

〚A1〛 *deleted text* 〚A1〛

5.2.1 Access to zone 1

5.2.1.1 Machines where the operator's hands enter the hazard zone at each cycle

Access shall be prevented by provision of a moveable interlocking guard (Figure 4). The interlocking device chosen shall stop movement of the closing die before injury can occur. This may be achieved by a maximum stopping time of one second after any movement of the guard from close or use of guard locking (3.3 and 4.2.2, EN 1088:1995).

Either power interlocking (4.1.2, EN 1088:1995) or control interlocking (4.1.1, EN 1088:1995) with a dual circuit may be used and devices shall comply with clauses 5 and 6 of EN 1088:1995.

〚A1〛 The safety related parts of the control systems shall present at least a performance level d defined in accordance with EN ISO 13849-1:2008. The performance of the interlocking device(s) shall be compatible with this category or performance level, according to 7.6 of EN 1088:1995. 〚A1〛

5.2.1.2 Machines which are loaded outside the hazard zone

Access shall be prevented by a combination of fixed guards and moveable interlocking guards (3.2 and 4.2.1, EN 1088:1995) used if necessary in conjunction with false tables or table frames and adjustable sections so that all openings giving access to the hazard zone are minimized and a permanent warning sign showing the risk (see EN 61310-1) shall be fixed to the machine.

Suitable false tables and/or frames shall be supplied for use with all dies/platforms provided with the machine. In relation to height of frames the minimum provision necessary for any particular size of mould is one frame corresponding to the deepest pie mould of that size. Means to avoid pastry fouling the guard shall be provided, for example, the frame webs may be higher than the pie moulds.

Where shearing traps are created between guards and false tables or frames, injury shall be prevented by:

— limiting the force, with which the rotating table indexes round, to 75 N;

— using a device which causes the table to stop in a time less than or equal to 0,5 s (e.g. trip flaps).

Figures 5 and 6 show examples of the use of table frames and false tables respectively.

〚A1〛 When false tables or table frames are used means shall be provided to ensure that the machine cannot operate unless these are in place. This may be achieved by interlocking with the machine control circuit. Because of the technical difficulty of interlocking a rotating frame or table the use of proximity switches which comply with 5.7.3 and 6.3 of EN 1088:1995 is allowed. If adjustable guards are used the detection switch shall be fixed to the adjustable portion of the guard so that guard adjustment allowing only openings in accordance with Table 4 of EN 294:1992 is necessary to allow machine operation. 〚A1〛

5.2.1.3 Automatic machines

Access shall be prevented by a combination of fixed and movable interlocking guards (Figure 7).

5.2.2 Access to zone 2

During its operation, access to the depositor cut off device, shall be prevented. Access via the feed hopper may be prevented by fixed or movable interlocking guards whose dimensions comply with EN 294:1992, Table 4. Where the hopper itself is removable for cleaning access to the hazard zone shall be prevented. This may be achieved by interlocking the hopper itself.

Where movable interlocking guards or removable hoppers are used, the stopping time shall be less than or equal to 0,5 s.

Access via the discharge outlet shall be prevented by use of an outlet whose dimensions comply with EN 294:1992, Table 4 or by a suitable curved outlet tube designed to prevent access.

Because of the need for accurate dispensing of product this may not always be achievable. The use of a piston mechanism (with a maximum force of 50 N) can be used to prevent access to the depositor cut off device. The residual risk of slight injury from these should be highlighted by a warning sign on the machine and in the machine instruction handbook.

5.2.3 Access to zone 3

Access to the inrunning rollers of the dough sheeter, shall be prevented. This may be achieved by a combination of fixed and movable interlocking guards to prevent access via the hopper. When an open hopper is used access may be prevented by use of swan neck extension, whose dimensions comply with Table 4 of EN 294:1992 (see Figure 7).

5.2.4 Access to zone 4

Access to the dough cutting guillotine shall be prevented. This may be achieved by fixed guarding (EN 953) to the infeed and outfeed conveyors which complies with the distance requirements in Table 4 of EN 294:1992.

5.2.5 Access to zone 5

The shearing hazard at zone 5 shall be eliminated as far as possible by design, for example careful location of structural members below moving conveyors with openings for foils.

Access to any such traps through the foil dispensing magazine shall be prevented. This may be by the presence of the foils themselves if a sensing device e.g. a suitable photocell [A1⟩ (see EN 61496-1) ⟨A1] stops the machine before the magazine becomes empty and prevents it starting unless a foil is in place.

A trip mechanism or flap may also be used to prevent injury at Zone 5. Movement of the mechanism or flap shall be interlocked to stop movement of the machinery before injury occurs. Figure 5 shows an example of a trip mechanism. In the case of rotating table machines the entire front guard may act as a trip mechanism.

5.2.6 Access to zone 6

Access to the inrunning nips shall be prevented by fixed guards complying with dimensions of Table 4 of EN 294:1992.

For example a guard such as the one marked B in Figure 10, shall be fitted to prevent access to the inrunning nip.

5.2.7 Access to zone 7

Trapping points at the ejector unit shall be prevented by design in accordance with EN 349:1993, Table 1.

Alternatively, the trapping hazard may be eliminated by observing the safety distances set out in EN 294:1992, Table 4 or by provision of an interlocked guard.

5.2.8 Access to zone 8

Access to hazards in the drive mechanism shall be prevented. This may be achieved by the use of fixed or movable and interlocked guards.

5.2.9 Loss of stability

Machines shall be designed to be stable and shall comply [A1) with 5.2.9.1 to 5.2.9.2 (A1] as applicable. For machines designed to be fixed to the floor, the instruction handbook shall indicate the values of forces at the fixing points.

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

5.2.9.2 Free standing machines with castors shall have at least two castors (or sets of castors) fitted with a locking device, and shall comply with the provisions [A1) of 5.2.9.1 (A1].

[A1)

5.3 Electrical hazards

5.3.1 General

Electrical equipment shall comply with EN 60204-1.

Electrical equipment, for example switches, that may be exposed to water, e. g. during cleaning, shall be protected to an appropriate IP rating according to EN 60529 and EN 60204-1.

5.3.2 Safety requirements related to electromagnetic phenomena

The machines shall have sufficient immunity to 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 recommendations of the suppliers of these sub-assemblies.

5.3.3 Protection against electric shock

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

5.3.4 Power circuits

Devices for detection and interruption of over-current shall be applied to each live conductor in compliance with EN 60204-1:2006, 7.2.3. In case of single phase machines, no such device is required for the earthed neutral conductor.