SLOVENSKI STANDARD
SIST EN 1678:2000+A1:2010

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Stroji za predelavo hrane - Stroji za rezanje zelenjave - Varnostne in higienske zahteve (vključno z dopolnilom A1)

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

Nahrungsmittelmaschinen - Gemüseschneidemaschinen - Sicherheits- und Hygieneanforderungen

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

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ICS:

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

SIST EN 1678:2000+A1:2010 **en,fr,de**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

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English Version

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

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

Nahrungsmittelmaschinen - Gemüseschneidemaschinen - Sicherheits- und Hygieneanforderungen

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Foreword

〚A1〛 This document (EN 1678:1998+A1:2010) 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. 〈A1〉

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of an identical text or by endorsement, at the latest by November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.

This document includes Amendment 1, approved by CEN on 2010-04-09.

This document supersedes EN 1678:1998.

The start and finish of text introduced or altered by amendment is indicated in the text by tags 〚A1〛 〈A1〉.

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.

It is one of a series of standards on the design and construction of machines used in catering.

〚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 EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document. 〈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, Croatia, 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 United Kingdom.

Introduction

The use of vegetable cutting machines involves various mechanical and other hazards.

Their extensive use justifies the need of a standard covering both safety and the hazards to food hygiene arising from machine design.

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

The machinery concerned and the extend 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

〈A1〉

1.1 This European Standard specifies the safety and hygiene requirements for the design and manufacture of vegetable cutting machines which are transportable and have a maximum rated power less than 3 kW.

This European Standard deals with machines intended for cutting, shredding, dicing, chipping and grating of food products in which the product passes through the machine.

As described in 3.2.1, the types of machines in the scope are machines with a fixed chamber and rotating blade or cutting disc, with a rotating drum and fixed blades or machines with horizontal reciprocating cutters (mainly used for potato chipping).

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

This European Standard deals with the hazards which can arise during commissioning, operation, cleaning, removal of food blockages, feeding, changing the tools, maintenance and decommissioning of the machine.

1.3 This European Standard does not apply to:

— food processors (see EN 12852);

— vegetable peelers (see EN 13208);

— vegetable cutting attachments which are mounted onto machines having an auxiliary drive hub (see EN 12851);

— planetary mixers (see EN 454);

— domestic machines.

1.4 This European Standard is not applicable to vegetable cutting machines which are manufactured before the date of its publication as EN. 〈A1〉

2 〈A1〉 Normative references

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

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

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

EN ISO 3744:1995, *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 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 11201:1995, *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)*

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 and specifications (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 13857:2008, *Safety of machinery — Safety distances to prevent danger zones being reached by upper and lower limbs (ISO 13857:2008)* 〈A1〉

3 〈A1〉 Terms and definitions – Description

3.1 Terms and definitions

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

3.1.1
pusher device
device assisting feeding, hinged to the hopper and interlocked so when withdrawn from the hopper the machine stops. It prevents access to the danger zone when in the working position

3.1.2
plunger device
device assisting feeding, which is removable A1

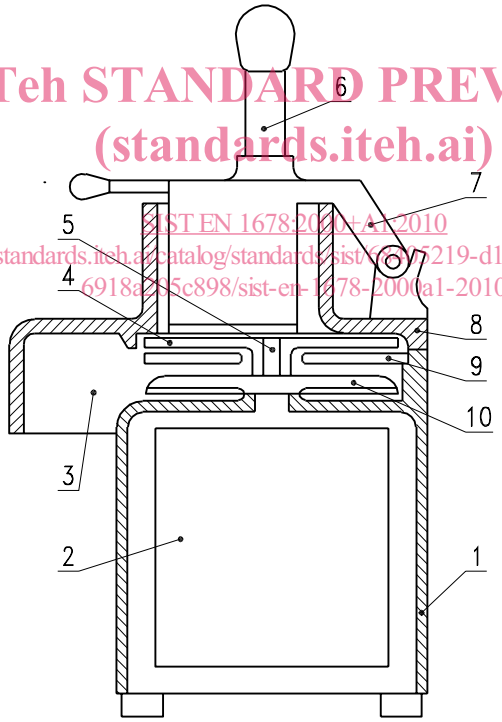
3.2 Description

3.2.1 Machines covered by the standard

This standard covers the three following types of machine including combinations of them:

3.2.1.1 Machines with rotating cutting devices

Such machines contain the rotating cutting devices in a fixed chamber. Product is fed into the top of the chamber, typically through a feed hopper and assisted by a pusher or plunger device (see figure 1).

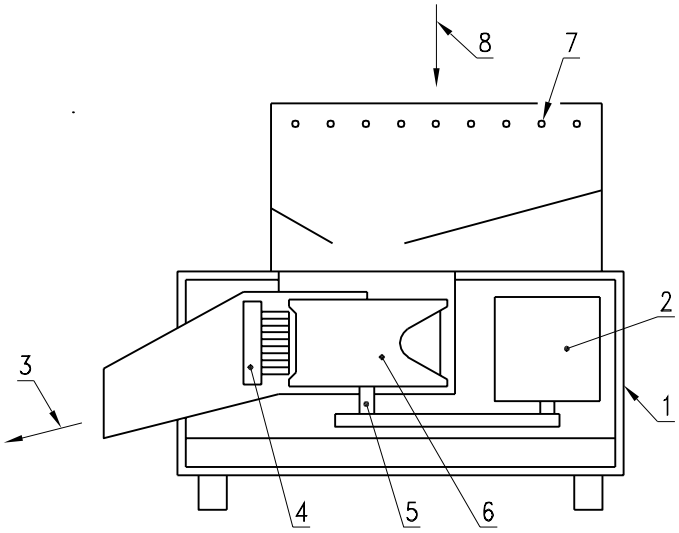


Key
1 Body
2 Electric motor
3 Delivery chute
4 Cutting device
5 Shaft
6 Plunger (removable)
7 Pusher device
8 Feed chute
9 Fixed plate
10 Ejector

Figure 1

3.2.1.2 Machines with rotary drum

These machines generally have a hopper method of feeding product to a rotating drum. As the product is held against the outside wall by the spinning drum so it comes into contact with a fixed cutting device (see figure 2).

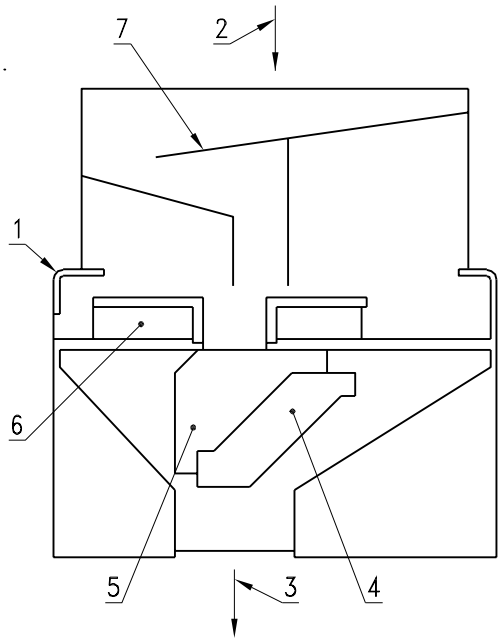


Key
1 Body
2 Motor
3 Delivery chute
4 Cutting device
5 Shaft
6 Rotating drum
7 Fixed grid
8 Feed hopper

Figure 2

3.2.1.3 Machines with horizontal reciprocating cutters

These machines are used extensively for chipping potatoes. Raw potatoes are fed from a hopper into the cutting chamber containing fixed plates and reciprocating plates and cutting devices (see figure 3).



Key
1 Body
2 Feed hopper
3 Delivery chute
4 Reciprocating cutters
5 Fixed plate
6 Reciprocating plate
7 Baffles

Figure 3

3.2.2 Elements of a machine (see figures 1, 2 and 3)

All machines generally contain the following elements of design:

— a device for feeding product into the machine;

— one or several tools: cutting plates or blades, hereafter called "cutting devices". A cutting plate or blade consists of one or more cutting edges fixed to a frame. Fixed cutting blades may be installed in conjunction with moving plates;

— an ejector;

— a delivery chute;

— control devices.

3.2.3 Devices for feeding

Three devices for feeding product are used:

3.2.3.1 Hopper feed

The product is fed to the cutter from the hopper generally by gravity and/or by feeding devices.

3.2.3.2 Pusher feed

Here a small amount of product is fed into a feed chute and assisted to the cutters by pressure on the pusher device.

3.2.3.3 Plunger feed

Here product is manually fed to the cutting device. It is assisted with a plunger. Typically the feeding is done through a narrow feed chute.

Often machines have both pusher and plunger feed so that the operator can select the most suitable operation according to the food product being cut.

4 〈A1〉 List of significant hazards

4.1 General

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this European 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

4.2.1 Access to the danger zones

Mechanical hazards arise from the risk of contact with the cutting devices and the associated rotating parts.

The hazards may be reached by:

— Zone 1: access down the feed chute/hopper;

Hazard of cutting and drawing-in,

— Zone 2: access when opening the machine to expose the cutter or drum. Typically this is when cleaning the machine or changing the cutting device.

Hazard of cutting and drawing-in;

— Zone 3: access through the delivery chute;

Hazard of crushing and drawing-in;

— Zone 4: access to the driving mechanism;

Hazard of crushing and drawing-in.

4.2.2 Loss of stability

Hazards of crushing and impact.

4.2.3 Incorrect assembly and fitting

Hazard of cutting and impact for fingers or hands.

4.2.4 Handling, cleaning and storage of cutting devices

Hazard of cutting and impact.

4.3 Electrical hazards

Hazard of shock by direct or indirect contact with live parts.

4.4 Hazards generated by neglecting hygiene principles in the machine design

Inability to clean food contact and splash areas effectively and thoroughly.

Contamination of the food by undesirable materials including residues of food, microbiological causes as well as residues of cleaning and disinfecting fluids.

4.5 Hazards generated by neglecting ergonomic principles in machine design

Lack of ergonomic principles can be anything that causes wrong operation of controls, physical damage due to over-reaching, heavy loads, awkward posture, etc.

〚A1〛 *deleted text* 〈A1〉

5 Safety and hygiene requirements and/or measures

5.1 〚A1〛 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 614-1, EN 953, EN 1088, EN 60204-1, EN 60529, EN ISO 12100, EN ISO 13849-1 and EN ISO 13857, 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. 〈A1〉

5.2 Mechanical hazards

5.2.1 〚A1〛 General

All the interlocking devices associated with guards shall comply with EN 1088:1995.

The safety related parts of the control systems shall meet at least performance level c and category 1 in accordance with EN ISO 13849-1:2008.

NOTE The category 1 in accordance with EN ISO 13849-1:2008 is equivalent to category 1 of EN 954-1:1996. 〈A1〉

5.2.2 Access to the danger zones

5.2.2.1 Zone 1

5.2.2.1.1 Objective

The safeguarding objective is to prevent contact by the operator (or other person) reaching down the feed openings and coming into contact and being injured by the cutting device.

5.2.2.1.2 General

All three devices for feeding (hopper, plunger and pusher) consist of an opening which could give access to the cutting devices. The level of hazard is in relationship with the size of each feeding device. Requirements of table 4 of ⟨A1⟩ EN ISO 13857:2008 ⟨A1⟩ should be fulfilled to prevent any access to the cutting devices with the upper limbs.

⟨A1⟩ See also 5.2.2.1.4. ⟨A1⟩

Nevertheless, in order to comply with particular specificities of use, like:

— dimensions and diversity of food products to be processed (vegetable, fruits,…);

— height of loading and of discharge chute;

— ratio performance/compactness;

— cleanability;

and taking into account risk assessment, one of the solutions ⟨A1⟩ given in 5.2.2.1.3 and 5.2.2.1.4 ⟨A1⟩ shall be taken.

5.2.2.1.3 Feeding by plunger or pusher

The dimensions of the feed chute shall conform to the table 1:

Table 1

Dimensions in millimetres

Maximum dimension of the opening of feed tube (*b*)	Safety reach distance between the edge of the hopper and the blade (a)	
	For cutting gap depth ≤ 10	For cutting gap depth > 10
≤ 55	≥ 120	≥ 120
≤ 60	≥ 130	≥ 130
≤ 70	≥ 150	≥ 230
≤ 80	≥ 150	a ≥ 230 with h ≥ 1400 (see figure 4)
> 80	Pusher device with interlocking device	

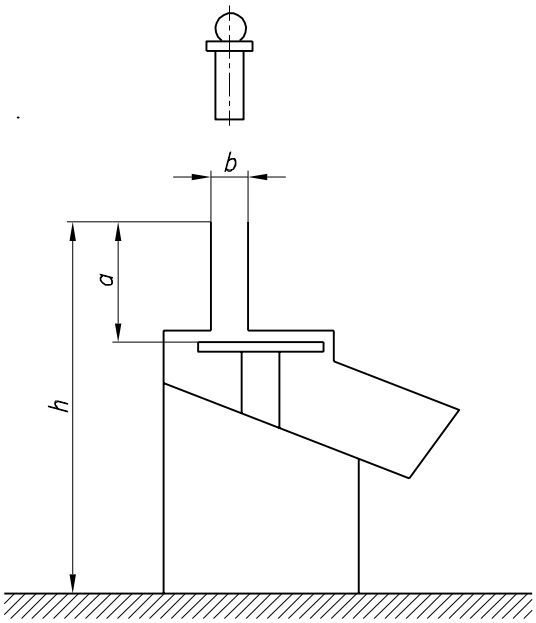


Figure 4

5.2.2.1.3.1 In all cases where *b* is less than or equal to 80 mm and where the table 1 is used:

— A plunger shall be supplied, with all machines having a feed tube;

— Where machines are not dedicated to be used with cutting devices the height of which is greater than 10 mm, a notice in the instruction handbook shall be given.

5.2.2.1.3.2 For the case where *b* > 80 mm machines shall have an interlocking control guard pusher device, the interlocking switch shall be designed to meet the opening and closing and stopping time required as below.

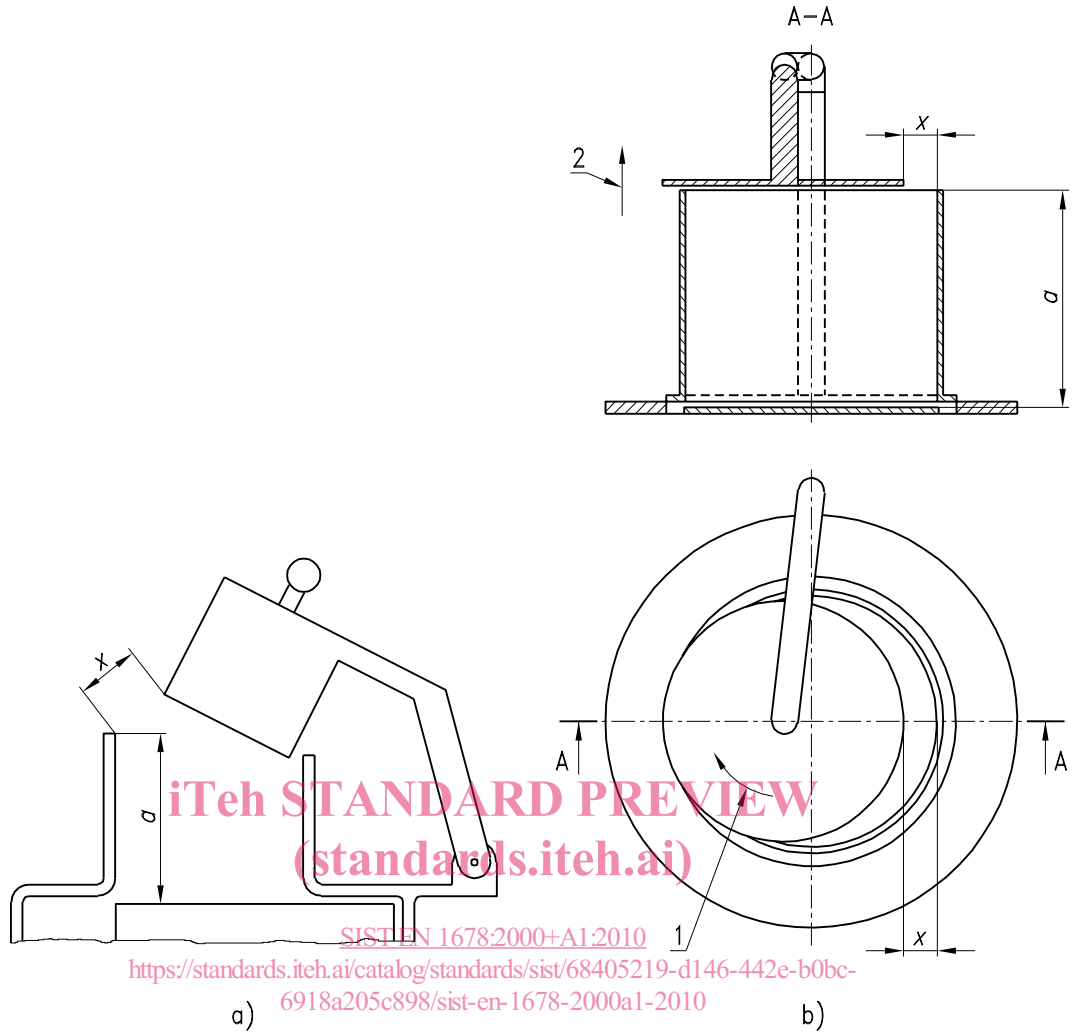
Where a pusher device is used, this can restart the machine without operating the on/off switch. For those machines the stopping time shall be less than 2 s.

It shall be measured when the machine is running without product at its maximum speed and equipped with the heaviest cutting device.

The safety interlocked switch shall be actuated when the gap (*x*) between the top of the aperture and the edge of the pusher is as shown in figure 5, where:

$x \leq 60$ mm for $a \geq 150$ mm

$x \leq 45$ mm for $130 \text{ mm} \leq a < 150$ mm



Key
1 Rotational motion
2 Translatory motion

Figure 5a — Hinger pusher **Figure 5b — Sliding pusher**

Figure 5

5.2.2.1.4 Feeding by hopper

[A1] Designs which comply with 5.2 and 5.3 of EN ISO 12100-2:2003 and 4.2.3 of EN ISO 13857:2008 can be used, for example (see Figure 6): [A1]

— baffles;

— sloping hopper;

— swan neck extension;

[A1]

— fixed grids (opening to Table 4 of EN ISO 13857:2008); [A1]

— interlocked hopper lid;