



SLOVENSKI STANDARD
SIST EN 1673:2002+A1:2010
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Food processing machinery - Rotary rack ovens - Safety and hygiene requirements

Nahrungsmittelmaschinen - Stikken-Backöfen - Sicherheits- und Hygieneanforderungen

Machines pour les produits alimentaires - Fours à chariot rotatif - Prescriptions relatives à la sécurité et l'hygiène

STANDARD PREVIEW
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ICS:

67.260	Tovarne in oprema za živilsko industrijo	Plants and equipment for the food industry
97.040.20	Pečnice, delovne mize, peči in podobne naprave	Cooking ranges, working tables, ovens and similar appliances

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EUROPEAN STANDARD

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Food processing machinery - Rotary rack ovens - Safety and hygiene requirements

Machines pour les produits alimentaires - Fours à chariot rotatif - Prescriptions relatives à la sécurité et l'hygiène

Nahrungsmittelmaschinen - Stikken-Backöfen - Sicherheits- und Hygieneanforderungen

This European Standard was approved by CEN on 11 June 2000 and includes Amendment 1 approved by CEN on 24 October 2009.

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Foreword

This document (EN 1673:2000+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of an identical text or by endorsement, at the latest by June 2010, and conflicting national standards shall be withdrawn at the latest June 2010.

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 includes Amendment 1 approved by CEN on 24 October 2009.

This document supersedes EN 1673:2000.

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

This European Standard 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).

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts 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, 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 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

This standard specifies safety and hygiene requirements for the design and manufacture of rotary rack ovens with one or more rotary racks.

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These ovens are used in the food industry and shops (bakeries, pastry-making, etc.) for the batch baking of foodstuffs containing flour, water and other additives. This standard applies to ovens used only for food products except for those containing volatile flammable ingredients.

The control of the humidity of the air in the baking chamber is by the production and introduction of steam around normal atmospheric pressure.

The following machines are excluded:

- experimental and testing machines under development by the manufacturer;
- domestic appliances.

[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 12100-1:2003)."

This document deals with all significant hazards, hazardous situations and events relevant to rotary rack ovens, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

Noise is not considered to be a significant hazard. This does not mean that the manufacturer is absolved from reducing noise and making a noise declaration. Therefore a noise test code is given in Annex B. **[A1]**

The hazards from the use of gaseous fuel by gas appliances are not covered by this standard.

[A1] This standard is not applicable to rotary rack ovens which are manufactured before the date of its publication as EN. **[A1]**

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2 [A1] Normative references

[SIST EN 1673:2002+A1:2010](https://standards.iteh.ai/catalog/standards/sist/3ca67c6-187b-4cee-9b5b-8488-1673-2002-a1)

[https://standards.iteh.ai/catalog/standards/sist/3ca67c6-187b-4cee-9b5b-](https://standards.iteh.ai/catalog/standards/sist/3ca67c6-187b-4cee-9b5b-8488-1673-2002-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 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 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

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 3743-1:1995, *Acoustics — Determination of sound levels of noise sources — Engineering methods for small, movable sources in reverberant fields — Part 1: Comparison method for hard-walled test rooms (ISO 3743-1:1994)*

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 a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)*

EN ISO 11688-1:1998, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12001:1996, *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 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 13849-1:2008, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)* 

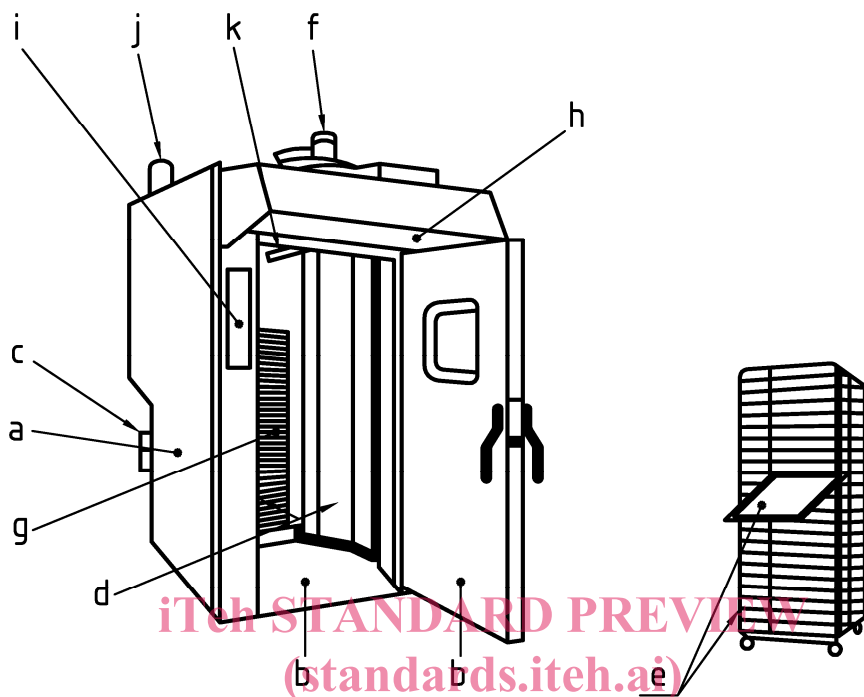
3 Description

A rotary rack oven usually consists of the following parts (see figure.1):

- a) container built with insulated panels;
- b) baking chamber with access door;
- c) heat production unit;
- d) hot air circulation system;
- e) rack and trays;
- f) drive unit for rack rotation;
- g) steam generator;
- h) steam extractor;
- i) control panel;

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- j) miscellaneous devices (e.g. combustion product flue where gas or fuel fired);
- k) device to hold the removable rotary racks.



SIST EN 1673:2002+A1:2010
 Figure 1 — Parts of a rotary rack oven
<https://standards.iteh.ai/catalog/standards/sist/en-1673-2002-a1-2010>

4 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 Standard, identified by risk assessment as significant for this type of machinery, and which require action to eliminate or reduce the risk. 

4.2 Mechanical hazards

The significant mechanical hazards are:

- shearing hazard;
- trapping hazard;
- impact hazard;
- loss of stability.

The example in figure 2 shows the danger zones:

Zone 1: rotation of the rack inside the oven
hazards of shearing, trapping, impact;

Zone 2: drive mechanism
hazards of shearing, trapping;

Zone 3: space between the rack and the door frame
hazards of shearing, trapping, impact;

All zones: sharp corners and edges on touchable parts hazards of cutting.

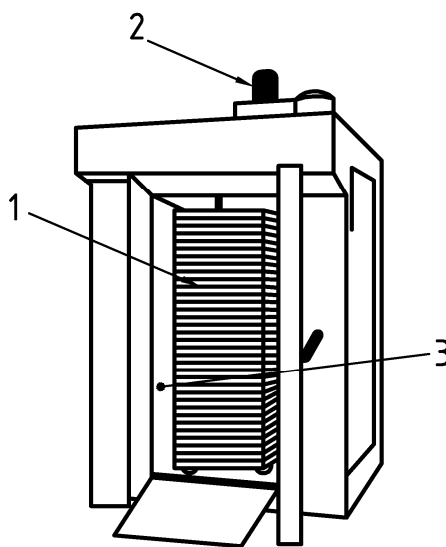


Figure 2 — Danger zones of a rotary rack oven

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There is also a hazard relating to loss of stability of the trays and of the rack during rotation and on entering the baking chamber.

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 hazards

4.4.1 Escape of steam from the baking chamber on opening the door creates a hazard of burns.

4.4.2 High temperature of external parts and hand operated components creates a hazard of burns.

4.5 Explosion and fire hazards

4.5.1 Overpressure of steam inside the baking chamber creates a hazard of explosion.

4.5.1.1 The use in the oven of combustible substances (for example sugar) can create a hazard of fire.

4.5.1.2 Improper operation of control and adjustment components of the combustion equipment can create a hazard of overheating of the oven and of fire.

4.6 Hazard from being trapped inside

Hazard of burns and suffocation.

4.7 Hazard generated by neglecting hygienic design principles

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

4.8 Hazards generated by neglecting ergonomic principles

During loading and unloading racks, cleaning and maintenance, there is a risk of injury or chronic damage to the body resulting from awkward body postures, heavy lifting, pushing and pulling.

5  Safety and hygiene requirements and/or protective measures **5.1  General**

Machinery shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machine shall be designed according to the principles of EN ISO 12100-2 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 614-1, EN 953, EN 954-1, EN 1088, EN 60204-1, EN 60529, EN ISO 12100 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.

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.

The safety related devices and their interface with the control systems shall meet at least category 1 of 6.2.2 of EN 954-1:1996 or present at least a performance level c defined in accordance with EN ISO 13849-1:2006.

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

5.2.1 A1 Zone 1: Rotation of the rack inside the oven A1

Where reference is made to interlocking devices throughout clause 5, they shall comply with clause 4.3.1 and clauses 5 and 6 of EN 1088:1995.

Safety related control systems be to category 1 of EN 954-1:1996.

A1 deleted text A1

If the force required to stop the rotating rack is greater than or equal to 150 N, access to the baking chamber, while the rack is rotating, shall be prevented by an interlocking door (e.g. using a rotary cam operated switch). Opening the door shall cause the rack to stop within 3 s. Any operation which requires the rack to rotate under power, with the door open, shall be controlled by a hold-to-run control.

5.2.3 Zone 2: Drive mechanism

If the sum of distances from the floor to danger point is less than 2,5 m, access to the external transmission shall be prevented by fixed guards in accordance with EN 953 : 1997.

5.2.4 Zone 3: Space between the rack and the door frame

Means shall be provided to prevent hand injury when moving the rack in and out of the oven.

Since the movement is manual and controlled by the operator, this may be achieved by providing a clearance of 50 mm between the rack and the sides of the door frame.

5.2.5 All zones - External surfaces and edges

A1 External rough surfaces and sharp edges on the oven shall be avoided in accordance with 4.2.1 of EN ISO 12100-2:2003. A1

5.2.6 Loss of stability

5.2.6.1 Stability of the rack during the rotation

To prevent overturning of the rack during rotation and engagement/disengagement of the drive, one of the solutions shown as examples in figure 3 may be adopted. Other technical solutions giving the same level of safety level are also permitted.

In figure 3 b), the rack is manually pushed onto the rotation system lifting hook and then lifted off the ground. The rack shall remain stable during rotation on the oven floor. This may be achieved by a coupling at its axis of rotation or by other means.

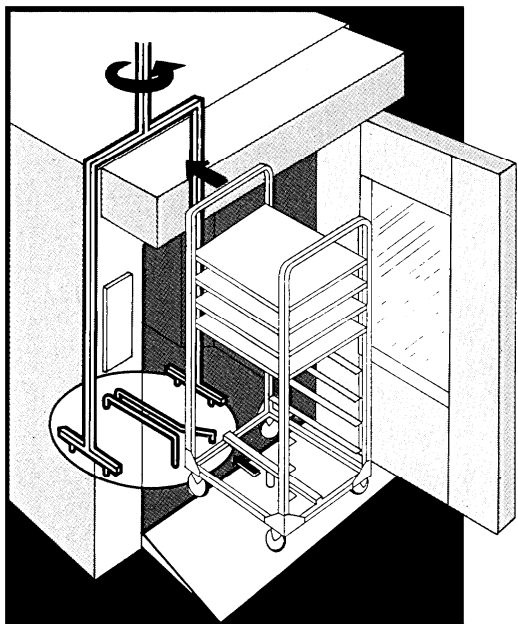


Figure 3 a) — Rotating platform with ramp

The rack is manually pushed onto the rotating platform.

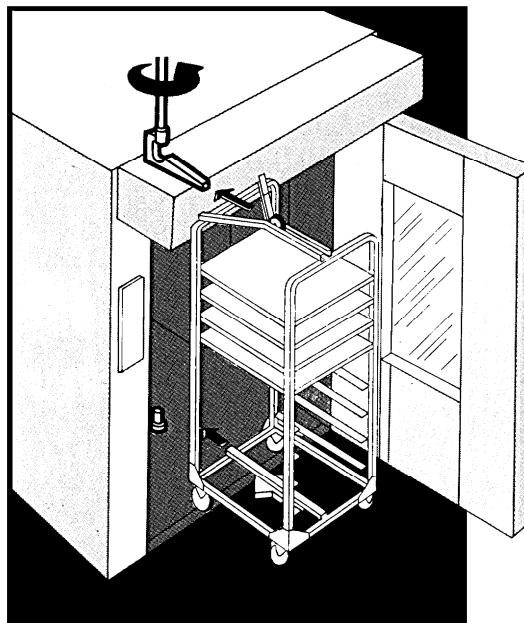


Figure 3 b) — Rotating system lift hook

The rack is manually engaged and lifted onto the rotating system.

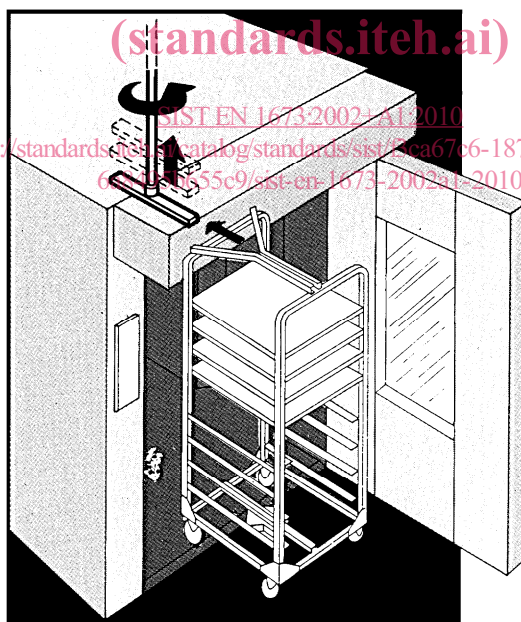


Figure 3 c) — Automatic lifting unit

The rack is manually engaged onto the lifting system and automatically lifted when the door is closed.

Figure 3 - Examples of rotary rack coupling systems

5.2.6.2 Stability of the rack entering the baking chamber

To prevent the rack overturning on entering the oven a ramp or other suitable device shall be provided if the difference in level exceeds 10 mm.

5.2.6.3 Stability of the rack

The rack shall be stable when tilted 10° from the horizontal plane in the most unfavourable position.

5.2.6.4 Stability of the trays

When trays are supplied by the manufacturer, the design shall prevent accidental displacement of the trays, especially during loading and unloading of the oven. If the slope of the floor is over 10 degrees, trays shall be secured in the rack. When trays are not supplied by the manufacturers, these requirements shall be described in the instruction handbook.

5.3 Electrical hazards

5.3.1 General

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

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 7.2.3 of EN 60204-1:2006. In case of single phase machines, no such device is required for the earthed neutral conductor.

5.3.5 Protection against earth faults in control circuits

For machinery supplied from a single-phase conductor and an earthed neutral conductor, there is no requirement for double pole interruption of the control circuit. The single pole interruption shall be in the phase conductor (see 9.4.3.1 of EN 60204-1:2006).