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Stroji za predelavo hrane - Planetarni mešalniki - Varnostne in higienske zahteve

Food processing machinery - Planetary mixers - Safety and hygiene requirements

Nahrungsmittelmaschinen - Planetenrühr- und -knetmaschinen - Sicherheits- und Hygieneanforderungen

Machines pour les produits - Batteurs-mélangeurs - Prescriptions relatives à la sécurité et l'hygiène

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Food processing machinery - Planetary mixers - Safety and hygiene requirements

Machines pour les produits - Batteurs-mélangeurs - Prescriptions relatives à la sécurité et l'hygiène

Nahrungsmittelmaschinen - Planetenrühr- und -knetmaschinen - Sicherheits- und Hygieneanforderungen

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Foreword

This document (EN 454:2014) 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of an identical text or by endorsement, at the latest by May 2015 and conflicting national standards shall be withdrawn at the latest by May 2015.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 supersedes EN 454:2000+A1:2009.

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.

Significant changes:

The significant changes with respect to the previous edition EN 454:2000+A1:2009 are listed below:

— modification of the numbers of classes of machines (2 instead of 3);

— solid guard to protect against dust emission was added;

— safety dimensions for the guard was precised;

— control of the position of the bowl in working position for the Class 1;

— table of verification of safety and hygiene requirements was completely revised.

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 document 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.

1 Scope

1.1 This European Standard specifies safety and hygiene requirements for the design and manufacture of fixed bowl planetary mixers with a tool having a planetary movement by using two parallel axes. The capacity of the bowl is greater than or equal to 5 L[1)] and less than or equal to 200 L.

These planetary mixers are used separately in the food industry and shops (catering, bakery, pizza, pastry and confectionary industry) for mixing, kneading and emulsifying/whipping food products (e.g. cocoa, flour, sugar, oils and fat, eggs, and other ingredients). These machines are fed by hand and sometimes during operation without stopping the machine.

Processing is carried out in cycles of variable duration. It can be either manually or automatically controlled, in individual cycles or on a cycle repeat basis, etc.

This European Standard deals with all significant hazards, hazardous situations and events relevant to the transport, installation, adjustment, operation, cleaning, maintenance, dismantling, disassembling and scrapping of planetary mixers, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer(see Clause 4).

1.2 This European Standard does not deal with the following machines:

— catering attachment for planetary mixers (see EN 12851);

— continuously fed machines;

— dough mixers (see EN 453);

— whipping mixers which contain no parallel axes;

— stirring machines;

— experimental and testing machines under development by the manufacturers;

— machines used in other industry, for example: meat industry, candy industry, pharmaceutical industry, chemical industry;

— domestic appliances.

1.3 This European Standard is not applicable to machines which are manufactured before its date of 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 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

1) Below 5 L, EN 60335-1 and the EN 60335-2 series are applicable.

EN 1672-2:2005+A1:2009, *Food processing machinery — Basic concepts — Part 2: Hygiene requirements*

EN 12851, *Food processing machinery — Catering attachments for machines having an auxiliary drive hub — Safety and 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)*

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

EN ISO 3743-1, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for small movable sources in reverberant fields — Part 1: Comparison method for a hard-walled test room (ISO 3743-1)*

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 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

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

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

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

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

EN ISO 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

3 Terms, definitions, description and classification

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1.1
tool
mobile and removable equipment having a planetary movement which is used for mixing, kneading and emulsifying

Note 1 to entry: The tool can have different shapes.

Note 2 to entry: The scraper is considered as a tool in this document.

3.1.2
planetary movement
rotation of a tool both on itself and around the inside of a bowl by using two parallel axes

3.1.3
working position
stable position both for the bowl and the tool and in which the bowl is locked in the upper position and the tool, locked on its shaft, is nearest to the bottom of the inside of the bowl

3.2 Description

A planetary mixer (see Figure 1) usually consists of a frame supporting:

— a casing (1), containing the tool(s) drive mechanism;

— control devices (2);

— a bowl (3) equipped with a grid or a solid cover, in which ingredients are processed;

— interchangeable tool (4) designed to process ingredients; their rotation speed may be either constant or variable;

— an optional auxiliary drive hub (5) for catering attachments (see EN 12851);

— a device (6) for vertically moving the bowl or the head of the mixer to allow tool removal, or tilting of the head to remove the tool;

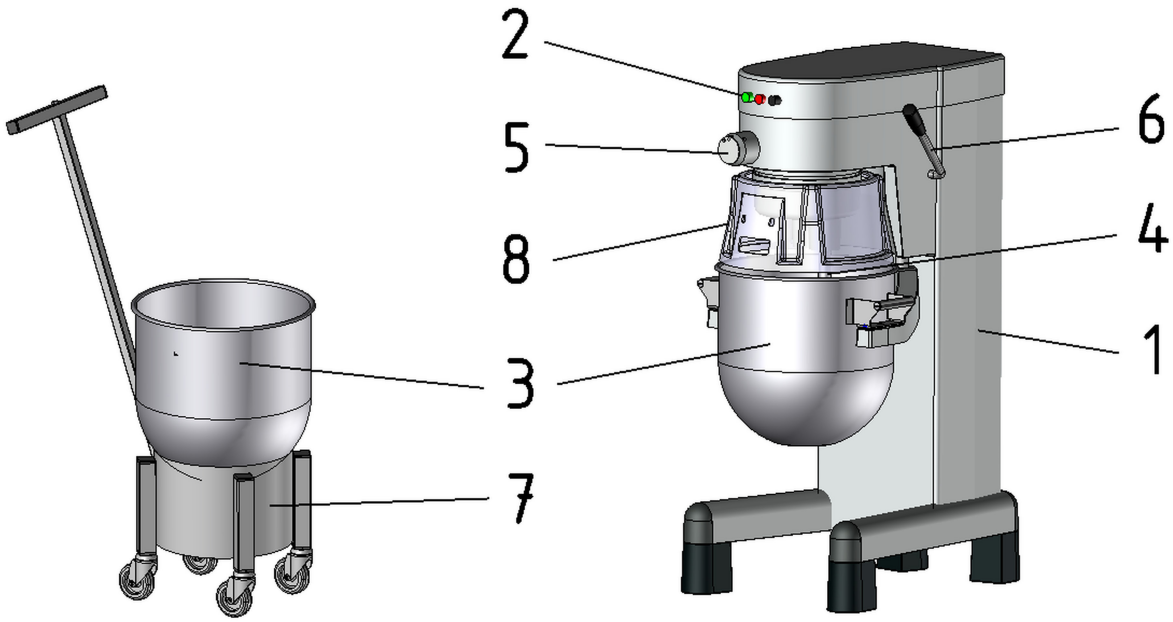
— a device (7) for handling the bowl (optional), for example a trolley;

— an interlocked guard (8);

— bowl heating device (optional, not included in Figure 1);

— bowl cooling device (optional, not included in Figure 1);

— bowl gravity discharge (optional, not included in Figure 1).



Key

1 casing
2 control devices
3 bowl
4 tool
5 auxiliary drive hub
6 handle
7 trolley
8 interlocked guard (solid cover)

Figure 1 — Main parts of a planetary mixer

3.3 Classification

Planetary mixers are classified into the following two categories according to their bowl volume:

— class 1: bowls having a volume equal to or greater than 5 L and less than 10 L;

— class 2: bowls having a volume equal to or greater than 10 L and less than or equal to 200 L,

where the bowl volume is the maximum volume of water in litres that the bowl can contain.

When a mixer is supplied with several bowls of different capacities, the mixer classification is determined by the size of the bowl with the greatest volume.

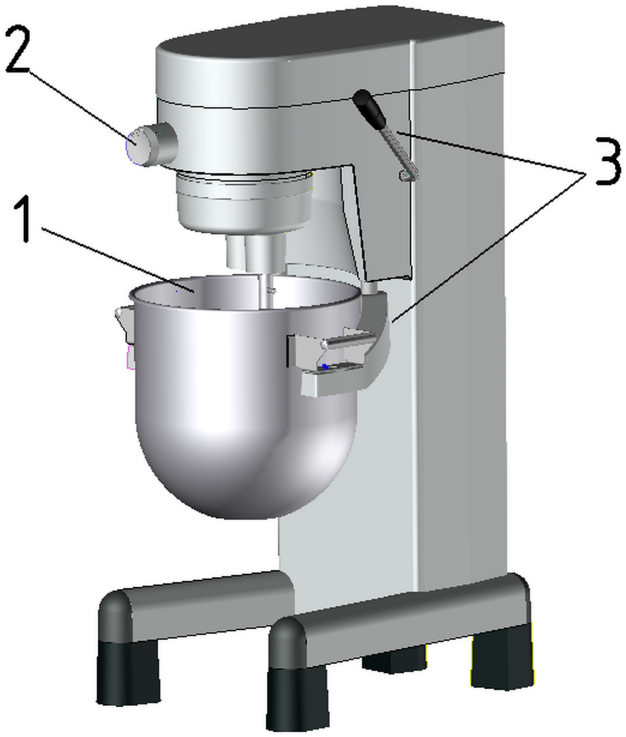
4 List of significant hazards

This clause contains all the significant hazards, hazardous situations and events, identified by risk assessment as significant for this type of machinery and which require measures to eliminate or reduce the risk associated with the identified hazards (see Table 1).

Figure 2 shows the danger zones.

Table 1

Hazards, hazardous situations and hazardous events	Location or cause	Clause/subclause in this European Standard
Mechanical hazards (see Figure 2)		5.2
— trapping hazard	zone 1: volume covered by the moving tool zone 3: space between bowl lifting system and frame	
— trapping and shearing	zone 2: auxiliary drive hub (mechanical)	
Electrical hazards	Electric shock from direct or indirect contact with live components Electromagnetic disturbance	5.3 5.3
IP degree	Motor enclosure	5.4
Stopping of the machine	No access to the normal OFF of the machine	5.5
Thermal hazards	Device to maintain food at a constant temperature	5.6
Gas accumulation hazard	Gas burner	5.7
Hazards generated by noise	Hearing damage, accidents due to interference with speech communication and interference with the perception of acoustic signals	5.8
Hazards generated by materials and substances	inhalation of flour dust	5.9
Hazards generated by neglecting hygienic design principles	e.g. contamination by microbial growth or foreign materials	5.10
Hazards generated by neglecting ergonomic principles	During operation, cleaning and maintenance	5.11



Key

zone 1: volume covered by the moving tool

zone 2: auxiliary drive hub for attachments

zone 3: space between bowl lifting system and frame

Figure 2 — Danger zones of a planetary mixer (with guard removed)

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

Unless otherwise specified, the requirements given throughout Clause 5 apply both to Class 1 and Class 2.

5.2 Mechanical hazards

5.2.1 General

Where reference is made to interlocking devices throughout Clause 5, they shall comply with EN ISO 14119.

The safety related parts of the control system shall present at least a performance level “c” defined in accordance with EN ISO 13849-1.

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.

5.2.2 Zone 1 – Volume covered by the movement of the tool

5.2.2.1 Solid interlocked guard

Access from above shall be prevented while the tool is moving. This may be achieved by a movable interlocking guard covering the top of the bowl. The bowl itself when in working position prevents access from other directions.

For Class 1 planetary mixers, because of their low power and small size, access to the volume covered by the tool shall be at least restricted by a bowl extension. It may be fixed or associated with an interlocking device and movable so that the tool will not operate unless the bowl extension is in position, see Figure 3. There shall be a minimum distance of 120 mm between the upper edge of the extension and the upper limit of the volume covered by the tool. The distance between the upper edge of bowl and the lower edge of the bowl extension may not exceed 8 mm. In working position the distance between the upper edge of the bowl extension and the machine frame shall be less than or equal to 80 mm.

Dimensions in millimetres

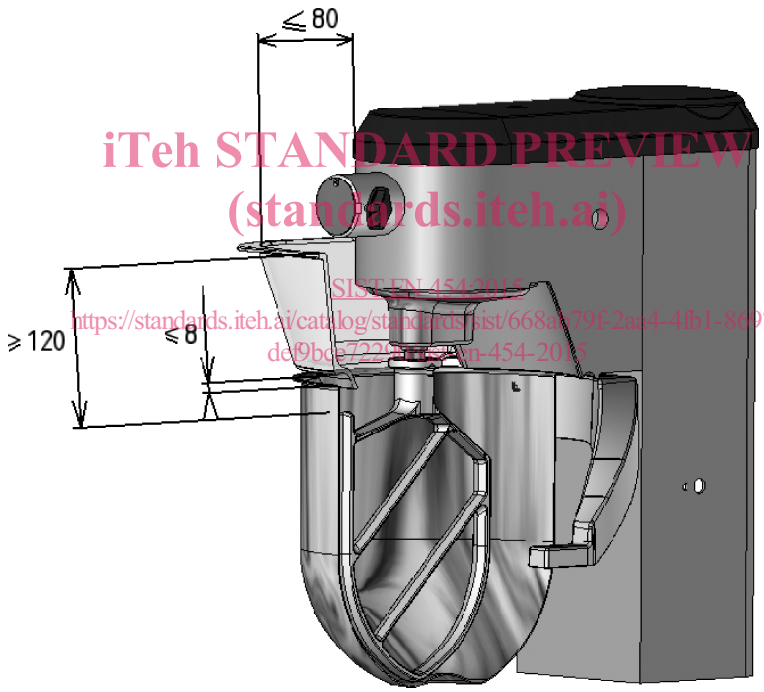


Figure 3 — Class 1 planetary mixers with bowl extension

For class 2 planetary mixers, preventing access to the tool may be achieved by a movable interlocking guard covering the top of the bowl. In working position the distance between the upper edge of the interlocked guard and the machine frame shall be less than or equal to 80 mm.

If the interlocked guard is solid (e.g. a cover without apertures), it can also be used to prevent flour dust emission hazard (see 5.9), and the following requirements apply.

The interlocked guard shall be linked to suitable actuated position detectors functioning in the positive mode in compliance with EN ISO 14119:2013, 5.4. Position detectors themselves shall comply with EN ISO 14119:2013, 5.2 and 5.3.1, and any rotary or linear cams with EN ISO 14119:2013, 5.3.2.

The safety dimensions shall be in accordance with Table 2 and Figure 4.

Table 2

Safety dimensions (see Figure 4)	a	b	c	d
mm	8	15	25	25

The opening space between the bowl and the movable guard (see Figure 4a) and Figure 4b)) shall be less than or equal to 8 mm in the working position.

The distance between the rear edge of the protective device and the nearest point of the machine (see Figure 4a) and Figure 4b)) shall be less than or equal to 15 mm in the working position.

The opening space between the upper edge of the bowl and lower edge of the interlocked guard shall be less than or equal to 25 mm when the interlocking device is actuated (see Figure 4c) and Figure 4d)).

The opening space between the edge of the interlocked guard and the frame of the machine shall be less than or equal to 25 mm when the interlocking device is actuated (see Figure 4).