

BS EN 12041:2014



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Food processing machinery — Moulders — Safety and hygiene requirements

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee MCE/3/5, Food industry machines.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Food processing machinery - Moulders - Safety and hygiene requirements

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

Nahrungsmittelmaschinen - Langwirkmaschinen -
Sicherheits- und Hygieneanforderungen

This European Standard was approved by CEN on 13 September 2014.

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Foreword

This document (EN 12041:2014) 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of an identical text or by endorsement, at the latest by May 2015 and conflicting national standards shall be withdrawn at the latest by May 2015.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 12041:2000+A1:2009.

This document has been prepared under a Mandate given to CEN by the Commission of 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 standard.

Significant changes:

The significant changes with respect to the previous edition EN 12041:2000+A1:2009 are listed below:

- normative references updated;
- addition of 3 new definitions: flattening, rolling and elongating;
- more detailed and clearer description of the moulders Type 2 and Type 3;
- increase of the safety distances;
- clauses/subclauses technically updated: 5.2.2 (zone 1 – feeding area), 5.2.4 (zone 4 – input and output devices), 5.3.2 (electromagnetic phenomena), 5.9 (ergonomic principles), Clause 6 (verifications), Clause 7 (information for use), Annex A (noise test code) and Annex B (principles of design);
- new subclauses: 5.2.5 (flour duster), 5.7 (protection against dust emission) and 7.1 (signals and warning);
- addition of the emergency stop: 5.5.

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 applies to the design and manufacture of moulders of the types described from 3.2.1 to 3.2.4 and illustrated in Figure 1 to Figure 3.

These moulders are used separately or in a line in the food industry and shops (pastry-making, bakeries, confectionery, etc.) for flattening, rolling and, but not necessarily, elongating pieces of dough. These machines can be fed by hand or mechanically.

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

1.2 This European Standard does not deal with:

- designs of moulder other than those described from 3.2.1 to 3.2.4;
- experimental and testing machines under development by the manufacturer;
- domestic appliances;
- bagel machines;
- additional hazards generated when the machine is used in a line;
- dough and pastry brakes (see EN 1674).

1.3 This document 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*

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

EN 894-4:2010, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 4: Location and arrangement of displays and control actuators*

EN 1672-2:2005+A1:2009, *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 60204-1:2005, modified)*

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

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

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

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

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

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*

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)*

3 Term, definition and description

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

flattening

transformation of the lump of dough into a flat piece, the shape of which depends on the form of the lump; for instance a pre-rounded lump can be transformed into a round or oval shape disc

3.1.2

rolling

transformation of the flattened dough lump into a short cylindrical shape

3.1.3

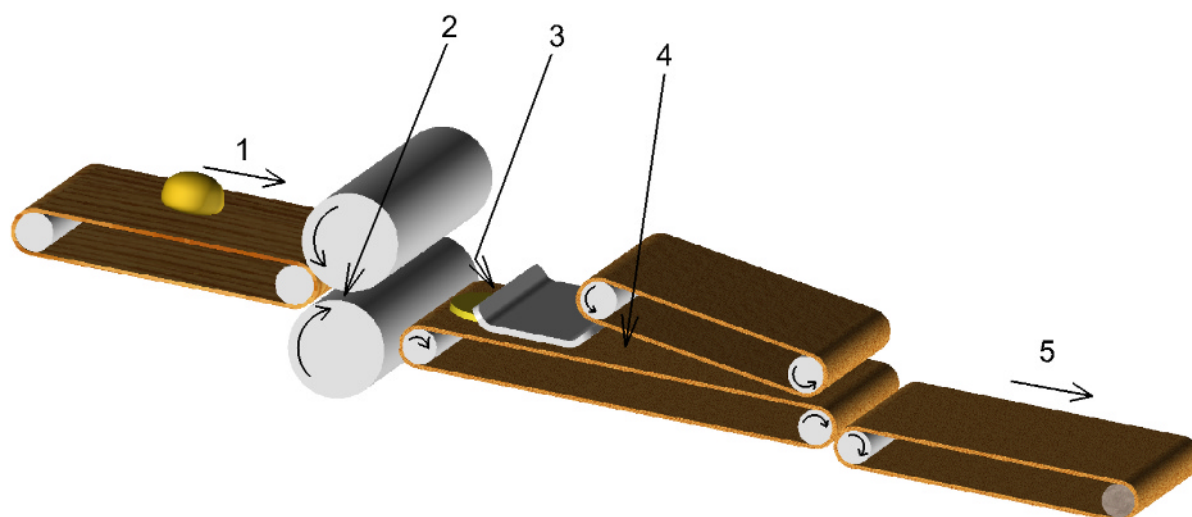
elongating

transformation of a short cylindrical shape of dough into a long cylindrical shape

3.2 Description

3.2.1 General

Machines may be manually or automatically fed (for example by discharge conveyor from the intermediate prover, see Figure 1). Dough pieces are flattened between at least two cylinders (2), rolled between at least two surfaces (e.g. two moving belts, or one belt and a fixed plate, or one belt and a fixed band) (3), and, but not necessarily, elongated (4) in the same way (see Figure 1). Discharge may be manual or by conveyor. The machine can be equipped with a flour duster.



Key

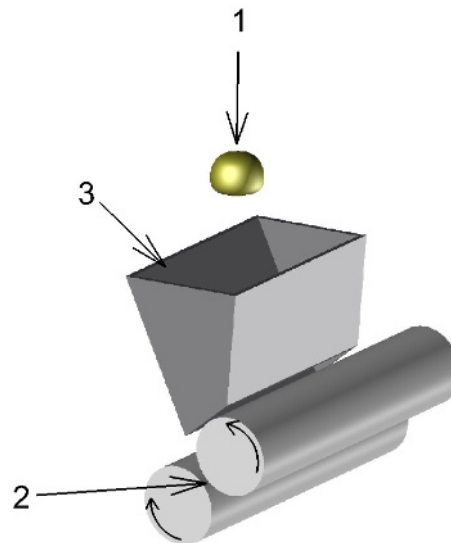
- 1 feeding (by belt)
- 2 flattening
- 3 rolling
- 4 elongating
- 5 discharge

Figure 1 — General principle

3.2.2 Type 1: Moulder with manual feeding by gravity

These machines are used mainly to produce long bread with soft dough (e.g. French baguette) (see Figure 2 and Figure 4).

NOTE Product quality depends on careful handling of the dough and in particular on manual introduction of the dough without any excessive drop.



Key

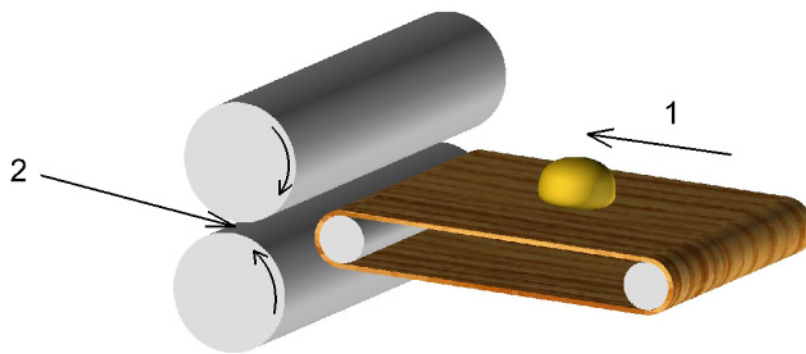
- 1 feeding
- 2 flattening
- 3 feed chute

Figure 2 — Feeding by gravity

3.2.3 Type 2: Compact moulder without elongating system and with feeding by belt

These machines without a specific elongating action are used mainly to produce rolled bread with soft or hard dough. The piece of dough is manually placed on the inlet conveyor belt (see Figure 2 and Figure 11) or can pass onto it by gravity, transfer, etc., from other machines (conveyor belts, intermediate provers, etc.), at different angles from the axes of cylinders in order to obtain several shapes of bread (e.g. banana, mantovane, barillini, bocconcini, etc.).

NOTE The flattened piece of dough is rolled by two counter-rotating belts, which are placed one over the other, divergent towards the outlet and with different linear speeds. When the rolled piece of dough comes out from the above said rolling belts, it passes to a rigid plate, which can be under the infeed belt or at the opposite side or at both sides (see the example shown in Figure 11), or to a conveyor belt (like the “discharge belt” (5) in Figure 1), different from the belts which carry out the dough rolling action.



Key

- 1 feeding
- 2 flattening

Figure 3 — Feeding by belt

3.2.4 Type 3: Moulder with elongating system and with feeding by belt

These machines are mainly suitable for producing large rolled bread (long loaves) laminating, rolling and elongating pieces of (usually) soft dough. The piece of dough is placed on the inlet conveyor belt (see Figure 3 and Figure 6) manually or can pass onto it by gravity, transfer etc. from other machines (conveyor belts, intermediate provers, etc.).

The machine can be equipped also with two bars between which the rolled dough pass during the elongation phase for limiting the length of the long loaves and flattening their ends (e.g. long loaves for tin bread).

The product outlet can be as described for the type-2 moulder; it can also fall by gravity in a special container (e.g. long loaves for tin bread).

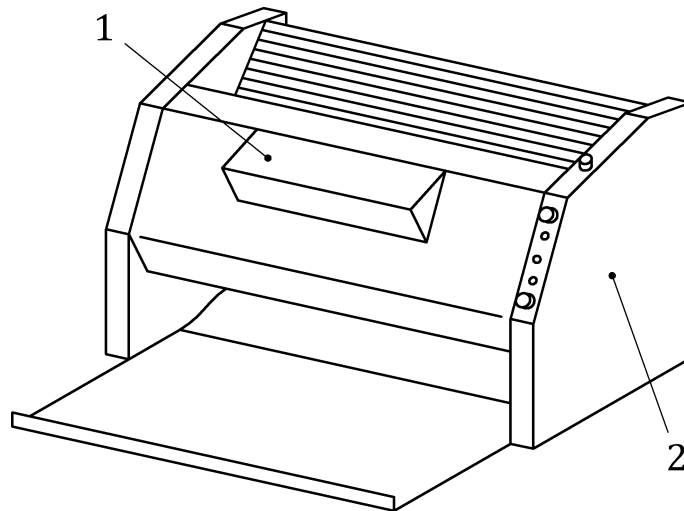
4 List of significant hazards

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).

Figures 4, 5 and 6 show the danger zones.

Table 1 –List of significant hazards

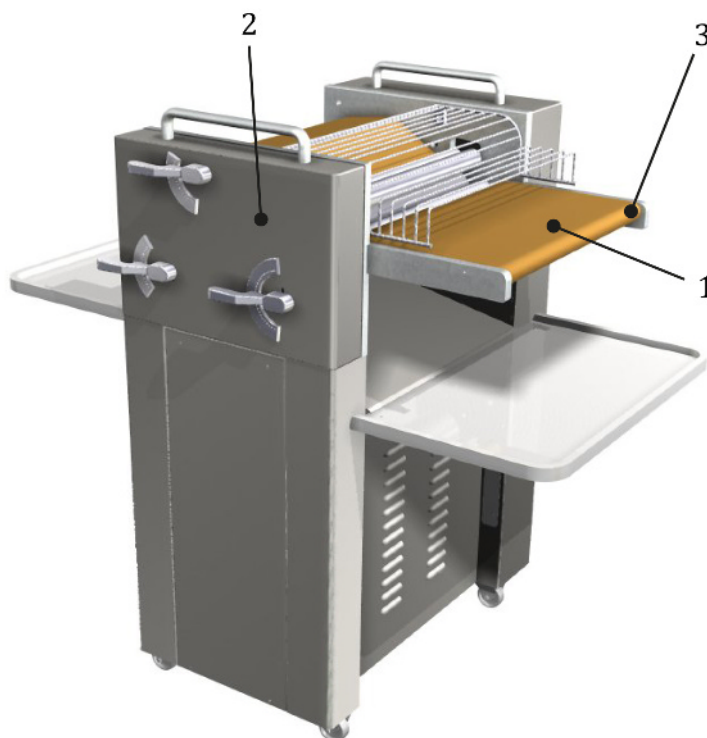
Hazards, hazardous situations and hazardous events	Location or cause	Clause/subclause in this European Standard
Mechanical hazards (see Figures 4, 5 and 6)		5.2
— drawing-in and crushing	Zone 1 – Feeding area (hazardous inrunning nips)	
— trapping, shearing and entanglement	Zone 2 – Drive mechanism	
— drawing-in and crushing	Zone 3 – Input and output devices (hazardous inrunning nips)	
Electrical hazards	Electric shock from direct or indirect contact with live components	5.3
	Electromagnetic disturbance	5.3
	External influences on electrical equipment (e.g. cleaning with water)	5.4
Stopping of the machine	No access to the normal OFF of the machine	5.5
Hazards generated by noise	Hearing damage, accidents due to interference with speech communication and interference with the perception of acoustic signals	5.6 7.2
Hazards generated by materials and substances (inhalation of dust)	Flour dusters	5.7
Hazards generated by neglecting hygienic design principles	e.g. contamination by microbial growth or foreign materials	5.8
Hazards generated by neglecting ergonomic principles	During operation, cleaning and maintenance	5.9



Key

- 1 zone 1 – feeding area
- 2 zone 2 – drive mechanism

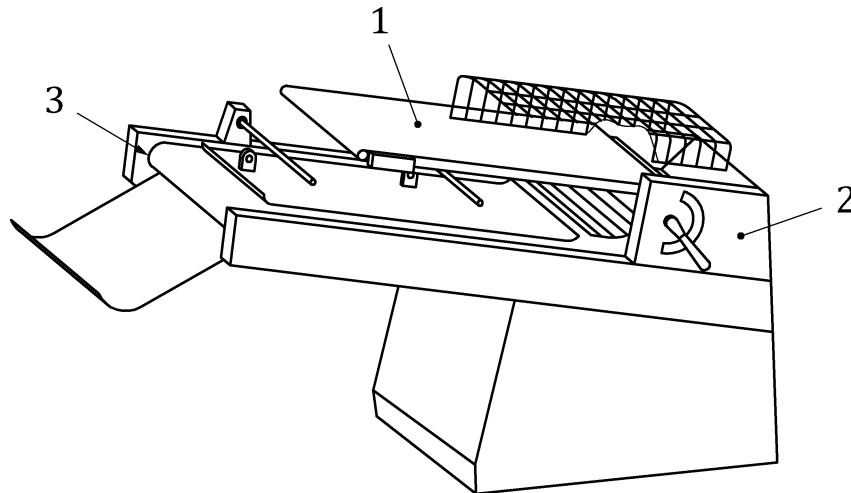
Figure 4 — Danger zones of type 1 moulders



Key

- 1 zone 1 – feeding area
- 2 zone 2 – drive mechanism
- 3 zone 3 – input and output devices

Figure 5 — Danger zones of a type 2 moulder



Key

- 1 zone 1 – feeding area
- 2 zone 2 – drive mechanism
- 3 zone 3 – input and output devices

Figure 6 — Danger zones of a type 3 moulder

5 Safety and hygiene requirements and/or 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.

5.2 Mechanical hazards

5.2.1 General

Where reference is made to interlocking devices throughout Clause 5, they can be interlocked without guard locking and shall comply with EN ISO 14119:2013, Clauses 5, 7 and 8.

Where the interlocking mechanism has movable parts, e.g. position switches, these shall be protected from contamination with dough or dry ingredients, e.g. by mounting them within the machine body.

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.

The stopping time of the machine, when protective devices (e.g. interlocking guards, trip device) are actuated, shall be less than or equal to 1 s from their actuation. Restarting shall only be possible by actuating the starting control.

5.2.2 Zone 1: Feeding area

5.2.2.1 General

Access to the hazard zone (gap between the rollers) shall be prevented.

Moulders shall be equipped with an interlocking guard and/or a device preventing the introduction of the hand into the danger zone through the feeding devices (see 5.2.2.2 and 5.2.2.3).

The surface of the rollers shall be smooth and without groove or crevice, except for the Type 3 moulder.

5.2.2.2 Type 1: manual feeding by gravity

Restricting access to zone 1 shall be achieved by means of one of the following devices:

- a mechanical device with dimensions according to Figure 7;
- a feed chute which acts as a tripping device (see Figure 8);
- a feed chute with a tripping device (e.g. a pressure sensitive bar, a pressure sensitive edge) at the top of the hopper (see Figure 9).

The upper edge of the feed chute shall be at a minimum distance of 230 mm of the hazard zone (see Figure 8 and Figure 9).

The distance between the upper edge of the feed chute and the trip device shall be less than 20 mm (see Figure 8 and Figure 9).

The trip device shall be actuated between the resting position and the upper edge of the feed chute (see Figure 8 and Figure 9).

The width of the upper opening of the feed chute shall be less than or equal to 160 mm.

The distance between the upper edge of the feed chute and the floor shall be more than or equal to 1 400 mm. For machines that are too small to be placed directly on the floor (e.g. machines standing on a table), this requirement shall be specified in the instruction handbook (see 7.3).

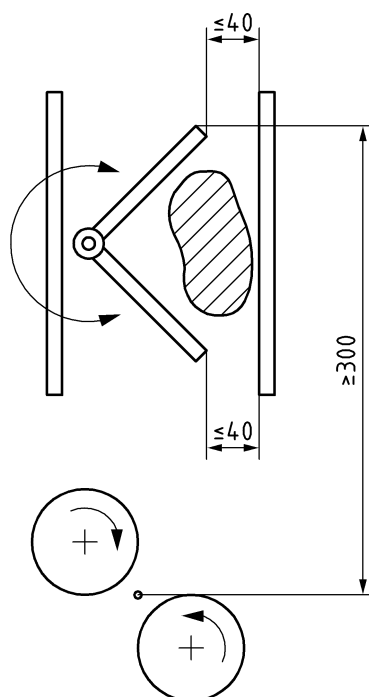


Figure 7 — Feed chute with mechanical device