SLOVENSKI STANDARD
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SIST EN 12012-1:2007+A1:2008
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Stroji za predelavo gume in plastike - Drobilni stroji - 1. del: Varnostne zahteve za rezalne drobilnike in drobilnike

Plastics and rubber machines - Size reduction machines - Part 1: Safety requirements for blade granulators and shredders

Kunststoff- und Gummimaschinen - Zerkleinerungsmaschinen - Teil 1: Sicherheitsanforderungen für Schneidmühlen und Schredder

Machines pour les matières plastiques et le caoutchouc - Machines à fragmenter - Partie 1 : Prescriptions de sécurité relatives aux granulateurs à lames et aux déchiqueteurs

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83.200	Oprema za gumarsko industrijo in industrijo polimernih materialov	Equipment for the rubber and plastics industries

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English Version

Plastics and rubber machines - Size reduction machines - Part 1: Safety requirements for blade granulators and shredders

Machines pour les matières plastiques et le caoutchouc - Machines à fragmenter - Partie 1 : Prescriptions de sécurité relatives aux granulateurs à lames et aux déchiqueteurs

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This European Standard was approved by CEN on 9 March 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 12012-1:2018) has been prepared by Technical Committee CEN/TC 145 “Plastics and rubber machines”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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.

This document supersedes EN 12012-1:2007+A1:2008 and EN 12012-3:2001+A1:2008.

Compared with the previous versions of EN 12012-1:2007+A1:2008 and EN 12012-3:2001+A1:2008, the following significant technical changes have been made:

— the contents of EN 12012-1 and EN 12012-3 have been merged into this standard;

— the performance levels and safety integrity levels of safety related parts of control systems have been specified in accordance with EN ISO 13849-1:2015 and EN 62061:2005;

— the hazards related to the break of the cutting chamber have been removed because reliable chambers represent now the state of the art (no projections have been reported from a broken cutting chamber for a long time);

— requirements about rotor blocking device have been modified considering the design of the drive system;

— hazards due to neglecting ergonomic principles have been considered;

— the annex for noise measurement has been revised.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

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

1 Scope

This European Standard specifies the essential safety requirements applicable to the design and construction of blade granulators and shredders used to reduce the size of products made from plastics and/or rubber.

Machines considered in this European Standard begin at the outer edge of the feeding device/feed opening and end at the discharge area.

This European Standard deals with all significant hazards, hazardous situations or hazardous events during all phases of the machine life cycle (see Annex A), when blade granulators and shredders are used as intended and under conditions of misuse that are reasonably foreseeable by the manufacturer.

This European Standard does not deal with:

— equipment for feeding material or discharging processed material that is not an integral part of the machine;

— machines intended to process materials that could be hazardous to health or flammable materials (e.g. expanded foam material).

This European Standard is not applicable to blade granulators and shredders that are manufactured before the date of its publication.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 574:1996+A1:2008, *Safety of machinery - Two-hand control devices - Functional aspects - Principles for design*

EN 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 62061:2005, *Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005)*

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 3746:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:2010)*

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

EN ISO 9614-2:1996, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2:1996)*

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 11202:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections (ISO 11202:2010)*

EN ISO 11204:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections (ISO 11204:2010)*

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

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

EN ISO 13855:2010, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

EN ISO 13856-2:2013, *Safety of machinery - Pressure-sensitive protective devices - Part 2: General principles for design and testing of pressure-sensitive edges and pressure-sensitive bars (ISO 13856-2:2013)*

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)*

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

EN ISO 14122-2:2016, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2016)*

EN ISO 14122-3:2016, *Safety of machinery - Permanent means of access to machinery - Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14122-4:2016, *Safety of machinery - Permanent means of access to machinery - Part 4: Fixed ladders (ISO 14122-4:2016)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
blade granulator/shredder
machine that cuts material within a cutting chamber until the size has been reduced so that the product is allowed into the discharge area (see Figure 1 and Figure 2)

Note 1 to entry Typically, granulators are high-speed machines (about 400 RPM) while shredders are low-speed machines (about 100 RPM).

3.2
cutting chamber
part of the machine where size reduction takes place

3.3
rotor
rotating device including the shaft and cutting tools (usually blades) inside the cutting chamber

Note 1 to entry Rotors can be one or more (see Figure 3).

3.4
stationary cutting tool
single or multiple cutting tool(s) (usually blades) fixed inside the cutting chamber

3.5
feeding area
area of the machine where the feeding of material takes place

3.6
feeding device
integral part of the machine (e.g. feeding hopper or similar device, rollers, screws) used for feeding the material into the cutting chamber

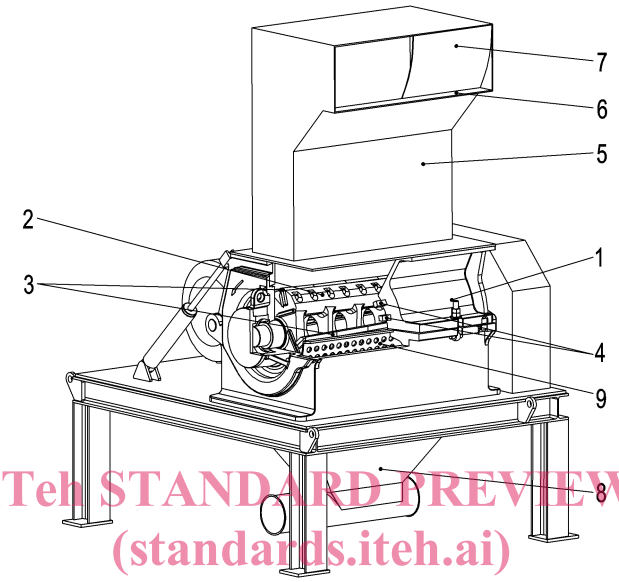
3.7
screen
perforated rounded sheet fitted at the discharge side of the cutting chamber, to allow the passage of granulate or finished product of suitable size into the discharge area

3.8
working level
surface on which the person who feeds the machine stands

3.9
loading table
surface for placing material to be fed into the machine

3.10
discharge area
area where the product leaves the cutting chamber

3.11
pusher
device used to push the material toward the rotor(s)



Key

1	cutting chamber	6	feeding opening
2	rotor	7	protective flap
3	rotor blade	8	discharge area
4	stationary cutting tools	9	screen
5	feeding hopper		

Figure 1 — Example of a blade granulator