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Stroji za predelavo gume in plastike - Drobilni stroji - 4. del: Varnostne zahteve za aglomeratorje

Plastics and rubber machines - Size reduction machines - Part 4: Safety requirements for agglomerators

Kunststoff- und Gummimaschinen - Zerkleinerungsmaschinen - Teil 4: Sicherheitsanforderungen für Agglomeratoren

Machines pour les matières plastiques et le caoutchouc - Machines à fragmenter - Partie 4: Prescriptions de sécurité relatives aux agglomérateurs

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Plastics and rubber machines - Size reduction machines - Part 4: Safety requirements for agglomerators

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If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12012-4:2017) has been prepared by Technical Committee CEN/TC 145 “Plastics and rubber machines”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document will supersede 12012 4:2006+A1:2008.

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.

The main changes compared to the previous version are:

— the performance levels / safety integrity level of safety related parts of control systems have been specified in accordance with EN ISO 13849-1:2008 / EN 62061:2005;

— feed opening of big dimension are considered;

— requirements for moving parts of feed and discharge systems;

— the annex for noise measurement has been revised.

Introduction

This document 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);

— consumers (in case of machinery intended for use by consumers).

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 agglomerators used to densify plastic scrap, reducing its size and/or volume.

The limits of the agglomerator are as follows:

— the outer edge of the feed opening, or the outer edge of the fixed feed device when it is an integral part of the machine or the interface between the agglomerator chamber and the feed system, when it is not an integral part of the machine and

— the outer edge of the discharge opening of the agglomerator chamber or the integral discharge system or the interface between the agglomerator chamber and the discharge system, when it is not an integral part of the machine.

When the feed or discharge device is covered by a specific type C standard (e.g. EN 1114-1 for extruder) this should be applied.

Only the significant hazards listed in Annex A and dealt with in Clause 5 are subject to this European Standard.

This European Standard does not deal with hazards caused by processing materials which, when heated, may lead to a risk of fire and release of toxic gases.

This European Standard does not deal with hazards caused by upstream and/or downstream equipment.

This document is not applicable to agglomerators manufactured before the date of its publication.

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 1037, *Safety of machinery — Prevention of unexpected start-up*

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

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

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, *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)*

EN ISO 3746, *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)*

EN ISO 3747, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering/survey methods for use in situ in a reverberant environment (ISO 3747)*

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

EN ISO 9614-1, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 1: Measurement at discrete points (ISO 9614-1)*

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

EN ISO 11201, *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)*

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 11203, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level (ISO 11203)*

EN ISO 11204, *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)*

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

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

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

EN ISO 13856-2, *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)*

EN ISO 13856-3, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices (ISO 13856-3)*

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 14122-1, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access (ISO 14122-1)*

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

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

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

3 Terms and definitions

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

3.1
agglomerator
machine (sometimes called densifier) for reducing the size and volume of thermoplastic scrap in a chamber. The material is cut, kneaded, mixed, or heated by friction and, thus, densified, if required by using water. Feeding the scrap can be by hand or by feed system

3.2
opening in the agglomerator chamber
opening designed and constructed for feeding the material, discharging the material, inspecting the process inside the agglomerator chamber and/or maintaining the blades

3.3
blade
cutting/kneading tool, that can be fixed or rotating and is used to cut/knead and heat by friction the material being processed

3.4
feed system
power operated equipment (conveyor belts, nip roll feeders, feed screws etc.) that is an integral part of the machine used to feed the agglomerator

3.5
fixed feed device
non power operated equipment (hopper, feed table etc.) used to feed the agglomerator

3.6
discharge system
power operated equipment that is an integral part of the machine such as output slides etc. used to discharge the material from the agglomerator chamber

4 Safety requirements and/or protective measures

4.1 General

Machinery shall comply with the safety requirements and/or protective/risk reduction measures of this Clause 4. In addition, the machine shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards that are not dealt with by this document.

The safety functions performed by the control system shall be in accordance with EN ISO 13849-1 or EN 62061 and the required performance levels (PL_r) or Safety Integrity Levels (SIL) are given in the relevant sub-clauses.

4.2 Mechanical hazards

4.2.1 Access through openings in the agglomerator chamber

Access to the dangerous movements of the parts in the agglomerator chamber through openings shall be prevented by one or more of the following:

— design,

— fixed guards as defined in EN ISO 14120:2015, 3.2,

— interlocking guard with guard locking as defined in EN ISO 14119:2013, 3.5, such that the guard remains closed and locked until all motions of the blade has ceased;

— safety related parts of the control system shall be according to:

  — PLr=d or SIL=2 for the interlocking function and

  — PLr=c or SIL=1 for the locking function.

Safety distances shall be in accordance with EN ISO 13857:2008, Table 2, Table 3, Table 4 and/or Table 6.

If the fixed feed device or feed system, or the part of the agglomerator chamber containing the feed opening, or the discharge system, is capable of being moved out of position and the resulting access to the agglomerator chamber does not comply with the above safety distances of EN ISO 13857:2008, then it shall act as an interlocking guard with guard locking as defined in EN ISO 14119:2013, 3.5 such that it remains locked in position until all motion of the blade has ceased. Safety related parts of the control system shall be according to:

— PLr=d or SIL=2 for the interlocking function and

— PLr=c or SIL=1 for the locking function.

To avoid any motion of movable parts during the changing or adjusting of blades, appropriate devices and/or tools shall be provided.

The temperature of the material shall be controlled in order to prevent the blocking of the rotating blades, see 6.1.12.

If the dimensions of the feed opening are greater than 0,40 m in height and 0,50 m in width, falling through the feed opening shall be prevented by the lower edge of the opening positioned at a minimum height of 1,40 m from the working level.

See 6.1.3, 6.1.4, 6.1.5, 6.1.6 and 6.1.7.