SLOVENSKI STANDARD
SIST EN 1612:2020

01-januar-2020

Nadomešča:
SIST EN 1612-1:2000+A1:2008

Stroji za predelavo gume in plastike - Stroji in naprave za tlačno litje - Varnostne zahteve

Plastics and rubber machines - Reaction moulding machines and plants - Safety requirements

Kunststoff- und Gummimaschinen - Reaktionsgießmaschinen und -anlagen - Sicherheitsanforderungen

Machines pour les matières plastiques et le caoutchouc - Machines et installations de moulage par réaction - Prescriptions de sécurité

Ta slovenski standard je istoveten z: **EN 1612:2019**

ICS:

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

SIST EN 1612:2020 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1612

October 2019

ICS 83.200

Supersedes EN 1612-1:1997+A1:2008

English Version

Plastics and rubber machines - Reaction moulding machines and plants - Safety requirements

Machines pour les matières plastiques et le caoutchouc - Machines et installations de moulage par réaction - Prescriptions de sécurité

Kunststoff- und Gummimaschinen - Reaktionsgießmaschinen und -anlagen - Sicherheitsanforderungen

This European Standard was approved by CEN on 21 July 2019.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 1612:2019) 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of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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 will supersede EN 1612-1:1997+A1:2008.

In comparison with the previous edition, the following technical modifications have been made:

— clarification that reaction moulding machines and plants are dealt with;

— revised type-A and type-B standards are taken into account;

— list of significant hazards moved into an informative annex;

— the performance levels of safety related parts of control systems are specified in accordance with EN ISO 13849-1:2015;

— technical specifications for moulding and transport equipment safeguarding are given;

— technical specifications for positioning of the emergency stop devices are given;

— the annex for noise measurement and declaration has been revised.

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 Directives.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 document specifies the essential safety requirements applicable to the design and construction of reaction moulding machines and plants as defined in 3.1 and 3.2.

This document deals with all significant hazards, hazardous situations or hazardous events during all phases of the machine life cycle (see EN ISO 12100:2010, 5.4), when reaction moulding machines and plants are used as intended and under conditions of misuse that are reasonably foreseeable by the manufacturer (see Annex A).

A reaction moulding machine begins at the working tank(s) and ends at the mixing head(s).

A reaction moulding plant begins at the working tank(s) and ends at the product shaping and transport equipment or at the moulding equipment (see 3.6 and 3.7).

This document is not applicable to reaction moulding machines and plants manufactured before the date of its publication.

NOTE Reaction moulding machines and plants usually do not produce explosive atmospheres. Where materials are processed, which may cause an explosive atmosphere, the Directive 2014/34/EU on the Equipment intended for use in Potentially Explosive Atmospheres (ATEX) can be applied.

Explosion hazards are not dealt with in this document.

Fire hazards are not dealt with in this document.

This document does not cover the requirements for the design of the exhaust systems.

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 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 614-2:2000+A1:2008, *Safety of machinery — Ergonomic design principles — Part 2: Interactions between the design of machinery and work tasks*

EN 1005 (all parts), *Safety of machinery — Human physical performance*

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61496-1:2013, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2012)*

[1] As impacted by EN 60204-1:2006/A1:2009.

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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

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

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 13849-1:2015, *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 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors (ISO 13856-1:2013)*

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)*

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
reaction moulding machine
machine that consists of at least one working tank, a metering unit and a mixing head

3.2
reaction moulding plant
complex installation for reaction moulding which consists of one or more reaction moulding machine(s), a moulding equipment or a product shaping and transport equipment for the feeding of products

Note 1 to entry: See 3.1, 3.6 and 3.7.

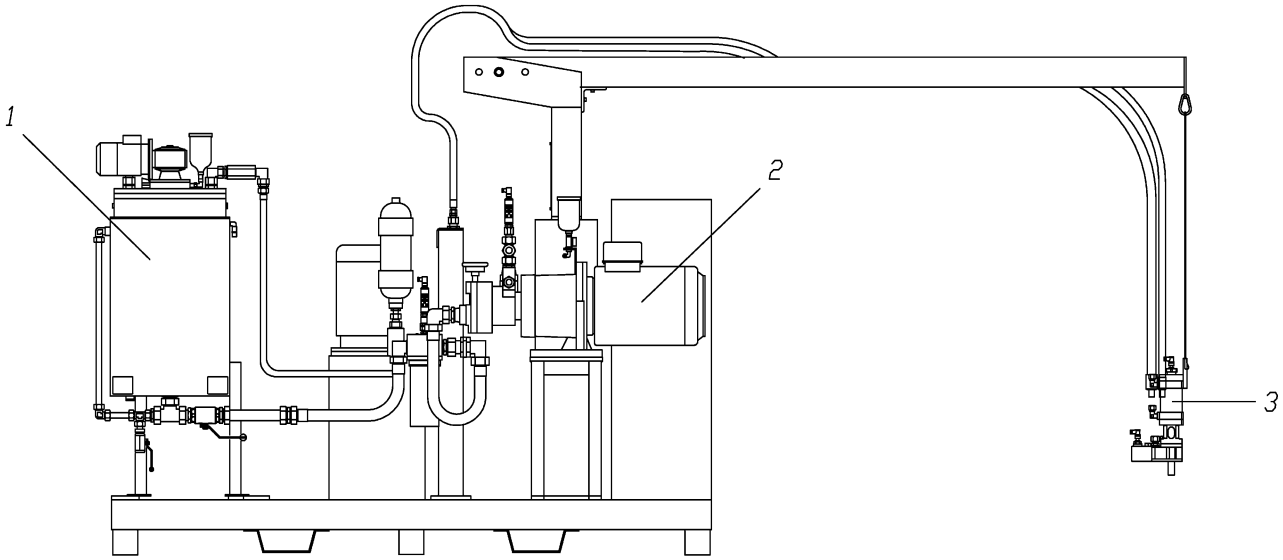
3.3
working tank
tank which is part of the reaction moulding machine and contains at least one of the components

Note 1 to entry: See Figure 1.

Note 2 to entry: One tank may be used for each component or a mixture of more components.

3.4
mixing head
part of the reaction moulding machine for mixing components and delivery that can be manually operated or powered

Note 1 to entry: See Figure 1.



Key

1 working tank

2 metering unit

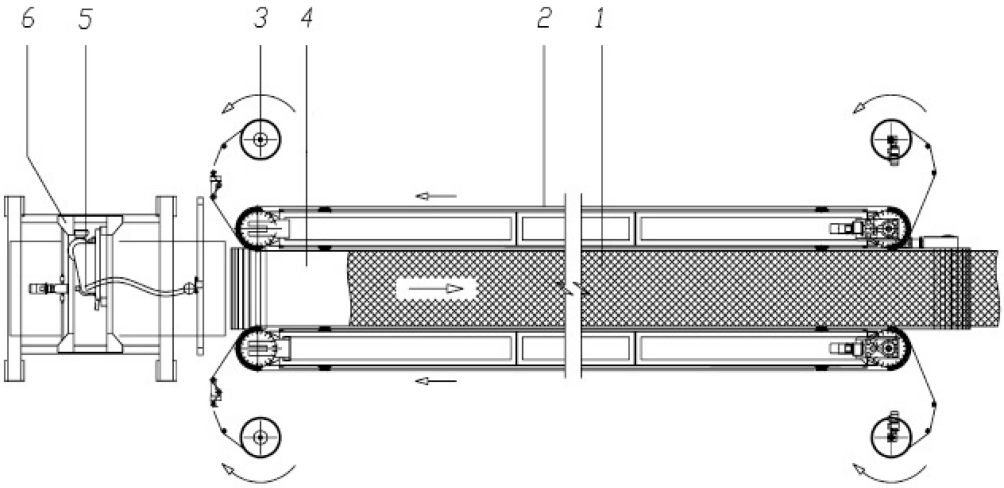
3 mixing head

Figure 1 — Example of reaction moulding machine (side view)

3.5
components
chemical and mineral components that need to be mixed in the process to produce the final product

3.6
product shaping and transport equipment
part of the plant for the transport and shaping of the continuous product

Note 1 to entry: See Figure 2.



Key

1 product

2 side wall of product shaping and transport equipment for limiting the width of the product

3 equipment for feeding side cover sheet

4 product shaping and transport area

5 mixing head

6 equipment for manipulating the mixing head

Figure 2 — Product shaping and transport equipment (top view)

3.7
moulding equipment
equipment for continuous or discontinuous production of cured parts by one or more moulds

Note 1 to entry: See Figure 3 and Figure 4.

3.8
mould transport equipment
part of the plant for the transport of the moulds for continuous production

Note 1 to entry: Loading/unloading could be automatic or manual in a restricted area that is not shown in the figures.

3.9
non-electrically controlled mixing head
mixing head opened and closed mechanically