



SLOVENSKI STANDARD
SIST EN 1612-1:2000+A1:2008
01-november-2008

Plastice in gume stroji - Reakcijske strojevalnice - Del 1: Varnostni zahtevi za merilne in mešalne enote

Plastics and rubber machines - Reaction moulding machines - Part 1: Safety requirements for metering and mixing units

Kunststoff- und Gummimaschinen - Reaktionsgießmaschinen - Teil 1: Sicherheitsanforderungen an Misch- und Dosiereinheiten

Machines pour les matières plastiques et le caoutchouc - Machines de moulage par réaction - Partie 1: Prescriptions de sécurité relatives aux unités de dosage et de mélange

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Ta slovenski standard je istoveten z: EN 1612-1:1997+A1:2008

ICS:

83.200	Oprema za gumarsko industrijo in industrijo polimernih materialov	Equipment for the rubber and plastics industries
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SIST EN 1612-1:2000+A1:2008 en,fr

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1612-1:1997+A1

August 2008

ICS 83.200

Supersedes EN 1612-1:1997

English Version

Plastics and rubber machines - Reaction moulding machines - Part 1: Safety requirements for metering and mixing units

Machines pour les matières plastiques et le caoutchouc -
Machines de moulage par réaction - Partie 1: Prescriptions
de sécurité relatives aux unités de dosage et de mélange

Kunststoff- und Gummimaschinen -
Reaktionsgießmaschinen - Teil 1:
Sicherheitsanforderungen an Misch- und Dosiereinheiten

This European Standard was approved by CEN on 11 July 1997 and includes Amendment 1 approved by CEN on 8 June 2008.

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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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 1612-1:1997+A1:2008) 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 February 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-06-08. The main changes compared to the previous version are:

- Modification of the main element of the title
- Editorial modification of Annex ZA
- Addition of Annex ZB
- editorial changes of EN 292-1:1991 to EN ISO 12100-1 and of EN 292-2:1991 to EN ISO 12100-2:2003 in the following clauses: Introduction, 2, 7.

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This document supersedes EN 1612-1:1997.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 and A1.

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This European Standard 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).

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. A1

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 1612-1:1997+A1:2008 (E)**Introduction**

This European Standard is a type C Standard as defined in **A1** EN ISO 12100 **A1**.

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery shall comply as appropriate with **A1** EN ISO 12100 **A1** for hazards which are not covered by this standard.

1 Scope

This standard specifies the health and safety requirements for the design of metering and mixing units for reaction moulding machines. The significant and specific hazards are listed in clause 4 and are dealt with in this standard.

This standard does not cover completely the hazards arising from the use of highly flammable additives, for example, pentane used as a blowing agent (see 4.7), because these hazards depend to a large extent on the additives and processes used.

This standard does not cover the hazards arising from the assembly of separate units not supplied at the same time by the same manufacturer.

This standard does not cover the hazards arising from the movement of powered mixing heads; for these, see **A1** EN 1612-2 **A1**.

This standard applies to metering and mixing units manufactured after the date of publication of this standard.

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2 Normative references

This standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

A1 *deleted text* **A1**

EN 418:1992, *Safety of machinery - Emergency stop equipment, functional aspects - Principles for design*

EN 563, *Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish limit values for hot surfaces*

EN 954-1, *Safety of machinery - Safety related parts of control systems - Part 1: General principles for design*

A1 EN 1005 **A1**, *Safety of machinery – Human physical performance*

EN 60204-1:1992, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* **A1** (IEC 60204-1:1992, modified) **A1**

A1 EN ISO 12100-1, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology* (ISO 12100-1:2003)

EN ISO 12100-2:2003, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003)* ^(A1)

3 Definitions

For the purposes of this standard, the following definitions apply (see figure 1):

3.1

working tank

a tank which is part of the metering and mixing unit and contains one of the components

3.2

metering unit

a unit for metering the components

3.3

mixing head

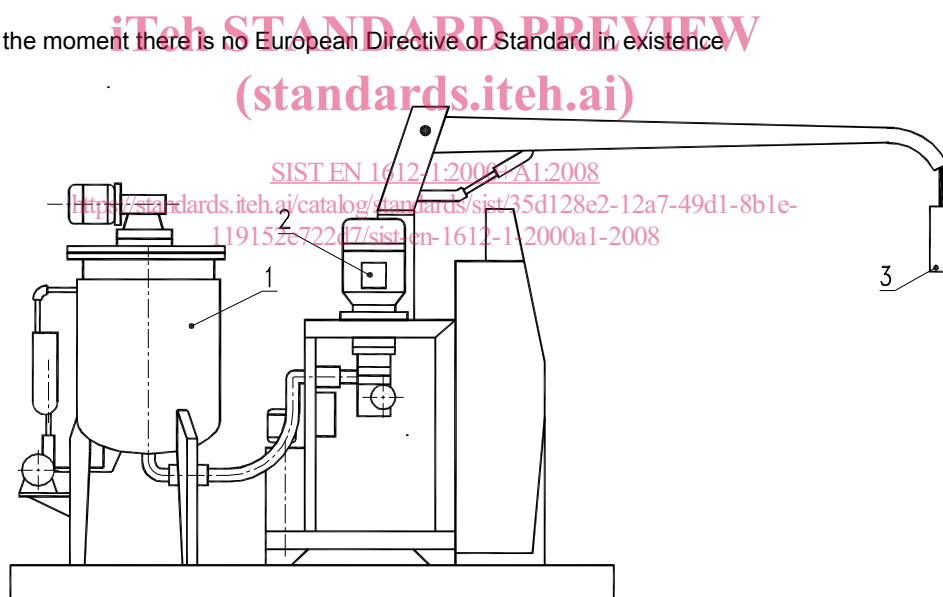
the part of the metering and mixing unit for mixing and delivery which can be manually operated or powered (if powered, see ^(A1) EN 1612-2 ^(A1))

3.4

highly flammable additive

an additive with a flash point $\leq 21^{\circ}\text{C}$

NOTE For the moment there is no European Directive or Standard in existence



Key

- 1 working tank
- 2 metering unit
- 3 mixing head

Figure 1 — Example of a metering and mixing unit

EN 1612-1:1997+A1:2008 (E)**4 List of hazards**

4.1 Hazards due to moving couplings

4.2 Hazards due to instability

4.3 Hazards due to whiplash of hoses following rupture or disconnection

4.4 Hazards due to fluid ejection

4.5 Hazards due to overpressure

4.6 Hazards due to elevated temperatures of manually operated mixing heads which can cause either burns or unexpected reactions on the part of the operator

4.7 Hazards due to contact with the components, additives or a mixture of them or due to the inhalation of gases dangerous to health

— During manual filling of the working tanks;

— Due to leakage;

— During delivery of product through the mixing head.

4.8 Hazards due to incorrect connection of hoses

4.9 Hazards due to explosion where highly flammable additives are used

4.10 Hazards due to neglect of ergonomic principles

4.11 Electrical hazards

4.12 Hazards due to failure of the control circuit

5 Safety requirements and/or measures**5.1 Hazards due to moving couplings**

The exposed couplings between pumps and motors shall be protected by fixed guards.

5.2 Hazards due to instability

Where independent fixings are used to support the mixing head they shall be bolted to the floor. See also clause 7.

5.3 Hazards due to whiplash of hoses

Whiplash of hoses shall be prevented, for example by:

— Binding the hoses together;

- Attaching the hoses to a fixed part.

This shall be done at least every 75 cm.

In addition, flexible hoses and their connections shall be designed to prevent tearing from their fittings and unintentional detachment from connection points.

Flexible hoses shall not be used to support the mixing head.

5.4 Hazards due to fluid ejection

Hose assemblies shall be marked at their connection points with the nominal pressure, month and year of manufacture and the name of the manufacturer.

Because of the need to replace hoses (see clause 7) a shot counter shall be provided for metering and mixing units which work at a pressure of more than 30 bar.

Adjustment devices on the mixing head, for example screws or pins shall be designed in such a way that they are retained in the head so that unintentional complete removal of these devices and the resulting outflow of fluids is prevented.

It shall not be possible for fluids to be released from the mixing head due to

- Failure of the energy supply and/or
- Unexpected restoration of the energy supply.

This may be achieved for example

- By means of a valve which shall automatically close in case of any failure of the energy supply;
- By a requirement to restart the machine at the control panel after any failure of the energy supply.

The safety related parts of the control system for the mixing head shall be of at least category 1 of EN 954-1.

5.5 Hazards due to overpressure

The metering and mixing unit shall be designed so that the pressure cannot exceed the maximum pressure specified by the manufacturer. This shall be achieved either:

- By limitation of the drive system for pumps or
- By one or more mechanical devices for example a pressure relief valve or bursting disc. Opening of the device(s) shall not give rise to emissions to the environment. This may be achieved for example by the relief valve being vented into a vessel to contain any liquid released.

5.6 Hazards due to elevated temperatures of manually operated mixing heads

Manually operated mixing heads where the temperature of the surface can exceed 50°C shall be provided with handles.

The temperature of the handles shall not exceed the limits set by EN 563. These handles shall be so designed that it is impossible for the operator to touch the mixing head whilst holding them.

5.7 Hazards due to contact or inhalation

For manual filling of working tanks, see clause 7.