



SLOVENSKI STANDARD
SIST EN 422:2009

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Stroji za predelavo gume in plastike - Pihalni stroji za oblikovanje - Varnostne zahteve

Plastics and rubber machines - Blow moulding machines - Safety requirements

Kunststoff- und Gummimaschinen - Blasformmaschinen - Sicherheitsanforderungen

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

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Equipment for the rubber and plastics industries

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EUROPEAN STANDARD
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English Version

Plastics and rubber machines - Blow moulding machines - Safety requirements

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

Kunststoff- und Gummimaschinen - Blasformmaschinen -
Sicherheitsanforderungen

This European Standard was approved by CEN on 13 May 2009.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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.

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

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EN 422:2009 (E)**Foreword**

This document (EN 422:2009) 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of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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 422:1995.

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 EC Directive(s).

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

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 the United Kingdom.

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Introduction

This European Standard is a type C standard as defined in EN ISO 12100-1:2003.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous 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.

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EN 422:2009 (E)**1 Scope**

This European Standard covers essential health and safety requirements for the design of blow moulding machines for the processing of plastics. The significant hazards inherent in blow moulding machines are listed in Clause 4.

This European Standard does not cover dip blow moulding machines.

This European Standard does not cover hazards due to the use of fluorine or other toxic fluids.

The safety requirements for the interaction between blow moulding machines and ancillary equipment are stipulated. The technical safety requirements for the design of this equipment are not covered.

This European Standard does not cover the requirements for the design of the exhaust system.

The European Standard does not cover noise hazards.

This European Standard is not applicable to blow moulding machines which are manufactured before the date of its publication as an EN. A transition period until 29 December 2009 is foreseen during which the manufacturer may choose to apply either this or the previous version of the standard.

2 Normative references

The following referenced documents are indispensable for the application 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.

- ITeh STANDARD PREVIEW**
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- <https://standards.iteh.ai/en/standards/sist-en-422-2009>
cbb6995c767f/sist-en-422-2009
- EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*
- EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*
- EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*
- EN 999:1998, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*
- EN 1760-2:2001, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*
- EN 60204-1:2006, *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 61000-6-2:2001, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards; Immunity for industrial environments (IEC 61000-6-2:1999, modified)*
- EN 61000-6-4:2001, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards; Emission standard for industrial environments (IEC 61000-6-4:1997, modified)*
- EN 61496-1:1997, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:1997)*

EN 61496-3:2001, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR) (IEC 61496-3:2001)*

EN ISO 12100-1:2003, *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)*

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 13732-3:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces (ISO 13732-3:2005)*

EN ISO 13849-1:2006, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

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 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of a fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

EN ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2004)*

ISO 7010 *Graphical symbols — Safety colours and safety signs — Safety signs used in workplaces and public areas*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

blow moulding machine

machine which expands a parison or preform to make a hollow article using fluid under pressure blown into a fixed or moving blow mould

3.2

area of movement of the moulds

area in which the moulds move, close or open, also including the actuating equipment

3.3

feed area

area of the extrusion head or of the injection nozzle or of the preform feeding device

3.4

cutting device

apparatus which cuts the parison at the exit of the extrusion head

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- 3.5
blowing station**
part of the machine in which the hollow articles are blown and stretched as appropriate and where the container aperture may be calibrated
- 3.6
delivery station**
part of the machine in which the blown parts are withdrawn from the blow mould and removed from the machine
- 3.7
cooling station**
part of the machine in which the blown parts are cooled after being withdrawn from the blow mould
- 3.8
finishing station**
part of the machine in which excess material is removed from the blown part
- 3.9
heating station**
part of the machine in which the temperature of the preform is adjusted before blowing
- 3.10
automatic machine**
machine where unloading (and/or loading) is achieved only without manual intervention
- 3.11
semi automatic machine**
machine where unloading (and/or loading) is achieved only with manual intervention or machine with a mode selector switch for selecting automatic or non automatic operation

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4 List of significant hazards**4.1 General hazards**

Crushing, shearing or impact due to the whiplash of flexible hoses under pressure in normal operation or in case of rupture or disconnection, see 5.1.4.

Injury by impact of ejected fluids or hot plastic materials, see 5.1.5.1.

Injury by injection under the skin of very high pressure cooling fluids, see 5.1.4.

Puncture by the blowing needles, see 5.2.1.

Crushing, shearing or impact due to movements associated with hydraulic and pneumatic accumulators, see 5.1.4.

Crushing, shearing or impact due to movements of power operated guards, see 5.1.5.1 and 5.3.1.

Crushing, shearing or impact due to movements of parts of the machine by gravity, see 5.1.6 and 5.1.12.

Electric shock or burns due to direct or indirect contact with live conductive parts, see 5.1.7.

Malfunction of the control circuits due to electromagnetic interference with the electrical equipment, see 5.1.7.

Burns and/or scalds (see 5.1.8) due to very high or low temperatures of:

- surfaces;
- the connecting hoses of the temperature control unit;
- fluid leakage;
- moulds, heating elements, plasticised material e.g. in injection blow moulding machines if the material is injected into incompletely closed moulds;
- extrusion head or injection nozzle, parison, ejected plastic material or gas (in the case of decomposition);
- cutting device;
- blowing gas, blowing needles or mandrels;
- parts accessible through the delivery aperture;
- hot conditioning fluid blown onto or into the preforms or parisons;
- cooling fluid;
- heating apparatus and surrounding parts;
- preforms or parisons.

Contact with, or inhalation of, harmful substances (see 5.1.9) that may be released from:

- the blowing gas;
- the cooling and conditioning fluids; or [SIST EN 422:2009](https://standards.iteh.ai/catalog/standards/sist/dd40a547-0cd2-4d1b-b591-cbb6995c767f/sist-en-422-2009)
- the processed plastic and the blown part when the mould is not completely closed (before blowing) or when the mould opens (after blowing).

Fire due to ignition of the plastic material when a hot cutting device is used, see 5.1.10.

Impact due to bursting of the blown parts when the moulds open (applicable only when moulded parts with volume greater than 20 litres are blown with pressure greater than 10 bar), see 5.1.11.

Crushing, shearing or impact during setting (see 5.1.12) due to movement of:

- the blowing mould and its parts;
- the blowing needles or mandrels;
- the stretch rods;
- the individual blowing stations (multistation machines);
- the rotary table;
- the injection unit;
- the insert loading system.