SLOVENSKI STANDARD

oSIST prEN 422:2008

01-april-2008

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

Ta slovenski standard je istoveten z: **prEN 422**

ICS:
83.200

oSIST prEN 422:2008 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 422

January 2008

ICS 83.200

Will supersede EN 422:1995

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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 145.

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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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Ref. No. prEN 422:2008: E

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Foreword

This document (prEN 422:2008) 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 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 Annex ZA, ZB and Annex A normative which is an integral part of this document.

Introduction

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

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

1 Scope

This 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.

The standard does not cover dip blow moulding machines.

This standard does not cover machines using fluorine or similar toxic blowing 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.

The standard does not cover the requirements for the design of the exhaust system.

This standard is not applicable to blow moulding machines which are manufactured before the date of its publication as EN.

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.

EN 294:1992, *Safety of machinery - Safety distances to prevent danger zones to be reached by upper limbs*

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 60204-1:2006, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

EN 60529:1991, *Degrees of protection provided by housing (IP Code) (IEC 529:1989)*

EN 61000-6-2:2001, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments*

EN 61000-6-4:2001, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

EN 61496-1:1997, *Safety of machinery – Electro-sensitive protective equipment – Part 1: General requirements and tests*

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)*

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

EN ISO 12100-2:2003, *Safety of machinery - Basic concepts, general principles for design - Technical principles*

EN ISO 13732-1:2006, *Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 1: Hot surfaces*

EN ISO 13732-3:2006, Ergonomics of the thermal environment – Methods for the assessment of human responses to contact with surfaces – Part 3: Cold surfaces

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

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

3.3
feed area
the area of the extrusion head or of the injection nozzle or of the preform feeding device

3.4
cutting device
the apparatus which cuts the parison at the exit of the extrusion head

3.5
blowing station
the 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
the part of the machine in which the blown parts are withdrawn from the blow mould and removed from the machine

3.7
cooling station
the part of the machine in which the blown parts are cooled after being withdrawn from the blow mould

3.8
finishing station
the part of the machine in which excess material is removed from the blown part

3.9
heating station
the 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.

4 List of significant hazards

NOTE The sequence of hazards in this clause corresponds with the sequence of the safety requirements and/or protective measures specified in clause 5.

4.1 General hazards

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

Injury by injection under the skin or impact of ejected fluids or hot plastic materials.

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

Crushing, shearing or impact due to movements of power operated guards.

Crushing, shearing or impact due to movements of parts of the machine by gravity.

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

Shock due to electrostatic discharge.

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

Burns and/or scalds 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;

— head or injection nozzle, parison, ejected plastic material or gas (in the case of decomposition);

— cutting device;

— blowing gas, blowing needle or mandrel;

— 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.

Hearing impairment, tinnitus, tiredness, stress, loss of balance or awareness, interference with speech communications or with the perception of acoustic signals caused by high noise levels arising from:

— hydraulic or pneumatic systems;

— impact or movements of mechanical parts;

— blowing and gas exhaust;

— bursting of blown parts.

Contact with, or inhalation of, harmful substances that may be released from:

— the blowing gas;

— the cooling and conditioning fluids; or

— 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.

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).

Crushing, shearing or impact during setting due to movement of:

— the blowing mould and its parts;

— the blowing needle or mandrel;

— the stretch rods;

— the individual blowing stations (multistation machines);

— the rotary table;

— the injection unit;

— the insert loading system.

4.2 Mechanical hazards related to power operated movements during production

Injuries due to dangerous movements or parts as listed in table 1 (see 5.2.1).

4.3 Additional hazards associated with machines of specific design

4.3.1 Machines allowing whole body access

Crushing, shearing, impact and entanglement by moving parts when operators have whole body access:

— in the area of movement of the moulds;

— between the guard or safety device and dangerous moving parts;

— through the discharge aperture.

4.3.2 Rotary machines

Crushing, shearing, drawing-in or impact due to movements of the rotating table.