
Rubber and plastics machines - Safety - Blow moulding machines intended for the production of hollow articles - Requirements for the design and construction

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Machines pour le caoutchouc et les matières plastiques - Sécurité - Machines de moulage par soufflage pour la fabrication des corps creux - Prescriptions pour la conception et la construction

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Oprema za gumarsko
industrijo in industrijo
polimernih materialov

Equipment for the rubber and
plastics industries

SIST EN 422:2000**en**

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English version

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CEN

European Committee for Standardization
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Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 145 "Rubber and plastics machines - Safety", the secretariat of which is held by DIN.

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 EC Directive(s).

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of an identical text or by endorsement, at the latest by October 1995, and conflicting national standards shall be withdrawn at the latest by October 1995.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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0. INTRODUCTION

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery shall comply as appropriate with EN 292 for hazards which are not covered by this standard.

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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.

Health and safety requirements for extruders, or injection moulding machines which may be a part of blow moulding machines are not covered by this Standard. For these machines see prEN 1114-1 and EN201.

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 applies primarily to blow moulding machines manufactured after the date of publication of this standard.

*The standard cannot be applied to lines blowing films.

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2. Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed below. For dated references, subsequent amendments or revisions 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.

- EN292-1: 1991 Safety of Machinery. Basic concepts, general principles for design - Part 1: Basic terminology, methodology
- EN292-2: 1991 Safety of Machinery. Basic concepts, general principles for design - Part 2: Technical principles and specifications
- EN294: 1992 Safety of Machinery - Safety Distances to Prevent Danger Zones being Reached by the Upper Limbs
- EN414: 1992 Safety of Machinery - Rules for the Drafting and Presentation of Safety Standards.
- EN418: 1992 Safety of Machinery - Emergency Stop Equipment - Functional Aspects
- EN563 Safety of Machinery. Temperatures of touchable surfaces. Ergonomic data to establish limit values for hot surfaces.
- prEN 982 Safety requirements for fluid power systems and components- hydraulics
- prEN 983 Safety requirements for fluid power systems and components- pneumatics
- EN60204-1 Electrical Equipment of Machines, Part 1, General Requirements
- IEC 801-2 Electromagnetic compatibility for industrial process measurement and control equipment - Part 2. Electrostatic discharge requirements.
- ISO 3744 Acoustics - Determination of Sound Power Levels of Noise Sources; Engineering method employing an enveloping measurement surface in an essentially free field over a reflecting plane.
- ISO 11201 Acoustics - Noise emitted by machinery and equipment - Engineering method for the measurement of emission sound pressure levels at the work station and at other specified positions.

3. Definitions

For the purposes of this Standard the following definitions apply.

3.1 Blow moulding machine

A machine which expands a preform to make a hollow article using gas under pressure blown into a fixed or moving blow mould. The preform may be produced by extrusion or by injection moulding.

3.1.1 Extrusion blow moulding machine

A machine in which a hot tube produced by an extruder is introduced into a mould and blown (fig 1).

3.1.2 Extrusion stretch blow moulding machine

A machine in which a preform is produced as in Subclause 3.1.1.

The preform is then

- either directly transferred into a second mould, stretched and blown to obtain the final hollow article (first heat)

- or retained, reheated and then introduced into a second mould, stretched and blown to obtain the final hollow article (second heat).

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The stretching consists of lengthening the preform inside the mould by means of an elongation rod.

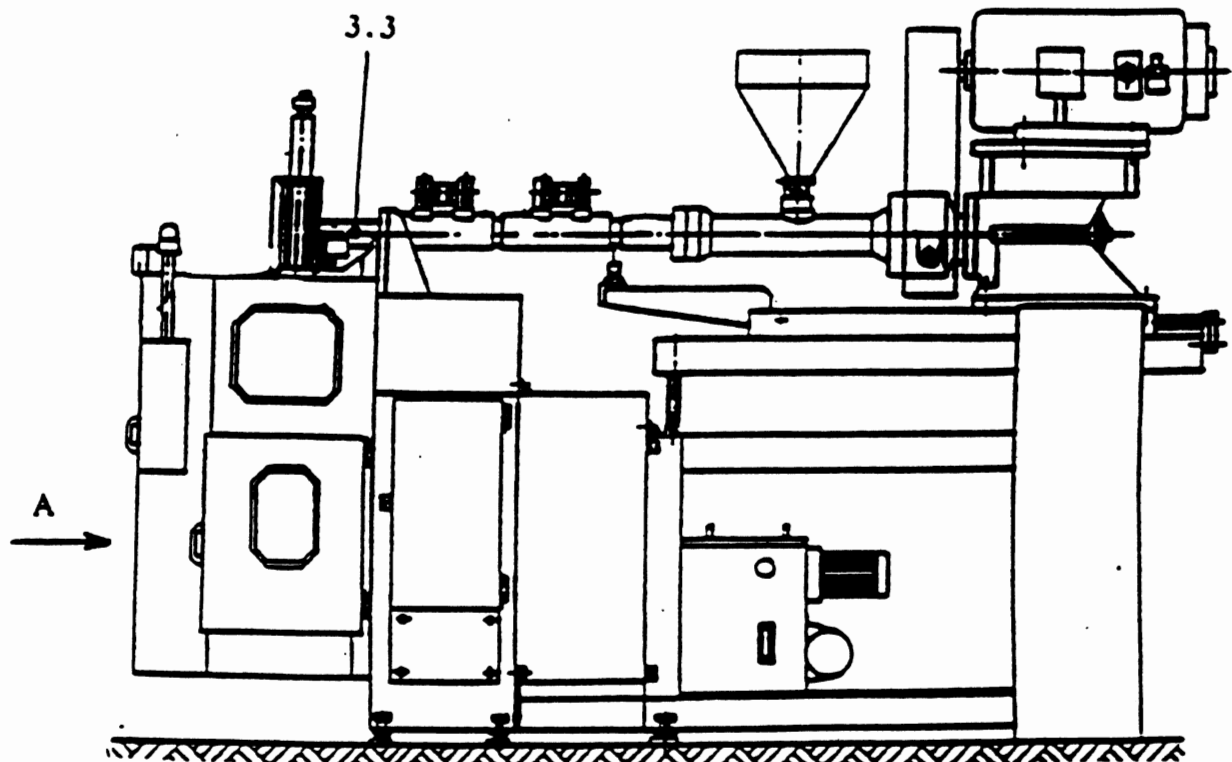


Figure 1a: Elevation

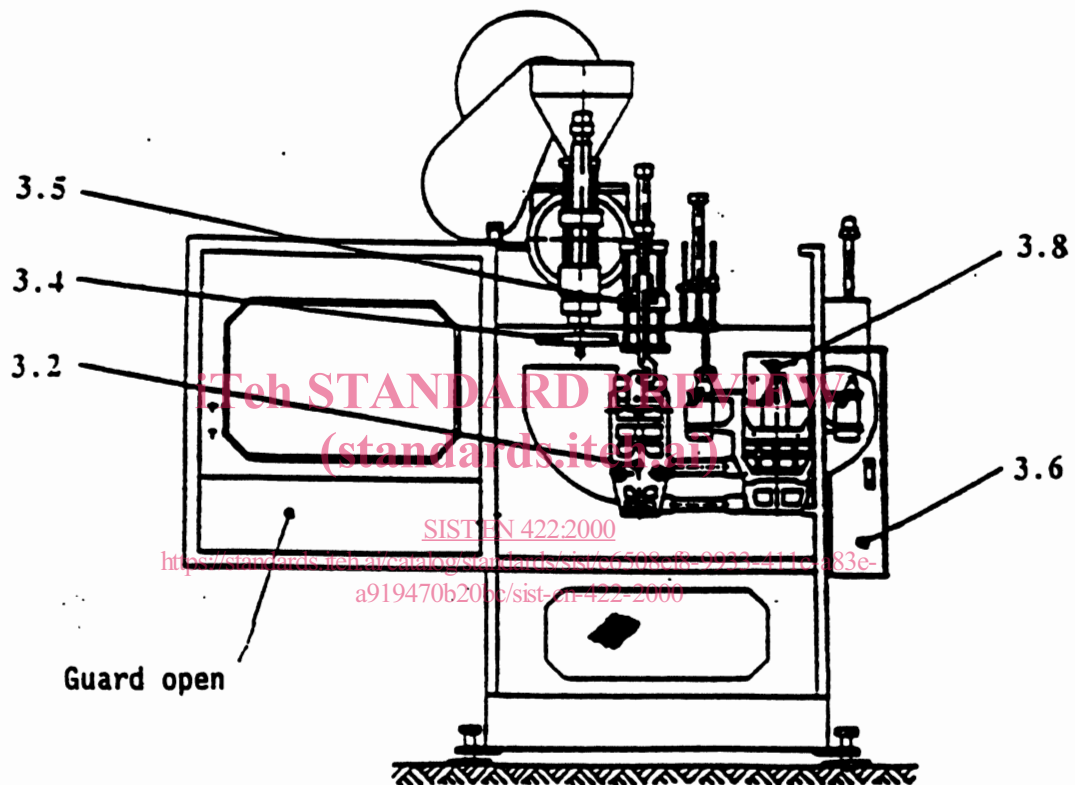


Figure 1b: View A

Figure 1: Extrusion Blow Moulding Machine

3.1.3 Injection blow moulding machine

A machine in which a preform is produced by injection and then transferred into (the interior of) a mould where it is blown (figure 2).

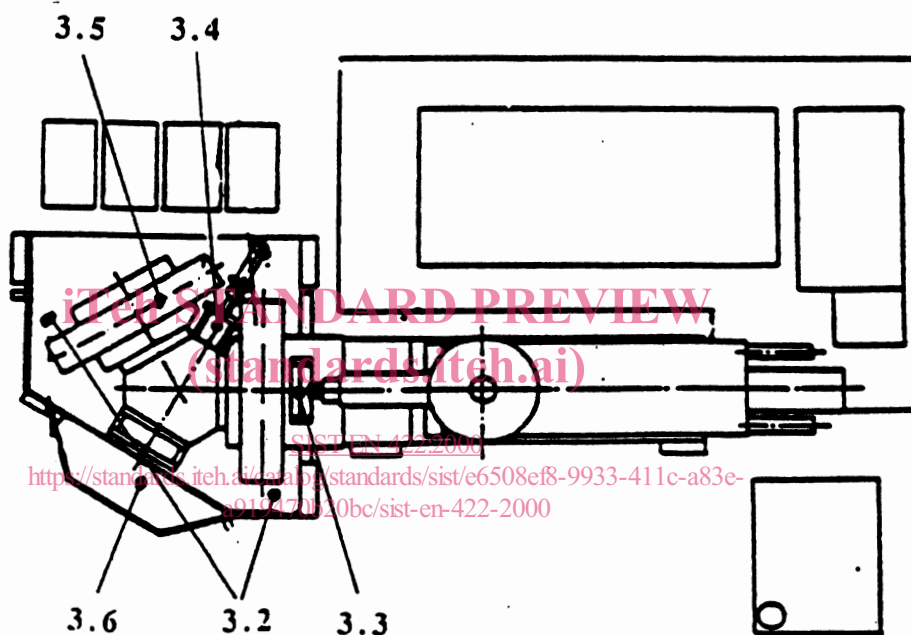
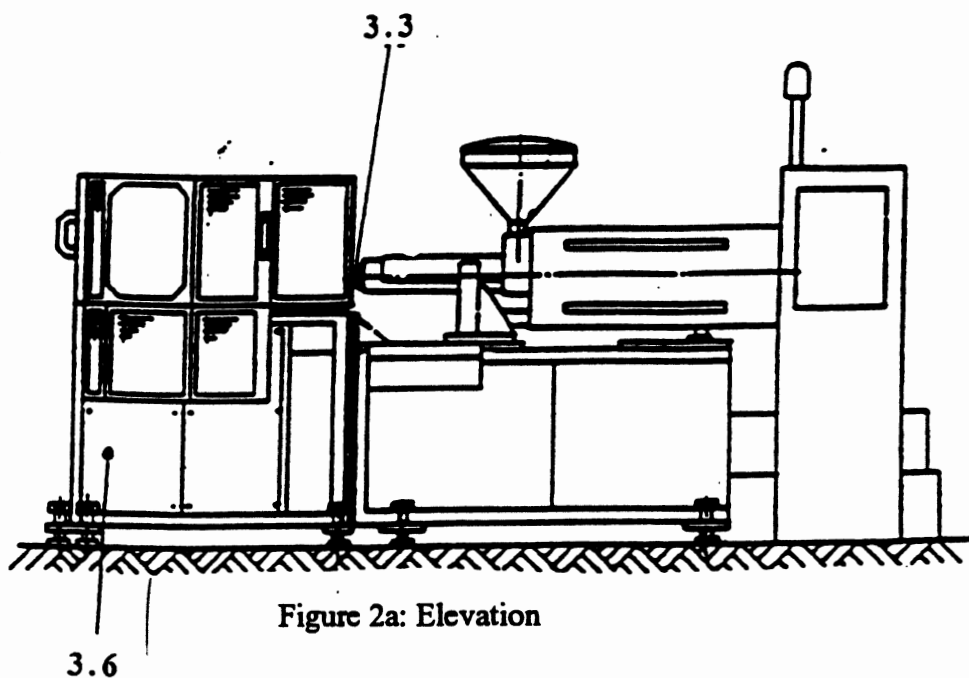


Figure 2b: Plan View
Fig 2: Injection Blow Moulding Machine

3.1.4 Injection stretch blow moulding machine

A machine in which a preform is produced by injection. The preform is then

- either transferred into the mould, stretched and blown (first heat)
- or retained, reheated, then introduced into the mould, stretched and blown (second heat) - (figure 3).

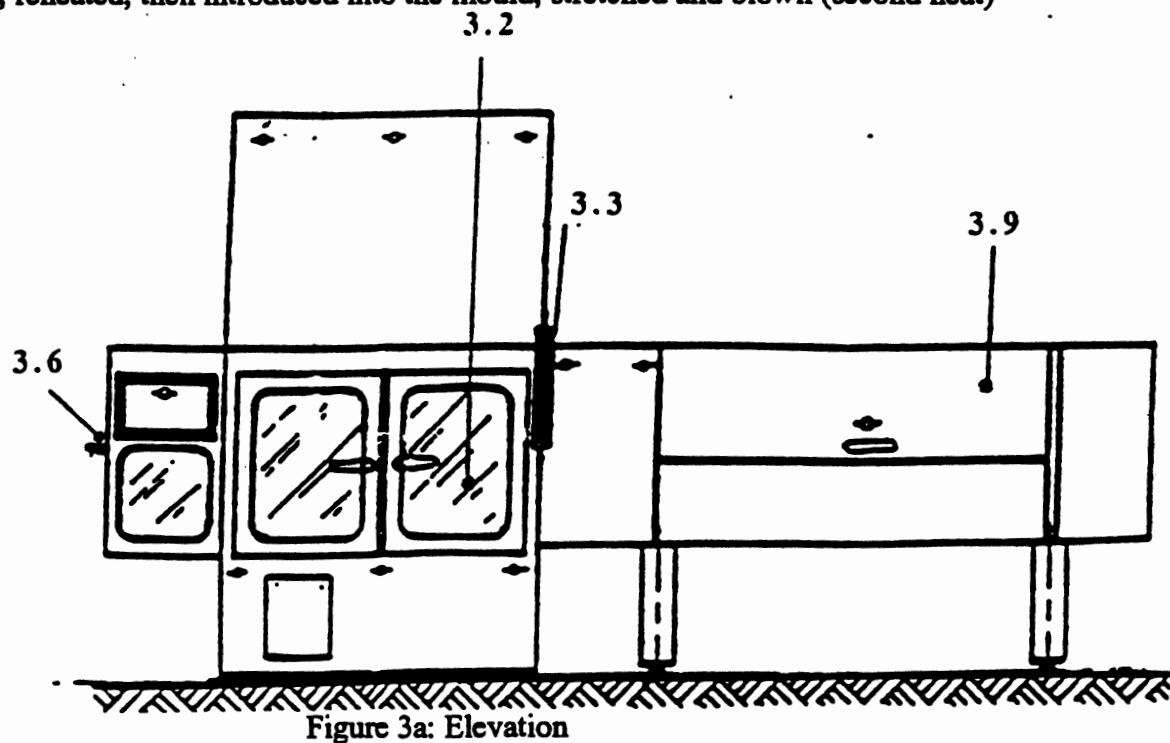


Figure 3a: Elevation

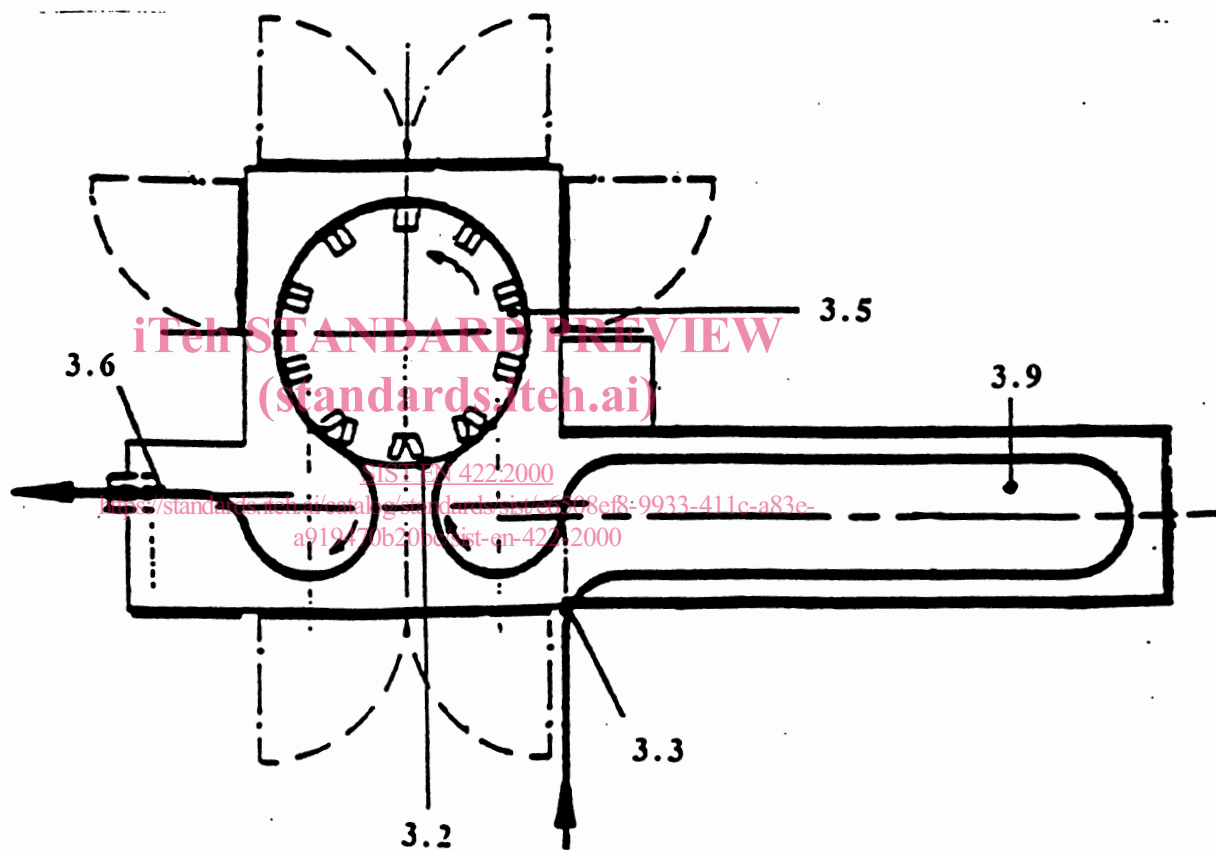


Fig 3b: Plan View Fig 3:
Injection Stretch Blow Moulding Machine - Second Heat

3.2 Area of movement of the moulds

The area in which the moulds move, close or open. All equipment which moves, closes, locks and opens the moulds is included.

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 where the container aperture may be calibrated.

3.6 Delivery station

The part of the machine in which the hollow articles are withdrawn from the blow mould and removed from the machine.

3.7 Cooling station

The part of the machine in which the hollow articles 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 hollow article

3.9 Heating station

The part of the machine in which the temperature of the preform is adjusted before blowing.

3.10 Rotary machines

A machine in which the moulds move on a circular or similar path.

3.11 Large machines

Machines into which whole body access to the danger areas is possible (including access via the discharge aperture) or where persons may stand behind the guards (figure 4).

3.12 Ancillary equipment

Equipment which forms a complex installation with the blow moulding machine and which is connected with the machine control circuit by the machine manufacturer.