SLOVENSKI STANDARD
oSIST prEN 16474:2012

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Stroji za predelavo gume in plastike - Stiskalnice za vulkaniziranje - Varnostne zahteve

Plastics and rubber machines - Tyre curing presses - Safety requirements

Kunststoff- und Gummimaschinen - Reifenheizpressen - Sicherheitsanforderungen

Machines pour les matières plastiques et le caoutchouc - Presses à vulcaniser - Prescriptions de sécurité

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

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ICS 83.200

English Version

Machines pour les matières plastiques et le caoutchouc - Presses à vulcaniser les pneumatiques - Exigences de sécurité

Machines pour les matières plastiques et le caoutchouc - Presses à vulcaniser - Prescriptions de sécurité

Kunststoff- und Gummimaschinen - Reifenheizpressen - 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (prEN 16474:2012) 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 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).

For relationship with EU Directive 2006/42/EC, see informative Annex ZA, which is an integral part of this document.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

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 and 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 in accordance with the provisions of this type C standard.

1 Scope

This European Standard applies to the tyre curing presses [1)] as defined in 3.36 having the following configuration.

— Crossing flow tyre curing presses, with two cavities with:

  — common curing cycle and common safeguarding; or

  — independent curing cycles and common safeguarding; or

  — independent curing cycles and independent safeguarding.

— Tyre curing presses with one cavity.

— Tyre curing presses with automatic rear feeding and discharge.

The requirements and/or safety measures specified in this European Standard apply to tyre curing presses for passenger vehicle tyres and truck tyres.

Only automatic tyre loading into the mould and automatic tyre unloading from the mould are covered by this European Standard.

Feeding system and discharge system are not covered by this European Standard.

Hazard associated with falling of parts of the container or mould are not covered by this European Standard.

Safety requirements relating to the design of ancillary equipment which is not an integral part of the tyre curing press, e.g. conveying equipment are not covered in this European Standard.

Safety requirements relating the design of exhaust systems are not covered in this European Standard.

This European Standard covers the significant hazards listed in Clause 4.

NOTE This European Standard is not intended to support the PED [1]. For pressure hazards, see informative Annex A.

This document is not applicable to tyre curing presses which are manufactured before the date of its publication as EN.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 619:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and moveable guards*

1) The machines covered by this document, although named « presses », are not listed in Annex IV of the Machinery Directive 2006/42/EC.

EN 1088:1995+A2:2008, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 1760-2:2001+A1:2009, *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, mod.)*

EN 61496-1:2004 + A1:2008, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, mod. + A1:2007 + corr. Jul. 2008)*

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 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 13849-1:2008, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design (ISO 13849:2006)*

EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

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 13857:2008, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper and lower limbs (ISO 13857:2008)*

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 14122-2:2001/A1:2010, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways - Amendment 1 (ISO 14122-2:2001/Amd 1:2010)*

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 14122-3:2001/A1:2010, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails - Amendment 1 (ISO 14122-3:2001/Amd 1:2010)*

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

EN ISO 14122-4:2004/A1:2010, *Safety of machinery - Permanent means of access to machinery — Part 4: Fixed ladders — Amendment 1 (ISO 14122-4:2004/Amd 1:2010)*

CLC/TS 61496-3:2008, *Safety of machinery — Electro-sensitive protective equipment — Part 3: Particular requirements for Active Opto-electronic Protective Devices responsive to Diffuse Reflection (AOPDDR) (IEC 61496-3:2008)*

ISO 7010:2011, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

3.1
access equipment
specific parts to allow access to the parts of the press in normal operation

EXAMPLES Footstep, platform, stairs

3.2
automatic loading/unloading
loading and unloading from one side

3.3
bladder
inflatable rubber component used to push the green tyre into contact with the mould while being inflated by the curing media

Note 1 to entry: The bladder is connected to the machine by means of the top and bottom rings.

3.4
bladder support
mechanism to fix the bladder either by standing post or bagwell

3.5
bottom ring
assembly of the bottom bladder clamping plate

3.6
change plate identification
action performed on the sidewall of the mould while mounted in the press

Note 1 to entry: This identification is commonly called department of transportation (DOT) or tyre ID.

3.7
chuck
device for holding or gripping the green or cured tyre

3.8
container
exchangeable equipment used to receive and heat the segments of the curing mould

Note 1 to entry: The container is fixed to the curing press by use of screws or automatic locking device.

3.9
container fixation device
steel support to fix the container

Note 1 to entry: The container fixation device is sometimes called bolster.

3.10
crossing flow
loading from the front and unloading from the rear

3.11
cured tyre
tyre in its final form after vulcanisation

3.12
curing cycle
period of time between full closing, squeezing and locking until the pressure is dropped down

3.13
curing mould
exchangeable equipment used to give the external shape to the cured tyre

3.14
curing valves and pipework
temperature and pressure regulation system installed on the tyre curing press

3.15
dimension change
changing the equipment depending on the size of the tyre to be cured

3.16
discharge
manual or automatic operation to remove cured tyres from the unloading system

3.17
energy evacuation system
part involved in draining the curing bladder and the heating system

3.18
energy supply system
system for supplying electrical, pneumatic, hydraulic and curing media

Note 1 to entry: Curing media are for example, hot water, steam, nitrogen and air.

3.19
exit conveyer
conveyer on which the unloading device deposits the cured tyres for discharge to the rear of the press

3.20
feeding
manual or automatic operation to feed green tyres to the loading system

3.21
fixed lower part
part of the machine fixed to the foundation which contains the bladder and supports the lower part of the mould

3.22
green tyre
assembly of rubber parts intended to be cured

3.23
handling accessory
device used for maintenance action or mould changing or press set up

3.24
heating platen
equipment used to heat the top and bottom sidewalls of the mould by contact

3.25
hydraulic tyre curing press
tyre curing press where squeezing force is applied by means of hydraulic cylinders

3.26
loading device
device used to pick up the green tyre and insert it into the tyre curing press

3.27
maintenance action
operation (for example, diagnostic, lubrication, etc.) intended to maintain the press at the design level

3.28
mechanical tyre curing press
tyre curing press where squeezing force is mechanically applied by means of side links, crank gear and gearbox driven by an electrical motor

3.29
movable upper part
part of the machine that is opened for loading and unloading the tyre and is closed and locked during curing

3.30
mould cleaning
system to remove deposits from the mould

3.31
segment mould operator
device used to open and close the mould segments

3.32
semi-closed position
position in which the top press part with the mould or container is at a distance of the maximum container with the extended segment

3.33
spraying device
static or dynamic nozzle(s) used to treat the mould and/or the bladder with treatment fluid

3.34
steam dome
equipment used to heat the complete mould by direct contact with the steam

3.35
top ring
assembly of the top bladder clamping plate

3.36
tyre curing press
machine used for vulcanisation of tyres usually comprising fixed and movable parts that can be locked together, inside which the green tyre assumes its final shape and characteristics by the use of pressure and heating

3.37
tyre curing press cleaning
operation to remove deposits from the press

3.38
tyre loading/tyre unloading
automatic action to put the tyre into or outside the press

3.39
unloading device
device used to remove the cured tyre from the tyre curing press

4 List of significant hazards

4.1 General

Clause 4 lists the significant hazards associated with tyre curing presses.

For the location of hazards on crossing flow tyre curing presses, see Figures 1, 2 and 3.

For the location of hazards on tyre curing presses with automatic rear feeding and discharge, see Figures 4, 5 and 6.

The numbering of the hazards on Figures 1 to 6 and in 4.3 corresponds to the numbering of the hazards in Table 1.

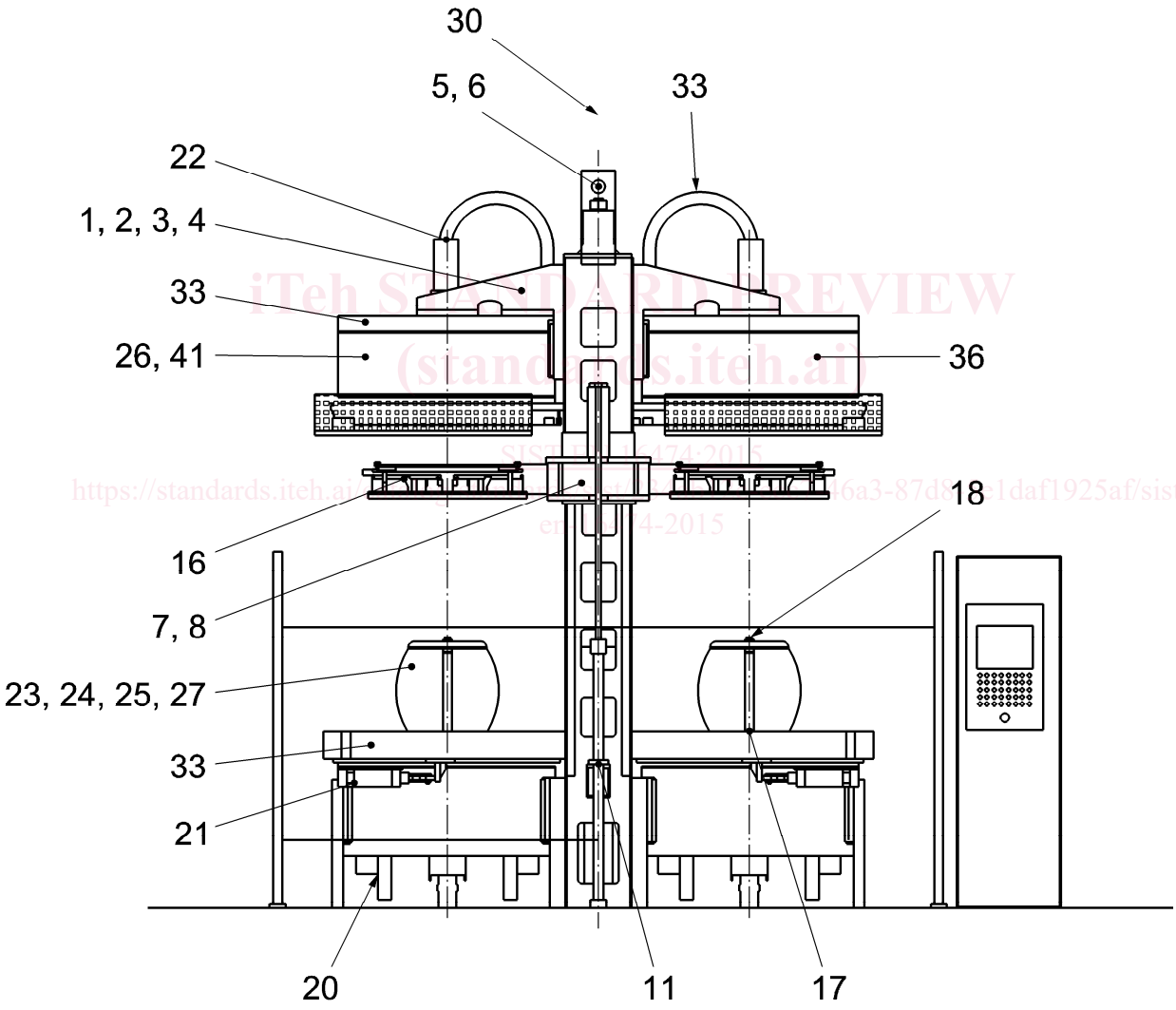

Figure 1 — Location of hazards on crossing flow tyre curing presses (front view)

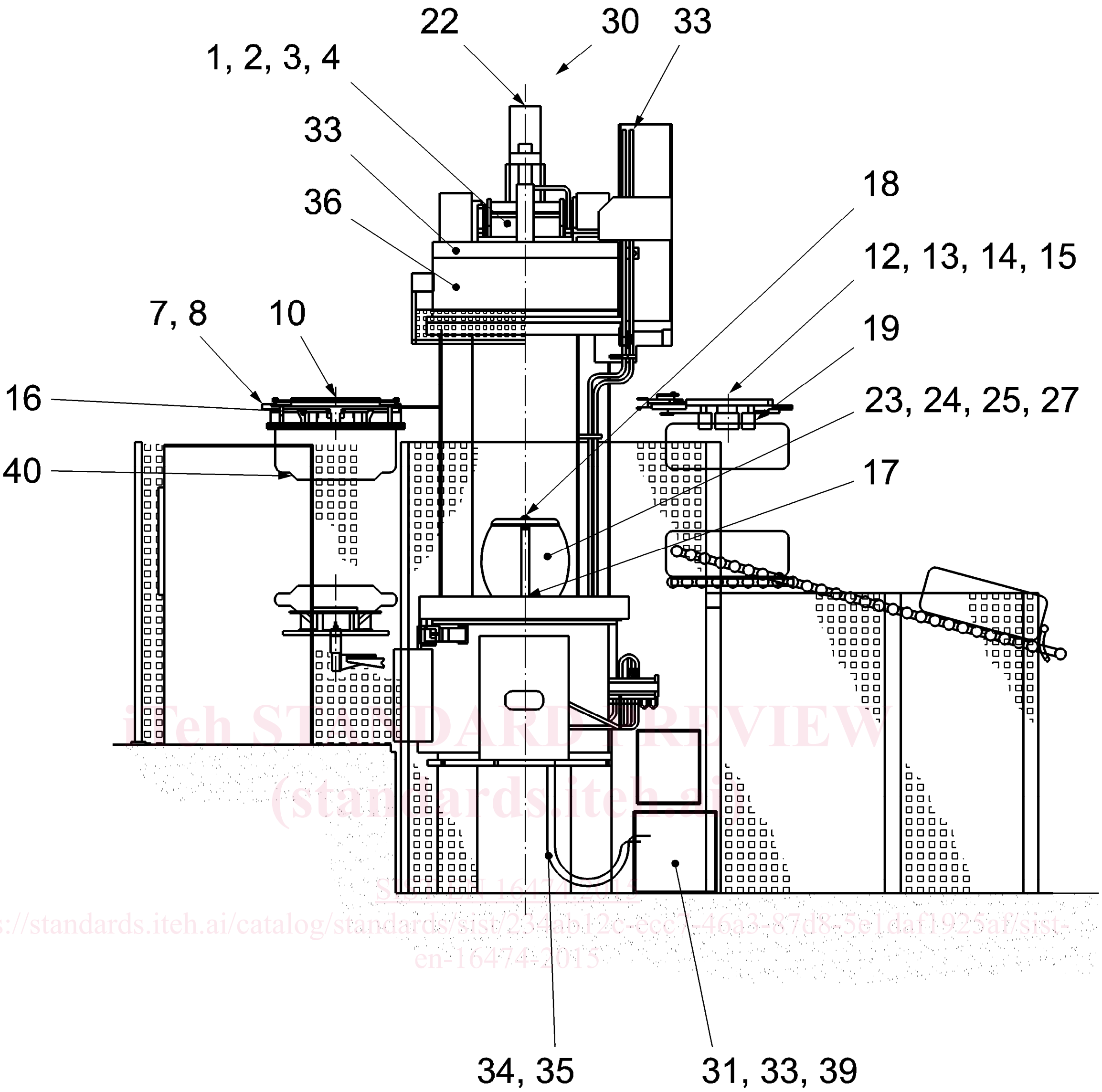

Figure 2 — Location of hazards on crossing flow tyre curing presses (side view)

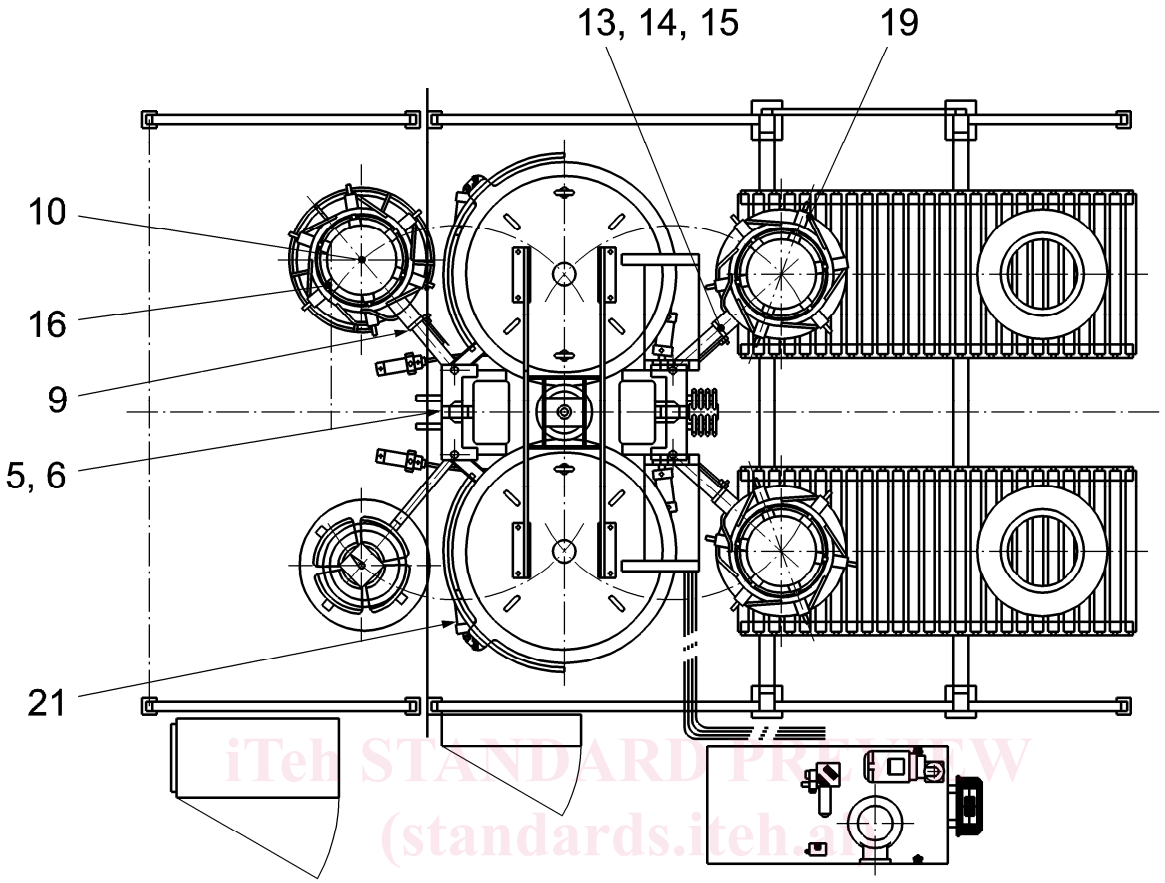

Figure 3 — Location of hazards on crossing flow tyre curing presses (top view)

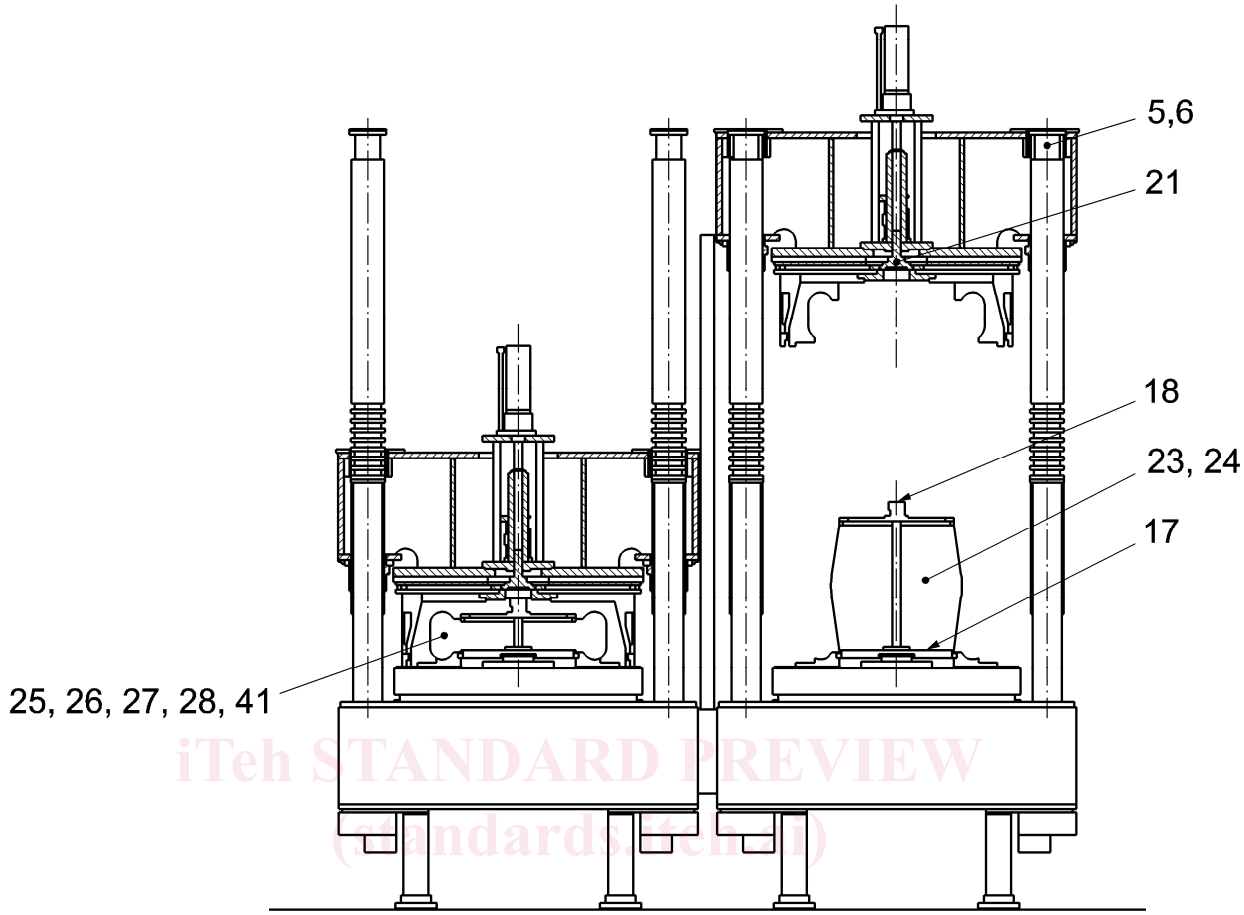

Figure 4 — Location of hazards on tyre curing press with automatic rear feeding and discharge (front view)