
Cestna vozila - Stroji za montažo in demontažo pnevmatik - Varnostne zahteve

Road vehicles - Machines for mounting and demounting vehicle tyres - Safety requirements

Straßenfahrzeuge - Maschinen für die Montage von Fahrzeugreifen - Sicherheitsanforderungen

Véhicules routiers - Machines pour le montage et le démontage des pneumatiques - Prescriptions de sécurité

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**Road vehicles - Machines for mounting and demounting
vehicle tyres - Safety requirements**

Véhicules routiers - Machines pour le montage et le
démontage des pneumatiques - Prescriptions de
sécurité

Straßenfahrzeuge - Maschinen für die Montage
von Fahrzeugreifen - Sicherheitsanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 301.

If this draft becomes a European Standard, 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.

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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 foreword

This document (prEN 17347:2019) has been prepared by Technical Committee CEN/TC 301 “Road vehicles”, the secretariat of which is held by AFNOR.

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(s), see informative Annex ZA, which is an integral part of this document.

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Introduction

This document defines the specific safety requirements for machines for mounting and demounting vehicle tyres. It examines all the main hazards and the hazard situations and conditions relating to the type of machine in question, when used as indicated by the manufacturer or in improper conditions reasonably foreseen by the manufacturer. The document defines the necessary technical measures for eliminating or reducing risks caused by significant hazards or danger situations and conditions during transport, use and maintenance.

This Standard is type “C”, as defined in EN ISO 12100:2010.

When provisions of this C-type Standard are different from those which are stated in A or B Standards, the provisions of this type C standard take precedence over the provisions of the other standard for machines designed and built according to the provisions of this C Standard.

The type of machine in question, and the degree to which the hazards and danger situations/events, are indicated in the “aim and application” section of this national Standard.

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1 Scope

This document specifies the safety requirements and their verification for the design and building of machines (see the definition in 3.2) for mounting and demounting tyres on the vehicles listed below and identified according to the international categories M1, M2, N1, O1, O₂, L4 and L5:

- a) cars
- b) buses
- c) lorries
- d) motor-vehicles for specific or special transport
- e) mobile homes
- f) cargo trailers
- g) car trailers
- h) motorised quadricycles
- i) motor vehicles
- j) mopeds
- k) agricultural machines (if the wheel/tyre dimensions are compatible with the maximum dimensions indicated in the tyre changer user instructions)

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The vehicles listed in points a) to f) shall have an overall full-load mass no greater than 3,5 t.

These machines are designed to ensure the tyre is correctly fitted on the wheel in safe conditions. The Standard describes how to eliminate or reduce the risks resulting from the foreseen use (or improper but reasonably foreseeable use) of these machines by the operator during normal operation and service. In addition, it specifies the type of information that the manufacturer shall supply with regard to safe working procedures.

The document describes all the significant hazards (as listed in Table 1) and the danger situations and events relating to these machines.

This document does not apply to hazards regarding maintenance or repairs carried out by professional maintenance personnel.

This document does not apply to machines manufactured before its date of publication.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 894-2:1997+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays*

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EN 894-3:2000+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators*

EN 894-4:2010, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 4: Location and arrangement of displays and control actuators*

EN 12645, *Tyre pressure measuring instruments - Devices for inspection of pressure and/or inflation / deflation of tyres for motor vehicles - Metrology, requirements and testing*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

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

ISO 7628, *Road vehicles — Thermoplastics tubing for air braking systems*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

specialist

person qualified to carry out the operation in question and working for a company authorized to perform that task

3.2

tyre changer

machine operated pneumatically, electro-mechanically, electro-pneumatically or electro-hydraulically to mount/demount tyres on vehicle wheels

Note 1 to entry: see the machine examples in Annex A.

3.3

wheel

combination of the rim and the disc

3.4

bead breaking

operation to detach the tyre bead from the rim by forcing it out of its seat

3.5

beading

positioning of the tyre bead in its seat on the rim

3.6

self centering chuck

device that centres and clamps the wheel on the rim

3.7**manual central clamping**

device that supports the wheel and can hold a centring/clamping system on the central hole

3.8**automatic central clamping**

device that supports and clamps the wheel and can hold a rim centring system on the central hole

3.9**centering and locking system**

manual or motorized mechanical device fitted with an interchangeable cone, that can centre and clamp the wheel on the manual wheel support plate by means of the central hole

3.10**centering system**

mechanical device that centres and fixes the wheel on the wheel support plate or turntable

3.11**static bead breaking unit (on the ground)**

mechanical device fitted with a suitable tool (driven by an actuator) for breaking the tyre while it's stationary (not yet clamped on the turntable)

3.12**dynamic bead breaking unit**

mechanical device fitted with a suitable rotating tool (driven by an actuator) for breaking the tyre while the wheel is rotating

3.13**mounting head**

suitably shaped mechanical device that can demount and remount the tyre on the rim thanks to a lever manually controlled by the operator

3.14**movable mounting head**

suitably shaped mechanical device (manually or automatically controlled) that can demount and remount the tyre on the rim without the need for levers

3.15**(mounting) tool arm**

mechanical device that moves the tool so it's correctly positioned (both vertically and horizontally)

3.16**tilting upper body of the tool arm**

tool release system with rear tool head rotation (manual, or driven by an actuator)

3.17**manual upper body of the tool arm**

tool release system with manual tool head movement

3.18**upper body of the swing tool arm**

tool release system with lateral tool head rotation (manual, or driven by an actuator)

prEN 17347:2019 (E)**3.19****upper body of the tool arm with orthogonal displacement**

tool release system (manual or automatic) that moves at right angles to the wheel support plate surface

3.20**dynamic beading device**

pneumatic inflation circuit for raising the bead on the bench, plus the system (if installed) for instantaneously releasing air when the bead approaches the rim seat

3.21**wheel lift**

device that raises the tyre-wheel assembly (driven by an actuator)

3.22**dangerous work area**

circular sector starting from the tool (or mobile tool) and the wheel surface, extending away from the tool in a specular manner to cover an overall angle of 120 degrees

Note 1 to entry: the dangerous area is shown in Figure 1.

3.23**arm sagittal plane**

vertical surface passing through the centre line of the arm and the tyre rotation axis in the working position

3.24**Tyre Pressure Monitoring System, TPMS**

any system fitted on a vehicle, able to evaluate the pressure of the tyres or the variation of the pressure over time and to transmit corresponding information to the user while the vehicle is running

[SOURCE: ISO 21750:2006, 3.7]

4 List of significant hazards

Table 1 lists the significant hazards, main hazards situations and hazardous events (that emerged from an assessment of the risks considered “significant” for this type of machine) requiring risk elimination/reduction interventions.

Table 1 — List of significant hazards

No.	Hazard	Dangerous situation or event	Corresponding requisite [relative points of this Standard]
1	Mechanical hazards		
	a) Relating to installation	a.1) risk of crushing feet between the pallet and the floor while positioning the machine	7
	b) Relating to machine use	b.1) risk of crushing	
		<i>During handling with lift:</i> - the crushing of fingers between moving parts (lift descent and ascent) - the crushing of feet between the lift and the floor (lift descent)	5.3.1 5.3.2
		<i>During clamping of wheel on wheel support plate:</i> the crushing of fingers/hands between the tyre-wheel assembly and the centring/tightening elements	5.3.3
		<i>During dynamic bead breaking:</i> - the crushing of upper/lower limbs between moving parts - the crushing of fingers/hands between the tyre-wheel assembly and the bead breaker	5.3.4 5.3.4
		<i>During bead breaking on the floor:</i> - the crushing of upper/lower limbs between the machine frame and moving parts - the crushing of fingers/hands between the tyre-wheel assembly and the bead breaker tool - the crushing of hands between the turntable and the tyre-wheel assembly	5.3.5 5.3.5 5.3.5
		<i>During wheel clamping on the clamped turntable:</i> the crushing of fingers/hands between the tyre-wheel assembly and the centring/tightening elements	5.3.6
		<i>During tyre positioning and demounting from wheel:</i> - the crushing of upper limbs between moving parts - the crushing of fingers/hands between the tyre-wheel assembly and the demounting tool	5.3.6 5.3.1
		<i>During tyre positioning and mounting on wheel:</i>	

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		- the crushing of upper limbs between moving parts - the crushing of fingers/hands between the tyre-wheel assembly and the mounting tools (e.g. pressors, mounting heads, etc.) - the crushing of fingers/hands between the tyre and the rim	5.3.6 5.3.1 5.3.1
		b.2) risk of getting entangled - clothes tangled up in rotating parts	5.3.1
		b.3) risk of collision - due to moving parts - with protruding parts	5.3.1 5.3.7
		b.4) risk due to ejection of pressurized fluid - due to breaks in the pneumatic pipes or detachment of connector pipes or accumulation tanks - due to breakage of the tyre/wheel during the bead insertion phase - from the dynamic bead insertion device	5.3.8 5.3.9 and 7 5.3.10
		b.5) risk of projection during the bead insertion phase - of paste, liquid, mounting dust of the tyre, or parts of it - of the dynamic bead insertion device	7 7 5.3.11
2	Electric hazards	Contact with live parts of the power circuit Motor isolation fault or cable sheath breakage	5.3.12 5.3.12
3	Noise	risk of damage to hearing, or other physiological disturbance due to the weighted sound pressure level A(L _{pa}) in the workplace > 70 dB(A), max 85 dB(A) [ref. EN ISO 3746:2010] during the bead breaking phase during the insertion phase	7 7 7
4	Hazards due to failure to observe the ergonomic principles when designing the machine		
	Uncomfortable positions or excessive strain	<i>During handling with lift:</i>	

		– the positioning of the wheel on the turntable, using the lift	5.3.13
		– inappropriate design, positioning or identification of the commands	5.3.15
	Human error, human behaviour	Command devices: – accidental activation of the command devices (e.g. objects accidentally dropped onto the command) – incorrect use of commands – inappropriate layout of command devices (e.g. subject to accidental knocks) – command identification (e.g. coupled commands)	5.3.15 5.3.14 5.3.14 5.3.14
5	Hazards caused by unexpected start-up in overstroke position, or unexpected speed increase, or similar anomalies	Power reset after failure: – unexpected movements	5.3.16
		Command system fault: – loss of the command functions – unexpected movement of mechanical parts	5.3.17 5.3.17
		Outside influence on electrical equipment – unexpected movement of mechanical parts	5.3.18
6	Breakage during operation	Failure of mechanical, pneumatic and hydraulic parts	5.3.19
7	Falling/projected objects or fluids	<i>During handling with lift:</i> – accidental falling of the wheel	7
8	Machine loss of stability or overturning	<i>During transport/handling:</i> – risk of crushing – risk of collision <i>During use:</i> – risk of crushing – risk of collision	7 7 5.3.20 5.3.20
9	People slipping, tripping or falling (near the machine)	risk of collision	5.3.21