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Varnostne zahteve - Oprema za čiščenje vozil

Safety requirements - Vehicle cleaning equipment

Fahrzeugwaschanlagen - Sicherheitsanforderungen

Systèmes de lavage de véhicules - Exigences de sécurité

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43.180	Diagnostična, vrževalna in preskusna oprema	Diagnostic, maintenance and test equipment
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Sicherheitsanforderungen - Fahrzeugwaschanlagen

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 17281:2021) has been prepared by Technical Committee CEN/TC 197 “Pumps”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

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EN 17281:2021 (E)**Introduction**

This document is a type-C standard as stated in EN ISO 12100:2010. This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises).
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document. The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the scope of this document. When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

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1 Scope

This document contains technical safety requirements for the design, equipment and testing of brushless vehicle washing systems and vehicle washing systems with brushes for, indoor and outdoor operation, i.e. roll-over vehicle washing systems, vehicle washing tunnels, manually movable vehicle washing facilities.

This document does not apply to hand-guided high pressure cleaners which are covered by EN 60335-2-79:2012, to water recycling systems, buildings and doors for entering the traffic zone, for powered ride-on machines and powered walk-behind machines with a traction drive.

NOTE Signals (example doors, lighting systems) can be provided by the vehicle washing system.

This document contains requirements for the protection of persons and objects from accidents and damages during use and operation of vehicle washing systems.

Persons to be protected are:

- operators,
- maintenance and monitoring personnel,
- persons in the vicinity of vehicle washing systems,
- persons sitting in the vehicle during cleaning.

Objects to be protected are:

- vehicles.

Significant hazards associated with vehicle washing systems are listed in Clause 4. These hazards have been established by a risk assessment according to EN ISO 12100 and require measures to eliminate the hazard or to reduce the risk. These measures are specified in Clause 5 of this document.

The safety requirements assume that vehicle washing systems are regularly maintained by trained and competent persons according to the manufacturer's information and that the operators, with the exception of users of self-service washing systems, have been instructed in the handling of vehicle washing systems.

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 81-20:2020, *Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts*

EN 81-50:2020, *Safety rules for the construction and installation of lifts - Examinations and tests - Part 50: Design rules, calculations, examinations and tests of lift components*

EN 280:2013+A1:2015, *Mobile elevating work platforms - Design calculations - Stability criteria - Construction - Safety - Examinations and tests*

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005)*

EN 60335-2-79:2012, *Household and similar electrical appliances - Safety - Part 2-79: Particular requirements for high pressure cleaners and steam cleaners*

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EN 60529:1991¹⁾, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

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 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11203:2009, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level (ISO 11203:1995)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems – Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

EN ISO 13854:2019, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14122-1:2016, *Safety of machinery - Permanent means of access to machinery- Part 1: Choice of fixed means and general requirements of access (ISO 14122-1:2016)*

EN ISO 14122-2:2016, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2016)*

3 Terms and definitions

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

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

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

3.1

work and traffic zone

area which is assigned to one or several persons for the execution of the work task

Note 1 to entry: A definition of work task is given in EN 614-1:2006+A1:2009.

1) As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

3.2**traffic zone (of a vehicle washing system)**

area used for pedestrian or vehicular traffic from which the vehicle washing system can be entered and exited

3.3**operating temperature (of the washing liquid)**

temperature of the liquid supplied to the spraying device or to another part of the liquid system during operation

3.4**operating pressure**

pressure resulting at the pressure generator from a given volume flow with the corresponding nozzle

3.5**flammable liquid**

liquid which can react exothermally with air when ignited

3.6**brushless vehicle washing system**

vehicle washing system, where the cleaning is carried out without mechanical contact between washing system and vehicle

Note 1 to entry: In general, the cleaning is carried out contactless, e.g. with liquid from nozzles.

3.7**pressure generator**

device generating an overpressure [SIST EN 17281:2021](https://standards.iteh.ai/catalog/standards/sist/aded532b-0440-425a-9ecc-c1c95da12d39/sist-en-17281-2021)

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3.8**tandem roll-over vehicle washing system**

two or more roll-over vehicle washing systems which wash and/or dry the same car, and move independently

3.9**liquid heater**

device for the heating of the liquids to the operating temperature

3.10**vehicle ground conveyor**

device for the horizontal movement (trailing) of vehicles on a track or on rails

3.11**vehicle displacement device**

platform or access rails on which vehicles are mechanically moved in the washing system so that they can be cleaned in their entire length even in short washing bays

3.12**vehicle washing system**

system for the external cleaning of vehicles or parts of vehicles, where cleaning, drying or special treatment devices and/or vehicles are mechanically moved and where the vehicle is placed in the system by the vehicle driver

EN 17281:2021 (E)**3.13****vehicle washing tunnel/street**

vehicle washing system where the vehicles to be cleaned are moved through washing, drying or special treatment points by means of power driven vehicle ground conveyor devices

3.14**liquid jet**

device or system where the liquid, also with additives, is ejected in a free jet from devices equipped with nozzles or from other devices equipped with speed increasing outlets

3.15**high pressure pipework**

pipeline or hose pipe in which the liquid is conducted from the pressure generator to the consumption points with a minimum pressure of 2,5 MPa and not exceeding 35 MPa

3.16**vehicle washing system with brushes**

system, where the washing unit consists of rotating or moving bodies equipped with bristles, stripes or similar elements

3.17**roll-over washing system**

mobile, rail mounted vehicle washing system, where a gantry with mounted or integrated washing, drying and special treatment devices is mechanically moved over the standing vehicle

Note 1 to entry: Also, rigidly coupled machines are considered as roll-over washing systems.

3.18**hose fittings**

connecting elements for hoses or hose pipes

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3.19**instructed service person driven vehicle washing system**

vehicle cleaning facility which is started by an instructed service person

3.20**automatic vehicle washing system**

vehicle cleaning facility which is started without an instructed service person

3.21**self-service vehicle washing system**

vehicle cleaning facility which is started and operated by the customer

3.22**instructed service person**

capable of conducting the tasks as defined in the operator's manual of the manufacturer

3.23**automatic safeguard**

automatic guard or protective device provided to protect persons from a hazard

3.24**protective device**

means a device (other than a guard) which reduces the risk, either alone or in conjunction with a guard

Note 1 to entry: This may e.g. be achieved by preventing the surpassing of the maximum recommended operating parameters as e.g. pressure, temperature, etc.

3.25**takt/batch washing system**

mobile, rail mounted vehicle washing system of the roll-over type, where the washing and drying units are separately mounted on different gantries

Note 1 to entry: Both gantries are consecutively mounted. They move mechanically over the vehicle being either in washing or drying position.

Note 2 to entry: The vehicle shall be moved from the washing to the drying position. In intermittent washing systems, no continuous vehicle advance is carried out.

3.26**under chassis wash**

device for cleaning the underside of vehicles

3.27**manually movable vehicle washing system**

system which is manually moved along or around the standing vehicle

3.28**maximum operating pressure**

pressure which is permitted for a component on the basis of the material and the calculation documents at the permissible temperature

3.29**drive-through washing system**

during cleaning, the vehicle is moved by its own power

4 List of hazards

The list of hazards given in Table B.1 is based on harmonized standards to the Machinery Directive 2006/42/EC. The numbering is taken from the Machinery Directive. The list contains significant hazards, danger points and hazardous operating conditions related to vehicle washing systems. The relevant requirements according to Clause 5 are intended to avoid hazards, to protect from dangers or to reduce the risk.

5 Safety requirements and safety measures**5.1 General safety requirements****5.1.1 Shearing and crushing points at power-operated movable parts**

Crushing and shearing points at power operated parts shall be avoided in the work and traffic zones up to a height of 2 m above the respective floor space for persons or, if this is not possible, they shall be protected. The hazard points may be avoided or protected by e.g.:

— safety distances according to EN ISO 13854:2019 and EN ISO 13857:2019;

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- guards;
- safety devices;
- impeding device according to EN ISO 12100:2010, Clause 3.29.

NOTE 1 Counterweights could be a point of crushing and shearing.

NOTE 2 The space between two independent moving tandem roll-over vehicle washing systems can be a point of crushing.

5.1.2 Tripping and twisting points

Tripping and twisting points in the work or traffic zones shall be avoided or protected.

Tripping points caused by ground rails are avoided if the rails are laid evenly with the ground. Nevertheless, all necessary steps shall be taken to ensure that tripping and twisting points are avoided.

Twisting points are considered to be protected if they are made visible by appropriate surrounding conditions, e.g. by sufficient lighting and/or coloured design.

Equipment such as e.g. wheel entering devices and on-floor under-chassis washing systems, which cannot be realised below a certain level for functional reasons, shall be visible by appropriate surrounding conditions, e.g. by sufficient lighting and/or coloured design.

5.1.3 Gears and sprocket wheels

Enclosures for gears and sprocket wheels in the work and traffic zones shall have openings in compliance with EN ISO 13857:2019. If they are positioned outside the work and traffic zones, at least the nip points shall be protected against contact.

5.1.4 Belt and rope drives

The nip points at belt and rope drives within the work and traffic zones shall be protected by guards or impeding devices.

5.1.5 Supporting means

The supporting means for horizontal system components shall be designed with a safety factor for breaking load divided by load bearing capacity of at least 6 to ensure the safety of the machine.

NOTE The factor is in conformity with EN 14492-2.

In the event of breaking of a supporting means, roof brushes or roof nozzles shall not fall down uncontrolled. The drop distance shall only be 0,3 m at maximum within the work and traffic zone.

5.1.6 Horizontal and vertical system components

Horizontal and vertical system components such as roof brushes with horizontal axis or horizontal roof nozzle carriers shall automatically stop at their final positions. Furthermore, an additional protective device shall stop the system components at the end of the guide rails.

NOTE This can for example be achieved by means of operational limit switches in connection with a fixed stopper or an emergency limit switch or a fixed stopper in connection with an overload protection.

5.1.7 Guides/guide pulleys

Nip points between guides and guide pulleys of roof brushes, roof nozzles, side brushes and wheel wash brushes within the work and traffic zones shall be so protected that it is not possible to introduce a finger into them.

5.1.8 Guiding system

Vehicle washing systems shall be equipped with guiding devices for vehicles, leading the driver and his/her vehicle into a correct centre position.

This is only mandatory for self-service washers.

5.1.9 Positioning system

Roll-over vehicle washing systems shall be equipped with one positioning device (each), leading the user of the system with his/her vehicle into a correct longitudinal start position for the washing or drying process.

NOTE To show the customer that he is in the correct position, a signal can be sufficient.

This is only mandatory for self-service washers.

5.1.10 Wall and ceiling rails

Vehicle washing systems or parts of systems which are supported or guided by wall or ceiling rails shall be so constructed that they cannot derail or crash.

5.1.11 Ground rails

Fixing elements for ground rails in the work and traffic zones, e.g. screws, shall be sunk in the rail base or designed in a way that no crushing points exist between the front surface of the travelling mechanism and the ground rails.

NOTE The fixing elements at systems for rail vehicles can be designed in the same way as those for railways.

5.1.12 Protruding components

Protruding components as e.g. retainer keys, screws and lubricating devices at rotating parts shall be enclosed when there is the risk of entanglement of body parts or clothing, even if they are outside the work and traffic zones.

5.1.13 Accessible covers

The width of openings in accessible covers on the work and traffic zone floor shall be 4 cm at maximum.

NOTE 1 Accessible covers are e.g. grids, sheets and working platforms.

NOTE 2 Wider openings were experienced to lead to accidents caused by twisting. Openings in accessible covers can e.g. be necessary for under-chassis washing systems.

Accessible covers provided by the manufacturer shall be of a non-slip type according to evaluation group R 11 V 4 in leaflet BGR 181, in connection with EN ISO 14122-2:2016.

5.1.14 Treads

Surfaces which are intended to be treads shall be safe when accessed. They shall be protected against unintended displacement.

Surfaces of treads shall be of a non-slip type according to evaluation group R 11 V 4 in Leaflet BGR 181, in connection with EN ISO 14122-2:2016.

5.1.15 Vehicle wheel guides

The sides of the rail guides shall be constructed in a way that risks are avoided.