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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

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Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 27281

Safety requirements - Vehicle washing systems

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This document is circulated as received from the committee secretariat.

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European foreword

This document (prEN ISO 27281:2024) has been prepared by Technical Committee CEN/TC 197 “Pumps”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 17281:2021. The main technical changes compared to the previous edition are as follows:

- precision in [Clause 1](#) (scope) that the document does not apply to bicycle cleaning systems;
- update of [Clause 3](#) and addition of definitions of "fresh water", "recycled water" and "process water";
- addition of an informative [Annex D](#) on the determination and control of Legionella and Pseudomonas aeruginosa concentration in stationary vehicle wash systems;
- update of [Annex ZA](#) for presumption of conformity with the Machinery Regulation (EU) 2023/1230.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative [Annex ZA](#), which is an integral part of this document.

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.

Safety requirements - Vehicle washing systems

1 Scope

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

NOTE 1 [Annex D](#) covers the determination and control of Legionella and Pseudomonas aeruginosa concentration in stationary vehicle wash systems. Additionally, it can be applied to all vehicle wash systems that can form aerosols due to their cleaning systems.

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.

This document does not apply to bicycle cleaning systems.

NOTE 2 Signals (example doors, lighting systems) can be provided by the vehicle wash system.

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

Persons to be protected are:

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

Objects to be protected are:

- vehicles.

Significant hazards associated with vehicle wash 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 wash 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 wash systems, have been instructed in the handling of vehicle wash 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 280-1:2022, *Mobile elevating work platforms — Part 1 : 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*

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

EN ISO 3744:2024, *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 3744:2024)*

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 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

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 11203:2009²⁾, *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 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 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2023)*

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

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>

1) As impacted by EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/AC:2016-12, EN 60529:1991/corrigendum May 1993 and EN 60529:1991/A2:2013/AC:2019-02.

2) As impacted by EN ISO 11203:2009/A1:2020

3.1

work and traffic zone

area up to a height of 2 m 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.

3.2

traffic zone (of a vehicle wash system)

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

3.3

operating temperature (of the wash liquid)

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

3.4

brushless vehicle wash system

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

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

3.5

pressure generator

device generating the operation pressure

3.6

tandem roll-over vehicle wash system

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

3.7

liquid heater

device for the heating of the liquids to the operating temperature

3.8

vehicle ground conveyor

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

3.9

vehicle displacement device

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

3.10

vehicle wash 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

3.11

vehicle wash tunnel/street

vehicle wash system ([3.10](#)) where the vehicles to be cleaned are moved through wash, drying or special treatment points by means of power driven *vehicle ground conveyor* ([3.8](#)) devices

3.12

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

3.13

high pressure pipework

pipeline or hose pipe in which the liquid is conducted from the *pressure generator* (3.5) to the consumption points with a minimum pressure of 2,5 MPa and not exceeding 35 MPa

3.14

vehicle wash system with brushes

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

3.15

roll-over wash system

mobile, rail mounted vehicle wash system, where a gantry with mounted or integrated wash, 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 wash systems.

3.16

hose fittings

connecting elements for hoses or hose pipes

3.17

instructed service person driven vehicle wash system

vehicle wash system which is started by an *instructed service person* (3.20)

3.18

automatic vehicle wash system

vehicle wash system (3.10) which is started without an *instructed service person* (3.20)

3.19

self-service vehicle wash system

vehicle wash system (3.10) which is started and operated by the customer

3.20

instructed service person

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

3.21

automatic safeguard

automatic guard or *protective device* (3.22) provided to protect persons from a hazard

3.22

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.

3.23

takt/batch wash system

mobile, rail mounted vehicle wash system of the roll-over type, where the wash 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 wash or drying position.

Note 2 to entry: The vehicle moves from the wash to the drying position. In intermittent wash systems, no continuous vehicle advance is carried out.

3.24

under chassis wash

device for cleaning the underside of vehicles

3.25**maximum operating pressure**

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

3.26**drive-through wash system**

during cleaning, the vehicle is moved by its own power

3.27**fresh water**

external water fed into the machine e.g. potable water, rainwater, or well water

3.28**recycled water**

water from previous vehicle wash which is treated biologically, physically or chemically before reuse

3.29**process water**

recycled water ([3.28](#)), treated *fresh water* ([3.27](#)) or untreated fresh water that is used for the cleaning process

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

If inherent safe construction is not possible automatic safeguards or ISO 14120:2015 shall be applied.

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.

If inherent safe construction is not possible automatic safeguards or ISO 14120:2015 shall be applied.

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 accordance 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.

If inherent safe construction is not possible automatic safeguards or ISO 14120:2015 shall be applied.

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 wash 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 wash 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 wash or drying process.

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