SLOVENSKI STANDARD
oSIST prEN 12921:2026

01-maj-2026

Naprave za površinsko čiščenje in predobdelavo industrijskih proizvodov s pomočjo tekočin ali par - 1. del: Varnostne zahteve

Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours - Safety requirements

Maschinen zur Oberflächenreinigung und -vorbehandlung von industriellen Produkten mittels Flüssigkeiten oder Dampfphasen - Sicherheitsanforderungen

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Machines de nettoyage et de pré-traitement de pièces industrielles utilisant des liquides ou des vapeurs - Prescriptions de sécurité

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Ta slovenski standard je istoveten z: **prEN 12921**

ICS:

97.080	Aparati za čiščenje	Cleaning appliances

oSIST prEN 12921:2026 **en,fr,de**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 12921

April 2026

ICS 97.080

Will supersede EN 12921-1:2005+A1:2010, EN 12921-2:2005+A1:2008, EN 12921-3:2005+A1:2008, EN 12921-4:2005+A1:2008

English Version

Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours - Safety requirements

Machines de nettoyage et de pré-traitement de pièces industrielles utilisant des liquides ou des vapeurs - Prescriptions de sécurité

Maschinen zur Oberflächenreinigung und -vorbehandlung von industriellen Produkten mittels Flüssigkeiten oder Dampfphasen - Sicherheitsanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 271.

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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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European foreword

This document (prEN 12921:2026) has been prepared by Technical Committee CEN/TC 271 “Surface treatment equipment - Safety”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12921-1:2005+A1:2010, EN 12921-2:2005+A1:2008, EN 12921-3:2005+A1:2008 and EN 12921-4:2005+A1:2008.

prEN 12921:2026 includes the following significant technical changes with respect to EN 12921-1:2005+A1:2010, EN 12921-2:2005+A1:2008, EN 12921-3:2005+A1:2008 and EN 12921-4:2005+A1:2008:

a) the four parts of the EN 12921 series have been merged into one document;

b) requirements for minimization of contact with process liquid, aerosol and vapours have been added as 4.1 and 4.14;

c) requirements for lighting have been added as 4.2;

d) requirements for ergonomics have been added as 4.3;

e) requirements for operating positions have been added as 4.4;

f) requirements for protection against corruption have been added as 4.5;

g) requirements for controls (e.g. required performance level) have been updated as 4.6;

h) requirements for mechanical safety have been revised as 4.7;

i) requirements for surfaces, edges or angles have been added as 4.7.4;

j) requirements for design of electrical equipment to withstand thermal and chemical influences have been added as 4.8.2;

k) requirements for pneumatic power, hydraulic power and fuelgas supply have been added as 4.9;

l) requirements for protection against hot surfaces have been added in more detail as 4.10.1;

m) requirements for protection against hot liquids have been added as 4.10.2;

n) requirements for fire protection have been added in more detail as 4.11;

o) requirements for explosion protection have been restructured with more detail added as 4.12;

p) requirements for protection against noise have been updated as 4.13;

q) requirements for protection against hazardous substances have been updated as 4.14;

r) requirements for protection against entrapment have been added as 4.15;

s) requirements for protection against slipping, tripping and falling have been updated as 4.16;

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t) requirements for protection against lightning have been added as 4.17;

u) requirements for maintenance oriented machine design have been added as 4.18.

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.

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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);

— service providers, e.g. for maintenance (small, medium and large enterprises).

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 specifies safety requirements and recommendations for environmental aspects for cleaning and pretreatment machinery.

This document specifies requirements against all significant hazards, hazardous situations and hazardous events relevant to cleaning and pretreatment machinery, when they are used as intended, including reasonably foreseeable misuse.

See Annex A for significant hazards.

This document also specifies in Annex B recommendations for minimizing environmental impact of cleaning and pretreatment machinery.

Interfaces between cleaning and pretreatment machinery and potentially connected equipment not in scope are given in Figure 1.

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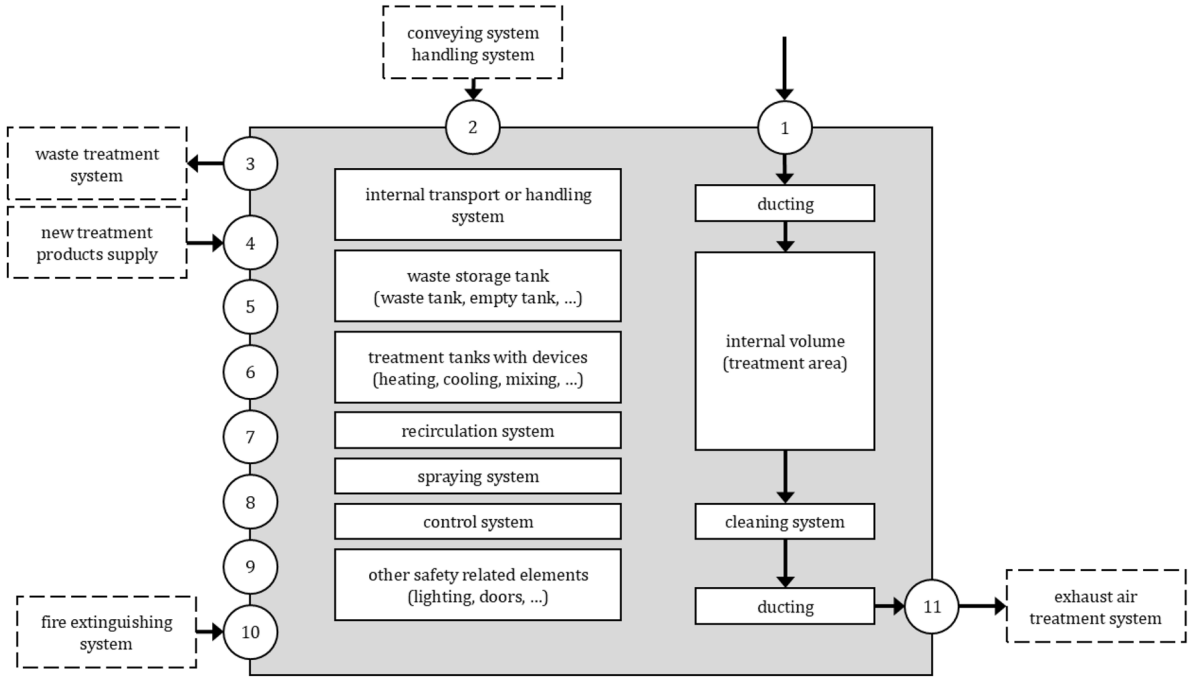

Key

Cleaning and pretreatment machine

Element / system of cleaning and pretreatment machine

System out of scope

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1	Connector to fresh air supply
2	Interface to conveying or handling system
3	Waste output connector
4	New treatment products input connector
5	Connector to electrical power supply
6	Connector to fuel supply
7	Connector to pressurized air supply
8	Connector to water supply
9	Connector to cooling water supply
10	Connection to external fire extinguishing system
11	Connector to exhaust air treatment system

Figure 1 — Interfaces between cleaning and pretreatment machinery and potentially connected equipment not in scope

The specific significant risks related to the use of this machinery with foodstuff and pharmaceutical products are not dealt with in this document.

This document does not apply to:

a) high pressure water jet machinery according to EN 1829-1:2021;

b) inerted cleaning and pretreatment machinery;

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c) surface-cleaning appliances for household use employing liquids or steam according to EN 60335-2-54:2008[5];

d) high pressure cleaners and steam cleaners according to EN 60335-2-79:2012, modified;

e) cleaning and pretreatment equipment installed in paint application booths;

f) shot blasting machinery according to EN ISO 23779:2025;

g) dry ice blasting machines;

h) laser surface cleaning machinery;

i) plasma surface cleaning machinery;

j) electroplating machinery according to EN 17059:2018.

This document does not apply to cleaning and pretreatment machines manufactured before the date of its publication as an European standard.

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.

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EN 547-1:1996+A1:2008, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 809:1998+A1:2009,[1] *Pumps and pump units for liquids — Common safety requirements*

EN 1005-3:2002+A1:2008, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1570-1:2024, *Safety requirements for lifting tables — Part 1: Lifting tables serving up to two fixed landings*

EN 1837:2020, *Safety of machinery — Integral lighting of machines*

EN 14462:2015, *Surface treatment equipment — Noise test code for surface treatment equipment including its ancillary handling equipment — Accuracy grades 2 and 3*

EN 17059:2018, *Plating and anodizing lines — Safety requirements*

EN 60204-1:2018,[2] *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016, modified)*

EN 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN IEC 61496-1:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2020)*

[1] As impacted by EN 809:1998+A1:2009/AC:2010
[2] As impacted by EN 60204-1:2018/A1:2025

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EN IEC 61496-2:2020, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:2020)*

EN IEC 60079-0:2018,[3] *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017)*

EN IEC 62305-1:2024, *Protection against lightning — Part 1: General principles (IEC 62305-1:2024)*

EN IEC 62305-2:2024, *Protection against lightning — Part 2: Risk management (IEC 62305-2:2010, modified)*

EN IEC 62305-3:2024, *Protection against lightning – Part 3: Physical damage to structures and life hazard — Supplement 2: Additional information for special structure*

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 10218-2:2025, *Robotics — Safety requirements — Part 2: Industrial robot applications and robot cells (ISO 10218-2:2025)*

EN ISO 11688-1:2009, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688-1:1995)*

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

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EN ISO 13577-2:2023, *Industrial furnaces and associated processing equipment — Safety — Part 2: Combustion and fuel handling systems (ISO 13577-2:2023)*

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

EN ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors (ISO 13856-1:2013))*

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 14119:2025, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2024)*

EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

[3] As impacted by EN IEC 60079-0:2018/A11:2024 and EN IEC 60079-0:2018/AC:2020-02

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

EN ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2016)*

EN ISO 19353:2019, *Safety of machinery — Fire prevention and fire protection (ISO 19353:2019)*

EN ISO 80079-36:2016,[4] *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36:2016)*

EN IEC 61784-3:2021,[5] *Industrial communication networks — Profiles — Part 3: Functional safety fieldbuses — General rules and profile definitions (IEC 61784-3:2021)*

EN IEC 62443-2-1:2024, *Security for industrial automation and control systems — Part 2-1: Security program requirements for IACS asset owners (IEC 62443-2-1:2024)*

EN IEC 62443-3-2:2020, *Security for industrial automation and control systems — Part 3-2: Security risk assessment for system design (IEC 62443-3-2:2020)*

EN IEC 62443-3-3:2019,[6] *Industrial communication networks — Network and system security — Part 3-3: System security requirements and security levels (IEC 62443-3-3:2013 + COR1:2014)*

EN IEC 62443-4-1:2018, *Security for industrial automation and control systems — Part 4-1: Secure product development lifecycle requirements (IEC 62443-4-1:2018)*

EN IEC 62443-4-2:2019,[7] *Security for industrial automation and control systems — Part 4-2: Technical security requirements for IACS components (IEC 62443-4-2:2019)*

EN ISO/IEC 15408-1:2023, *Information security, cybersecurity and privacy protection — Evaluation criteria for IT security — Part 1: Introduction and general model (ISO/IEC 15408-1:2022)*

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[4] As impacted by EN ISO 80079-36:2016/AC:2019
[5] As impacted by EN IEC 61784-3:2021/A1:2024
[6] As impacted by EN IEC 62443-3-3:2019/AC:2019-10
[7] As impacted by EN IEC 62443-4-2:2019/AC:2022-09

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3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

3.1
cleaning and pretreatment machinery
automatic or manually operated machinery for cleaning and/or pretreatment of industrial items using liquids or vapours

3.2
integral transport system
handling system which is integral part of the cleaning and pretreatment machine

4 Safety requirements and/or protective/risk reduction measures

4.1 Materials and products

Cleaning and pretreatment machinery shall by design and construction minimize contact with cleaning and pretreatment agents during filling, operation, recycling, recovery or draining.

Requirements against hazardous substances are given in 4.14.

Requirements for the information for use are given in Clause 6.

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4.2 Lighting

Internal parts requiring frequent inspection and adjustment and maintenance areas shall be illuminated by at least 500 lx.

If ambient lighting does not provide this illumination intensity, these areas/parts of the machinery shall be illuminated by integral lighting according to EN 1837:2020.

If installation of machine integral lighting is not reasonable (e.g. due to contamination), information on the use of mobile lighting shall be given in the information for use.

The requirement for minimum ambient illumination intensity at the place of installation shall be given in the user information.

4.3 Ergonomics

4.3.1 Operation

Manually operated machine parts (e.g. lids, gates, shutters, handling systems) shall be designed to

— limit the required manual force for operation to a maximum of 25 kg, according to EN 1005-3:2002+A1:2008;

— limit the required handling range from 1 m to 1,8 m above installation floor level.

Machinery for manual cleaning and pretreatment operation shall provide a working level between 0,75 m and 1,10 m above installation floor level.

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4.3.2 Maintenance

To minimize postural constraints:

— openings and accesses for maintenance purposes shall be designed according to EN 547-1:1996+A1:2008;

— operations to change expendable equipment (e.g. filter elements) shall be taken into account for the machinery design;

— operations for changing or filling of process liquids shall be taken into account for the machinery design.

4.3.3 Control devices

Devices provided for control of the cleaning and pretreatment machine (e.g. operating panels) shall be designed according to EN 61310-1:2008.

4.3.4 Warning devices

Warning devices (e.g. overfilling) shall be designed according to EN 61310-1:2008. Warning devices shall be equipped with means to check their function. Warning signals shall comply with EN ISO 7731:2008.

Warning signals shall be perceptible at all workplaces of the machine.

4.4 Operating positions

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Operating positions shall be protected against

— hazardous atmosphere (hot vapours or health hazardous vapours) generated in the cleaning or pretreatment process, by requirements given in 4.14;

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— contact with hazardous liquid (hot liquid or health hazardous liquid), e.g. by spilling, splashing or ejection, by requirements given in 4.14.

Hot surfaces shall be avoided at operating positions by the requirements given in 4.10.

Access to moving parts shall be avoided by requirements given in 4.7.5, 4.7.6 and 4.7.7.

4.5 Protection against corruption

Communication connections related to safety functions shall be assessed and designed according to EN ISO/IEC 15408-1:2023, EN IEC 62443-2-1:2024, EN IEC 62443-3-2:2020, EN IEC 62443-3-3:2019[6], EN IEC 62443-4-1:2018 and EN IEC 62443-4-2:2019[7].

NOTE The standard prEN 50742:2025 on protection against corruption is under development in IEC TC44.

4.6 Control systems

4.6.1 Safety and reliability of control systems

Safety related control systems shall be designed according to EN ISO 13849-1:2023. This applies also for input and processing of safety related parameters. Requirements for safety functions are given in Table 1.

After activation of a safety function, the machinery shall not restart automatically.

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