

**Masinaid tööstuslike detailide pindade  
puhastamiseks ja eeltöötlemiseks vedelike või  
aurude abil. Osa 1: Üldised ohutusnõuded**

Machines for surface cleaning and pre-treatment of  
industrial items using liquids or vapours - Part 1:  
Common safety requirements

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12921-1:2005+A1:2010 sisaldab Euroopa standardi EN 12921-1:2005+A1:2010 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 31.12.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 26.05.2010.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 12921-1:2005+A1:2010 consists of the English text of the European standard EN 12921-1:2005+A1:2010.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 31.12.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 26.05.2010.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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Aru 10 Tallinn 10317 Eesti; [www.evs.ee](http://www.evs.ee); Telefon: 605 5050; E-post: [info@evs.ee](mailto:info@evs.ee)

English Version

**Machines for surface cleaning and pre-treatment of industrial  
items using liquids or vapours - Part 1: Common safety  
requirements**

Machines de nettoyage et de pré-traitement de pièces  
industrielles utilisant des liquides ou des vapeurs - Partie 1:  
Prescriptions générales de sécurité

Maschinen zur Oberflächenreinigung und -vorbehandlung  
von industriellen Produkten mittels Flüssigkeiten oder  
Dampfphasen - Teil 1: Allgemeine  
Sicherheitsanforderungen

This European Standard was approved by CEN on 24 March 2005 and includes Amendment 1 approved by CEN on 23 April 2010.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document (EN 12921-1:2005+A1:2010) has been prepared by Technical Committee CEN/TC 271 “Surface treatment equipment — Safety”, the secretariat of which is held by DIN.

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 November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.

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

This document includes Amendment 1, approved by CEN on 2010-04-23.

This document supersedes EN 12921-1:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** and **A1**.

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.

**NOTE** Although a cleaning machine, as an integral whole, formally does not fall under the scope of the ATEX Directive 94/9/EC, the standard is based upon a fundamental risk analysis according to this directive.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 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 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 or 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 according to the provisions of this type C standard.

This European Standard consists of the following parts:

- Part 1: Common safety requirements
- Part 2: Safety of machines using water based cleaning liquids
- Part 3: Safety of machines using flammable cleaning liquids
- Part 4: Safety of machines using halogenated solvents

## 1 Scope

**1.1** This standard applies to machines for surface cleaning and pre-treatment – in the following called "cleaning machines" – of industrial items using liquids or vapours, i.e. stationary machines and related equipment for automated and manual cleaning and pre-treatment processes.

**NOTE** Cleaning machines are operated with or without heating, for example as dipping or spraying or vapour condensation process, where additional using of ultrasound is possible. These cleaning machines could be designed as single-zone or multi-zone machine, chamber machines, drum cleaning machine, low lift truck machines, round time machines or tunnel (continuous) machines.

To the extent of this document, cleaning machines for industrial items are considered as an assembly of the following equipment:


- pump(s) and/or other mechanical system of agitation, recirculation and spraying of cleaning liquid;
- forced ventilation system;
- heating system with temperature control;
- condensation system;
- filtration and separation system and/or solid particles extraction from the liquid;
- conveyor and/or handling system for the items to be processed;
- product handling systems and reciprocators which are part of the cleaning machine;
- control and/or monitoring systems;
- liquid handling system.

**1.2** This European Standard deals with the common significant hazards, hazardous situations and events relevant to cleaning machines for industrial items using liquids or vapours when they are used as intended and under the conditions foreseen by the manufacturer (see clause 4). This part of the standard defines the common safety requirements for all kinds of cleaning machines for industrial items using liquids or vapours and related common devices and should be used in connection with other parts of the EN 12921-series. The specific requirements specified in part 2 and following parts of EN 12921 take precedence over the respective requirements in EN 12921.

**NOTE** In addition, where a cleaning machine is not covered by a specific part of this document, part 1 of EN 12921 can be used to establish the approach for dealing with the relevant risks.

Specific hazards which are related to the type of cleaning liquid used are dealt with in the following documents:

- EN 12921-2 for water based cleaning liquids;
- EN 12921-3 for flammable cleaning liquids;
- prEN 12921-4 for halogenated solvents.

**1.3**  This standard is not applicable to machines for:

- mobile portable cleaning,



- high pressure cleaning with high pressure water jet according to prEN 1829-1,
- conveyor dishwashing according to EN 50416,
- surface cleaning employing liquids according to EN 60335-2-54,
- commercial electric dishwashing according to EN 60335-2-58,
- cleaning with high pressure and steam according to EN 60335-2-79,
- plasma cleaning,
- mechanical blasting,
- thermal cleaning,
- drying processes,
- cleaning of textiles or clothes,
- food processing.

This standard is not applicable to the following equipment:

- loading and unloading systems,
- automatic systems, e.g. robots as covered by EN ISO 10218-1,
- centrifuges as covered by EN 12547,
- pumps and pump units for liquids as covered by EN 809. <sup>(A1)</sup>

**1.4** This standard is not applicable to cleaning machines for industrial items which are manufactured before the date of publication of this document by CEN.

## 2 Normative references

The following referenced documents are indispensable for the application 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 294, *Safety of machinery — Safety distance to prevent danger zones being reached by the upper limbs*

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 418, *Safety of machinery - Emergency stop equipment, functional aspects - Principles for design*

EN 563, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit values for hot surfaces*

EN 619, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 626-1, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

EN 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

EN 842, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 894-1, *Safety of machinery — Ergonomic requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

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

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

EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 954-1:1996, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

CR 954-100, *Safety of machinery — Safety-related parts of control systems — Part 100: Guide on the use and application of EN 954-1:1996*

EN 981, *Safety of machinery — System of auditory and visual danger and information signals*

EN 982, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 999, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*

EN 1037, *Safety of machinery — Prevention of unexpected start-up*

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

EN 1093-3, *Safety of machinery — Evaluation of the emission of airborne hazardous substances — Part 3: Emission rate of a specified pollutant — Bench test method using the real pollutant*

EN 1127-1, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 12921-3, *Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours - Part 3: Safety of machines using flammable cleaning liquids*

EN 13478, *Safety of machinery — Fire prevention and protection*

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

EN 60204-1:1997, *Safety of machinery - Electrical equipment of machines – Part 1: General requirements (IEC 60204-1:1997)*

EN 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards; Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:1997, modified)*

EN 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards; Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:1996, modified)*

EN 61010-1; *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (IEC 61010-1:2001)*

EN 61310-1; *Safety of machinery - Indication, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995)*

EN 61310-2, *Safety of machinery - Indication, marking and actuation – Part 2: Requirements for marking (IEC 61310-2:1995)*

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

EN ISO 12100-1:2003; *Safety of machinery - Basic concepts, general principles for design – Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003; *Safety of machinery - Basic concepts, general principles for design – Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 14122-1; *Safety of machinery - Permanent means of access to machinery – Part 1: Choice of fixed means of access between two levels (ISO 14122-1:2001)*

EN ISO 14122-2; *Safety of machinery - Permanent means of access to machinery – Part 2: Working platforms and walkways (ISO 14122-2:2001)*

EN ISO 14122-3; *Safety of machinery - Permanent means of access to machinery – Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2001)*

ISO 3864-1, *Graphical symbols - Safety colours and safety signs*

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

#### 3.1

##### **accessible danger zone**

areas where, for example, area guards or ESPDs allow whole-body access. The objective is to prevent anyone starting the machine while persons are inside the danger zone

#### 3.2

##### **automatic machines and equipment**

machines and equipment in which systems are used to control their operation without further intervention from the operator once the start control has been activated. Such machines may be either free standing or included in a complex installation

#### 3.3

##### **cleaning liquid**

any liquid which can be used in liquid and vapour form for surface treatment (cleaning and/or washing) of items in the machine

NOTE 1 It is distinguished between: