SLOVENSKI STANDARD
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Naprave za površinsko čiščenje in predobdelavo industrijskih proizvodov s pomočjo tekočin ali par - 1. del: Splošne varnostne zahteve (vključno z dopolnilom A1)

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

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

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

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97.080	Aparati za nego tal	Floor treatment appliances

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

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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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Contents

page

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of an identical text or by endorsement, at the latest by November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.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〛 〚/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 〈A1〉 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. A1

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:

- water based cleaning liquids and
- flammable cleaning liquids and
- halogenated solvents.

NOTE 2 Some preparations for cleaning and degreasing at room temperature are also called cleaner solvents. They may be hazardous to health and combustible, as a mixture with air their vapours may be explosive.

3.4
closed machine
machine offering access to the (cleaning) process by safe guarded covers or doors which shall remain closed during the process and which can be opened for maintenance and loading or unloading purposes only

3.5
complex installation
combination of machines and service equipment, working as one integrated production unit, subject to an overall control system

3.6
danger points
defined locations in the danger zone of machines where persons can be injured by movements of

- parts of machines
- tools of machines or parts of tools
- items or parts of items
- materials being processed.

NOTE Danger points can exist, for example, on gear, chain and worm drives, V-belt, flat belt, pulling and supporting elements on continuous conveyors, spoke wheels and fly wheels, shafts and shaft ends, rollers, slides, push rods and similar parts, tools and clamping devices.

Particular points of danger are:

- crushing and shearing points
- trapping points
- inrunning nips
- cutting, punching and impact points.

3.7
ESPD
electro-sensitive protective device

3.8
flammable cleaning liquid
liquid able to undergo an exothermic reaction with air when ignited

NOTE A liquid can only burn when the molecules of the liquid are in intimate contact with oxygen from the air. Ignition is possible when the liquid generates a concentration of vapour in air, or the flammable liquid is present as a suspension of fine droplets in air (aerosol).

3.9
forced ventilation
air exchange achieved by fans or by other powered means which removes from the machines vapours, fumes, gases, mist, etc.

3.10
halogenated solvent
organic solvent containing at least one halogen atom per molecule and not having a flash point as determined by standard methods

NOTE These halogenated solvents used in industry generally contain a small quantity of stabilising agents (anti-acid, anti-oxidant, etc.).

3.11
heating system
system fitted to the machine in order to raise the temperature of the cleaning liquid above the local ambient temperature

3.12
heat source
any energy source in contact with the cleaning liquid which can lead to an increase of the temperature of the cleaning liquid

NOTE Heat sources are e.g.:

— heating system;
— ultrasonic waves;
— pumping energy;
— stored heat of items;
— mechanical agitation;
— heating from electrical conductors, motors;
— heat caused by magnetic fields;
— refrigeration system;
— sunrays.

3.13
hold-to-run control device
control device which initiates and maintains operation of machine elements only as long as the manual control (actuator) is actuated. The manual control (actuator) automatically returns to the stop position when released

3.14
immersion process
operation where the item to be cleaned is placed in a tank containing a cleaning liquid which comes into contact with the entire surface of the item in order to achieve the required result by dispersion of contaminants into the cleaning liquid

3.15
items
parts whose surfaces are treated in the cleaning machine

NOTE The word item is used for workpieces processed individually, or in bulk, or on jigs or in baskets.

3.16
liquid agitation machine
machine for an immersion process where the cleaning liquid is moved by e.g.: pump(s) with adequate, submerged or not, nozzles, jets or inlet openings, propeller

3.17
maximum admissible cleaning liquid capacity
maximum mass and volume of cleaning liquid which can be filled into the cleaning machine