SLOVENSKI STANDARD
SIST EN 1953:2000+A1:2010

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Razprševalna in brizgalna oprema za prekrivne materiale - Varnostne zahteve

Atomising and spraying equipment for coating materials - Safety requirements

Spritz- und Sprühgeräte für Beschichtungsstoffe - Sicherheitsanforderungen

Equipements d'atomisation et de pulvérisation pour produits de revêtement - Exigences de sécurité

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Atomising and spraying equipment for coating materials - Safety requirements

Equipements d'atomisation et de pulvérisation pour produits de revêtement - Exigences de sécurité

Spritz- und Sprühgeräte für Beschichtungsstoffe - Sicherheitsanforderungen

This European Standard was approved by CEN on 4 September 1998 and includes Amendment 1 approved by CEN on 30 July 2009.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 1953:1998+A1:2009) 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of an identical text or by endorsement, at the latest by March 2010, and conflicting national standards shall be withdrawn at the latest by March 2010.

This document includes Amendment 1, approved by CEN on 2009-07-30.

This document supersedes EN 1953:1998.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] ⟨A1⟩.

This European Standard 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).

[A1] For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

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, 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 ENV1070.

This European Standard forms part of a series of standard specifying the health, safety and environmental protection requirements for devices, units and equipment for surface coating.

— Atomising and Spraying Equipment for Coating Materials

— Machinery for the Supply and Circulation of Coating Materials Under Pressure

— Mixing machinery for Coating Materials

The equipment concerned and the extent to which hazards are covered is indicated in the scope of this standard. The equipment shall comply, as appropriate, with [A1] EN ISO 12100-1 and EN ISO 12100-2 [A1] for hazards which are not covered by this standard.

1 Scope

This European Standard applies to the design and construction of spraying equipment for both manual and automatic application of liquid, paste (semi-solid) and powder coating materials. The manual equipment is hand-held and the automatic equipment is operated by auxiliary signals and mounted either rigidly or onto automated devices such as robots, or reciprocating or rotary machines.

The coating material may be atomised by air, by airless, by airless with the assistance of air or mechanically by centrifugal force. With atomisation by centrifugal force, the atomised coating material may be assisted towards the workpiece by controlled air veils.

The atomising and spraying equipment may also be electrostatically supported.

This standard specifically refers to hazards created by or resulting from the use of atomising and spraying equipment, if it is used as determined and in accordance with the foreseeable conditions of the manufacturer (see clause 4).

Atomising and spraying equipment may be linked with supply systems, control circuits, spray booths and/or automated machinery, none of which are covered by the scope of this standard. This may result in the overlapping of some hazards or risks. Such hazards or risks should be taken into consideration when specifying and installing the atomising and spraying equipment.

Further topics for this standard are minimum user information:

— Operation manuals,

— Marking.

This standard excludes:

— Flocking machines;

— Equipment related to the atomising and spraying of foodstuffs and pharmaceuticals;

— Artists airbrushes;

— Machinery for the supply and/or circulation of coating materials under pressure;

— Automated devices such as robots, reciprocating or rotary machines.

This standard applies to equipment constructed after the date of issue of this standard.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter.

For dated references, subsequent revisions of any of these publications apply to the European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

〈A1〉 *deleted text* 〈A1〉

EN 349, *Safety of Machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 563, *Safety of Machinery - Temperature of touchable surfaces: Ergonomic data to establish limit values for hot surfaces*

EN 614-1, *Safety of Machinery - Ergonomic design principles – Part 1: Terminology and General Principles*

EN 971-1, *Paints and Varnishes: Terms and definitions for coating materials – Part 1: General Terms*

CR 1030-1, *Hand-arm vibration: Guidelines for vibration hazard reduction – Part 1: Engineering methods by design of machinery*

ENV 1070, *Safety of Machinery - Terminology*

EN 1127-1, *Safety of Machinery - Fire and explosion – Part 1: Explosion prevention and protection*

〈A1〉 EN 14462, *Surface treatment equipment - Noise test code for surface treatment equipment including its ancillary handling equipment – Accuracy grades 2 and 3* 〈A1〉

〈A1〉 EN ISO 11688-1, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)* 〈A1〉

ENV 26385, *Safety of Machinery - Ergonomic principles of the design of work systems*

EN 50050, *Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment*

EN 50053-1, *Regulations for selection, installation and use of electrostatic atomising and spraying equipment for flammable coating materials – Part 1: Electrostatic hand-held atomising and spraying equipment for liquid spraying materials with an energy limit of 0.24 mJ including accessories*

EN 50053-2, *Regulations for selection, installation and use of electrostatic atomising and spraying equipment for flammable coating materials – Part 2: Electrostatic hand-held atomising and spraying equipment for powder materials with an energy limit of 5 mJ including accessories*

EN 50059:1990, *Electrostatic hand-held atomising and spraying equipment for non-flammable liquid coating materials*

EN 50176, *Automatic electrostatic spraying installations for flammable liquid coating materials*

EN 50177, *Automatic electrostatic spraying installations for flammable powder spraying materials*

EN 60204-1, *Safety of Machinery: Electrical equipment of machines – Part 1: General Requirements*

EN 60335-1, *Safety of household and similar electrical appliances – Part 1: General requirements*

[A1) 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)* (A1]

3 Definitions

For the purposes of this standard, the definitions apply from EN971-1 and ENV1070. For the purposes of this standard, the following definitions also apply:

3.1
general
The coating materials for use with the atomising and spraying equipment can either be delivered to the equipment by a pump or a pressure vessel via a supply hose or by an integrated gravity or suction cup.

For atomising and spraying equipment fitted with a gravity or suction cup only compressed air is supplied to the equipment and the coating material either flows from the gravity cup or is sucked from the suction cup.

Atomising and spraying equipment which has the coating material supplied via a hose from a pump or pressure vessel may also be supplied with compressed air.

The coating material is emitted from the atomising and spraying equipment via a valve which is controlled either manually by the trigger or automatically by auxiliary energy from an actuator system.

3.2
atomising and spraying equipment
Any type of device which can be used to atomise coating materials. Atomisation may be achieved by air, hydromechanically (airless) with or without air assistance, or by centrifugal forces such as rotating bells or discs.

NOTE Atomising and spraying equipment (either manual or automatically operated) normally consists of a gun body, a coating material valve either located inside the body or integrated with it and a trigger mechanism which operates the valve.

3.3
safety devices
Devices for atomising and spraying equipment which aim to prevent the unintended spraying of a coating material. Safety devices of this type are such as, but not limited to:

— Trigger guards

— Trigger locking devices

— Fluid needle locking mechanisms

3.4
electrostatic atomising and spraying equipment
Equipment used for the atomising and spraying of coating materials with the assistance of an electrostatic charge.

Such equipment can be fitted with a high voltage generator, located either outside the equipment or integrated with it, a high voltage electrode, power lines and an earth connection.

For powder coating materials the electrostatic charge can be achieved by flow friction (tribocharging) only.

3.5
hand-held atomising and spraying equipment
equipment operated manually and triggered by hand for the application of coating materials onto a workpiece.

3.6
automatic atomising and spraying equipment
Equipment operated by auxiliary signals which may be electrical, pneumatic or hydraulic, excluding any other equipment associated with automated devices.

These auxiliary signal normally trigger a valve which operates the equipment.

NOTE Automatic atomising and spraying equipment may be mounted either rigidly or on automated equipment such as robots or reciprocating or rotary machines. They may spray continuously or be rapid triggered for a specific time when either the workpiece passes in front of it or it passes over the workpiece.

3.7
coating material
In accordance with EN971-1, a liquid, paste (semi-solid) or powdered product which, if applied to a substrate, forms a film which has protective, decorative or other specific properties. Such coating materials may consist of binding agents, pigments, colourings, fillers, solvents and other additives.

Such coating materials can be:

— Varnishes,

— Paints,

— Synthetic resins,

— Patching compounds,

— Fillers,

— Floor coatings,

— Sealers and adhesives.

3.8
flammable coating material
a substance which can be ignited by a sufficient ignition source and which can continue to burn after the ignition source has been removed or which can react in the form of an explosion

3.9
non-flammable coating material
in accordance with EN50059:1990, a substance which, in any mixture with air, cannot be ignited by an ignition source of less than 500mJ

3.10
fire
a process of combustion, characterised by the emission of heat accompanied by the formation of smoke and/or flames

3.11

explosion
an abrupt oxidisation or decompression reaction producing an increase in temperature, pressure or in both simultaneously [EN 1127-1]

3.12
explosion range
The range of the concentration of a flammable substance in air within which an explosion can occur [EN 1127-1]

3.13
lower explosion limit (LEL)
the lower limit of the explosion range [EN 1127-1]

3.14
chemical reaction
process where the coating material or any part of the coating material reacts with the materials of construction of the atomising and spraying equipment

3.15
maximum working pressure
the highest pressure, indicated by the manufacturer, to which the equipment should be subjected during normal operation

3.16
burst pressure
a pressure at which any part of the equipment may fail or crack

3.17
proof pressure
a pressure which can be applied to the equipment without creating any deformation, leakage or other failure and which allows normal operation of the equipment after testing

3.18
functional test
when the equipment is operated under normal operating conditions as laid down in the operation manual

NOTE This shall be done on every piece of equipment.

3.19
type test
a test conducted at the design stage of the product which proves the conformity with the required safety factors and/or measures

4 List of hazards

4.1 General

This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce the risk.

4.2 Mechanical hazards

4.2.1 Bruising hazards:

for instance by trapping or pinching any part of the human body when operating the atomising and spraying equipment.