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Mešalne naprave za premaze - Varnostne zahteve - 1. del: Mešalne naprave za uporabo v lakirnicah za popravila avtomobilov (vključno z dopolnilom A1)

Mixing machinery for coating materials - Safety requirements - Part 1: Mixing machinery for use in vehicle refinishing

Mischgeräte für Beschichtungsstoffe - Sicherheitsanforderungen - Teil 1: Mischgeräte zur Verwendung in der Fahrzeugreparaturlackierung

Machines à homogénéiser des produits de revêtement - Prescriptions de sécurité - Partie 1: Machines à homogénéiser destinées à être utilisées pour la réfection des peintures d'automobiles

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87.100	Oprema za nanašanje premazov	Paint coating equipment
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EUROPEAN STANDARD
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Mixing machinery for coating materials - Safety requirements - Part 1: Mixing machinery for use in vehicle refinishing

Machines à homogénéiser des produits de revêtement -
Prescriptions de sécurité - Partie 1: Machines à
homogénéiser destinées à être utilisées pour la réfection
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Verwendung in der Fahrzeugreparaturlackierung

This European Standard was approved by CEN on 1st August 2005 and includes Amendment 1 approved by CEN on 6 May 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 12757-1:2005+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of an identical text or by endorsement, at the latest by December 2010, and conflicting national standards shall be withdrawn at the latest by December 2010.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 2010-05-06.

This document supersedes EN 12757-1:2005.

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).



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

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 C type standard as stated in Parts 1 and 2 of EN ISO 12100.

This European Standard is part of a series of documents specifying the health, safety and environmental protection requirements for the devices, units and equipment for surface coating:

- EN 1953 "Atomising and spraying equipment for coating materials — Safety";
-  EN 12621  "Machinery for the supply and circulation of coating materials under pressure — Safety";
- EN 12757-1 "Mixing machinery for coating materials — Safety".

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

NOTE Further parts of this European Standard to cover other mixing machinery applications for coating materials may follow.

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.

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1 Scope

1.1 This European Standard applies to the design and construction of mixing machinery for liquid coating materials equipped with container of maximal volume ≤ 10 l used by vehicle refinishers and their coating materials distributors.

The pressure related parts of the machines covered are classified as no higher than category I under article 9 of the Pressure Equipment Directive 97/23/EC.

NOTE Pressure related parts of the machines referred to in this European Standard exceeding the limits of category I may lead to additional application of the Pressure Equipment Directive 97/23/EC.

This European Standard deals with all significant hazards, hazardous situations and events relevant to mixing machinery mentioned above, when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4).

Mixing machinery can operate by stirring or vibrating (shaking) and consists of the following equipment:

- cabinet;
- stirrer;
- vibrator;
- shaker;
- drive unit and related devices; [SIST EN 12757-1:2006+A1:2010](https://standards.iteh.ai/catalog/standards/sist/d5daa9c5-51d9-4a42-9ba3-1569b6e2e3ff/sist-en-12757-1-2006a1-2010)
- container for coating material; <https://standards.iteh.ai/catalog/standards/sist/d5daa9c5-51d9-4a42-9ba3-1569b6e2e3ff/sist-en-12757-1-2006a1-2010>
- safety, measuring and control devices;
- lighting;
- heating equipment and/or air conditioning inside the mixing cabinet.

The mixing machinery may be fixed or mobile.

1.2 The following is excluded from this European Standard:

- Mixing machinery intended for:
 - pressure vessels;
 - open or closed material containers larger than 10 l;
- hand-held mixing tools.

1.3 This European Standard is not applicable to mixing machinery which is manufactured before the date of publication of this European Standard by CEN.

EN 12757-1:2005+A1:2010 (E)**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 619, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

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

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

EN 971-1:1996, *Paints and varnishes — Terms and definitions for coating materials — Part 1: General terms*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*

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

EN 1127-1:2007, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 13237:2003, *Potentially explosive atmospheres — Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

EN 13445-1, *Unfired pressure vessels — Part 1: General*

EN 13463-1:2001, *Non-electrical equipment for potentially explosive atmospheres — Part 1: Basic method and requirements*

EN 13463-5:2003, *Non-electrical equipment intended for use in potentially explosive atmospheres — Part 5: Protection by constructional safety "c"*

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 14986, *Design of fans working in potentially explosive atmospheres*

EN 60079-0:2009, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2007)*

EN 60079-15:2005, *Electrical apparatus for explosive gas atmospheres — Part 15: Construction, test and marking of type of protection "n" electrical apparatus (IEC 60079-15:2005)*

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

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

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 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:1999, 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 61000-6-4:2001, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:1997, modified)*

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

EN ISO 11688-1:1998, *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)*

ISO 3864-1:2002, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs in workplaces and public areas*

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 971-1:1996, EN ISO 12100-1:2003 and the following apply.

3.1

mixing machinery

machine for the mixing by stirring (with an inside agitating device), or by vibrating or shaking (by motion of the container) of liquid coating materials in containers (vessels without pressure)

NOTE 1 In a container, in which two or more components of which at least one is in a liquid consistence are brought together to be processed to a liquid coating material for vehicle refinishing use.

NOTE 2 In general, the mixing machinery consists of a cabinet (as framework) with several shelves on which the mixing places are arranged. The number of shelves and mixing places depend on the volume of the container. The mixing places could be occupied by container of standardized mixing coating materials with a capacity between 1 l and 10 l.

The container is closed by a stirring lid. The stirring lids generally consist of a unit with stirrer, lid and drive (e.g. clamp or rack-wheel) which are put on the open container of the coating materials. The lids are fixed by the pressing and turning of fixing clamps and ensure mixing process only in totally closed container. The stirrer can be powered e.g. via a clamp drive by a motor powered special shaft or via belt or worm drive.

In general this is an electric motor, but also air driven motors are used, especially for installations in hazardous explosive environments.

Furthermore the mixing machinery is equipped with a control unit with programmable timer controlling the mixing time (in most cases several times a day) of the closed stirring container. By fitting the side cowling moving parts of the power drive can be protected. Another standard equipment of mixing cabinets is drip trays for the coating materials.

If necessary, the mixing machinery is equipped with lighting.

EN 12757-1:2005+A1:2010 (E)**3.2****container**

vessel without pressure used for mixing and/or storage of coating and/or auxiliary materials

3.3**agitator**

device which is used to stir or otherwise to move the coating material

NOTE Such device is generally used in conjunction with coating material containers. Such devices may be driven by a power supply and may have a shaft with a stirrer inside a container. The cover of this container may be an integrated part of the stirrer.

3.4**stirrer**

part of the agitator which is immersed into the liquid coating material

NOTE Depending on the characteristics of the coating material, different types of stirrer may be used such as, but not limited to, discs, rods, twirling sticks, paddles (blades), propellers, impellers etc.

3.5**vibrator, shaker**

device for mixing by mechanical movement of the liquid coating material container

3.6**hoses**

flexible conduits intended for the transport of coating and/or auxiliary materials and compressed air, when connected together

3.7**pipes**

rigid conduits intended for the transport of coating and/or auxiliary materials and compressed air, when connected together

3.8**safety device**

device to fulfil a safety function when in use and the failure or malfunctioning of which endangers the safety or health of persons

3.9**coating material**

organic product in liquid or in paste (semi-solid) form (see 1.9 of EN 971-1:1996)

NOTE 1 Such coating materials may consist of binding agents, pigments, fillers, solvents and other additives.

NOTE 2 Such coating materials can be:

- varnishes (see 1.7 of EN 971-1:1996);
- paints (see 1.36 of EN 971-1:1996);
- patching compounds;
- fillers (see 1.21 of EN 971-1:1996);
- sealers and adhesives.

3.10**auxiliary material**

materials used for such purposes as:

- solvent, compressed air (for cleaning);
- water, compressed air (for maintenance)

3.11**chemical reaction**

process where the coating material or any part of the coating material reacts with the materials of construction of the mixing machinery and/or process which takes place between the components of coating materials

3.12**flammable substance**

substance in form of gas, vapour, liquid, solid, or mixtures of these, able to undergo an exothermic reaction with air when ignited A_1 (see 3.48 of EN 13237:2003) A_1

NOTE 1 “Flammable substances” and “combustible material” are equivalently used terms in this document.

NOTE 2 Examples:

- Solvents, which are flammable or slow burning;
- most coating materials.

3.13**non-flammable coating material**

in accordance with EN 50059:1990 a substance which, in any mixture with air, cannot be ignited by an ignition source of less than 500 mJ

3.14**explosion range**

the range of the concentration of a flammable substance with air, within which an explosion can occur A_1 (see 3.33 of EN 13237:2003) A_1

3.15**lower explosion limit (LEL)**

the lower limit of the explosion range A_1 (see 3.74 and 3.33 of EN 13237:2003) A_1

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3.16**hazardous areas**

areas where hazards due to explosive atmosphere may exist. The probability of occurrence of explosive atmospheres is classified in zones

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NOTE Limits of hazardous zones are given in Annex B.

3.16.1**zone 0**

place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently A_1 (see 3.119-1 of EN 13237:2003) A_1

3.16.2**zone 1**

place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally A_1 (see 3.119-2 of EN 13237:2003) A_1

3.16.3**zone 2**

place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation, but, if it does occur, will persist for a short period only A_1 (see 3.119-3 of EN 13237:2003) A_1

3.17**equipment category**

ignition protection category for intended use of equipment in areas in which explosive atmospheres may occur

3.17.1**equipment Group II category 1**

equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

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Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are present continuously, for long periods or frequently.

Equipment of this category ensures the requisite level of protection, even in the event of rare malfunctions relating to equipment, and is characterised by means of protection such that:

- either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection,
- or the requisite level of protection is assured in the event of two faults occurring independently of each other

3.17.2**equipment Group II category 2**

equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are likely to occur.

The means of protection relating to equipment in this category ensuring the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account

3.17.3**equipment Group II category 3**

equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a normal level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

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Equipment of this category ensures the requisite level of protection during normal operation

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3.18**maximum allowable temperature**

maximum temperature for which the equipment is designed as specified by the manufacturer

3.19**maximum allowable pressure**

maximum pressure for which the equipment is designed as specified by the manufacturer

3.20**functional test**

test carried out for every mixing machinery operated under normal operating conditions

3.21**type test**

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

4 List of significant hazards**4.1 General**

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

The following hazards may occur when installing, operating, cleaning or maintaining the machine.

NOTE Information on the method of risk analysis is given in EN 1050.