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Vroče brizganje - Varnostne zahteve za opremo za vroče brizganje - 5. del: Prah in žice dovodne enote

Thermal spraying - Safety requirements for thermal spraying equipment - Part 5: Powder and wire feed units

Thermisches Spritzen - Sicherheitsanforderungen für Einrichtungen für das thermische Spritzen - Teil 5: Pulver- und Drahtfördereinheiten

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Projection thermique - Exigences de sécurité relatives au matériel de projection thermique - Partie 5: Dispositifs d'alimentation en poudre et en fil

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (CEN/TR 15339-5:2014) has been prepared by Technical Committee CEN/TC 240 “Thermal spraying and thermally sprayed coatings”, the secretariat of which is held by DIN.

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.

CEN/TR 15339, *Thermal spraying - Safety requirements for thermal spraying equipment* is composed of the following parts:

— *Part 1: General requirements*

— *Part 2: Gas control units* (published as a European Standard)

— *Part 3: Torches for thermal spraying and their connection and supply units*

— *Part 4: Gas and liquid fuel supply*

— *Part 5: Powder and wire feed units*

— *Part 6: Spray booth, Handling system, Dust collection, Exhaust system, Filter*

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1 Scope

This Technical Report specifies safety requirements of equipment for thermal spraying, in this case of powder and wire feed units.

This part of CEN/TR 15339 should be used in conjunction with CEN/TR 15339-1, which deals with general aspects of designing, manufacturing, and/or putting in service of machines or equipment and with the responsibility for issuing the CE Conformity Declaration.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TR 15339-1, *Thermal spraying — Safety requirements for thermal spraying equipment — Part 1: General requirements*

EN 657, *Thermal spraying — Terminology, classification*

EN 1395-7, *Thermal spraying — Acceptance inspection of thermal spraying equipment — Part 7: Powder feed systems*

3 Function of the powder and wire feed units

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3.1 General

Thermal spray processes are described and schematically represented in EN 657.

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The feed unit shall enable a uniform processing of the spraying material and shall be suitable for operation with the spraying equipment to be intended for spray application.

3.2 Features of the powder feed unit

The powder feed unit can be of type:

— stand-alone; or

— integrated in the torch system;

and its operation mode can be:

— independent; or

— in automatic/remote mode controlled by the spray control system.

The powder feed rate shall be adjustable. The actual values shall be constant and reproducible in relation to the set values; this requires an adequate flow rate and a constant pressure of the carrier gas.

The powder feed unit shall be able to operate inside or outside of a spray booth, subject to practical limits on the length of powder feed hose from the feeder to the torch.

The acceptance inspection of the powder feed unit is specified in EN 1395-7.

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3.3 Features of the wire feed unit

3.3.1 Flame spraying

Usually the wire feed rate for flame spraying is set by the speed regulation of an air turbine or air motor. It may also be set by adjustment of an electric motor manually or through a more sophisticated control.

3.3.2 Arc spraying

The wire feed rate for arc spraying is set by the adjustment of an electric motor or an air motor and the push and/or pull drives connected with that.

There is an almost linear relationship between wire feed rate and current so it is common to express the feed rate in amperes. In some systems, the current itself is set and the wire feed rate automatically adjusted to give the set current.

A uniform, controllable, and reproducible wire feed rate shall be provided by the regulated motor. An adequate and constant air pressure and flow rate or electrical power supply shall also be provided.

4 Potential hazards

4.1 General

For a safe operation of the powder or wire feed unit, the following hazards shall be considered for normal operation or abnormal foreseeable circumstances.

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4.2 Powder feed units

The following hazards shall be considered:

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— gas leakage from the powder feed unit and/or the hoses;

— gas escape under high pressure;

— static charging in powder supply hoses with risk of sparks and shocks;

— back flow of hot or flammable gases in the case of excessive pressure in the combustion chamber for HVOF spraying;

— exposure of the operating personnel to harmful dust when filling, emptying, or cleaning the powder feed unit. An adequate pressure release shall be ensured before opening;

— risk of explosion due to powder distributed outside the powder feeder during filling, emptying or cleaning.

4.3 Wire feed units

The operator can be injured by electric shock if live parts such as the wire reel and the wire itself can be touched. Whilst the voltage is typically less than 50 V, occasionally higher transient voltages can be generated by the inductance in the system.

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5 Safety requirements — Protection measures

5.1 General

According to the type of the feed unit and also whether the spraying process is manually, mechanically or automatically operated specific safety requirements are to be considered and protection measures are to be carried out for normal operation or any foreseeable abnormal operation.

5.2 Safety requirements and protection measures for powder feed units in the case of flame, HVOF, and plasma spraying

Concerning the safety requirements of the powder feed unit, the following items shall be considered:

— the relationship between the pressure in the combustion chamber of the torch and the carrier gas system shall be considered;

— only inert carrier gases (usually Ar or N_2) should be used;

— to ensure gas tightness of the powder feed unit and the connection hoses, a leak test shall be carried out prior to use, after installation, commissioning, after re-assembly or repair work;

— to provide a simple and safe method to fill and empty the powder feeder. When cleaning, filling or emptying the powder feed unit exposure of the operator to dust shall be considered. If applicable, personal protective equipment shall be used;

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— powder spilled around the powder feeder should be extracted or cleaned up, using appropriate tools and methods before starting operation.

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5.3 Safety requirements for wire feed units and protection measures in the case of arc spraying

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Concerning the safety requirements of the wire feed unit, the following items shall be considered:

— protection against contact with electrically live parts like the wire reel and the spraying wire itself;

— avoidance of inadmissible high voltage at the feeder, which may impair the operator;

— protection against mechanical hazards such as finger trapping, etc.

6 Requirements for manufacture, supply, service and maintenance

6.1 Requirements of the manufacturer

The following items shall be considered:

— designing and manufacturing of the equipment according to the relevant Directives of the European Union and the technical instructions of CEN/TR 15339-1 and of this Technical Report;

— presentation of an operation manual of the equipment;

— service plan providing instructions for measures and testing respectively replacement of worn parts at intervals;

— plan for training the operators.

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6.2 Requirements of the integrator

Installation and putting into service meeting the requirements of the Directives of the European Union and the instructions of CEN/TR 15339-1 and of this Technical Report.

6.3 Requirements of the user

The following items shall be considered:

— operating equipment meeting the requirements of the Directives of the European Union and the instructions of CEN/TR 15339-1 and of this Technical Report;

— preparing the operating personnel;

— instruction of the operator;

— execution of the service plan.

7 National rules

National laws or regulations shall be considered and can be added in the prevailing national foreword of this Technical Report, if applicable.

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