



SLOVENSKI STANDARD
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Vročje brizganje - Varnostne zahteve za opremo za vroče brizganje - 2. del: Plinske kontrolne enote

Thermal spraying - Safety requirements for thermal spraying equipment - Part 2: Gas control units

Thermisches Spritzen - Sicherheitsanforderungen für Einrichtungen für das thermische Spritzen - Teil 2: Gaskontrolleinheiten

Projection thermique - Exigences de sécurité relatives au matériel de projection thermique - Partie 2 : Unités de régulation de l'alimentation en gaz

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English Version

Thermal spraying - Safety requirements for thermal spraying equipment - Part 2: Gas control units

Projection thermique - Exigences de sécurité relatives au matériel de projection thermique - Partie 2 : Unités de régulation de l'alimentation en gaz

Thermisches Spritzen - Sicherheitsanforderungen für Einrichtungen für das thermische Spritzen - Teil 2: Gaskontrolleinheiten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 240.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 15339-2:2020) has been prepared by Technical Committee CEN/TC 240 “Thermal spraying and thermally sprayed coatings”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15339-2:2007.

The main changes compared to the previous edition EN 15339-2:2007 are as follows:

- a) the document was editorially reviewed;
- b) the normative references and the bibliography have been updated;
- c) Annex A, A.5 regarding oxygen-carrying components in gas control units were added.

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1 Scope

This document specifies safety requirements of machines and equipment for thermal spraying, in this case of gas control units. This document should be used in conjunction with the Part 1 which deals with general aspects when designing, manufacturing, and/or putting in service of machines or equipment.

Generally the requirements of EU-Directive 2014/34/EU are valid for the use of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 3821, *Gas welding equipment — Rubber hoses for welding, cutting and allied processes (ISO 3821)*

EN 560, *Gas welding equipment — Hose connections for equipment for welding, cutting and allied processes*

EN 561, *Gas welding equipment — Quick-action coupling with shut-off valves for welding, cutting and allied processes*

EN ISO 5175-1, *Gas welding equipment — Safety devices — Part 1: Devices incorporating a flame (flashback) arrestor (ISO 5175-1:2017)*

EN ISO 5175-2, *Gas welding equipment — Safety devices — Part 2: Not incorporating a flame (flashback) arrestor (ISO 5175-2)*

EN ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413)*

EN 13611, *Safety and control devices for gas burners and gas-burning appliances — General requirements*

EN 15069, *Safety gas connection valves for metal hose assemblies used for the connection of domestic appliances using gaseous fuel*

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

EN 60079-1, *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures “d” (IEC 60079-1:2014)*

EN 60079-2, *Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure “p” (IEC 60079-2)*

EN 60079-10-1, *Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres (IEC 60079-10-1)*

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

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1)*

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

EN 61496-1, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1)*

EN 60079-29-1, *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1)*

ISO 1219-1, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols for conventional use and data-processing applications*

ISO 1219-2, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 2: Circuit diagrams*

ISO 2928, *Rubber hoses and hose assemblies for liquefied petroleum gas (LPG) in the liquid or gaseous phase and natural gas up to 25 bar (2,5 MPa) — Specification*

ISO 7000-DB,¹⁾ *Graphical symbols for use on equipment — Index and synopsis*

IEC 60417-DB,²⁾ *Graphical symbols for use on equipment*

3 Gas control units

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3.1 Function

Gas control units are designed in order to control and/or close loop control and/or monitor gas flows which are applied for thermal spraying processes according to EN ISO 14917.

Moreover gas control units can provide further functions such as controlling and/or closed loop controlling and/or monitoring of:

- current and/or voltage;
- feeding liquid flow volumes or masses (fuel, cooling water);
- other cooling media (air, CO₂ and others);
- wire feed rate velocities;
- as well as various control functions of the spraying process.

3.2 Design

Concerning the art of design and scope of control and closed loop control technique the systems can be divided into the following main components:

- monitoring or operating (e.g. HMI – Human Machine Interface);

¹⁾ Online-Database - It will be updated permanently. Access to the database is on a subscription basis alternatively for a period of 3, 6, 12, or 24 months. Preview available at <https://www.iso.org/obp/ui/#iso:pub:PUB400008:en>

²⁾ Online-Database - It will be updated permanently. Access to the database is on a subscription basis alternatively for a period of 3, 6, 12, or 24 months. Preview available at <https://www.iso.org/obp/ui/#iso:pub:PUB400008:en>

- control logic (e.g. Programmable Logic Controller (PLC unit));
- gas control unit;
- pump system for liquid fuels applied with high velocity oxygen fuel spraying (HVOF);
- pumping and/or conveying and/or monitoring of cooling media.

In any gas control unit all of the above mentioned components or only some of them can be integrated in a gas control unit (see examples in Annex A, Figures A.1 to A.3).

4 Components within a gas control unit

Within a gas control unit various components typically perform the following functions:

a) gas measuring and gas control:

- flow meter tube;
- critical orifice;
- gas mass flow controller;
- gas valve;

b) gas pressure measuring:

- pressure transducer;
- pressure gauge;

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c) gas conveying:

- hosing;
- piping;
- fitting;

d) housing:

- sheet metal cabinet of an appropriate guard class (IP);

e) gas safety:

- sensor with control unit;
- shut off valve;
- flashback arrestor;

f) water- and power junction:

- special fittings with power connectors;

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- g) liquid fuel control:
- pump;
 - impeller-type flow meter.

Annex A shows schematic examples for design of gas control units.

5 Requirements**5.1 General**

Thermal spraying technology also uses flammable gases for flame, plasma or HVOF processes which imply a significant potential of danger. Also pure oxygen shall be considered as a dangerous gas because material of low flammability will burn in the presence of a defined concentration of oxygen.

5.2 Local separation of gas and electric power

The local separation of gas and electric power provides an important safety feature and shall be realized.

5.3 Solid piping

Solid piping for at least fuel, flammable gas and oxygen conveying gas lines shall be used where ever possible.

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5.4 Leak test

A leak test shall be carried out and any leaks corrected after installation and before first use.

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6 Safety standards

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The following standards reveal the safety guidelines which shall be adhered to for evaluation as well as for manufacturing of gas control units for thermal spraying:

- a) Area: gas control unit general:
- EN 60079-0;
 - EN 60079-10;
 - EN 60204-1.
- b) Area: housing and cabinets:
- EN 60079-1;
 - EN 60079-2;
 - EN 60529.
- c) Area: monitoring and operation:
- EN 61310-1;
 - EN 61310-2;