



SLOVENSKI STANDARD SIST EN 15339-2:2021

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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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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 European Standard was approved by CEN on 7 June 2021.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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-CENELEC Management Centre has the same status as the official versions.

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

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Contents

	Page
European foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Gas control units	5
4.1 Function	5
4.2 Design	6
5 Components within a gas control unit	6
6 Requirements	7
6.1 General	7
6.2 Local separation of gas and electric power	7
6.3 Solid piping	7
6.4 Leak test	7
7 Safety standards	7
8 National rules	8
Annex A (informative) Examples for design of gas control units	9
A.1 Simple gas control unit	9
A.2 Gas control-closed loop control with integrated HMI	10
A.3 Gas control-closed loop control with separate HMI	10
A.4 Pressurized enclosures	11
A.4.1 General	11
A.4.2 Pressure control	11
A.4.3 Ventilation	12
A.5 Oxygen-carrying components in gas control units	13
A.5.1 General	13
A.5.2 Conditions favouring an oxygen-induced fire	13
A.5.3 Measures to ensure safe operation inside the gas control unit	14
A.5.4 Additional measures	15
Bibliography	16

European foreword

This document (EN 15339-2:2021) has been prepared by Technical Committee CEN/TC 240 “Thermal spraying and thermally sprayed coatings”, 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 January 2022, and conflicting national standards shall be withdrawn at the latest by January 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes 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) in Annex A, A.5 regarding oxygen-carrying components in gas control units was added.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 15339-2:2021 (E)**1 Scope**

This document specifies safety requirements of machines and equipment for thermal spraying, in this case of gas control units. This document is intended to be used in conjunction with 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)*

EN ISO 5175-2, *Gas welding equipment - Safety devices - Part 2: Devices 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 burners and appliances burning gaseous and/or liquid fuels - 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)*

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)*

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 - Graphical symbols and circuit diagrams - Part 1: Graphical symbols for conventional use and data-processing applications*

ISO 1219-2, *Fluid power systems and components - Graphical 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 - Registered symbols*

IEC 60417-DB,¹ *Graphical symbols for use on equipment*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Gas control units

4.1 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;
- various control functions of the spraying process.

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>

EN 15339-2:2021 (E)**4.2 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);
- 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).

5 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; iTeh STANDARD PREVIEW
- critical orifice; (standards.iteh.ai)
- gas mass flow controller; [SIST EN 15339-2:2021](https://standards.iteh.ai/catalog/standards/sist/86c4f3e0-bca4-4979-89a1-986ddceba0fc/sist-en-15339-2-2021)
- gas valve. <https://standards.iteh.ai/catalog/standards/sist/86c4f3e0-bca4-4979-89a1-986ddceba0fc/sist-en-15339-2-2021>

b) gas pressure measuring:

- pressure transducer;
- pressure gauge.

c) gas conveying:

- hosing;
- piping;
- fitting.

d) housing:

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

e) gas safety:

- gas concentration sensor with controller coupled with automated shut-off valve;
- shut off valve;
- flashback arrestor.

- f) water- and power junction:
 - special fittings with power connectors.
- g) liquid fuel control:
 - pump;
 - impeller-type flow meter.

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

6 Requirements

6.1 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.

6.2 Local separation of gas and electric power

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

6.3 Solid piping

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

6.4 Leak test

<https://standards.iteh.ai/catalog/standards/sist/86c4f3e0-bca4-4979-89a1-986ddceba0fc/sist-en-15339-2-2021>

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

7 Safety standards

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 60079-10-1;
 - EN 60204-1.
- b) Area: housing and cabinets:
 - EN 60079-1;
 - EN 60079-2;
 - EN 60529.

EN 15339-2:2021 (E)

c) Area: monitoring and operation:

- EN 61310-1;
- EN 61310-2;
- EN 61496-1.

d) Area: liquid pump, e.g. for fuel:

- EN ISO 4413.

e) Area: safety devices:

- EN ISO 5175-1;
- EN ISO 5175-2;
- EN 13611;
- EN 60079-29-1.

f) Area: operators manual – documentation:

- IEC 60417-DB;
- ISO 1219-1;
- ISO 1219-2;
- ISO 7000-DB.

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g) Area: piping – hosing within gas cabinet:

- EN 15069;
- ISO 2928.

h) Area: input and output:

- EN ISO 3821;
- EN 560;
- EN 561.

8 National rules

National laws, regulations and standards for the use of this document should be mentioned in the national foreword of this document.