



SLOVENSKI STANDARD

SIST EN 12094-5:2006

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Nadomešča:
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**Vgrajeni gasilni sistemi – Sestavni deli sistemov za gašenje s plinom – 5. del:
Zahteve in preskusne metode za visokotlačne in nizkotlačne sortirne ventile in
njihova sprožila**

Fixed firefighting systems - Components for gas extinguishing systems - Part 5:
Requirements and test methods for high and low pressure selector valves and their
actuators

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Ortsfeste Brandbekämpfungsanlagen - Bauteile für Löschanlagen mit gasförmigen
Löschmitteln - Teil 5: Anforderungen und Prüfverfahren für Hoch- und Niederdruck-
Bereichsventile und zugehörige Auslöseeinrichtungen

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Installations fixes de lutte contre l'incendie - Éléments constitutifs des installations
d'extinction a gaz - Partie 5: Exigences et méthodes d'essai pour vannes directionnelles
haute et basse pression et leurs déclencheurs

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13.220.10 Gašenje požara Fire-fighting

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Fixed firefighting systems - Components for gas extinguishing systems - Part 5: Requirements and test methods for high and low pressure selector valves and their actuators

Installations fixes de lutte contre l'incendie - Éléments constitutifs des installations d'extinction à gaz - Partie 5: Exigences et méthodes d'essai pour vannes directionnelles haute et basse pression et leurs déclencheurs

Ortsfeste Brandbekämpfungsanlagen - Bauteile für Löschanlagen mit gasförmigen Löschmitteln - Teil 5: Anforderungen und Prüfverfahren für Hoch- und Niederdruck-Bereichsventile und zugehörige Auslöseeinrichtungen

This European Standard was approved by CEN on 9 March 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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.



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Foreword

This European Standard (EN 12094-5:2006) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

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 October 2006, and conflicting national standards shall be withdrawn at the latest by April 2009.

This European Standard supersedes EN 12094-5:2000.

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 Annex ZA, which is an integral part of this European Standard.

This European Standard is part of a series concerned with gas extinguishing system components.

The following European Standards are planned to cover:

- gas extinguishing systems (EN 12094),
- sprinkler systems (EN 12259 and EN 12845),
- powder systems (EN 12416),
- explosion protection systems (EN 26184),
- foam systems (EN 13565),
- hose systems (EN 671),
- smoke and heat control systems (EN 12101),
- water spray systems (EN 14816).

This standard has the general title “Fixed firefighting systems – Components for gas extinguishing systems” and will consist of the following parts:

- Part 1: Requirements and test methods for electrical automatic control and delay devices,
- Part 2: Requirements and test methods for non-electrical automatic control and delay devices,
- Part 3: Requirements and test methods for manual triggering and stop devices,
- Part 4: Requirements and test methods for container valve assemblies and their actuators,
- Part 5: Requirements and test methods for high and low pressure selector valves and their actuators,
- Part 6: Requirements and test methods for non-electrical disable devices,
- Part 7: Requirements and test methods for nozzles for CO₂ systems,

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- Part 8: Requirements and test methods for connectors,
- Part 9: Requirements and test methods for special fire detectors,
- Part 10: Requirements and test methods for pressure gauges and pressure switches,
- Part 11: Requirements and test methods for mechanical weighing devices,
- Part 12: Requirements and test methods for pneumatic alarm devices,
- Part 13: Requirements and test methods for check valves and non-return valves,
- Part 16: Requirements and test methods for odorizing devices for CO₂ low pressure systems,
- Part 20: Requirements and test methods for the compatibility of components.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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.

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Introduction

It has been assumed in the preparation of this European Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

All pressure data in this European Standard are given as gauge pressures in bar, unless otherwise stated.

NOTE 1 bar = 10^5 N m^{-2} = 100 kPa.

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EN 12094-5:2006 (E)**1 Scope**

This European Standard specifies requirements and describes test methods for selector valves and their actuators used in CO₂ -, Inert Gas- or Halocarbon gas fire extinguishing systems.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60068-2-6:1995, *Environmental testing — Part 2: Tests — Tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995)*

EN ISO 9001:2000, *Quality management systems — Requirements (ISO 9001:2000)*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply.

3.1**actuator**

component which causes a valve to operate

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3.2**closing time**

time for the sealing device of the valve to move from its fully open position to its fully closed position

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3.3**CO₂-high-pressure installation**

fire extinguishing installation in which the CO₂ is stored at ambient temperature. For example, the pressure of the CO₂ in storage is $p_{abs} = 58,6$ bar at 21 °C

3.4**CO₂-low-pressure installation**

fire extinguishing installation in which the CO₂ is stored at low temperature, normally -19 °C to -21 °C

3.5**fill ratio**

mass of extinguishing medium related to the net capacity of a container expressed as kilograms per litre (kg/l)

3.6**Halocarbon Gas**

extinguishing agent that contains as primary components one or more organic compounds containing one or more of the elements fluorine, chlorine, bromine or iodine

3.7**Halocarbon Gas installation**

fire extinguishing installation in which the Halocarbon Gas is stored at ambient temperature

3.8**Inert Gas**

non liquefied gas or mixture of gases which extinguish the fire mainly by reducing the oxygen-concentration in the protected zone, such as Argon, Nitrogen or mixtures of these gases with CO₂

3.9**Inert Gas installation**

fire extinguishing installation in which the Inert Gas is stored at ambient temperature

3.10**opening time**

time for the sealing device of the valve to move from its fully closed position to its fully open position

3.11**selector valve**

valve which releases the extinguishing media to the pipework for a flooding zone when activated

3.12**resistance coefficient**

value for the calculation of the pressure drop in a component under two-phase flow condition

3.13**two-phase flow**

partial change of phase of a fluid from liquid to vapour under flowing conditions

3.14**working pressure**

pressure at which the component is used in the system

4 Requirements

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4.1 General design

4.1.1 The valve body and internal parts except seals shall be made of metal. All mechanical parts of the actuator shall be made of metal. Operating moving parts shall be manufactured of stainless steel, copper, copper alloy or corrosion-protected steel (e.g. galvanised steel).

All materials shall be resistant to media with which they come into contact.

4.1.2 The open and closed position of the selector valve shall be clearly indicated by mechanical means at the valve or the actuator and shall be defined by mechanical limitation of the movement of the valve or the actuator.

4.1.3 Selector valves and actuators shall be designed for a maximum opening time of 3 s.

CO₂-low pressure selector valves and actuators shall be designed for a maximum opening time of 3 s and for a maximum closing time of 3 s.

4.1.4 Selector valves shall be designed such that the closed position may be left only by activation of the actuators or by manual means.

The closed position of CO₂-low pressure selector valves shall not be maintained only by friction.

4.1.5 Selector valves and pneumatic actuators shall be specified by the manufacturer for working pressure according to Table 1.

Selector valves may be specified by the manufacturer for use in systems with reduced and controlled pressure only.

Table 1 — Working pressure

| Component | Working pressure in bar | | | |
|--|---|--|------------------------|-----------------------------|
| | CO ₂ -high-pressure component | CO ₂ -low-pressure component | Inert Gas component | Halocarbon Gas component |
| Selector valve | 140 | 25 | see NOTE | see NOTE |
| Pneumatic actuator | As specified by the manufacturer | | | |
| NOTE This value is given as the developed pressure in the container at 50 °C with the highest fill ratio/superpressurization, where applicable, or – for components specified for use in systems with reduced and controlled pressure only – as specified by the manufacturer. | | | | |

NOTE 1 Actuators may have a different working pressure than selector valves.

NOTE 2 Guidelines for planning and installation may require that a manual emergency operating device, if applicable, at the selector valve does not override pre-warning and time delay.

4.1.6 The pressure of the housing of the selector valve shall not exceed the working pressure in any operating position.

NOTE Cold liquid CO₂ locked in a closed CO₂-low pressure selector valve after flooding may cause pressures exceeding the working pressure when the temperature of the CO₂ and the valve goes up again.

4.1.7 The test samples shall comply with the technical description as specified in 4.12 (drawings, parts lists, description of functions, operating and installation instructions) when checked in accordance with 5.3.

4.1.8 Selector valves and actuators shall be designed so that during operation no part of the valve or its components shall be ejected outside the confines of the valve or into the discharge pipework.

4.1.9 The flow characteristics of the valve shall be specified by the manufacturer either as an equivalent length or as a flow-resistance coefficient.

4.1.10 The nominal and the internal diameter of the pipes at the inlet and the outlet of the valve shall be specified by the manufacturer.

4.1.11 The free flow cross sectional area of CO₂ selector valves shall be not less than 80 % of the area given by the inlet pipe internal diameter.

4.1.12 Where the component incorporates a pneumatic actuator, the manufacturer shall specify nominal, maximum and minimum figures for the pressure supply.

4.1.13 Where the component incorporates a gravity powered actuator, the manufacturer shall specify the mass and the drop distance.

4.1.14 Where the component incorporates an electric powered actuator, the manufacturer shall specify nominal, maximum and minimum figures for voltage and current and the electrical data giving 50 % of the force achieved for nominal electrical conditions (voltage and current). Electric powered actuators shall be specified for continuous duty.

4.1.15 The component shall be specified by the manufacturer either for installation on walls only or for installation on both walls and machinery.

4.1.16 For Inert gas and Halocarbon gas selector valves not specified for use in systems with reduced and controlled pressure only the manufacturer shall specify the maximum developed pressure in the container at 20 °C with the highest fill ratio/superpressurization, as applicable.

4.2 Connection threads and flanges

Connections threads shall comply with European Standards or International Standards for threads, e.g. ISO 7-1 or EN ISO 228-1 and for flanges, e.g. EN 1092 or ISO 7005.

Inlet and outlet connections of the valve shall be of the same size in diameter.

4.3 Function and ambient temperatures

The selector valve and actuator shall operate in an ambient temperature range encompassing - 20 °C to + 50 °C, when tested in accordance with 5.4 and 5.8.

NOTE Test temperature for CO₂-low pressure selector valves in accordance with 5.8 is - 30 °C taking into account temperature drop during discharge.

Selector valves and actuators shall have opening times of maximum 3 s, when tested in accordance with 5.4 and 5.8.

CO₂-low pressure selector valves with their actuators shall have times for opening and closing of 3 s maximum, when tested in accordance with 5.4 and 5.8.

After being tested as described in 5.8.1 selector valves shall meet the requirements of 4.4 when tested as described in 5.5.2 at the test temperature defined in 5.8.1.

After being tested as described in 5.8.2 selector valves shall meet the requirements of 4.4 when tested as described in 5.5.2 at the test temperature defined in 5.8.2.

4.4 Resistance to internal pressure and leakage

The valve and, where applicable, the pneumatic actuator, shall not suffer any permanent deformation when tested as described in 5.5.1 at 1,5 times the working pressure. When subsequently tested as described in 5.5.2 the leakage shall not exceed 10 ml in the case of CO₂-low pressure valves and 100 ml in the case of actuators and other valves in (300^{+10}_0) s at atmospheric pressure.

4.5 Resistance to bursting

The valve casing, closure mechanism and pressurised actuators shall not burst when subjected to a test pressure of three times the working pressure, when tested in accordance with 5.6.

4.6 Operational reliability

There shall be no deterioration of performance when a selector valve and actuator is tested in accordance with 5.7. During operation no part of the valve or its components shall be ejected outside the confines of the valve or into the discharge pipework.

After the operational reliability test, the components shall meet the requirements of 4.4 when tested as described in 5.5.2.

4.7 Flow characteristics

4.7.1 Except as stated in 4.7.2, the flow characteristic figures of the valves given by the manufacturer shall be in the accuracy range of ± 10 %, when tested in accordance with 5.9.

4.7.2 The test in accordance with 5.9 is not necessary when the following conditions are in place:

— the valve is a ball valve, and

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- the free flow cross sectional area of the selector valves is not less than 100 % of the area given by the inlet pipe internal diameter, and
- the flow characteristic data of the valves given by the manufacturer represent at least a pipe or a pressure drop of a pipe with the length of the component.

4.8 Resistance to corrosion

After being subjected to the corrosion test as described in 5.10, the valve assemblies shall operate satisfactorily when tested as described in 5.4 and shall meet the requirements of 4.4 when tested as described in 5.5.2.

4.9 Resistance to stress corrosion

Any copper alloy part used in the valve assembly shall be tested in accordance with 5.11 and shall not crack when tested.

4.10 Vibration resistance

The valve assembly including accessories and actuator shall not operate or be damaged when tested in accordance with 5.12. No deterioration or detachment of parts shall occur during the test.

After the vibration test, the valve assemblies shall operate satisfactorily when tested as described in 5.4 and shall meet the requirements of 4.4 when tested as described in 5.5.2.

4.11 Operating force

The effective force of the actuator shall be at least twice the force required to operate the valve, when the valve assembly is tested in accordance with 5.13.

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4.12 Documentation <https://standards.iteh.ai/catalog/standards/sist/ddd3d807-e7b0-4500-986a-2aca11efd256/sist-en-12094-5-2006>

4.12.1 The manufacturer shall prepare and maintain documentation.

4.12.2 The manufacturer shall prepare installation and user documentation, which shall be submitted to the testing authority together with the sample(s). This documentation shall comprise at least the following:

- a) a general description of the component, including a list of its features and functions;
- b) a technical specification including:
 - 1) the information mentioned in 4.1;
 - 2) sufficient information to permit an assessment of the compatibility with other components of the system (if applicable e.g. mechanical, electrical or software compatibility);
- c) installation instructions including mounting instructions;
- d) operating instructions;
- e) maintenance instructions;
- f) routine testing instruction, if appropriate.

4.12.3 The manufacturer shall prepare design documentation, which shall be submitted to the testing authority together with the sample(s), except where the conditions of supply to the manufacturer make this impossible. This documentation shall include drawings, parts lists, block diagrams (if applicable), circuit