

Fixed firefighting systems — Components for gas extinguishing systems —

Part 5: Requirements and test methods for high and low pressure selector valves and their actuators

The European Standard EN 12094-5:2006 has the status of a
British Standard

ICS 13.220.20

National foreword

This British Standard is the official English language version of EN 12094-5:2006. It supersedes BS EN 12094-5:2001 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee FSH/18, Fixed firefighting systems, to Subcommittee FSH/18/6, Gaseous extinguishing media and systems, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Additional information

In 4.1.9, Figures ZA.1 and ZA.3 the term ‘flow resistance coefficient’ is used. This characteristic, which is the friction or resistance that the valve, pipe or fitting presents to the flow of fluid, is also referred to in the UK as ‘pressure loss coefficient’.

Subclause 5.9 currently requires tests on selector valves using both gas and water. For the next revision of the European Standard the UK will request that all selector valves are flow tested using only water to determine the flow resistance coefficient. In addition to simplifying the text, this will have the added benefit of avoiding an unnecessary discharge of the extinguishant to the environment. It should be noted that the coefficients used for the pipe fittings in the EN 12094 series were all determined using water.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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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,

- 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.

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.

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

3.2

closing time

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

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**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.