BRITISH STANDARD

BS EN
12094-4:2004

Fixed firefighting systems — Components for gas extinguishing systems —

Part 4: Requirements and test methods for container valve assemblies and their actuators

The European Standard EN 12094-4:2004 has the status of a British Standard

ICS 13.220.20

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 12094-4:2004.

This European Standard is the subject of transitional arrangements agreed under a Commission mandate which is intended to lead to CE marking in support of the Construction Products Directive. In order to allow for any changes in national regulations, the Member States have agreed a transition period of 30 months before CE marking becomes effective.

The UK participation in its preparation was entrusted by Technical Committee FSH/18, Fixed fire fighting 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 the 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.

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 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.

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Foreword

This document (EN 12094-4:2004) 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of an identical text or by endorsement, at the latest by January 2005, and conflicting national standards shall be withdrawn at the latest by July 2007.

This document 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 89/106/EEC.

For relationship with EU Directive, see informative annex ZA, which is an integral part of this document.

This part of EN 12094 is one of a number of European Standards prepared by CEN/TC 191 covering components for gas extinguishing systems.

They are included in a series of European Standards planned to cover:

— gas extinguishing systems (EN 12094)

— sprinkler systems (EN 12259)

— 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 (prEN 14816)

The following parts of this European Standard are planned:

— 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[1)]: Requirements and test methods for container valve assemblies and actuators

— Part 5: Requirements and test methods for high and low pressure selector valves and their actuators for CO2 systems

— Part 6: Requirements and test methods for non-electrical disable devices for CO_2 systems

— Part 7: Requirements and test methods for nozzles for CO_2 systems

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[1)] Under preparation.

— Part 8: Requirements and test methods for flexible connectors for CO_2 systems

— 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 CO_2 low pressure systems

— Part 17[1)]: Pipe hangers

— Part 20[1)]: Requirements and test methods for 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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1) Under preparation.

Introduction

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

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

NOTE 1 bar = 10^5 N/m^2 = 100 kPa.

1 Scope

This document specifies requirements and describes test methods for container valve assemblies for CO_2-high-pressure-, Inert Gas- or Halocarbon Gas-fire extinguishing systems, which include a container valve, an actuator and possibly a diptube.

This document specifies requirements and describes test methods for features of the component relevant only for its use in fire extinguishing installations.

Diptubes not assembled to the container valves are not covered by this standard.

NOTE Valve assemblies can be equipped with additional components (e.g. gauges and switches).

2 Normative references

The following referenced documents are indispensable for the application 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 849, *Transportable gas cylinders - Cylinder valves - Specification and type testing.*

EN 60529, *Degrees of protection provided by enclosures (IP-Codes) (IEC 60529:1989).*

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

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads - Part 1: Dimensions, tolerances and designation (ISO 228-1:2000).*

EN ISO 4126-2, *Safety devices for protection against excessive pressure - Part 2: Bursting disc safety devices (ISO 4126-2:2003).*

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

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads - Part 1: Dimensions, tolerances and designation.*

3 Terms and definitions

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

3.1
check valve
valve which is installed between container and manifold and which permits flow only in one direction

3.2
container valve
valve which retains the extinguishing medium in a container, releasing it when actuated

3.3
CO_2-high-pressure installation
fire extinguishing installation in which the CO_2 is stored at ambient temperature. For example, the pressure of the CO_2 in storage is p_{abs} = 58,6 bar at 21 °C

3.4
CO_2-low-pressure installation
fire extinguishing installation in which the CO_2 is stored at low temperature, normally –19 °C to –21 °C

3.5
diptube
pipe, connected to a container valve inlet, which allows the discharge of the liquid extinguishing medium out of a container with the valve at the top

3.6
fill ratio
mass of extinguishing medium related to the net capacity of a container, expressed as kilograms per litre

3.7
Halocarbon Gas
extinguishing agent which contains as primary components one or more organic compounds containing one or more of the elements fluorine, chlorine, bromine or iodine

3.8
Halocarbon Gas installation
fire extinguishing installation in which the Halocarbon Gas is stored at ambient temperature

3.9
Inert Gas
non liquefied gas or mixture of gases which extinguishes the fire mainly by reducing the oxygen-concentration in the protected zone, e.g. Argon, Nitrogen or CO_2 or mixtures of these gases

3.10
Inert Gas installation
fire extinguishing installation in which the Inert Gas is stored at ambient temperature

3.11
resistance coefficient
value for the calculation of the pressure drop in a component under flow conditions

3.12
type 1 valve
valve without pressure relief device

3.13
type 2 valve
valve with pressure relief device relieving other than into the valve discharge outlet

3.14
type 3 valve
valve with pressure relief device relieving into the valve discharge outlet

WARNING — Type 3 valves permit release of extinguishing media into the protected zone when pressure relief occurs. As this takes place without prior alarms a danger to personnel within the protected zone may arise.

3.15
working pressure
pressure at which the component is used in the system

4 Requirements

4.1 Compliance

The test sample shall comply with the technical description (drawings, parts list, description of functions, operating and installation instructions) when checked in accordance with 5.3.

4.2 General design

4.2.1 The valve body and its internal parts and mechanical parts of the actuator except seals shall be made of metal. Metal parts of the component shall be made of corrosion resistant materials, e.g. stainless steel, copper, copper alloy or corrosion-protected steel (e.g. galvanized steel).

The operation of the valve and actuator shall not be adversely affected during the tests, except the strength test.

NOTE prEN 12094-20 requires that pressure gauges and pressure switches are able to be checked separately.

4.2.2 Container valve assemblies shall be specified by the manufacturer for use at pressures at least corresponding to the working pressure as given in Table 1, which is taken as the basis for the tests.

Table 1 — Working pressure

working pressure in bar

Component	CO_2-high-pressure component	Inert Gas component	Halocarbon Gas component
Container valve	140	see [a]	see [a]
Pneumatic actuator	As specified by the manufacturer		

[a] This value is given as the developed pressure in the container at 50 °C, or at the maximum service temperature recommended by the manufacturer, whichever is the higher, with the highest fill ratio/superpressurization, where applicable.

NOTE Actuators may have a different working pressure than container valves.

4.2.3 The manufacturer shall specify the free cross-sectional area of the minimum flow way of the valve. In addition the manufacturer may specify the flow characteristics of the component either as an equivalent length or as a flow resistance coefficient.

4.2.4 The manufacturer shall specify the smallest container, the related minimum and maximum fill ratio and, if applicable, the related superpressurization the component shall be used for.

4.2.5 Where the component is assembled with a diptube, the diptube shall be made of metal, rigid or flexible, and shall be fixed to the container valve by mechanical means, e.g. a threaded connection. The geometry of the inlet of the diptube and the length of the diptube related to the container shall be specified

by the manufacturer. Torque and sealant shall be specified, if relevant. Rigid curved diptubes intended for use in containers not in the vertical position shall be provided with a means of alignment, via a mark on the valve, indicating the correct attitude for installation.

4.2.6 Where the component incorporates a pneumatic actuator, the manufacturer shall specify nominal, maximum and minimum triggering pressure and the minimum duration of the triggering pressure for the pressure supply.

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

4.2.8 Where the component incorporates an electric powered actuator, the manufacturer shall specify the nominal, maximum and minimum voltage and current and the minimum duration of triggering signal. Electric powered actuators shall be specified for continuous duty.

4.2.9 Where the component incorporates a pyrotechnic powered actuator, the manufacturer shall specify the:

— minimum all-fire current with respect to the kind of electrical connection (serial or parallel) and its minimum duration and the form of the signal; and

— maximum monitoring current; and

— range of triggering voltage; and

— nominal resistance; and

— maximum storage time under specified storage conditions; and

— maximum life time under normal stand-by conditions (50 °C and 70 % relative humidity) or higher values specified by the manufacturer.

In addition data shall be provided by the manufacturer to show that:

a) the failure rate of the device in the energy transfer path does not exceed 1 in 10 000 at the recommended firing current; and

b) actuators will achieve the required power output after being subjected to a 30 day ageing test at a test temperature of (60 ± 2) °C; and

c) actuators will achieve the required power output at the end of their service life as recommended by the manufacturer.

4.2.10 Electric parts of the actuator shall be in accordance with at least class IP 54 of EN 60529 and pyrotechnic elements as per class IP X7.

4.2.11 Provision should be made for testing the actuator without actually releasing the extinguishing media.

NOTE If the component does not include such a test facility, prEN 12094-20 requires that the system includes a test facility which can be used to separately test each group of containers actuated at the same time, to verify that the necessary type and level of power is provided.

4.2.12 Where a pressure relief device is incorporated as part of a container valve, it shall be rated in accordance with European regulations or in their absence with national requirements valid in the place of use of the component. The integrity of the device, or in the case of a component family (see 7.1) the device with the highest rating, shall be maintained throughout the following tests:

— high temperature in accordance with 5.9.3;

— low temperature in accordance with 5.9.2;

— vibration in accordance with 5.13;

— corrosion in accordance with 5.11.

The operating pressure shall be verified in accordance with European regulations or in their absence with national requirements valid in the place of use of the component.

4.2.13 The manufacturer shall specify design details (e.g. threads, type of sealing) of all connections for accessories such as pressure gauges and pressure switches.

4.2.14 For Inert Gas or Halocarbon Gas components, the manufacturer may specify service temperatures below – 20 °C, and/or above + 50 °C.

4.2.15 Container valve assemblies shall have operating times (i.e. time between triggering of the actuator and fully open position of the valve) of 2 s maximum, when tested in accordance with 5.4.

4.2.16 Where the type 1 container valve incorporates a rupture disc for the activation of the valve by an actuator, the rupture disc shall be designed for at least 1,5 times the valve working pressure in accordance with Table 1.

4.2.17 Where the type 2 container valve incorporates a rupture disc for the activation of the valve by an actuator, the rupture disc shall be specified by the manufacturer in such way that the minimum rupture pressure (nominal value with minus tolerance) of the rupture disc is at least 5 %, subject to a minimum value of 10 bar, higher than the maximum rupture pressure (nominal value with plus tolerance) of the pressure relief device, or 1,5 times the valve working pressure in accordance with Table 1, whichever is the higher.

4.2.18 Where the type 3 container valve incorporates a common rupture disc for the activation of the valve by an actuator and pressure relief, the rupture disc shall be specified by the manufacturer for at least 1,15 times the valve working pressure in accordance with Table 1.

WARNING — Type 3 valves permit release of extinguishing media into the protected zone when pressure relief occurs. As this takes place without prior alarms a danger to personnel within the protected zone may arise.

4.3 Connection threads

Container and discharge outlet connection threads shall comply with European Standards or International Standards, e.g. ISO 7-1 and EN ISO 228-1.

4.4 Function and ambient temperature

4.4.1 Container valves shall remain in their fully open position at a maximum differential pressure between inlet and outlet of 3 bar. Container valve assemblies where the status of the valve depends on the differential pressure between inlet and outlet shall be tested in accordance with 5.4.3.

4.4.2 The container valve assemblies shall operate in an ambient temperature range encompassing - 20 °C to + 50 °C, or the service temperature range specified by the manufacturer, when tested as described in 5.9.2 and 5.9.3.

4.5 Resistance to internal pressure

The valve, except any rupture disc, shall not suffer any permanent deformation when tested as described in 5.5.2. Any rupture disc may deform but shall not rupture. After this, the valve shall not leak when tested as described in 5.5.4, i.e. no bubbles shall appear in one minute.

A pneumatic actuator shall not suffer any permanent deformation when tested as described in 5.5.3. The actuator shall not leak more than 20 ml (measured at atmospheric pressure) in ($300\ ^{+10}_{0}$) s, when tested as described in 5.5.5.

4.6 Strength

Actuators intended to be pressurized by external pilot pressure sources shall not burst when subjected to a test pressure of three times their working pressure, when tested as described in 5.6.

The parts of the valve assembly which are pressurized with the cylinder pressure shall meet the hydraulic pressure test requirements of EN 849.

4.7 Leakage

The loss of content from the valve assembly and the container shall not exceed 0,5 % of the actual net charge mass of the specified smallest appropriate container, when tested as described in 5.7.

Additionally in the case of superpressurization the loss of pressure from the specified smallest appropriate container filled with minimum and maximum fill ratio shall not exceed 0,5 %, when tested as described in 5.7.

4.8 Operational reliability

There shall be no deterioration of performance when a component is tested as described in 5.8.2 or 5.8.3 as applicable. During operation no part of the component shall be ejected outside the confines of the component or into the discharge pipework. Any rupture discs in components tested in accordance with 5.8.3 shall comply with EN ISO 4126-2.

4.9 Flow characteristics

4.9.1 The free cross-sectional area of the minimum flow way of the valve shall be within ± 10 % of the value specified by the manufacturer, when verified by the measurement check described in 5.3.

4.9.2 If the manufacturer has specified the flow characteristics of the component as an equivalent length or as a flow resistance coefficient, the figure given by the manufacturer shall be within ± 10 % of the value determined in accordance with 5.10.

NOTE The specification of the flow characteristic is optional.

4.10 Corrosion

The valve assembly shall operate satisfactorily when tested in accordance with 5.4 after being subjected to the corrosion test as described in 5.11.

4.11 Stress corrosion

If copper alloy parts are used in the component they shall be tested as described in 5.12 and shall not crack.

4.12 Vibration resistance

The valve assembly shall not operate or be damaged when tested as described in 5.13. Where the component incorporates a diptube, the diptube shall not fracture, become loose or detach during the test.

4.13 Diptube

4.13.1 Where the component incorporates a diptube, the length and configuration of the diptube shall be such that the volume of water remaining in the cylinder at the end of the discharge is less than 5 % of the internal volume of the cylinder when tested as described in 5.14.

4.13.2 For containers in a vertical position with the valve at the top, the above requirement is fulfilled without testing, when the highest point of the inlet of the diptube is not more than two times the internal diameter of the diptube above the base of the container, measured straight below the diptube inlet, and the flow to the inlet of the diptube is not hindered.

4.14 Operating force

The effective force of the actuator shall be at least two times and in the case of pyrotechnic actuators at least three times the force necessary to open the valve within the required operating time under the most severe conditions, when the component is tested as specified in 5.15.

4.15 Functional reliability

4.15.1 There shall be no deterioration of performance when a component incorporating an electric powered actuator is tested as described in 5.15. The valve shall operate within 2 s and open fully at the nominal, maximum and minimum specified voltage.

4.15.2 There shall be no deterioration of performance when a pneumatic powered actuator is tested as described in 5.15. The valve shall operate within 2 s and open fully at the nominal, maximum and minimum specified pressure.

4.15.3 There shall be no deterioration of performance when a gravity powered actuator is tested as described in 5.15. The valve shall operate within 2 s. The free travel of the falling mass shall not be inhibited and there shall be at least 50 mm clearance beyond the fully operated position.

4.15.4 There shall be no deterioration of performance when a pyrotechnic actuator is tested as described in 5.15. The valve shall operate within 2 s.

4.16 Manual powered actuators

NOTE This Clause covers only actuators where the power to operate the valve is given directly by persons, e.g. a lever at the valve.

The force required to operate a manually powered actuator shall not exceed:

a) 150 N for hand operation; or

b) 50 N for finger pull operation; or

c) 10 N for finger push operation;

and the actuator shall not require a movement of more than 300 mm or 270 ° to achieve actuation, when tested as described in 5.15.

4.17 Documentation

4.17.1 The manufacturer shall prepare and maintain documentation.

4.17.2 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 and 4.2;

   2) sufficient information to permit an assessment of the compatibility with other components of the system (if applicable e.g. mechanical, electric or software compatibility);

c) installation instructions including mounting instructions;

d) operating instructions;

e) maintenance instructions;

f) routine testing instructions, if appropriate.

4.17.3 The manufacturer shall prepare design documentation, which shall be submitted to the testing authority together with the sample(s). This documentation shall include drawings, parts lists, block diagrams (if applicable), circuit diagrams (if applicable) and a functional description to such an extent that compliance with this document may be checked and that a general assessment of the design is possible.

5 Test methods

5.1 Test conditions

The components shall be assembled for test as specified in the technical description. The tests shall be carried out at a temperature of (25 ± 10) °C, except when otherwise specified for a particular test.

The tolerance for all test parameters is 5 %, unless otherwise stated.

5.2 Test samples and order of tests

For the tests at least three samples are needed. In the case of pyrotechnic powered actuators 151 elements are needed. The order of tests is shown in Table 2; however some of the tests shown for sample A may be performed on other or additional samples.

The replacement of parts as set out in the manufacturer's operation and maintenance manual shall be carried out during testing. Such parts shall be provided with the test samples.

Table 2 — Order of tests [a]

Test exposure	Order of tests for				
	Sample A	Sample B	Sample C	Sample D	Sample E
5.3 Compliance	1	1	1	1	1
5.4 Function	3 and 9	-	-	-	4
5.5 Internal pressure	2	-	-	-	-
5.6 Strength	10	-	-	-	-
5.7 Leakage	-	-	2	2	-
5.8 Operational reliability	7	-	-	-	-
5.9 Temperature	5	-	-	-	-
5.10 Flow characteristics	4	-	-	-	-
5.11 Corrosion	8	-	-	-	-
5.12 Stress corrosion	-	2	-	-	-
5.13 Vibration	-	-	-	-	3
5.14 Diptube	-	-	-	-	2
5.15 Operating force and functional reliability	6	-	-	-	-
NOTE 1 Where a container has a single fill ratio, agent and level of superpressurization, the test for sample D against 5.7 is not required. NOTE 2 See also 7.1. NOTE 3 Sample B is only required where the stress corrosion test is necessary.					
[a] Where the component is intended for different end use conditions (e.g. different extinguishants), the component shall be tested at whichever combinations of conditions represent the most onerous test conditions.					

5.3 Compliance

A visual and measurement check shall be made to determine whether the test samples correspond to the description in the technical literature (drawings, parts lists, description of functions, operating and installation instructions).

5.4 Function

5.4.1 General

NOTE This test relates to the requirements of 4.2.15 and 4.4.1.

5.4.2 Mount the container valve in the attitude specified by the manufacturer or, if not given, in the attitude where maximum force is required. Verify compliance with the requirements of 4.4.1 by one of the two following methods.

— Method 1: Connect the inlet of the sample to a suitable gas supply and install a pressure measuring device at the inlet of the sample. Actuate the valve and start gas flow through the sample increasing the pressure until the valve is fully open. Decrease the pressure at the inlet of the sample to 3 bar. Check that the sample remains in its fully open position.

— Method 2: Connect a force gauge to the centre of the sealing device. Move the sealing device by increasing the force to the fully open position. Measure the force to the fully open position of the valve. Calculate the necessary pressure to operate the valve to the fully open position.

5.4.3 The test pressure is:

— for CO_2-high-pressure container valves (60 ± 5) bar;

— for other container valves the pressure developed in the container at 20 °C.

The following test cycle shall be used:

a) apply the test pressure to the inlet port of the valve using gaseous CO_2, air or nitrogen. The outlet shall be connected to a pipe with a length of (0,5 ± 0,1) m of the nominal diameter of the valve and a nozzle with an outlet of at least 3 mm diameter;

b) open the valve with the actuator under normal power condition;

c) check the correct function of the sample and measure the operating time;

d) after (10 ± 5) s close the inlet pressure source to the valve, depressurise to a value below 5 bar and close the sample manually.

This cycle shall be carried out five times.

During each test cycle the supply pressure to the valve shall not drop below:

— 50 bar for CO_2-high-pressure container valves;

— 80 % of the test pressure for other container valves.

5.5 Internal pressure

5.5.1 General

NOTE These tests relate to the requirements of 4.5.

5.5.2 The valve in its closed position shall be connected via the inlet to a suitable hydraulic pressure supply. All ports including the pressure relief device port shall be blocked, except type 3 valves where the rupture disc remains in place and unblocked. Provision for venting shall be available.

For type 1 and type 2 valves vent the system of air and increase the pressure at (2 ± 1) bar/s up to 1,5 times its working pressure, or up to the nominal pressure of the pressure relief device, whichever is higher.

Maintain this pressure for a period of $(5\ ^{+5}_{0})$ min. At the end of this period release the hydraulic pressure.

For type 3 valves vent the system of air and increase the pressure at (2 ± 1) bar/s up to the working pressure and maintain this pressure for 1 h. After 1 h increase the pressure until the rupture disc operates and record the burst pressure of the disc. Verify that this pressure is not less than 1,15 times the working pressure. Then block the outlet port, increase the pressure to 1,5 times the working pressure and maintain this pressure for a period of $(5\ ^{+5}_{0})$ min. At the end of this period release the hydraulic pressure.

5.5.3 The actuator shall be connected via the inlet to a suitable hydraulic pressure supply. All other ports shall be blocked. Provision for venting shall be available.

Vent the system of air and increase the pressure at (2 ± 1) bar/s up to 1,5 times its working pressure.

Maintain this pressure for a period of ($5\ ^{+5}_{0}$) min. At the end of this period release the hydraulic pressure.

Actuators which are pressurized permanently or during the actuation with the container pressure shall additionally be tested in accordance with 5.5.2 for the valve/actuator connection.

5.5.4 Pressurize the valve with air or nitrogen to the working pressure. Examine the valve in a water bath for leakage.

5.5.5 Pressurize the actuator with air or nitrogen to the working pressure. Examine the actuator in a water bath for leakage during $(300\ ^{+10}_{0})$ s.

5.6 Strength

NOTE This test relates to the requirements of 4.6.

Actuators shall be connected via the external pressure inlet to a suitable hydraulic pressure supply. All ports including the pressure relief device port shall be blocked. Provision for venting shall be available.

Vent the system of air and increase the pressure at (2 ± 1) bar/s up to three times the working pressure ($^{+10}_{0}$) %.

Maintain this pressure for a time period of ($5\ ^{+1}_{0}$) min. At the end of this period release the hydraulic pressure.

For pyrotechnic powered actuators the test procedure shall be set up with data provided by the manufacturer of the pyrotechnic elements to meet the three times working pressure strength requirement.

5.7 Leakage test for valves

NOTE This test relates to the requirements of 4.7.

Components for non-liquefied extinguishants (e.g. Inert gases) and for liquefied extinguishants without superpressurization (e.g. CO_2) shall be tested in conjunction with the smallest container for which the valve is designed. The container sample shall be charged to the maximum specified fill ratio.

Components for liquefied extinguishants with superpressurization shall be tested in conjunction with the smallest container for which the valve is designed. One of the specified container samples shall be charged to the minimum fill ratio and the other to the maximum fill ratio. Both containers shall be superpressurized to the superpressurization pressure.

Measure and record the charge mass to an accuracy of ± 0,1 %.

For superpressurized liquefied extinguishants additionally measure and record the charge pressure to an accuracy of ± 0,1 %.

Expose the assembly to changes of temperature in air:

a) lower temperature shall be ($-20\ ^{0}_{-2}$) °C, or the manufacturer's recommended minimum service temperature ($^{0}_{-2}$) °C, whichever is the lower;

b) higher temperature shall be ($50\ ^{+2}_{0}$) °C, or the manufacturer's recommended maximum service temperature ($^{+2}_{0}$) °C, whichever is the higher;

c) duration of exposure at each temperature is (24 ± 0,5) h including a period of 4 h maximum to reach this temperature;

d) number of cycles is three.

After completion of the cycling period, which takes 6 d, store the assembly at (20 ± 5)°C for (28 ± 2) d.

Carry out this sequence of cycling, followed by storage, a total of three times.

Subsequently measure and record the charge mass and, if applicable, the charge pressure to the accuracy stated. Record any loss and calculate any loss as a percentage of the initial charge conditions.

5.8 Operational reliability

5.8.1 General

NOTE This test relates to the requirements of 4.8.

5.8.2 Except as provided for in 5.8.3, carry out 100 test cycles as described in 5.4.3 a) to d), but without measuring the opening time.

5.8.3 Components for which there are no moving parts associated with the actuation of the valve, shall be assembled, pressurized with working pressure and disassembled. Repeat this test 100 times. Subsequently carry out the function test in accordance with 5.4.3.

5.9 Temperature

5.9.1 General

NOTE These tests relate to the requirements of 4.4 and 4.2.12 if relevant.

5.9.2 Low temperature test

Condition the sample at $(-20\ ^{0}_{-2})$ °C, or the service temperature recommended by the manufacturer $(^{0}_{-2})$ °C whichever is the lower, for (2 ± 0,5) h.

Carry out five test cycles as described in 5.4.3 a) to d) at the test temperature.

5.9.3 High temperature

Condition the sample at $(50\ ^{+2}_{0})$ °C, or the service temperature recommended by the manufacturer $(^{+2}_{0})$ °C whichever is the higher, for (2 ± 0,5) h.

Carry out five test cycles as described in 5.4.3 a) to d) at test temperature.

5.10 Flow characteristics

5.10.1 General

NOTE This test relates to the requirements of 4.9.

The flow characteristics of the container valve is determined in combination with the diptube, if applicable.

The tests shall be done using:

— CO_2 as test medium for CO_2-high-pressure container valves;

— an Inert Gas or air as test medium for Inert Gas container valves;

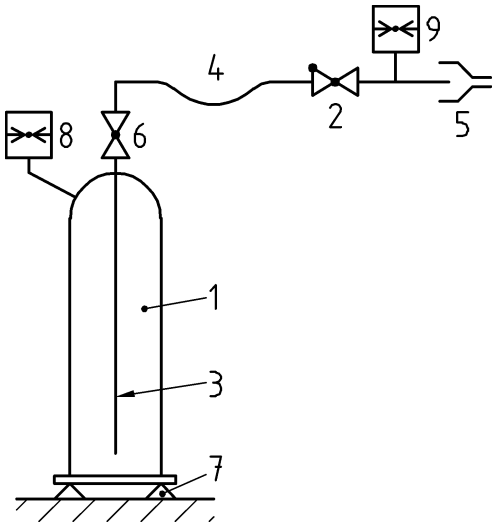
— the extinguishant (including superpressurization, if applicable) as test medium for Halocarbon Gas container valves.

5.10.2 Resistance coefficient

The two possible test set-ups are shown in Figures 1 and 2. For testing Inert Gas container valves the diptube is not necessary and a pressure reduction device may be installed downstream of the measuring point p_3. The supply container shall for at least 10 h be kept at a pressure of

— (56,3 ± 1,5) bar for CO_2-high-pressure container valves;

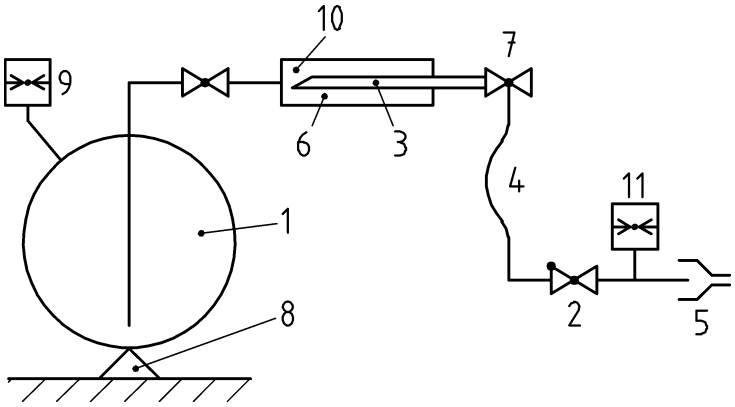
— the pressure developed in the container at 20 °C for other container valves.



Key

1	Supply container	6	Container valve
2	Check valve	7	Container mass
3	Diptube	8	Pressure in the container (p_1)
4	Flexible connector	9	Pressure downstream of the sample (p_3)
5	Nozzle		

Figure 1 — Test set-up 1 for measuring resistance coefficient or equivalent length



Key

1	Supply container	7	Container valve
2	Check valve	8	Container mass
3	Diptube	9	Pressure in the container (p_1)
4	Flexible connector	10	Pressure upstream of the test pipe (p_2)
5	Nozzle	11	Pressure downstream of the test pipe (p_3)
6	Test pipe		

Figure 2 — Test set-up 2 for measuring resistance coefficient or equivalent length

Either the valve with the diptube, if applicable, is connected directly to a test container, see Figure 1, or the valve is connected with the diptube, if applicable, into a special test pipe, see Figure 2, which is connected to a gas supply. The internal diameter of the test pipe shall be at least 10 times the internal diameter of the diptube or the diameter of the valve inlet. A straight pipe is connected to the outlet of the sample. At this pipe the pressure measuring point p_3 is attached at a distance of at least 10 times the internal diameter of the pipe. At the end of the measuring line, one or more nozzle(s) shall be fitted, which shall be dimensioned so that a mass flow forms, which is characteristic for the tested valve.

Depending on the type of the gas, the following measuring points with continuous measurement recording are necessary:

— pressure in the supply container [p_1] (CO_2 and Halocarbon Gas container valves);

— temperature in the supply container [t_1] (Halocarbon Gas container valves);

— pressure upstream of the sample [p_2] (all container valves);

— temperature upstream of the sample [t_2] (Inert Gas and Halocarbon Gas container valves);

— pressure downstream of the sample [p_3] (all container valves);

— mass of the supply container [M_V];

— discharge period [t_F];

5.11 Corrosion

NOTE This test relates to the requirements of 4.10 and 4.2.12 if relevant.

The sample shall be exposed to a salt spray within a fog chamber. The inlet of the valve or, if applicable, of the diptube and the inlet of pneumatic actuators shall be sealed. An open bend shall be fitted to the outlet to prevent direct entry of the salt spray to the valve's interior.

The essential components and properties of the reagents and the test configuration are:

— solution consists of Na Cl in distilled water;

— pH value: 6,5 to 7,5;

— concentration of the solution: (5 ± 1) %;

— spray pressure: 0,6 to 1,5 bar;

— spray volume: 1 to 2 ml h^{-1} on an area of 80 cm^2;

— temperature in test cabinet: $(35\ ^{+1,0}_{-1,7})$ °C;

— position of the sample: 15° to the vertical axis;

— spray time: (240 ± 2) h;

— drying time: (168 ± 5) h at a humidity of maximum 70 %.

5.12 Stress corrosion

NOTE This test relates to the requirements of 4.11.

Use a suitable container of known capacity fitted with a capillary tube vent. The aqueous ammonia solution shall have a specific mass of (0,94 ± 0,0188) kg/l. The container is filled with (10 ± 0,5) ml of the solution for each litre of container volume.

Degrease the sample for test and expose for (10^{+1}_{0}) d to the moist atmosphere of ammonia and air, at a temperature of (34 ± 2) °C. The sample is positioned (40 ± 5) mm above the level of the liquid.

After testing, the sample is cleaned and dried and subjected to careful visual examination. To make cracking clearly visible, a liquid penetration method shall be used.

5.13 Vibration

NOTE This test relates to the requirements of 4.12 and 4.2.12 if relevant.

The vibration test shall be carried out with the valve assembled with the longest specified diptube, if applicable, and the actuator.

The sample is attached to a vibration table using fixing materials provided by the manufacturer.

The test apparatus and procedure shall be as described in IEC 60068-2-6, Test Fc:

— frequency range: 10 Hz to 150 Hz;

— acceleration amplitude 10 to 50 Hz: 1,0 g_n;

— acceleration amplitude 50 to 150 Hz: 3,0 g_n;

— sweep rate: 1 octave per 30 min;

— number of sweep cycles: 0,5 per axis;

— number of axes: 3 mutually perpendicular.

The sample shall not operate during the test caused by the vibrations. No deterioration or detachment of parts shall occur. The samples shall be able to function after the vibration test.

5.14 Diptube

NOTE This test relates to the requirements of 4.13.

The container fitted with the container valve and diptube shall be charged with water to 50 % of the container capacity and pressurized with nitrogen to 25 bar. Measure the mass of the set with an accuracy of ± 0,1 kg.

The container shall be mounted on the test rig in the attitude specified by the manufacturer. The outlet of the valve shall not be reduced.

Open the valve to its fully open position and determine by mass, with the same accuracy as before, the remaining volume of water at the end of the discharge.

5.15 Operating force and functional reliability

5.15.1 General

NOTE These tests relate to the requirements of 4.14, 4.15 and 4.16.

5.15.2 Pressurise the container valve with air or nitrogen to the pressure that requires the highest operating force.

5.15.3 For components with a pneumatic actuator connect the pneumatic actuator to a pressure supply at the specified minimum, nominal and maximum pressure. Trigger the actuator and check the valve for correct operation three times at each pressure.

Connect the pneumatic actuator to a pressure supply at 50 % of the specified minimum pressure. Trigger the actuator and check the valve for correct operation three times.

5.15.4 For components with an electrical powered actuator connect the actuator to a power supply at the specified minimum, nominal and maximum voltage. Trigger the actuator, measure the current and check the valve for correct operation three times at each voltage.

Verify, by a suitable method, that the minimum force given by the actuator is not less than twice the maximum force necessary to open the valve.

5.15.5 For components with a gravity powered actuator connect the component with specified mass and drop distance to a suitable test rig. Trigger the actuator and check the valve for correct operation three times.

Reduce the drop mass to 50 % of the specified drop mass. Trigger the actuator and check the valve for correct operation three times.

5.15.6 For components with pyrotechnic elements connect the actuator to a suitable power supply giving the specified signal at the specified minimum all-fire current. Trigger the actuator and check the valve for correct operation ten times.

Verify, by a suitable method, that the minimum force given by the actuator is not less than three times the maximum force necessary to open the valve.

5.15.7 For components with manual powered actuator measure the force and movement of the handle at the centre of the area provided for this purpose with suitable instrumentation.

6 Marking and data

6.1 General

The marking shall be non-detachable, non-flammable, permanent and legible.

Where the requirements of ZA.3 give the same information as below, the requirements of this Clause 6 are met.

6.2 Valve assemblies

6.2.1 Valve assemblies shall be marked with the following information:

a) manufacturer's or supplier's name or trademark; and

b) nominal diameter or model designation; and

c) some mark(s) or code(s) (e.g. serial number or batch code), by which, at least, the date or batch and place of manufacture (if several places of manufacture) can be identified by the manufacturer; and

d) in the case of rigid curved diptubes the mounting position of the diptube inlet.

6.2.2 Actuators shall be marked with the following information:

a) nominal voltage and current for electrical types; and

b) working pressure for pneumatic types; and

c) manufacturing date for pyrotechnic types; and

if the actuator is produced as a separate part, it shall be marked with the following additional information:

d) model designation; and

e) some mark(s) or code(s) (e.g. serial number or batch code), by which, at least, the date or batch and place of manufacture (if several places of manufacture) can be identified by the manufacturer.

7 Evaluation of conformity

7.1 General

The compliance of the component with the requirements of this document shall be demonstrated by:

— initial type testing;

— factory production control by the manufacturer.

NOTE The manufacturer is a natural or legal person, who places the component on the market under his own name. Normally, the manufacturer designs and manufactures the component himself. As a first alternative, he may have it designed, manufactured, assembled, packed, processed or labelled by subcontracting. As a second alternative he may assemble, pack, process, or label ready-made products.

The manufacturer shall ensure:

— that the initial type testing in accordance with this document is initiated and carried out (where relevant, under the control of a product certification body); and

— that the component continuously complies with the initial type testing samples, for which compliance with this document has been verified.

He shall always retain the overall control and shall have the necessary competence to take the responsibility for the component.

The manufacturer shall be fully responsible for the conformity of that component to all relevant regulatory requirements. However, where the manufacturer uses components already shown to conform to those requirements relevant for that component (e.g. by CE marking) the manufacturer is not required to repeat the evaluation which led to such conformity. Where the manufacturer uses components not already shown to conform, it is his responsibility to undertake the necessary evaluation to show conformity.

7.2 Initial type testing

7.2.1 Initial type testing shall be performed to demonstrate conformity with this document.

All characteristics given in Clause 4, except 4.17, shall be subject to this initial type testing, except as described in 7.2.3 to 7.2.5.

7.2.2 In the case of modification of the component or of the method of production (where these may affect the stated properties), initial type testing shall be performed. All characteristics given in Clause 4, except 4.17, which may be changed by the modification, shall be subject to this initial type testing, except as described in 7.2.3 to 7.2.5.

7.2.3 Tests previously performed in accordance with the provisions of this standard may be taken into account providing that they were made to the same or a more rigorous test method under the same system of attestation of conformity on the same component or components of similar design, construction and functionality, such that the results are applicable to the component in question.

NOTE Same system of attestation of conformity means testing by an independent third party under the control of a product certification body.

7.2.4 Components may be grouped into families where one or more characteristics are the same for all components within that family or the test results are representative of all components within that family. In this case not all components of the family have to be tested for the purposes of the initial type testing.

7.2.5 Where the characteristics of the component have previously been demonstrated according to the requirements of EN 849, EN 60529 and EN ISO 4126-2, no further evaluation of the component, in respect of these characteristics, is required to show conformity with this document.

7.2.6 Test samples shall be representative of the normal production. If the test samples are prototypes, they shall be representative of the intended future production and shall be selected by the manufacturer.

NOTE In the case of prototypes and third party certification, this means that it is the manufacturer not the third party who is responsible for selecting the samples. During the initial inspection of the factory and of the factory production control (see 7.3), it is verified that the component continuously complies with the initial type testing samples.

7.2.7 If the technical documentation of the test samples does not give a sufficient basis for later compliance checks, a reference sample (identified and marked) shall remain available for this purpose.

7.2.8 Any initial type testing and its results shall be documented in a test report.

7.3 Factory production control (FPC)

7.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the components placed on the market conform with the stated performance characteristics.

If the manufacturer has the component designed, manufactured, assembled, packed, processed and labelled by subcontracting, FPC of the subcontractor may be taken into account. Where subcontracting takes place, the manufacturer shall retain the overall control of the component and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this document. The manufacturer who subcontracts all of his activities may in no circumstances discharge himself of his responsibilities to a subcontractor.

FPC is the permanent internal control of production exercised by the manufacturer.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required component characteristics and the effective operation of the production control system to be checked.

Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the conformity of the component with its technical specifications. Its implementation may be achieved by controls and tests on measuring equipment, raw materials and constituents, processes, machines and manufacturing equipment and finished components, including material properties in components, and by making use of the results thus obtained.

7.3.2 General requirements

The FPC system shall fulfil the requirements as described in the following Clauses of EN ISO 9001:2000, where applicable:

— 4.2 except 4.2.1 a);

— 5.1 e), 5.5.1, 5.5.2;

— Clause 6;

— 7.1 except 7.1 a), 7.2.3 c), 7.4, 7.5, 7.6;

— 8.2.3, 8.2.4, 8.3, 8.5.2

The FPC system may be part of a Quality Management system, e.g. in accordance with EN ISO 9001:2000.

7.3.3 Component specific requirements

7.3.3.1 The FPC system shall:

— address this document; and

— ensure that the components placed on the market conform with the stated performance characteristics.

7.3.3.2 The FPC system shall include a component specific FPC- or Quality-plan, which identifies procedures to demonstrate conformity of the component at appropriate stages, i.e.

a) controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down; and/or

b) verifications and tests to be carried out on finished components according to a frequency laid down.

If the manufacturer uses finished components, the operations under b) shall lead to an equivalent level of conformity of the component as if normal FPC had been carried out during the production.

If the manufacturer carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production are carried out by the manufacturer, the more operations under b) may be replaced by operations under a). In any case the operation shall lead to an equivalent level of conformity of the component as if normal FPC had been carried out during the production.

NOTE Depending on the specific case, it may be necessary to carry out the operations referred to under a) and b), only the operations under a) or only those under b).

The operations under a) centre as much on the intermediate states of the component as on manufacturing machines and their adjustment, and measuring equipment etc. These controls and tests and their frequency are chosen based on component type and composition, the manufacturing process and its complexity, the sensitivity of component features to variations in manufacturing parameters etc.

The manufacturer shall establish and maintain records which provide evidence that the production has been sampled and tested. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available at least for ten years. Where the component fails to satisfy the acceptance measures, the provisions for non-conforming products shall apply, the necessary corrective action shall immediately be taken and the components or batches not conforming shall be isolated and properly identified. Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The component description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test. With regard to any control result not meeting the requirements of this document, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of the component) shall be indicated in the records.

7.3.3.3 Individual components or batches of components and the related manufacturing documentation shall be completely identifiable and retraceable.

7.3.4 Initial inspection of factory and FPC

7.3.4.1 Initial inspection of factory and FPC shall generally be carried out when the production is already running and the FPC is already in practice. It is, however, possible that the initial inspection of factory and FPC is carried out before the production is already running and/or before the FPC is already in practice.

7.3.4.2 The following shall be assessed to verify that the requirements of 7.3.2 and 7.3.3 are fulfilled:

— the FPC-documentation; and

— the factory.

In the assessment of the factory it shall be verified:

a) that all resources necessary for the achievement of the component characteristics required by this document are or will be (see 7.3.4.1) available; and

b) that the FPC-procedures in accordance with the FPC-documentation are or will be (see 7.3.4.1) implemented and followed in practice; and

c) that the component complies or will comply (see 7.3.4.1) with the initial type testing samples, for which compliance with this document has been verified; and

d) whether the FPC system is part of a Quality Management system in accordance with EN ISO 9001:2000 (see 7.3.2) and as part of this Quality Management system is certified and has yearly surveillance by a certification body, who is recognised by an accreditation body which is member of the “European Co-operation for Accreditation” and which has signed the “Multilateral agreement” (MLA) there.

7.3.4.3 All factories of the manufacturer, where for the relevant component final assembling or at least final testing is performed, shall be assessed to verify that the conditions of 7.3.4.2 a) to c) are in place. One assessment may cover one or more components, production lines and/or production processes. If the FPC system covers more than one component, production line or production process, and if it is verified that the general requirements are fulfilled then the detailed verification of the component specific FPC requirements for one component may be taken as representative of the FPC of other components.

7.3.4.4 Assessments previously performed in accordance with the provisions of this standard may be taken into account providing that they were made to the same system of attestation of conformity on the same component or components of similar design, construction and functionality, such that the results may be considered applicable to the component in question.

NOTE Same system of attestation of conformity means inspection of FPC by an independent third party under the control of a product certification body.

7.3.4.5 Any assessment and its results shall be documented in a report.

7.3.5 Continuous surveillance of FPC

7.3.5.1 All factories which have been assessed according to 7.3.4 shall be re-assessed once a year, except as stated in 7.3.5.2.

In this case each FPC assessment shall verify a different component or production process, where applicable.

7.3.5.2 If the manufacturer provides proof of continuing satisfactory operation of his FPC system the frequency of the re-assessment may be reduced to once every four years.

NOTE 1 Sufficient proof can be the report of a certification body, see 7.3.4.2 d).

NOTE 2 If the overall Quality Management system in accordance with EN ISO 9001:2000 is well implemented (verified in the initial assessment of factory and FPC) and continuously practised (verified in QM-audits), it can be assumed that the integrated FPC-relevant part is well covered. On this basis, the work of the manufacturer is well controlled, so that the frequency of special FPC-surveillance-assessments can be reduced.

7.3.5.3 Any assessment and its results shall be documented in a report.

7.3.6 Procedure for modifications

In the case of modification of the component, the method of production or the FPC system (where these may affect the stated properties), a re-assessment of the factory and of the FPC system shall be performed for those aspects which may be affected by the modification.

Any assessment and its results shall be documented in a report.

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

ZA.0 Scope of this annex

The scope as given in Clause 1 is applicable.

ZA.1 Relationship between EU Directive and this European Standard

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 Construction Products Directive (89/106).

The Clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106).

Compliance with these Clauses confers a presumption of fitness of the construction products covered by this European Standard for their intended use.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

NOTE In addition to any specific Clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply. An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through "http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

Construction product: Container valve assemblies and their actuators

Intended use(s): Components for use in gas extinguishing systems installed in buildings and field areas as a part of a complete operating system.

Table ZA.1 — Relevant Clauses

Essential characteristics	Clauses in this European Standard	Mandated levels and/or classes	Notes
Operational reliability	4.2**, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.12, 4.14, 4.15, 4.16	-	** excluding 4.2.3 and 4.2.4
Distribution of extinguishing media	4.2.3, 4.2.4, 4.9.1, 4.9.2*, 4.13	-	* if specified by the manufacturer
Durability of operational reliability against corrosion	4.10, 4.11	-	

ZA.2 Procedure for the attestation of conformity of container valve assemblies and their actuators

Container valve assemblies and their actuators for the intended use listed shall follow the system of attestation of conformity shown in Table ZA.2.

Table ZA.2 — Attestation of conformity system

Product	Intended use	Level(s) or class(es)	Attestation of conformity system
Container valve assemblies and their actuators	Fire safety	-	1
System 1: See CPD Annex III.2.(i), without audit testing of samples			

The product certification body will certify the initial type testing of all characteristics given in Table ZA.1, in accordance with the provisions of 7.2, and for the initial inspection of the factory and of the factory production control and for the continuous surveillance, assessment and approval of the factory production control, all characteristics shall be of interest to the approved body. The manufacturer shall operate a factory production control system in accordance with the provisions of 7.3.

ZA.3 CE marking

The CE marking symbol in the format specified in the EU Directive 93/68/EC shall be shown on the component body together with the marking as specified in Clause 6, except 6.2.1 c) and 6.2.2 e). In addition, the CE marking shall appear on the packaging and/or on the accompanying commercial documents, together with the following characteristics:

— identification number of the certification body; and

— name or identifying mark of the producer/supplier; and

— last two digits of the year in which the marking was affixed; and

— appropriate number of the EC-certificate of conformity; and

— number of this document (EN 12094-4); and

— component description, i.e. container valve assembly and type; and

— type of gas (e.g. “for CO_2“, “for Inert Gas”, “for Halocarbon Gas”); and

— wording "without diptube" or the type of diptube (i.e. “with rigid straight diptube” or “with rigid curved diptube” or“ with flexible diptube”), as appropriate; and

— valve nominal diameter or the model designation; and

— working pressure (in accordance with Table 1); and

— free flow cross sectional area; and

— flow characteristics (flow resistance coefficient or equivalent length), if specified and verified; and

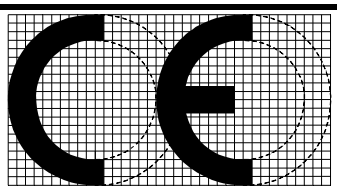
— type of actuator (e.g. pneumatic actuator, electrical actuator) followed by the specifications in accordance with 4.2.6, 4.2.7, 4.2.8 or 4.2.9, as appropriate, and the wording “testing of actuator possible” or “testing of actuator not possible”; and

— smallest container (internal volume); and

— if a pressure relief device is incorporated, the rated operating pressure; and.

— an extended service temperature range, if specified and tested.

Figure ZA.1 gives an example of the information to be given on the commercial documents.



0123

AnyCo Ltd, P.O. Box 21, B - 1050
04
0123-CPD-001

EN 12094-4
Container valve assembly
type 1
for inert gas (e.g. Nitrogen, Argon)
without diptube
valve DN 15, working pressure 240 bar
free cross-sectional area 100 mm^2
flow resistance coefficient 2
pneumatic actuator, nominal pressure 200 bar, pressure supply 10 bar – 240 bar, min. 5 s
testing of actuator not possible
smallest container 50 l

Figure ZA.1 — Example CE marking information

In addition to any specific information relating to dangerous substances shown above, the component should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE European legislation without national derogation need not be mentioned.

ZA.4 EC certificate and declaration of conformity

The manufacturer or his agent established in the EEA, shall prepare and retain a declaration of conformity, which authorises the affixing of the CE marking. This declaration shall include:

— name and address of the manufacturer, or his authorised representative established in the EEA, and the place of production,

— description of the component (type, identification, use), and a copy of the information accompanying the CE marking,

— provisions to which the component conforms (i.e. annex ZA of this EN);

— particular conditions applicable to the use of the component [if necessary];

— name and address (or identification number) of the product certification body;

— name of and position held by the person empowered to sign the declaration on behalf of the manufacturer or of his authorized representative.

The declaration shall contain a certificate of conformity with, in addition to the information above, the following information:

— name and address of the certification body;

— certificate number;

— any conditions and period of validity of the certificate, where applicable;

— name of, and position held by, the person empowered to sign the certificate.

The declaration and certificate shall be presented in the language(s) of the Member State of use of the product.

Bibliography

[1] EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999).*

[2] EN 45011, *General criteria for certification bodies operating product certification systems (ISO/IEC Guide 65:1996).*

[3] EU Directive 93/68/EEC, COUNCIL DIRECTIVE 93/68/EEC of 22 July 1993 amending Directives 87/404/EEC (simple pressure vessels), 88/378/EEC (safety of toys), 89/106/EEC (construction products), 89/336/EEC (electromagnetic compatibility), 89/392/EEC (machinery), 89/686/EEC (personal protective equipment), 90/384/EEC (non-automatic weighing instruments), 90/385/EEC (active implantable medicinal devices), 90/396/EEC (appliances burning gaseous fuels), 91/263/EEC (telecommunications terminal equipment), 92/42/EEC (new hot-water boilers fired with liquid or gaseous fuels) and 73/23/EEC (electrical equipment designed for use within certain voltage limits).

[4] 97/23/EC, Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment.

[5] 99/36/EC, Council Directive 1999/36/EC of 29 April 1999 on transportable pressure equipment.

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