

# Fixed firefighting systems — Components for gas extinguishing systems —

## Part 8: Requirements and test methods for connectors

The European Standard EN 12094-8:2006 has the status of a  
British Standard

ICS 13.220.20

## National foreword

This British Standard is the official English language version of EN 12094-8:2006. It supersedes BS EN 12094-8:1998 which is withdrawn.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.

### 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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### Summary of pages

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## Fixed firefighting systems - Components for gas extinguishing systems - Part 8: Requirements and test methods for connectors

Installations fixes de lutte contre l'incendie - Éléments constitutifs des installations d'extinction à gaz - Partie 8: Exigences et méthodes d'essai pour raccords

Ortsfeste Brandbekämpfungsanlagen - Bauteile für Löschanlagen mit gasförmigen Löschmitteln - Teil 8: Anforderungen und Prüfverfahren für Verbindungen

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 12094-8:2006) 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 12094-8:1998.

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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 =  $10^5 \text{ N m}^{-2}$  = 100 kPa.

## 1 Scope

This European Standard specifies requirements and describes test methods for flexible and rigid connectors used in CO<sub>2</sub> -, Inert Gas- or Halocarbon gas fire extinguishing systems.

This European Standard is applicable to connectors used:

- between container valves and the manifold (type 1 and type 5 connector);
- in pneumatic pilot lines (type 3 connector);
- in distribution pipework of fire extinguishing installations downstream of the manifold/selector valve (type 2 or type 4 connector).

## 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 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

#### **CO<sub>2</sub>-high-pressure installation**

fire extinguishing installation in which the CO<sub>2</sub> is stored at ambient temperature. For example, the pressure of the CO<sub>2</sub> in storage is  $p_{abs} = 58,6$  bar at 21 °C

### 3.2

#### **CO<sub>2</sub>-low-pressure installation**

fire extinguishing installation in which the CO<sub>2</sub> is stored at low temperature, normally -19 °C to -21 °C

### 3.3

#### **fill ratio**

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

### 3.4

#### **connector**

component that joins two parts

### 3.5

#### **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

### 3.6

#### **Halocarbon Gas installation**

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



**3.7****Inert Gas**

non liquefied gas or mixture of gases which extinguish the fire mainly by reducing the oxygen-concentration in the protected zone, like Argon, Nitrogen or mixtures of these gases with CO<sub>2</sub>

**3.8****Inert Gas installation**

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

**3.9****type 1 connector**

flexible connector for connecting container valves to a manifold or check valve

**3.10****type 2 connector**

flexible connector for use in distribution pipework downstream of the manifold/selector valve for the connection of parts which may move relative to each other

**3.11****type 3 connector**

flexible connector for use in pneumatic pilot lines

**3.12****type 4 connector**

flexible connector for use in distribution pipework downstream of the manifold/selector valve for the connection of non-moving parts which allow for dimensional adjustments

**3.13****type 5 connector**

rigid connector for connecting containers to a manifold

**3.14****working pressure**

pressure at which the component is used in the system

## 4 Requirements

### 4.1 General design

Metal parts of connectors shall be made of stainless steel, copper, copper alloy or corrosion-protected steel (e.g. galvanized).

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

The type of connectors shall be specified by the manufacturer.

Connectors shall be designed so that their function cannot be adversely affected by ageing or environmental influences.

Non-metallic materials and elastomers shall be selected to be stable and not alter their performance over the working life recommended by the manufacturer.

Connectors shall be specified by the manufacturer for working pressure at least in accordance with Table 1.

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

Connectors shall be specified by the manufacturer for bursting pressure of at least three times the working pressure according to Table 1.

The minimum bending radius of flexible connectors shall be specified by the manufacturer.

The maximum angle of deflection of flexible connectors may be specified by the manufacturer.

**Table 1 — Working pressure**

Type	Working pressure			
	in bar			
	CO <sub>2</sub> -high-pressure component	CO <sub>2</sub> -low-pressure component	Inert Gas component	Halocarbon Gas component
Type 1 connector	140	not applicable	see NOTE 1	see NOTE 1
Type 2 connector	60	25	As specified by the manufacturer	see NOTE 2
Type 3 connector	As specified by the manufacturer			
Type 4 connector	60	25	As specified by the manufacturer	see NOTE 2
Type 5 connector	140	not applicable	see NOTE 1	see NOTE 1
NOTE 1 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 2 This value is given as the developed pressure in the container at 20 °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.				

#### 4.2 Connection threads

Connection threads shall comply with European Standards or International Standards for threads, e.g. ISO 7-1 or EN ISO 228-1.

#### 4.3 Resistance to leakage

Connectors shall not leak, and shall show no sign of damage which could impair proper function, when pressurized up to 1,5 times the working pressure according to Table 1 when tested in accordance with 5.4.

#### 4.4 Resistance to bursting

Connectors shall not burst when pressurized up to 3 times the working pressure according to Table 1 when tested in accordance with 5.5.

#### 4.5 Resistance of type 2 and type 4 connectors to pressure and heat

NOTE Only for type 2 and type 4 connectors.

Type 2 and type 4 connectors shall show no sign of damage which could impair proper function when tested in accordance with 5.6 at the pressure and temperature conditions given in Table 2 and shall not leak when subsequently tested in accordance with 5.4.

**Table 2 — Test conditions for resistance of type 2 and type 4 connectors to pressure and heat**

Test condition	Test pressure in bar	Test temperature in °C
CO <sub>2</sub> -low pressure component	25	600
CO <sub>2</sub> -high pressure component	60	600
Inert Gas component	working pressure (see Table 1)	600
Halocarbon Gas component	working pressure (see Table 1)	600

#### 4.6 Resistance of type 2 and type 4 connectors to heat and cold shock

NOTE Only for type 2 and type 4 connectors, used in CO<sub>2</sub> systems.

Type 2 and type 4 connectors shall show no sign of damage which could impair proper function when tested in accordance with 5.7 and shall not leak when subsequently tested in accordance with 5.4.

#### 4.7 Resistance of flexible connectors to cold

NOTE Not applicable for type 5 connectors.

Flexible connectors shall show no visible sign of damage when tested in accordance with 5.8 and shall not leak when subsequently tested in accordance with 5.4.

#### 4.8 Resistance of type 2 connectors to flexing

NOTE Only for type 2 connectors.

Type 2 connectors shall not leak when tested in accordance with 5.4 after being tested in accordance with 5.9.

#### 4.9 Documentation

**4.9.1** The manufacturer shall prepare and maintain documentation.

**4.9.2** 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 instructions, if appropriate.

**4.9.3** 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 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 Type test methods**

### **5.1 Conditions**

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

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

### **5.2 Samples**

The manufacturer shall submit for tests three samples for type 1, type 3 and type 5 connectors, six samples for type 2 and five samples for type 4 connectors. One of these samples is needed for reference.

If for type 2 or type 4 connectors the same materials and parts are used to provide a range of connectors, use six samples of 350 mm to 1 000 mm long. The sequence of tests is shown in Table 3 and is given by the numbers 1, 2, 3 etc. In the table. A, B etc. are the different samples.

Table 3 — Order of tests

Tests	Order of tests for						
	type 1, type 3 and type 5		type 2 and type 4				
	Sample A	Sample B	Sample A	Sample B	Sample C	Sample D <sup>a</sup>	Sample E <sup>b</sup>
5.3 Compliance	1	1	1	1	1	1	1
5.4 Resistance to leakage	-	2 and 4 <sup>c</sup>	-	2 and 4	3	3	3
5.5 Resistance to bursting	2	-	2	-	-	-	-
5.6 Resistance of type 2 and type 4 connectors to pressure and heat	-	-	-	-	2	-	-
5.7 Resistance of type 2 and type 4 connectors to heat and cold shock	-	-	-	-	-	2 <sup>a</sup>	-
5.8 Resistance of flexible connectors to cold	-	3 <sup>c</sup>	-	3	-	-	
5.9 Resistance of type 2 connectors to flexing	-	-	-	-	-	-	2 <sup>b</sup>
a only for CO <sub>2</sub> -components b only for type 2 connectors c not applicable for type 5 connectors							

### 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 Test for resistance to leakage

NOTE This test relates to the requirements of 4.3, 4.5, 4.6, 4.7 and 4.8.

Connect the inlet of the sample to a hydraulic pressure supply and block the outlet. Vent the system and increase the pressure by  $(2 \pm 1)$  bar/s up to the test pressure  $(\begin{smallmatrix} +5 \\ 0 \end{smallmatrix})$  %.

Maintain this pressure for a period of  $(10 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix})$  min. At the end of this period release the hydraulic pressure and examine the sample for damage.

### 5.5 Test for resistance to bursting

NOTE This test relates to the requirements of 4.4.

Connect the inlet of the sample to a hydraulic pressure supply and block the outlet. Vent the system and increase the pressure at  $(5 \pm 1)$  bar/s up to the test pressure  $(\begin{smallmatrix} +5 \\ 0 \end{smallmatrix})$  %.

Maintain this pressure for a period of  $(10 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix})$  min. At the end of this period release the hydraulic pressure and examine the sample.

## 5.6 Test for resistance of type 2 and type 4 connectors to pressure and heat

NOTE This test relates to the requirements of 4.5.

Connect the sample to a vessel delivering an absolute pressure in accordance with Table 2. Block the outlet. Subject the sample to a temperature of  $(600 \pm 30) ^\circ\text{C}$  in a furnace for a period of 10 min. Then pressurise the heated sample for  $(30 \pm 5)$  s with gaseous  $\text{CO}_2$ , nitrogen or air at the test pressure. Remove the sample from the furnace and allow it to cool at normal temperature and examine it visually.

## 5.7 Test for resistance of type 2 and type 4 connectors to heat and cold shock

NOTE This test relates to the requirements of 4.6.

Connect the sample to a  $\text{CO}_2$  vessel which incorporates a diptube and is capable of delivering liquid  $\text{CO}_2$  at an absolute pressure of  $(20 \pm 1)$  bar. A 2 position, 3 port ball valve (by-pass-valve) shall be installed in the pipework between the vessel and the sample which allows the  $\text{CO}_2$  -flow from the vessel to be controlled. The nominal diameter of the pipework between the vessel and the by-pass-valve shall be at least 25 mm. The nominal diameter of the by-pass-valve and the connected pipe to the sample shall be 25 mm. The length of the connected pipe shall not exceed 1,1 m.

In one position, the test position, the by-pass-valve allows the  $\text{CO}_2$  to pass through the sample. In the other position, the by-pass position, the outlet to the sample is closed and the  $\text{CO}_2$  -flow is diverted via appropriate pipework, which is dimensioned to reach a stable flow of liquid  $\text{CO}_2$  at the by-pass-valve within 30 s. At the outlet of the sample connect a nozzle with a 10 mm orifice.

Subject the sample to a temperature of  $(600 \pm 30) ^\circ\text{C}$  in a furnace for a period of  $(10^{+2}_0)$  min. Just before completion of the heating period commence  $\text{CO}_2$  flow through the by-pass. Upon stabilization of liquid  $\text{CO}_2$  flow and completion of the heating period divert flow through the sample for a period of  $(30^{+10}_0)$  s. Remove the sample from the furnace and allow it to cool at normal temperature and examine it visually.

## 5.8 Test for resistance of flexible connectors to cold

NOTE This test relates to the requirements of 4.7.

Condition the sample for  $(4 \pm 1)$  h at  $(-20^{+0}_{-2}) ^\circ\text{C}$ . With the sample at  $-20 ^\circ\text{C}$  bend to the minimum radius and maximum angle of deflection as specified by the manufacturer. If the maximum angle of deflection is not specified, bend the flexible connector along the whole length to the specified minimum radius.

Then examine the sample for visible evidence of deterioration or damage.

## 5.9 Test for resistance of type 2 connectors to flexing

NOTE This test relates to the requirements of 4.8.

Use a bending rig to bend the sample around the minimum radius specified by the manufacturer. One bending cycle consists of bending the sample from straight to the maximum angle of deflection specified by the manufacturer (or, if not specified, to the maximum possible angle of deflection), and back to straight. Carry out 3 000 bending cycles.

## 6 Marking

Connectors shall be marked with the following:

- a) manufacturer's name or trademark;

- b) model designation;
- c) working pressure;
- d) 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.

The marking shall be non-flammable, with exception of a) and c) when marked on the hose material, permanent and legible.

NOTE The markings can be provided on a label permanently attached to each connector.

Where the requirements of ZA.3 give the same information as above, the requirements of this clause have been met.

## 7 Evaluation of conformity

### 7.1 General

The compliance of the component with the requirements of this European Standard 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 European Standard 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 European Standard 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 European Standard.

All characteristics given in Clause 4 shall be subject to this initial type testing, except as described in 7.2.3 to 7.2.4.

**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, which may

be changed by the modification, shall be subject to this initial type testing, except as described in 7.2.3 to 7.2.4.

**7.2.3** Tests previously performed in accordance with the provisions of this European 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 responsibility of a product certification body which is now a notified 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** 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 product certification body certification, this means that it is the manufacturer not the product certification body 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.

**7.2.6** 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.

**7.2.7** All 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 to 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 European Standard. 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 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:

- 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 European Standard, 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) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down, and/or
- b) the 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 European Standard, 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 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 European Standard 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 European Standard has been verified, and
- d) whether the FPC system is part of a Quality Management system in accordance with EN ISO 9001 (see 7.3.2) and as part of this Quality Management system is certified and has yearly surveillance by a certification body.

**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, the assessment of these general requirements does not need to be repeated when assessing the product-specific requirements for another product.

**7.3.4.4** Assessments previously performed in accordance with the provisions of this European 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 testing by an independent third party under the responsibility of a product certification body which is now a notified product certification body.

**7.3.4.5** All 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 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** All 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 the provisions of the Construction Products Directive

#### ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/109 given to CEN by the European Commission and the European Free Trade Association.

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/EEC).

Compliance with these clauses confers a presumption of fitness of connectors covered by this annex for the intended use indicated herein; reference shall be made to the information accompanying the CE marking.

**WARNING — Other requirements and other EU Directives, not affecting the fitness for intended use can be applicable to connectors falling within the scope of this European Standard.**

NOTE 1 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.

NOTE 2 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> ).

This annex establishes the conditions for the CE marking of connectors intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

This annex has the same scope as Clause 1 of this standard and is defined by Table ZA.1.

**Table ZA.1 — Relevant clauses**

<b>Product:</b>	Connector		
<b>Intended use:</b>	Components for use in gas extinguishing system installed in buildings as a part of a complete operating system		
<b>Essential characteristics</b>	<b>Clauses in this European Standard</b>	<b>Mandated levels and/or classes</b>	<b>Notes</b>
Operational reliability	4.1 (all types), 4.3 (all types), 4.4 (all types)	—	—
Performance under fire conditions	4.5 (types 2 and 4), 4.6 (types 2 and 4 for CO <sub>2</sub> )	—	—
Durability of operational reliability	4.7 (types 1, 2, 3 and 4), 4.8 (type 2)	—	—

## ZA.2 Procedure for the attestation of conformity of connectors

### ZA.2.1 System of attestation of conformity

The system of attestation of conformity of connectors indicated in Table ZA.1, in accordance with the Decisions of the Commission 96/577/EC of 1996-06-24 and 2002/592/EC of 2002-07-15 as given in Annex III of the mandate M/109, is shown in Table ZA.2 for the indicated intended use.

**Table ZA.2 — Attestation of conformity system**

Product	Intended use	Level(s) or class(es)	Attestation of conformity system
Connectors	Fire safety	—	1
System 1: See CPD Annex III.2.(i), without audit testing of samples			

The product certification body shall certify the initial type testing of all relevant 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.2.2 Certificate and Declaration of conformity

When compliance with the conditions of this annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity), which entitles the manufacturer to affix the CE marking. The certificate shall include:

- name, address and identification number of the certification body;
  - name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- NOTE 1 The manufacturer may also be the person responsible for placing the product onto the EEA market, if he takes responsibility for CE marking.
- description of the product (type, identification, use);
  - provisions to which the product conforms (i.e. Annex ZA of this EN);
  - particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);
  - the number of the certificate;
  - conditions and period of validity of the certificate, where applicable;
  - name of, and position held by, the person empowered to sign the certificate.

In addition, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following:

- name and address of the manufacturer, or his authorised representative established in the EEA, and the place of production;
- name, address and identification number of the certification body;

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- description of the product (type, identification, use), and a copy of the information accompanying the CE marking;

NOTE 2 Where some of the information required for the Declaration is already given in the CE marking information, it does not need to be repeated.

- provisions to which the product conforms (i.e. Annex ZA of this EN);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);
- number of the accompanying EC Certificate of conformity;
- name of and position held by the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.


The declaration and certificate shall be presented in the language or languages accepted in the Member State of the use of the product.

### ZA.3 CE Marking and labelling

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the component, or a label attached to the component, together with the marking as specified in Clause 6 except d). In addition, the CE marking symbol shall appear on the packaging and/or on the accompanying commercial documents, together with the following information:

- identification number of the certification body,
- 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 standard (EN 12094-8), and
- marking in accordance with Clause 6 except d), and
- the product type, i.e. connector type 1 or type 2 or type 3 or type 4 or type 5, length, and
- the type of gas (e.g. “for CO<sub>2</sub>”), and
- minimum bending radius, if appropriate, and
- maximum angle of deflection, if appropriate.

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


AnyCo Ltd, P.O. Box 21, B - 1050 06  0123-CPD-001
<b>EN 12094-8</b> <b>Connector type 2, Model 140</b> , length 300 mm for CO <sub>2</sub> working pressure 140 bar minimum bending radius 50 mm maximum angle of deflection 90 °

**Figure ZA.1 — Example CE marking information**

In addition to any specific information relating to dangerous substances shown above, the product 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.

## Bibliography

- [1] prEN 12094-20, *Fixed firefighting systems – Components for gas extinguishing systems – Part 20: Requirements and test methods for the compatibility of components*<sup>1)</sup>
- [2] EN 45011, *General requirements for bodies operating product certification systems (ISO/IEC Guide 65:1996)*
- [3] EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*
- [4] 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)
- [5] 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)*
- [6] ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation*

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1) under preparation





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