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**Fire protection — Automatic sprinkler  
systems —**

**Part 11:  
Requirements and test methods for pipe  
hangers**

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*Protection contre l'incendie — Systèmes d'extinction automatiques du  
type sprinkler —*

*Partie 11: Exigences et méthodes d'essai relatives aux dispositifs de  
fixation des conduites*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 6182-11 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 5, *Sprinkler and water spray extinguishing systems*.

ISO 6182 consists of the following parts, under the general title *Fire protection — Automatic sprinkler systems*:

- *Part 1: Requirements and test methods for sprinklers*
- *Part 2: Requirements and test methods for wet alarm valves, retard chambers and water motor alarms*
- *Part 3: Requirements and test methods for dry pipe valves*
- *Part 4: Requirements and test methods for quick-opening devices*
- *Part 5: Requirements and test methods for deluge valves*
- *Part 7: Requirements and test methods for early suppression fast response (ESFR) sprinklers*
- *Part 9: Requirements and test methods for water mist nozzles*
- *Part 11: Requirements and test methods for pipe hangers*

The following part is under preparation:

- *Part 10: Requirements and test methods for domestic sprinklers*

# Fire protection — Automatic sprinkler systems —

## Part 11: Requirements and test methods for pipe hangers

### 1 Scope

This part of ISO 6182 specifies performance requirements, test methods and marking requirements for pipe hangers.

### 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.

ISO 1460, *Metallic coatings — Hot dip galvanized coating on ferrous material — Gravimetric determination of the mass per unit area*

ISO 2064, *Metallic and other inorganic coatings — Definitions and conventions concerning the measurements of thickness*

ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method*

ISO 3575:1996, *Continuous hot-dip zinc-coated carbon steel sheet of commercial, lock-forming and drawing qualities*

ISO 4998:1996, *Continuous hot-dip zinc-coated carbon steel sheet of structural quality*

ASTM B568, *Standard test method for measurement of coating thickness by X-ray spectrometry*

### 3 Terms and definitions

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

#### 3.1

##### **band hanger**

type of hanger that is adjustable and utilizes a band looped around the pipe

#### 3.1.1

##### **adjustable swivel band hanger**

type of band hanger that is adjustable and swivels

#### 3.2

##### **bracket**

cantilever-type hanger that is attached directly to a vertical surface of the building structure

**3.3**  
**building attachment component**  
**support fixing**

hanger component set into the wall or ceiling to support the hanger

NOTE A building attachment component can be either a driven fastener, expansion anchor, undercut anchor, or cast-in insert.

**3.4**  
**cast-in insert**

type of building attachment component cast into the concrete at the time of pouring

NOTE Cast-in inserts can be channels, which take special threaded bolts, or internally threaded sockets, which accept conventional bolts.

**3.5**  
**ceiling flange**

type of building attachment component hanger that is attached directly to an overhead surface of a building structure

**3.6**  
**clamp**

type of building attachment that is rigidly attached to the flange of a steel structural member

**3.6.1**  
**beam clamp**

clamp that is rigidly attached to both edges of the bottom flange of a structural member

**3.6.3**  
**C-clamp**

building attachment component that grips a flange by means of a jaw and setscrew combination

**3.6.4**  
**riser clamp**

type of pipe clamp used to support risers at various levels

**3.6.5**  
**top/bottom clamp**

clamp that is rigidly attached to one edge of the top or bottom flange of a structural member

**3.7**  
**clevis attachment**

type of split-ring pipe-attachment component

**3.8**  
**clip**

pipe-attachment component, usually one piece and nonadjustable, that only partially embraces a pipe and that can be attached directly to a building structure

**3.9**  
**coupler**

threaded element used to connect the building attachment component (support fixing) to the rod

NOTE Couplers can have male or female threads (usually female) and can be the same thread throughout or two different thread diameters to link fixings and rods of different sizes.

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**3.10****driven fastener**

type of building attachment component driven into solid concrete or structural steelwork by means of a special tool, usually powder actuated, and can have female or, usually, male thread linked to the rod by means of a coupler

**3.11****expansion anchor**

type of building attachment component set into the ceiling or wall of the building structure in self-drilled or pre-drilled cylindrical holes; ceiling fixings usually “deformation-controlled” internally threaded socket anchors, which are expanded by driving an expander plug to the base of the shell or by driving the shell over the expander plug

NOTE Fixings for walls can be socket anchors or can be “torque-controlled” anchors, either through-bolts (where an expander clip is expanded by the tightening of the bolt) or sleeve anchors (where the sleeve is expanded by the tightening of the bolt).

**3.13****hanger**

assembly of components used singly or in combination with other assemblies for supporting pipework

NOTE A hanger can comprise a building attachment component (support fixing), coupler, rod or equivalent and pipe attachment component as shown in Figure 2, or a simple bracket and building attachment component (support fixing) as indicated in Figure 3.

**3.14****non-heat sensitive material**

material whose measured tensile strength at  $(540 \pm 10)^\circ\text{C}$  is at least 90 % of the value measured at  $(20 \pm 5)^\circ\text{C}$

**3.15****pipe attachment component**

hanger component that is attached directly to the pipe

See Figures 2 and 3.

**3.16****retaining strap**

building attachment component, usually made from steel strip, used in combination with a C-clamp to hold the C-clamp in place

**3.17****ring**

pipe hanger that completely encircles a pipe without a positive gripping action

**3.17.1****solid ring**

ring that has to be slipped onto the end of the pipe and cannot be opened in any way for attachment to the pipe after the pipe line is made up

**3.17.2****split ring**

ring that can be opened in some way to allow it to be put on the pipe after the pipeline is made up

**3.17.3****swivel ring**

solid or split ring that has a top swivel allowing the hanger to be connected to a rod after it has been installed on the pipe

**3.18 undercut anchor**

type of building attachment component set into the ceiling or wall of the building structure in self-drilled or pre-drilled undercut holes

NOTE The setting of the anchor, usually by hammering a sleeve over an outwardly tapered element, forces the sleeve out into the undercut shape forming a mechanical interlock with the base material. These anchors are intended for tension zones of concrete, i.e. cracked concrete.

**4 Product consistency**

It shall be the responsibility of the manufacturer to implement a quality control programme to ensure that production continuously meets the requirements of this part of ISO 6182 in the same manner as the originally tested samples.

**5 Materials and rod sizes**

**5.1 Materials**

Hangers and their components shall be made of ferrous or other non-heat-sensitive materials.

**5.2 Rod sizes**

**5.2.1** Hangers and their components shall be provided with rod sizes in accordance with Table 1 unless otherwise stated in 5.2.2 to 5.2.4.

**5.2.2** 8-mm hanger rod sizes may be used in countries where permitted by National Standards for use with pipe sizes up to and including DN 50. 8-mm hanger rods shall meet the load requirements of Table 1 for a pipe size of DN 50.

**5.2.3** Hanger rod sizes designated in Table 1 are the nominal diameters associated with machined threads. The diameter of a rod provided for with a rolled thread shall be not less than the root diameter of the thread.

**5.2.4** Some hanger assemblies, such as powder-driven (pyrotechnic) fasteners and 6-mm and 8-mm size expansion shells require the use of an increaser coupling to attach to nominal 10-mm size rod. The increaser couplings provided by the manufacturer shall have sufficient strength to support the test loads applicable to the maximum permitted pipe size.

**5.3 Ceiling flanges**

Ceiling flanges for pipe sizes up to DN 50 shall have at least two supporting screw holes. For pipe sizes of up to DN 200 (NPS 8), no less than three supporting screw holes shall be provided.

**6 Material thicknesses**

**6.1 Uncoated material thicknesses**

**6.1.1** Unprotected flat steel, no less than 3 mm thick, is acceptable for use as a clevis-type hanger, band hanger, adjustable swivel loop hanger and for other flat iron hangers, if the hanger is at least 25 mm wide and if the hanger exhibits strength values of at least 150 % of the required test load specified in Table 1.

**6.1.2** A C-clamp formed of a double thickness, no less than 3 mm thick, unprotected steel so as to form a 6 mm thick section is acceptable if the clamp exhibits strength value of at least 150 % of the required test load specified in Table 1.



**6.1.3** A pressed-steel concrete insert formed from unprotected steel, no less than 3 mm thick, is acceptable if it complies with all other requirements.

**6.1.4** If a hanger or part of a hanger is made of flat iron or steel, the thickness of the metal shall be at least 4,8 mm.

## 6.2 Coated material thicknesses

A hanger or part of a hanger shall have a minimum thickness of 3 mm provided it has an acceptable protective coating. Acceptable coatings are as follows:

- a) a zinc coating having a minimum thickness of 12,7  $\mu\text{m}$  on all outside surfaces and 7,6  $\mu\text{m}$  on all inside surfaces; or
- b) a Z180 continuous hot-dip zinc-coated steel sheet coating as specified in ISO 4998:1996, Table 3, or ISO 3575:1996, Table 2; or
- c) any other metallic or non-metallic finish or combination of the two which, when subjected to comparative tests, provides corrosion protection equivalent to a) or b).

The coating thickness shall be determined in accordance with 8.1.

Coated flat steel material, no less than 1,5 mm in width, is acceptable for use as a clevis-type hanger, band hanger, adjustable swivel loop hanger and as part of other flat iron hangers for pipes 50 mm or less in size provided the hanger exhibits a strength value of at least 150 % of the required test load specified in Table 1.

Coated flat steel material, no less than 2,5 mm in width, is acceptable for use as a clevis-type hanger, band hanger, adjustable swivel loop hanger and as part of other flat iron hangers for pipes greater than 50 mm in size provided the hanger exhibits a strength value of at least 150 % of the required test load specified in Table 1.

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## 7 Performance requirements

### 7.1 General

A pipe hanger or building attachment component shall be tested to the requirements of Table 1 using the values for the largest size of nominal piping that the hanger can accommodate or for the maximum load of the largest rod size to which it can be attached, whichever is larger.

### 7.2 Elongation and pull requirements

**7.2.1** When tested in accordance with 8.2, a pipe hanger, after initially being preloaded, shall support the elongation test load selected from Table 1 for 1 min without exceeding an elongation of 5 mm.

**Exception** — No elongation is permitted for building attachment components that are not provided with a clip or retaining strap to maintain securement to the building member.