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## Fire protection — Automatic sprinkler systems —

### Part 12: Requirements and test methods for grooved-end components for steel pipe systems

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

*Partie 12: Exigences et méthodes d'essai pour les raccords de tuyauterie à extrémités cannelées*

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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.

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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.

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ISO 6182-12 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 5, *Fixed firefighting systems using water*.

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 6: Requirements and test methods for check valves*
- *Part 7: Requirements and test methods for early suppression fast response (ESFR) sprinklers*
- *Part 8: Requirements and test methods for pre-action dry alarm valves*
- *Part 9: Requirements and test methods for water mist nozzles*
- *Part 10: Requirements and test methods for domestic sprinklers*
- *Part 11: Requirements and test methods for pipe hangers*
- *Part 12: Requirements and test methods for grooved-end components for steel pipe systems*
- *Part 13: Requirements and test methods for extended-coverage sprinklers*

## Introduction

This part of ISO 6182 is one of a number of International Standards prepared by ISO/TC 21 covering components for automatic sprinkler systems.

They are included in a series of International Standards planned to cover the following:

- carbon dioxide systems (ISO 6183);
- explosion suppression systems [ISO 6184 (all parts)].

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# Fire protection — Automatic sprinkler systems —

## Part 12:

# Requirements and test methods for grooved-end components for steel pipe systems

## 1 Scope

This part of ISO 6182 specifies performance requirements, grooving dimensions, test methods and marking requirements for couplings used in the joining of roll and cut grooved steel tube, pipe, grooved-end fittings and other grooved-end components up to 300 mm in nominal diameter.

## 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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 898-1:1999, *Mechanical properties of fasteners — Part 1: Bolts, screws and studs*

ISO 898-2:1992, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread*

ISO 1083:2004, *Spheroidal graphite cast irons — Classification*

ISO 4200:1991, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ASTM A47/A47M-99(2004), *Standard Specification for Ferritic Malleable Iron Castings*

ASTM A153/A153M, *Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*

ASTM A183, *Standard Specification for Carbon Steel Track Bolts and Nuts*

ASTM A536-84(2004), *Standard Specification for Ductile Iron Castings*

ASTM A563-07a, *Standard Specification for Carbons and Alloy Steel Nuts*

ASTM B633-07, *Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel*

ASTM D395-03, *Standard Test Methods for Rubber Property — Compression Set*

EN 12329, *Corrosion Protection of Metals — Electrodeposited coatings of zinc with supplementary treatment on iron and steel*

VdS 2100-6:2002-5(01), *Guidelines for water extinguishing systems — Pipe joints — Requirements and test methods*

### 3 Definitions

#### 3.1

##### **grooved end components**

pipe, tubes, fittings and other components that are used to form grooved mechanical coupling joints

#### 3.2

##### **mechanical coupling**

device consisting of two or more housings, fasteners such as bolts and nuts and a pressure-responsive gasket, used to mechanically join grooved pipe, tubing, valves, fittings and other grooved-end components to form a sealed joint

##### 3.2.1

##### **flexible mechanical coupling**

mechanical coupling forming a sealed joint wherein there is limited angular, axial and rotational movement without overstressing the pipe joint

NOTE See 6.8.

##### 3.2.2

##### **rigid mechanical coupling**

mechanical coupling forming a sealed joint where there is essentially no free angular, axial or rotational movement

#### 3.3

##### **mechanical coupling housing**

structural parts of a mechanical coupling that mechanically fit onto grooved pipes, tubes, fittings and other grooved-end components to provide restraint and enclosure of the gasket

#### 3.4

##### **OD**

outside diameter

#### 3.5

##### **pressure-responsive gasket**

gasket that improves its seal with the application of pressure; that is, additional pressure results in additional force between the gasket and the surface to which it is sealing

#### 3.6

##### **rated working pressure**

maximum service pressure at which a grooved piping system is intended to operate

### 4 Product consistency

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



## 5 Product assembly

Installation instructions shall be provided by the manufacturer and shall include at least the following:

- a) assembly procedure for the installation of couplings;
- b) grooved-end component specifications, with which the coupling is intended to be used, including minimum pipe wall thickness;
- c) bolt-torque specification where required by the manufacturer;
- d) maximum allowable movement for flexible couplings;
- e) specification for permissible media within the pipe in conjunction with the gasket material (see 8.2 for colour codes).

## 6 Requirements

### 6.1 Grooved-end dimensions

#### 6.1.1 Roll grooved-end dimensions

The dimensions of roll grooved-ends shall be in accordance with Table 1.

#### 6.1.2 Cut grooved-end dimensions

The dimensions of cut grooved-ends shall be in accordance with Table 2.

#### 6.1.3 Grooved end dimensions for fittings and valves

The dimensions of cast grooved-ends shall be in accordance with Table 3.

### 6.2 Minimum pipe wall thickness

Grooved-end pipe couplings shall be tested with pipe having the minimum nominal wall thickness specified in the manufacturer's installation instructions.

### 6.3 Mechanical coupling housing

Casting material of the housings shall be ductile iron in accordance with ISO 1083:2004, Grade 400-15; ASTM A536-84(2004), Grade 65-45-12, or malleable iron in accordance with ASTM A47/A47M-99(2004), Grade 32510 or 32518; or material having the equivalent strength and corrosion resistance. When requested on the purchase order, the housing shall be galvanized in accordance with ASTM A153 or EN 12329.

### 6.4 Pressure-responsive gasket

Materials for the coupling gaskets shall be ethylene-propylene diene m-class rubber (EPDM), nitrile, silicone rubber or other elastomeric materials suitable for the intended service.

### 6.5 Bolts

Oval neck track head bolts shall be in accordance with ISO 898-1:1999, Class 8.8, heavy hex bolts in accordance with ASTM A183 or other bolts that prevent rotation and have a minimum tensile strength of 800 N/mm<sup>2</sup>. Bolts shall be zinc plated in accordance with ASTM B633-07, SC1, or EN 12329, or be of a material that provides at least the equivalent corrosion resistance.

Table 1 — Roll grooved-end dimensional specifications

Dimensions in millimetres

Pipe or tube			Dimensional specifications <sup>a</sup>						
Nominal size	Outside diameter (OD)		Gasket seat A ± 0,76	Groove width B ± 0,76	Grooved diameter C		Groove depth D <sup>b</sup>	Wall thickness T Min. allow.	Flare F Max. dia.
	Actual size	Tolerance			Actual size	Tolerance			
25	33,7	+0,41 -0,68	15,88	7,14	30,23	0 -0,38	1,70	1,8	34,5
32	42,4	+0,50 -0,60	15,88	7,14	38,99	0 -0,38	1,70	1,8	43,3
40	48,3	+0,44 -0,52	15,88	7,14	45,09	0 -0,38	1,60	1,8	49,4
50	60,3	± 0,61	15,88	8,74	57,15	0 -0,38	1,60	1,8	62,2
65	73,0	± 0,74	15,88	8,74	69,09	0 -0,46	1,98	2,3	75,2
65	76,1	± 0,76	15,88	8,74	72,26	0 -0,46	1,93	2,3	77,7
80	88,9	+0,89 -0,79	15,88	8,74	84,94	0 -0,46	1,98	2,3	90,6
90	101,6	+1,02 -0,79	15,88	8,74	97,38	0 -0,51	2,11	2,3	103,4
100	108,0	+1,07 -0,79	15,88	8,74	103,73	0 -0,51	2,11	2,3	109,7
100	114,3	+1,14 -0,79	15,88	8,74	110,08	0 -0,51	2,11	2,3	116,2
125	133,9	+1,32 -0,79	15,88	8,74	129,13	0 -0,51	1,93	2,9	134,9
125	139,7	+1,40 -0,79	15,88	8,74	135,48	0 -0,51	2,11	2,9	141,7
125	141,3	+1,42 -0,79	15,88	8,74	137,03	0 -0,56	2,13	2,9	143,5
150	159,0	+1,60 -0,79	15,88	8,74	154,50	0 -0,56	2,20	2,9	161,0
150	165,1	+1,60 -0,79	15,88	8,74	160,90	0 -0,56	2,16	2,9	167,1
150	168,3	+1,60 -0,79	15,88	8,74	163,96	0 -0,56	2,16	2,9	170,7
200	219,1	+1,60 -0,79	19,05	11,91	214,40	0 -0,64	2,34	2,9	221,5
250	277,4	+1,60 -0,79	19,05	11,91	268,28	0 -0,69	2,39	3,6	275,4
300	328,2	+1,60 -0,79	19,05	11,91	318,29	0 -0,76	2,77	4,0	326,2

<sup>a</sup> See Figure 1 for dimensional diagram.

<sup>b</sup> Dimension for reference only, groove diameter is determined by C.