
**Fire protection — Automatic
sprinkler systems —**

Part 12:

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

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/TC 21, *Equipment for fire protection and firefighting*, Subcommittee SC 5, *Fixed firefighting systems using water*.

This second edition cancels and replaces the first edition (ISO 6182-12:2010), which has been technically revised.

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*

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:

- a) carbon dioxide systems (ISO 6183);
- b) explosion protection systems (ISO 6184).

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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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread*

ISO 1083, *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 or steel*

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

3 Terms and definitions

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

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 in which there is limited angular, axial, and rotational movement without overstressing the pipe joint

Note 1 to entry: See [6.8](#).

3.2.2

rigid mechanical coupling

mechanical coupling forming a sealed joint in which 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 Standard grooved-end dimensions

NOTE This clause gives standard dimensions for grooved ends that the coupling manufacturer may refer to if he does not need to specify special dimensions for the grooved ends compatible to his coupling. Couplings for grooved ends of special dimensions may be subjected to special tests to determine their suitability.

6.1.1 Roll grooved-end dimensions

The standard dimensions of roll grooved ends shall be in accordance with [Table 1](#). See also [Figure 1](#).

6.1.2 Cut grooved-end dimensions

The standard dimensions of cut grooved ends shall be in accordance with [Table 2](#). See also [Figure 2](#).

6.1.3 Cast grooved-end dimensions

The standard dimensions of cast grooved ends shall be in accordance with [Table 3](#).

6.2 Minimum pipe wall thickness

6.2.1 Grooved-end pipe couplings tested in accordance with [7.7.1](#) shall be tested with pipe according to ISO 4200:1991, [Table 1](#), range D. Pipe with higher wall thickness may be used, if this corresponds to the minimum wall thickness specified by the manufacturer.

6.2.2 Grooved-end pipe couplings tested in accordance with [7.7.2](#) shall be tested with pipe having the minimum nominal wall thickness specified in the manufacturer's installation instructions.

6.3 Mechanical coupling housing

The casting materials of the housings shall be ductile iron in accordance with ISO 1083, 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 equivalent strength and corrosion resistance. When requested on purchase order, the housing shall be galvanized in accordance with ASTM A153/A153M 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, Class 8.8, heavy hex bolts in accordance with ASTM A183 or other bolts which prevent rotation and have a minimum tensile strength of 800 N/mm². Bolts shall be zinc plated in accordance with ASTM B633-07, SC1 or EN 12329, or be of a material that provides at least equivalent corrosion resistance.

Table 1 — Roll grooved-end dimensional specifications

Dimensions in millimetres

Pipe or tube (OD) tolerance			Dimensional specifications						
Size	Outside diameter		Gasket seat A +/-0,76	Groove width B +/-0,76	Grooved diameter C		Groove depth D ^a	Min. allow. wall thickness T	Max. flare F Dia.
	Actual	Tolerance			Actual	Tolerance			
25	33,7	+0,41 -0,68	15,88	7,14	30,23	-0,38	1,60	1,8	36,3
32	42,4	+0,50 -0,60	15,88	7,14	38,99	-0,38	1,60	1,8	45,0
40	48,3	+0,44 -0,52	15,88	7,14	45,09	-0,38	1,60	1,8	51,1
50	60,3	-0,61	15,88	8,74	57,15	-0,38	1,60	1,8	63,0
65	73,0	-0,74	15,88	8,74	69,09	-0,46	1,98	2,3	75,7
65	76,1	-0,76	15,88	8,74	72,26	-0,46	1,98	2,3	78,7
80	88,9	+0,89 -0,79	15,88	8,74	84,94	-0,46	1,98	2,3	91,4
90	101,6	+1,02 -0,79	15,88	8,74	97,38	-0,51	2,11	2,3	104,1
100	108,0	+1,07 -0,79	15,88	8,74	103,73	-0,51	2,11	2,3	110,5
100	114,3	+1,14 -0,79	15,88	8,74	110,08	-0,51	2,11	2,3	116,8
125	133,9	+1,32 -0,79	15,88	8,74	129,13	-0,51	2,11	2,9	135,9
125	139,7	+1,40 -0,79	15,88	8,74	135,48	-0,51	2,11	2,9	142,2
125	141,3	+1,42 -0,79	15,88	8,74	137,03	-0,56	2,13	2,9	143,8
150	159,0	+1,60 -0,79	15,88	8,74	154,5	-0,56	2,16	2,9	161,3
150	165,1	+1,60 -0,79	15,88	8,74	160,90	-0,56	2,16	2,9	167,6
150	168,3	+1,60 -0,79	15,88	8,74	163,96	-0,56	2,16	2,9	170,9
200	219,1	+1,60 -0,79	19,05	11,91	214,40	-0,64	2,34	2,9	223,5
250	273,0	+1,60 -0,79	19,05	11,91	268,28	-0,69	2,39	3,6	277,4
300	323,9	+1,60 -0,79	19,05	11,91	318,29	-0,76	2,77	4,0	328,2

^a Dimension for reference only, groove diameter is determined by C.

Table 2 — Cut grooved-end dimensional specifications

Dimensions in millimetres

Pipe or tube			Dimensional specifications					
Nominal size	(OD) Outside diameter		Gasket seat A +/-0,76	Groove width B +/-0,76	Grooved diameter C		Groove depth D ^a	Min. allow. wall thickness T
	Actual	Tolerance			Actual	Tolerance		
25	33,7	+0,41 -0,68	15,88	7,54	30,23	-0,38	1,60	3,4
32	42,4	+0,50 -0,60	15,88	7,54	38,99	-0,38	1,60	3,6
40	48,3	+0,44 -0,52	15,88	7,54	45,09	-0,38	1,60	3,7
50	60,3	+0,61	15,88	8,36	57,15	-0,38	1,60	3,9
65	73,0	+0,74	15,88	8,36	69,09	-0,46	1,98	4,8
65	76,1	+0,76	15,88	8,36	72,26	-0,46	1,98	4,8
80	88,9	+0,89 -0,79	15,88	8,36	84,94	-0,46	1,98	4,8
90	101,6	+1,02 -0,79	15,88	8,36	97,38	-0,51	2,11	4,8
100	108,0	+1,07 -0,79	15,88	9,14	103,73	-0,51	2,11	5,2
100	114,3	+1,14 -0,79	15,88	9,14	110,08	-0,51	2,11	5,2
125	133,0	+1,32 -0,79	15,88	9,14	129,13	-0,51	2,11	5,2
125	139,7	+1,40 -0,79	15,88	9,14	135,48	-0,51	2,11	5,2
125	141,3	+1,42 -0,79	15,88	9,14	137,03	-0,56	2,13	5,2
150	159,0	+1,60 -0,79	15,88	9,14	154,5	-0,56	2,16	5,6
150	165,1	+1,60 -0,79	15,88	9,14	160,90	-0,56	2,16	5,6
150	168,3	+1,60 -0,79	15,88	9,14	163,96	-0,56	2,16	5,6
200	219,1	+1,60 -0,79	19,05	11,53	214,40	-0,64	2,34	6,1
250	273,0	+1,60 -0,79	19,05	12,32	268,28	-0,69	2,39	6,4
300	323,9	+1,60 -0,79	19,05	12,32	318,29	-0,76	2,77	7,1

^a Dimension for reference only, groove diameter is determined by C.