

INTERNATIONAL STANDARD

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Mechanical joint fittings for use with polyethylene pressure pipes for irrigation purposes

*Raccords mécaniques pour tubes en polyéthylène utilisés avec pression
et destinés à l'irrigation*



Reference number
ISO 9625:1993(E)

ISO 9625:1993(E)**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.

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.

International Standard ISO 9625 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Sub-Committee SC 2, *Plastics pipes and fittings for water supplies*.

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Mechanical joint fittings for use with polyethylene pressure pipes for irrigation purposes

1 Scope

This International Standard specifies the requirements and test methods for mechanical fittings intended to join polyethylene (PE) pressure pipes used in above-ground and underground irrigation systems conveying water at temperatures not exceeding 45 °C.

This International Standard does not apply to fittings used in drip irrigation systems.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7-1:—¹⁾, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 161-1:1978, *Thermoplastics pipes for the transport of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series.*

ISO 228-1:—²⁾, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 1167:—³⁾, *Thermoplastics pipes for the transport of fluids — Resistance to internal pressure — Test method.*

ISO 3458:1976, *Assembled joints between fittings and polyethylene (PE) pressure pipes — Test of leakproofness under internal pressure.*

ISO 3459:1976, *Polyethylene (PE) pressure pipes — Joints assembled with mechanical fittings — Internal under-pressure test method and requirement.*

ISO 3501:1976, *Assembled joints between fittings and polyethylene (PE) pressure pipes — Test of resistance to pull out.*

ISO 3503:1976, *Assembled joints between fittings and polyethylene (PE) pressure pipes — Test of leakproofness under internal pressure when subjected to bending.*

ISO 4059:1978, *Polyethylene (PE) pipes — Pressure drop in mechanical pipe-jointing systems — Method of test and requirements.*

ISO 8779:1992, *Polyethylene (PE) pipes for irrigation laterals — Specifications.*

3 Classification

For the purpose of this International Standard, mechanical fittings for PE pressure pipes are classified as follows:

- a) Internal grip fittings (insert-type fittings), which grip the pipe only at its inner surface.
- b) External grip fittings (compression-type fittings), which grip the pipe only at its outer surface.
- c) Internal-external grip fittings, which grip the pipe at both its inner and outer surfaces.

1) To be published. (Revision of ISO 7-1:1982)

2) To be published. (Revision of ISO 228-1:1982)

3) To be published. (Revision of ISO 1167:1973)

ISO 9625:1993(E)**4 Materials**

Fittings shall be manufactured of corrosion-resistant materials.

The composition of the plastics materials used shall ensure high resistance to ultraviolet rays.

Where applicable, the materials shall comply with relevant national standards.

All parts of the fittings coming in contact with water shall be resistant to agricultural chemicals, for example fertilizers, plant protection products and the fluids used for removal of pipe blockages in emitters.

5 Workmanship and appearance**5.1 Finish**

The fittings shall be cleanly and neatly finished, and be free from burrs or other features likely to damage the pipe. The bore shall be free from irregularities which can restrict the flow of fluid.

5.2 Plastics materials

The internal and external surfaces of fittings made of plastics materials shall be clean and free from grooves, pinholes, voids or other features likely to affect the performance and service of the system.

5.3 Metal or alloy materials**5.3.1 Castings**

Castings shall in all respects be sound, free from laps, blowholes and pitting, and both the external and the internal surfaces shall be clean, smooth and free from sand.

5.3.2 Fabrications

Metal components shall in all respects be sound, free from laps, blowholes and pitting, and both the external and internal surfaces shall be clean and smooth.

Metal components and fittings made by other processes shall be sound, solid and free from laminations.

6 Design

The fittings shall be designed with due regard to good practice in relation to their hydrodynamic characteristics. They shall be manufactured with such dimensions and tolerances as will permit their use with polyethylene irrigation pipes in accordance with ISO 8779 and/or any other relevant International Standard.

Dimensions shall be established so that fittings fulfill the requirements of clause 7.

6.1 Dimensions of internal grip fittings

The dimensions of internal grip fittings and of internal-external grip fittings used for PE 25 and PE 32 pipes shall be such that the bore of the pipe is not increased by more than 12,5 % of its original diameter at 20 °C.

6.2 Fitting threads

The size and length of fitting threads shall be in accordance with ISO 7-1 or ISO 228-1, as appropriate for the intended use.

7 Mechanical and hydraulic characteristics**7.1 General**

The fittings shall be tested as specified in 7.2 to 7.9, with the fittings joined to polyethylene pipes of designations PE 50 and/or PE 32 and/or PE 25. The nominal pressure of the pipe used in the tests shall be at least equivalent to the nominal pressure of the fitting (see ISO 161-1).

Metal fittings shall be tested according to 7.2, 7.3, 7.4, 7.5, 7.7, 7.8 and 7.9.

Plastics fittings shall be tested according to 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 and 7.9.

7.2 Leakproofness under internal pressure

All metal fittings shall be tested in accordance with ISO 3458 and shall comply with its requirements.

7.3 Leakproofness under internal pressure when subjected to bending

Metal and plastics fittings shall be tested in accordance with ISO 3503 and shall comply with its requirements.

7.4 Resistance to pull-out

Metal and plastics fittings shall be tested in accordance with ISO 3501 and shall comply with its requirements.

7.5 Resistance of external grip fittings under internal pressure

Metal and plastics fittings shall be tested in accordance with ISO 3459 and shall comply with its requirements.

7.6 Resistance to long-term internal hydrostatic pressure

The long-term pressure resistance of plastics fittings shall be evaluated by the following two tests.

7.6.1 Plastics moulded material

A pressure test for the plastics moulded material shall be performed using an injection-moulded pipe specimen made of the same material as the fitting body.

The dimensions of the test specimen shall be as shown in figure 1, where e is the wall thickness of the pipe.

The specimen shall be tested according to ISO 1167 and shall meet the strength requirements specified in

table 1. The tested specimen shall not suffer fracture or other damage.

NOTE 1 This test may be omitted if the fitting manufacturer supplies the testing laboratory with a report on the strength requirements as specified in table 1 indicating satisfactory test results.

7.6.2 Plastics components test

An internal hydraulic pressure test for the plastics fitting body shall be carried out under the conditions specified in table 2. Special sealing plugs can be used and the connection between fitting and plug may be externally reinforced.

No leakage or burst of the fitting body shall be noted before elapse of the minimum test duration. If leakage occurs at the sealing plugs, the test is not valid and shall be repeated using another test specimen.

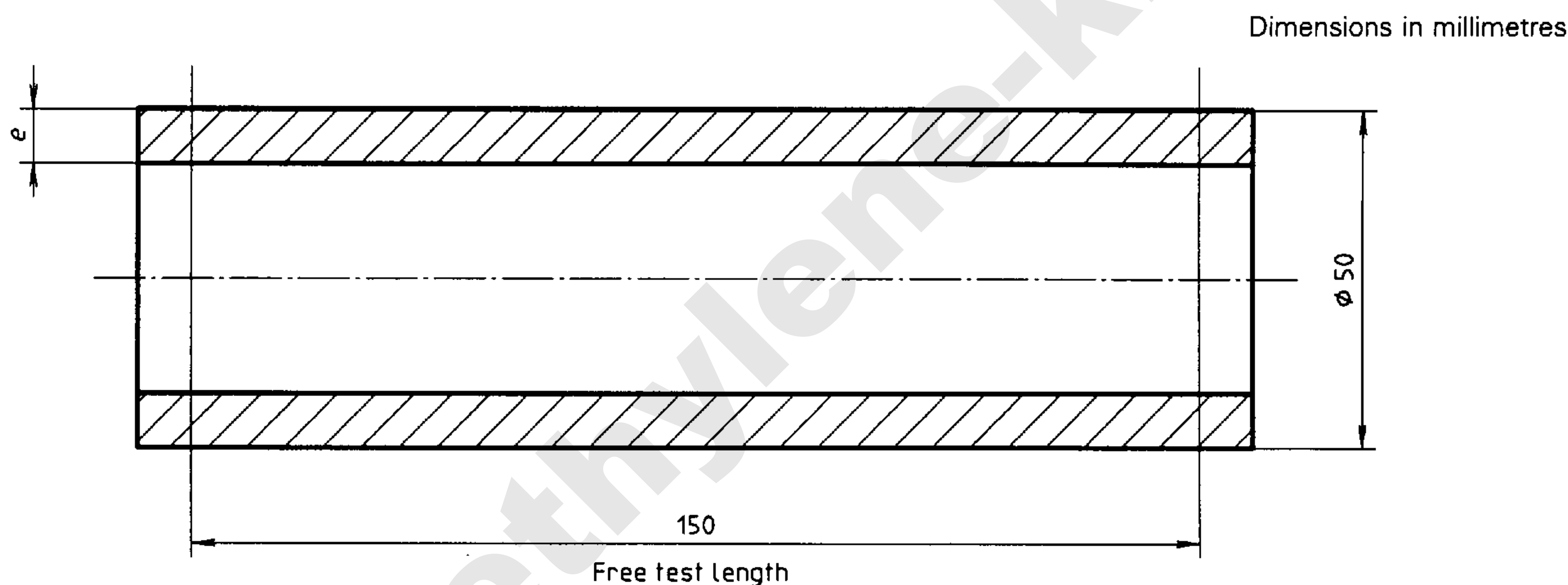


Figure 1 — Test specimen

Table 1 — Test conditions for plastics moulded materials

Material	Temperature °C	Induced stress MPa	Minimum test duration h
PVC-U	60	10	1 000
PE-HD	80	4	170
PP, Type 1 (homopolymer)	95	3,5	1 000
PP, Type 2 (copolymer)	95	2,5	1 000
POM	60	10	1 000
ABS	70	4	1 000

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7.7 Hydrostatic pressure test for assembled joints

Joints made with metal or plastics fittings shall be assembled in accordance with the manufacturer's instructions and tested without external reinforcement.

Three test assemblies shall be used, each comprising a joint together with a pipe closed at one end to form

a test specimen in accordance with ISO 1167. Each assembly shall be tested under the conditions specified in table 3 and otherwise in accordance with ISO 1167. During the test period, the test joints shall not develop leaks or fractures, nor shall the PE pipe develop fractures, cracks or other failures within the compression joint or within a distance *d* from the compression joint, where *d* corresponds to the outside diameter of the pipe.

Table 2 — Test conditions for plastics fitting bodies

Fitting material	Temperature	Minimum test duration	Test pressure
	°C	h	bar
PVC-U	20	1	4,2 × PN
	60	1 000	1 × PN
PE-HD	20	1	2,4 × PN
	80	170	0,8 × PN
PP, Type 1 (homopolymer)	20	1	3,2 × PN
	95	1 000	0,7 × PN
PP, Type 2 (copolymer)	20	1	2,7 × PN
	95	1 000	0,5 × PN
POM	20	1	6,3 × PN
	95	420	1,2 × PN
ABS	20	1	3,1 × PN
	70	1 000	0,5 × PN

NOTE — The nominal pressure (PN) is the working pressure of the fitting at 20 °C (see ISO 161-1).

Table 3 — Test conditions for assembled joints

Pipe material	Acceptance test			Quality test		
	Temperature °C	Duration h	Induced stress MPa	Temperature °C	Duration h	Induced stress MPa
PE-LD	20	1	7 (7)	70 (60)	100	2,5 (3)
PE-HD	20	1	12 (12)	80 (60)	170	4 (6)

NOTES

- Values given in parentheses apply only to fittings made of PVC-U.
- The data given in this table are based on field and laboratory experience. Further test conditions are under study.

7.8 Leakproofness under intermittent hydrostatic pressure

A test to check the leakproofness of assembled joints between fittings and polyethylene pressure pipes subject to intermittent internal pressure shall be carried out at an internal hydrostatic pressure equal to twice the nominal pressure of the pipe at a temperature of 20 °C, in a series of six cycles.

Each cycle shall consist of a 24-hour period of internal hydrostatic pressure application, followed by a 24-hour period of no pressure.

Apparatus, test specimen, procedure and test report shall comply with ISO 3458.

7.9 Pressure-loss test

The loss of pressure shall be tested in accordance with the method described in ISO 4059 and shall comply with its requirements.

8 Marking

All fittings shall be marked to show at least the following information:

- manufacturer's name and/or trademark;
- identification of fitting body material (if plastics);
- nominal outside diameter of pipes for which the fitting is intended;
- nominal pressure (PN);
- nominal size of thread, if one end of the fitting is threaded;
- the term "Irrig" (indicating intended for irrigation).

The manufacturer's name or trademark, nominal outside diameter, and nominal pressure of pipe and thread shall be marked by an impressed or raised marking on the fittings. Other markings may be identified by an impressed marking or label.

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