

INTERNATIONAL STANDARD

**ISO
1167**

Second edition
1996-11-01

Thermoplastics pipes for the conveyance of fluids — Resistance to internal pressure — Test method

*Tubes en matières thermoplastiques pour le transport des fluides —
Résistance à la pression intérieure — Méthode d'essai*



Reference number
Documents
ISO 1167:1996 (2)
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Foreword

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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 1167 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications*.

This second edition cancels and replaces the first edition (ISO 1167:1973), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Thermoplastics pipes for the conveyance of fluids — Resistance to internal pressure — Test method

1 Scope

This International Standard specifies a method for determination of the resistance of thermoplastics pipes to constant internal water pressure at constant temperature.

It is applicable to thermoplastics pipes intended for the conveyance of fluids.

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 161-1:1996, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*.

ISO 3126:1974, *Plastics pipes — Measurement of dimensions*.

ISO/TR 9080:1992, *Thermoplastics pipes for the transport of fluids — Methods of extrapolation of hydrostatic stress rupture data to determine the long-term hydrostatic strength of thermoplastics pipe materials*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 161-1 apply.

4 Principle

After conditioning, test pieces are subjected to a specified constant internal hydrostatic pressure for a specified period of time or until failure.

Throughout the test, the test pieces are kept in an environment at a specified constant temperature: this is water ("water-in-water" test), another liquid ("water-in-liquid" test) or air ("water-in-air" test).

5 Test parameters

The following test parameters are set by the standard making reference to this International Standard:

- a) the type of end cap to be used (see 6.1);
- b) the size and S-series of pipe to be used (see 7.1);
- c) the test temperature (see 6.2 and 10.1);
- d) for pipes of nominal outside diameter d_n greater than 315 mm, the free length of the test piece, if other than 1 000 mm (see 7.1.1);
- e) the number of test pieces (see 7.2);
- f) the test pressure p or the hoop stress σ to be induced by the test pressure (see 8.2.2);
- g) the conditioning period (see clause 9), if other than as specified in table 1;
- h) the type of test, i.e. water-in-water/air/liquid (see clause 4 and 10.1);
- i) the duration of the test under pressure and the criteria for a failure (see 10.3);
- j) the requirements, or patterns of requirements, if any, which determine the initiation of additional testing.

6 Apparatus

6.1 End caps, fixed to the ends of the pipe.

By means of an appropriate system, they shall allow sealing and connection to the pressurizing equipment.

The end cap shall be of one of the following types:

- a) Type A: Fittings rigidly connected to the test piece but not to each other, and hence transmitting the hydrostatic end thrust to the test piece, e.g. as shown in figure 1 a). They may comprise flanged plates on the ends of a large-diameter pipe, optionally welded when flanges, caps, plugs or plates are of a material compatible with that of the test pieces.
- b) Type B: Sockets, made of metal, fitted with joints ensuring sealing onto the external surface of the test piece and connected to one another, and hence not transmitting the hydrostatic end thrust to the test piece. They may comprise one or more metal rods, as shown in figure 1 b), allowing sufficient longitudinal movement at the ends of the test piece to avoid buckling due to thermal expansion.

Other than toothed grips, any sharp edges which would come into contact with the outside surface of the pipe shall be rounded off.

The constituent material of the end cap shall not have any known adverse effect on the pipe under test.

NOTES

1 In general, times to failure with type B end caps are shorter than those obtained with type A end caps because of differences of stress in deformation.

2 When no precautions are taken, type B end caps can cause buckling of the test piece when the test piece is assembled with the end caps at a lower temperature than the test temperature.

For the evaluation of pipe and/or fitting materials in accordance with ISO/TR 9080, type A end caps shall be used unless otherwise specified in the referring standard.

The reference end cap is the type A end cap.