INTERNATIONAL STANDARD

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Fittings, valves and other piping system components made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C), acrylonitrile-butadiene-styrene (ABS) and acrylonitrile-styrene-acrylester (ASA) for pipes under pressure — Resistance to internal pressure — Test method

Raccords, robinets et autres composants de systèmes de canalisation en poly(chlorure de vinyle) non plastifié (PVC-U), poly(chlorure de vinyle) chloré (PVC-C), acrylonitrile-butadiène-styrène (ABS) et acrylonitrile-styrène-ester acrylique (ASA) pour canalisations sous pression — Résistance à la pression interne — Méthode d'essai

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12092 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*.

Annex A of this International Standard is for information only.

Fittings, valves and other piping system components made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C), acrylonitrile-butadiene-styrene (ABS) and acrylonitrile-styrene-acrylester (ASA) for pipes under pressure — Resistance to internal pressure — Test method

1 Scope

This International Standard specifies methods for testing the resistance to internal pressure of piping components, such as fittings and valves, made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C), acrylonitrile-butadiene-styrene (ABS) and acrylonitrile-styrene-acrylester (ASA) and intended for use, respectively, with PVC-U, PVC-C, ABS and ASA pipes under pressure, irrespective of the type and design of the component or the method of assembly used.

NOTE Throughout this International Standard the term "fitting" is to be understood to represent any PVC-U, PVC-C, ABS or ASA piping component.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, this publication do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1167:1996, *Thermoplastics pipes for the conveyance of fluids — Resistance to internal pressure — Test method*.

3 Principle

Test pieces, each comprising a single fitting with its sealing devices or a pipe-fitting assembly, are conditioned and then subjected to a specified constant internal hydrostatic pressure for a specified period of time or until the test pieces fail.

Throughout the test, the test pieces are filled with water and are kept in an environment at a specified constant temperature which may be water ("water-in-water" test) or air ("water-in-air" test).

4 Apparatus

4.1 Pressure-tight devices

4.1.1 General

The pressure-tight devices shall be capable of connecting the fittings with the pressurizing equipment and, if applicable, between test pieces.

The devices shall not prevent the free parts of fittings, between joints, from deforming under the action of internal pressure at any time during the test.

External reinforcing rings may be used to prevent any leakage from the joint for the required duration of the test. The external reinforcing rings and the internal seal shall be located within the area of the socket.

The devices shall conform to the requirements given in 4.1.2.1, 4.1.2.2 or 4.1.2.3, if applicable, or shall be one of types described in 4.1.2.4 or 4.1.3.

4.1.2 Components with plain sockets

4.1.2.1 **Joints made using a solvent adhesive** (see Figure 1)

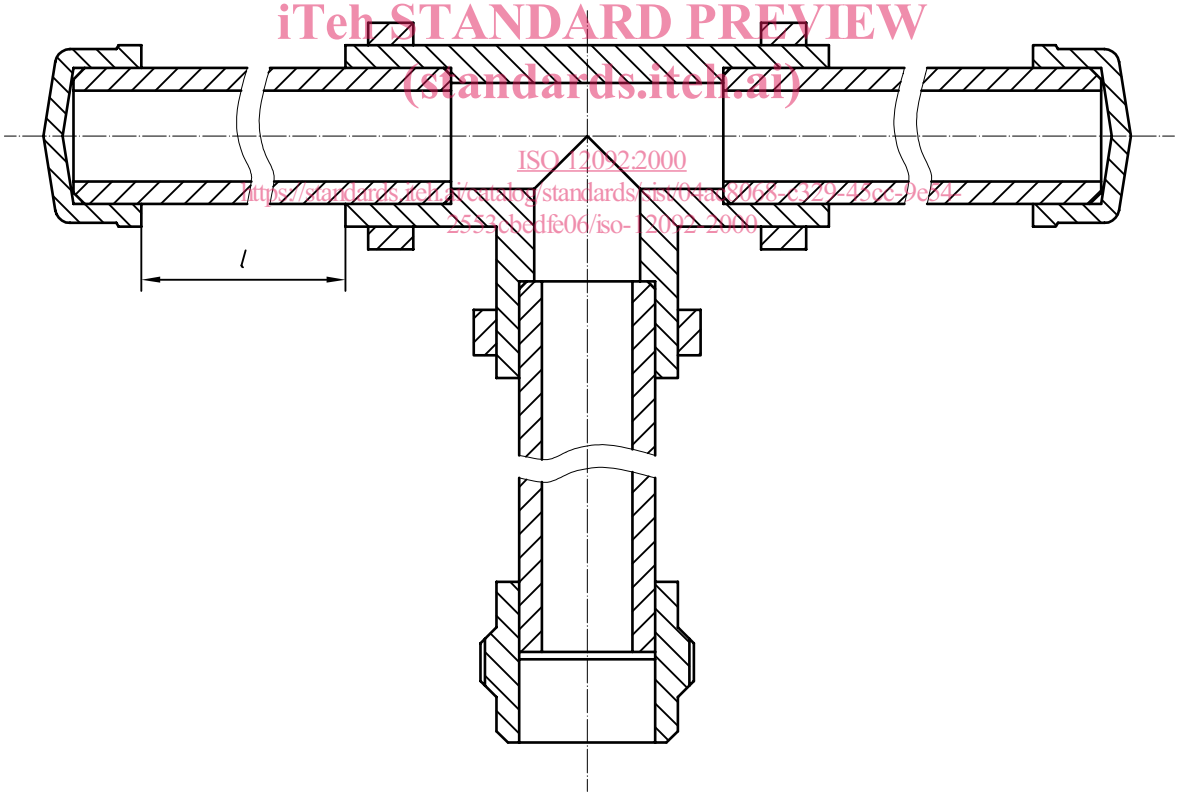

Figure 1 — Example of a pressure-tight test piece assembly with solvent adhesive joints and with hydrostatic end thrust

Each of the sockets of the fitting shall be joined, by means of solvent adhesive, to a portion of pipe of the series for which the fitting is designed. All pipe ends shall be chamfered. The minimum length *l* of the pipe portion (see Figure 1) shall be such that the connectors can be fixed without difficulty. Care shall be taken that no additional stress is caused in the solvent-cemented joint by the pressure-tight devices.

A storage period of at least 10 days is required (see clause 7) to ensure satisfactory drying of the joint.

4.1.2.2 **Mechanical joints made using external milled grooves or threads** (see Figure 2)

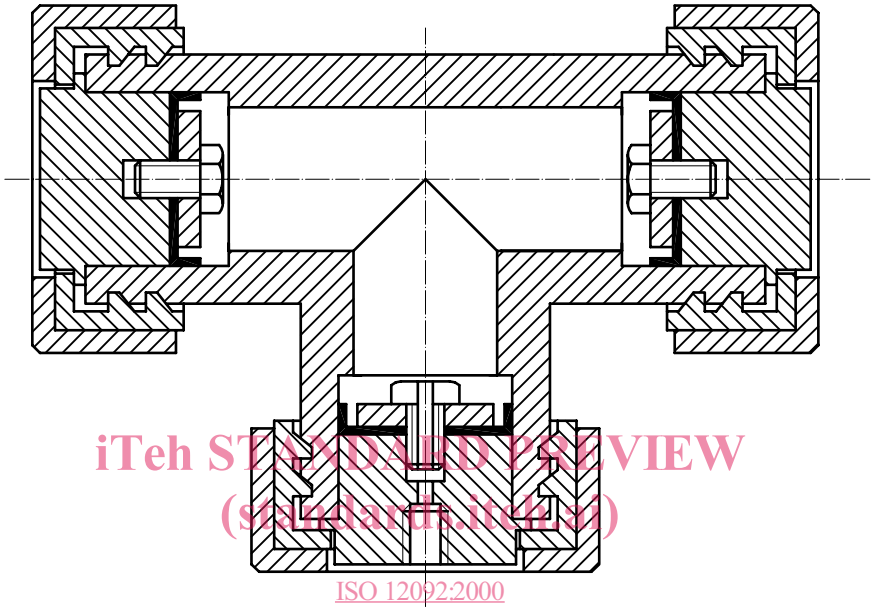

Figure 2 — Example of a pressure-tight test piece assembly with mechanical joints involving external milled grooves and with hydrostatic end thrust

The closing device is attached to the test piece by virtue of the fact that its ribs engage in the machined grooves in the test piece. Sealing is ensured by cup-shaped seals inside the socket of the test piece.

NOTE Machining of the grooves or threads should be carried out with great care, taking into consideration the notch sensitivity of the plastics material concerned. The number of grooves should preferably be at least two in the case of fittings designed for pipes of nominal external diameter 90 or less, and at least three for fittings designed for larger pipes.

4.1.2.3 Mechanical joints made using compression by means of ribbed half-segments (see Figure 3)

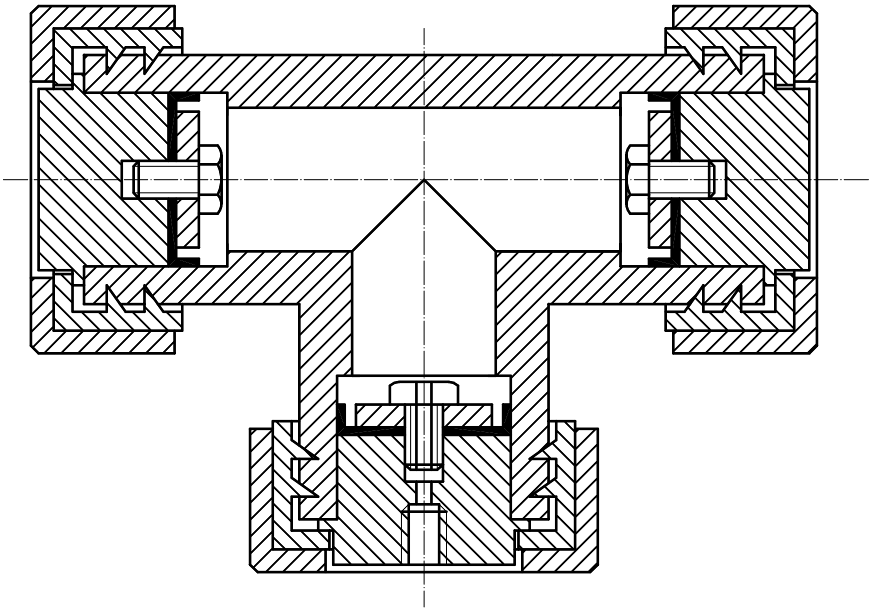

Figure 3 — Example of a pressure-tight test piece assembly with mechanical compression joints and with hydrostatic end thrust

The grooves in the test piece are formed by pressing the ribs of the half shells of the closing device into the test piece. The closing device is held to the test piece by virtue of the fact that the ribs engage in the grooves. Sealing is ensured by cup-shaped seals inside the socket of the test piece.

NOTE 1 The number of ribs on the clamping jaw (half-segments) should preferably be at least two in the case of fittings designed for pipes of nominal external diameter 90 or less and at least three for fittings designed for larger pipes. The height of the ribs should preferably be approximately 0,8 mm.

NOTE 2 The principle of the joint shown in Figure 3 is perhaps preferable to that shown in Figure 2, because it avoids machining and reduces the risk of defects due to the production of the grooves.

4.1.2.4 Joints made using internal metal pins to prevent expulsion of the connectors (see Figure 4)

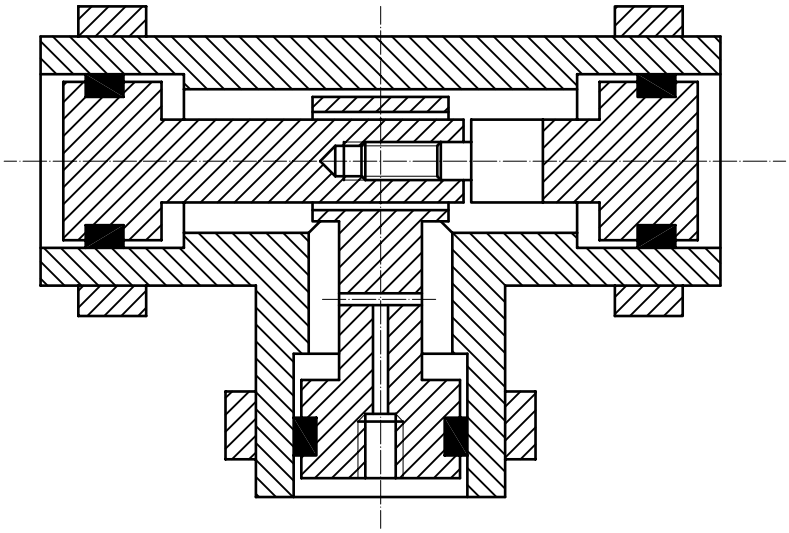

Figure 4 — Example of a pressure-tight test piece assembly with internally pinned joints and ring seals and without hydrostatic end thrust

The internally located closing pistons are held together by an appropriate coupling design. Sealing is ensured by ring seals inside the socket of the test piece.

NOTE The advantage of the principle illustrated in Figure 4 is the complete absence of any influence of notches caused by the gripping or retaining devices. The disadvantage is a possible influence on the deformation of the free parts and the existence of additional forces due to the rigidity of the metal pins.

4.1.3 Components with socket and gasket

4.1.3.1 Joints made using an elastomer gasket and internal metal pins to prevent expulsion of the connectors (see Figure 5)

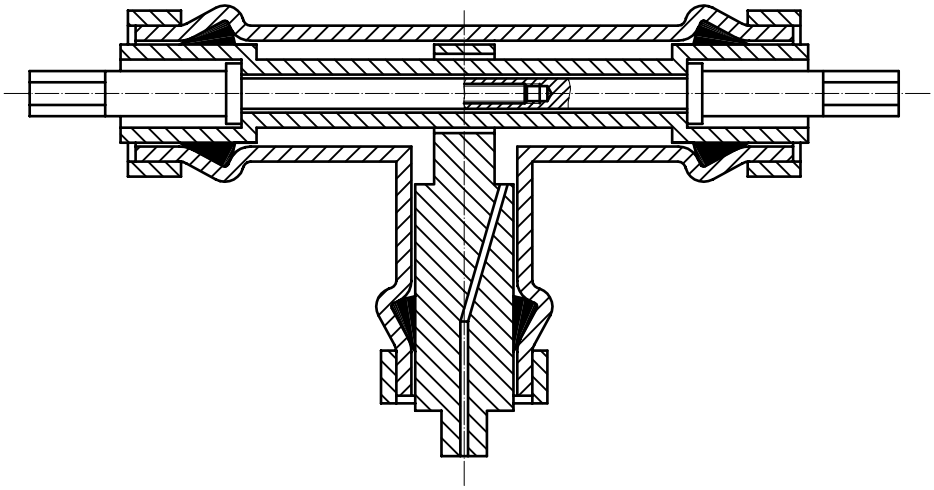

Figure 5 — Example of a pressure-tight test piece assembly with internally pinned joints and gasket seals and without hydrostatic end thrust