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Second edition
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Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling

Systèmes de canalisations thermoplastiques pour applications sans pression — Méthode d'essai de résistance à des cycles de température élevée

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Contents

Page

Foreword

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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).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 1, *Plastics pipes and fittings for soil, waste and drainage (including land drainage)*.

This second edition cancels and replaces the first edition (ISO 13257:2010), which has been technically revised. The major modifications to the previous edition are:

— revision of the Scope to delete the references to application areas "B", "BD" and "UD";

— addition in the Scope of the range of nominal outside diameters of components to which this method is applicable;

— addition of a definition for “sagging”;

— complete review of Clause 6, Test assemblies, in particular distinction between test assemblies including pipes with integral sockets and fittings with socket and spigot (Figure 1) and test assemblies including pipes without integral socket and fittings with sockets (Figure 2) for components $d_n \geq 40$ mm;

— in Clause 7, addition of Figure 4 to illustrate the measuring point of the column of water.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Thermoplastics piping systems for non-pressure applications — Test method for resistance to elevated temperature cycling

1 Scope

This document specifies a test method for determining the resistance to elevated temperature cycling of thermoplastics piping systems for non-pressure applications, inside buildings or buried in the ground within the building structure.

This document is applicable to piping systems with components of nominal outside diameters up to and including 200 mm.

Although limited to nominal outside diameters up to and including 200 mm, the test results may be extrapolated to products of larger nominal outside diameters from the same range.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/TS 7024:2005, *Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings — Thermoplastics — Recommended practice for installation*

3 Terms and definitions and symbols

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

3.1.1
nominal outside diameter
d_n
specified diameter assigned to a nominal size (DN/OD or DN/ID)

Note 1 to entry: It is expressed in millimetres.

3.1.2
sagging
S_g
deformation of the pipe occurring from the test conditions, which is measured after the test at a defined location in vertical direction downwards

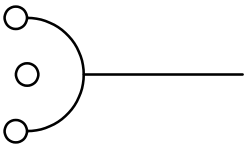
Note 1 to entry: It is expressed in millimetres.

3.1.3
expansion gap
distance between the bottom of a socket and the spigot of the inserted component allowing expansion of the system

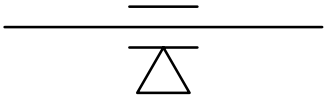
Note 1 to entry: Adapted from ISO/TS 7024:2005, definition 3.2.4.

3.2 Symbols

For the purposes of this document, the symbols given in ISO/TS 7024 and the following apply:



ring seal socket



guide brackets (for free movement of pipe)

anchor brackets (for fixed point)

4 Principle

A test assembly of pipes and fittings is subjected to a given pattern of thermal cycling by using hot and cold water alternately for a given number of cycles during which the leaktightness of joints is verified by inspection and sagging of the pipe is checked against a limit after the test.

5 Apparatus

5.1 Thermometer or **other temperature measuring device,** capable of measuring with an accuracy of 0,5 °C or better. The resolution of the thermometer or the temperature measuring device shall be 0,1 °C or better. The thermometer or the temperature measuring device shall be capable of recording the relevant temperature, with a reaction time less than or equal to 20 s, from 20 °C to 90 °C.

5.2 Timer, with an accuracy of 1 s.

5.3 Cold water source, capable of supplying at the inlet of the test assembly, every 4 min, the following quantities of water at (15 ± 5) °C (see 7.3):

a) for Programme A, (30 ± 0,5) l in (60 ± 2) s;

b) for Programme B, (15 ± 0,5) l in (60 ± 2) s.

5.4 Hot water source, capable of supplying at the inlet of the test assembly, every 4 min, the following volumes of water at (93 ± 2) °C (see 7.3):

a) for Programme A, (30 ± 0,5) l in (60 ± 2) s;

b) for Programme B, (15 ± 0,5) l in (60 ± 2) s.

However, in order to improve the reproducibility, it is recommended that the hot water temperature is maintained at (93 ± 1) °C.

5.5 Plugs or **other closures**, to seal, temporarily, the water outlet (see 7.1 and 7.4).

5.6 Device, capable of measuring pipe sagging as shown in Figures 1 to 3, as applicable, to an accuracy of 0,1 mm.

5.7 Brackets, comprising anchor brackets (for fixed points) capable of restraining piping components and guide brackets capable of supporting piping components without inhibiting longitudinal movement (see Clause 6 and Figures 1 to 3).

The brackets shall be chosen according to the documentation of the pipe and/or fitting manufacturer.

5.8 Supporting element, intended to support the test assembly, consisting of a firm wall or frame, using both anchor and guide brackets.

6 Test assembly

6.1 General

Unless otherwise specified in the product standard, the test assembly shall comprise a vertical branch and two adjacent horizontal branches, in accordance with Figures 1 and 2 (for $d_n \geq 40$ mm) or Figure 3 (for $d_n < 40$ mm).

Figures 1 to 3 are also applicable for other types of joints (e.g. cemented joints, welded joints, lip seal joints.).

It is not permitted to compensate axial misalignment with additional fittings.

Appropriate reduction fitting may be introduced for DN changes, provided that the invert level is maintained.

Injection moulded components in the horizontal branch shall be assembled such that the weld lines are in the invert, if possible.

All lengths have a tolerance of ±10 mm in Figures 1, 2 and 3.

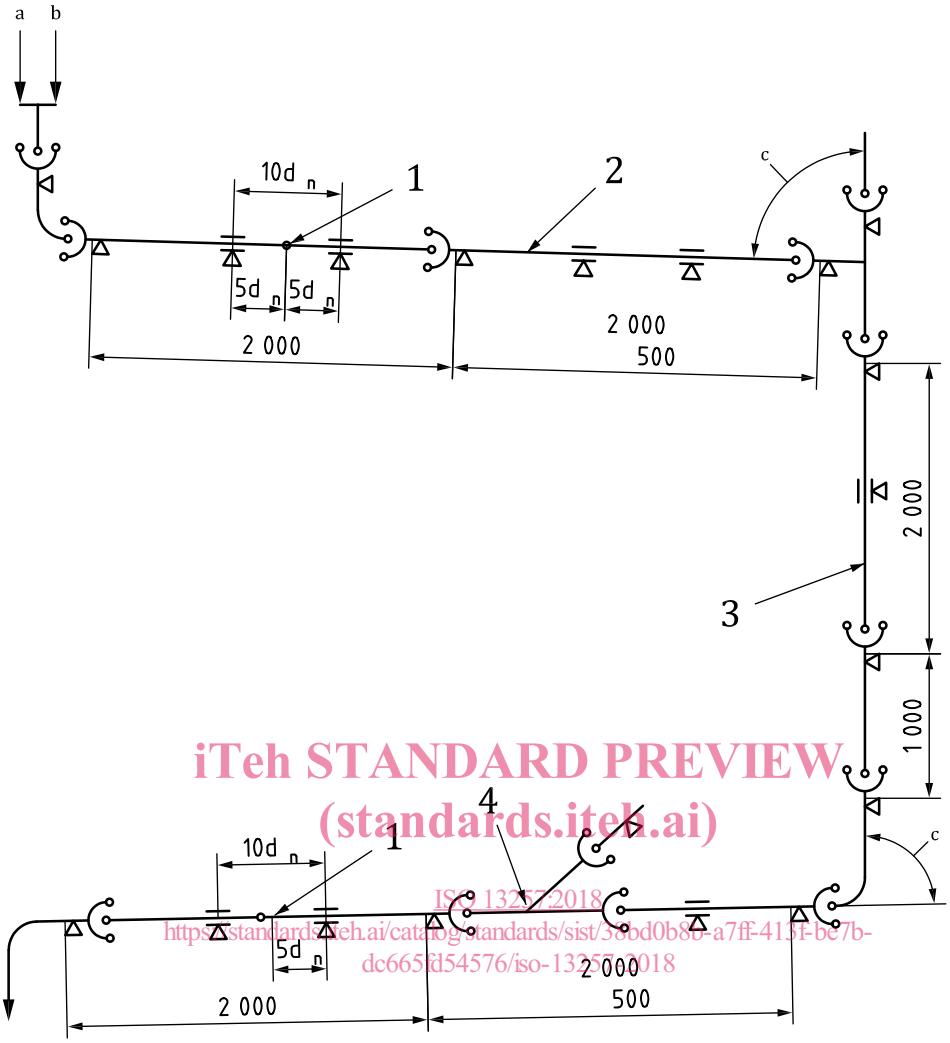
6.2 Assembly for pipes with integral socket (for $d_n \geq 40$ mm)

Pipes with an integral socket and fittings with socket and spigot shall be tested according to Figure 1.

6.3 Assembly for pipes without integral sockets (for $d_n \geq 40$ mm).

Pipes without integral socket and fittings with sockets shall be tested according to Figure 2.

Dimensions in millimetres



Key

1 sagging measuring point (see 6.4)

2 pipe: d_n = 40 mm or d_n = 50 mm

3 pipe: 75 mm ≤ d_n ≤ 160 mm

4 pipe: 75 mm ≤ d_n ≤ 160 mm for piping systems intended to be used inside building, with an additional branch 45° or 90°

pipe: 75 mm ≤ d_n ≤ 200 mm for piping systems intended to be used buried in the ground within the building structure, with an additional branch 45° or 90°

a Hot water.

b Cold water.

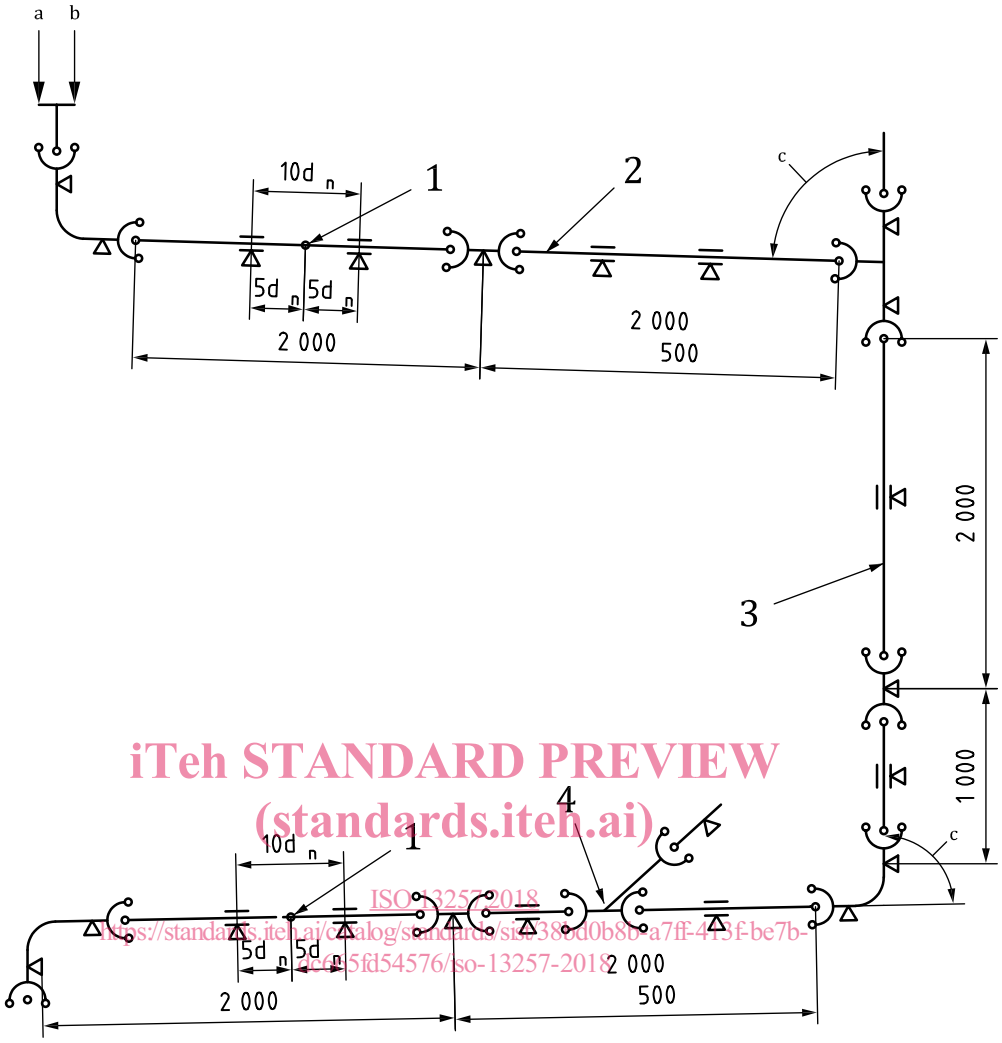
c Angle α: 85° ≤ α ≤ 89°.

NOTE 1 In this test assembly, joints with elastomeric ring seals are given as examples.

NOTE 2 Where both distances 2 000 mm and 500 mm are indicated, any distance between 500 mm and 2 000 mm is allowed.

Figure 1 — Test assembly for piping systems with components d_n ≥ 40 mm — Pipes with integral socket and fittings with socket and spigot

Dimensions in millimetres



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a Hot water.

b Cold water.

c Angle α: 85° ≤ α ≤ 89°.

NOTE 1 In this test assembly, joints with elastomeric ring seals are given as examples.

NOTE 2 Where both distances 2 000 mm and 500 mm are indicated, any distance between 500 mm and 2 000 mm is allowed.

Figure 2 — Test assembly for piping systems with components d_n ≥ 40 mm — Pipes without integral socket and fittings with sockets