
**Plastics piping systems for hot
and cold water installations —
Polybutene (PB) —**

**Part 3:
Fittings**

iTeh STANDARD PREVIEW
*Systemes de canalisations en plastique pour les installations d'eau
chaude et froide — Polybutène (PB) —
Partie 3: Raccords*
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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

ISO 15876-3 was prepared by the European Committee Standardization (CEN) Technical Committee CEN/TC 155, *Plastics pipings systems and ducting systems*, in collaboration with ISO Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 2, *Plastics pipes and fittings for water supplies*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 15876-3:2003), which has been technically revised with the following changes:

- introduction of polybutene random copolymer (PB-R) and renaming existing polybutene (PB) into polybutene homopolymer (PB-H);
- revision of specifications for conditioning of samples.

A list of all parts in the ISO 15876 series can be found on the ISO website.

Introduction

The System Standard ISO 15876, of which this document is Part 3, specifies the requirements for a piping system when made from polybutene (PB). The piping system is intended to be used for hot and cold water installations.

In respect of potential adverse effects on the quality of water intended for human consumption, caused by the product covered by ISO 15876 (all parts):

- ISO 15876 (all parts) provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA;
- it should be noted that, while awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

Requirements and test methods for materials and components, other than fittings, are specified in ISO 15876-1 and ISO 15876-2. Characteristics for fitness for purpose (mainly for joints) are covered in ISO 15876-5. ISO/TS 15876-7 gives guidance for the assessment of conformity.

This document specifies the characteristics of the fittings.

At the date of publication of this standard, System Standards for piping systems of other plastics materials used for the same application include ISO 15874, ISO 15875, ISO 15876, ISO 15877, ISO 21003 and ISO 22391.

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Plastics piping systems for hot and cold water installations — Polybutene (PB) —

Part 3: Fittings

1 Scope

This document specifies the characteristics of fittings for polybutene-1 (PB-1) piping systems intended to be used for hot and cold water installations within buildings for the conveyance of water, whether or not intended for human consumption (domestic systems) and for heating systems under design pressures and temperatures according to the class of application (see ISO 15876-1).

The designation polybutene is used together with the abbreviation PB throughout this document.

This document covers a range of service conditions (application classes) and design pressure classes. For values of T_D , T_{max} and T_{mal} in excess of those in ISO 15876-1:2016, Table 1, this document does not apply.

NOTE It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

It also specifies the parameters for the test methods referred to in this document.

In conjunction with the other parts of ISO 15876, this document is applicable to fittings made from PB and to fittings made from other materials which are intended to be fitted to pipes conforming to ISO 15876-2 for hot and cold water installations, whereby the joints conform to the requirements of ISO 15876-5.

This document is applicable to fittings of the following types:

- socket fusion fittings;
- electrofusion fittings;
- mechanical fittings;
- fittings with incorporated inserts.

It is also applicable to fittings made from alternative materials which, when fitted to pipes conforming to ISO 15876-2, conform to the requirements of ISO 15876-5.

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 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation*

ISO 1133-1, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method*

ISO 15876-3:2017(E)

ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-3, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components*

ISO 1167-4, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 7686, *Plastics pipes and fittings — Determination of opacity*

ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation*

ISO 15876-1:2016, *Plastics piping system for hot and cold water installations — Polybutene (PB) — Part 1: General*

ISO 15876-2, *Plastics piping system for hot and cold water installations — Polybutene (PB) — Part 2: Pipes*

ISO 15876-5, *Plastics piping system for hot and cold water installations — Polybutene (PB) — Part 5: Fitness for purpose of the system*

EN 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 681-2, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

EN 1254-3, *Copper and copper alloys — Plumbing fittings — Part 3: Fittings with compression ends for use with plastics pipes*

EN 1254-6, *Copper and copper alloys — Plumbing fittings — Part 6: Fittings with push-fit ends*

EN 1254-8, *Copper and copper alloys — Plumbing fittings — Part 8: Fittings with press ends for use with plastics and multilayer pipes*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels*

EN 10226-1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

3 Terms and definitions, symbols and abbreviated terms

For the purposes of this document, the terms and definitions, symbols and abbreviated terms given in ISO 15876-1 and the following 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 <http://www.iso.org/obp>

3.1 General

3.1.1 fitting

component of a piping system, which connects two or more pipes and/or fittings together, without any further function

3.2 Mechanical fittings

3.2.1

compression fitting

fitting in which the joint is made by the compression of a ring or sleeve on the outside wall of the pipe with or without additional sealing elements and with internal support

3.2.2

crimped fitting

fitting in which the joint is made by crimping of the fitting and/or a ring on the outside wall of the pipe by means of a special tool

3.2.3

flanged fitting

fitting in which the pipe connection consists of two mating flanges which are mechanically pressed together and sealed by the compression of an elastomeric sealing element between them

3.2.4

flat seat union fitting

fitting in which the pipe connection consists primarily of two components, at least one of which normally incorporates a flat sealing surface, which are mechanically pressed together by means of a screwed nut or similar and sealed by the compression of an elastomeric sealing element between them

3.3 Fittings for fusion

3.3.1

socket fusion fitting

fitting in which the joint with the pipe is made by melting together the outer part of the pipe with the inner part of the fitting by means of heat induced by a heated tool

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3.3.2

electrofusion fitting

fitting in which the joint with the pipe is made by melting together the outer part of the pipe and the inner part of the fitting by means of heat induced by current flowing in an appropriate resistor inserted in the fitting body

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3.4 Fitting with incorporated inserts

3.4.1

fitting with incorporated inserts

fitting in which the joint is made by means of connecting threads or other outlets, inserted in the plastics body combined with fusion ends for socket fusion or electrofusion

4 Material characteristics

4.1 Plastics fitting material

4.1.1 PB Fitting material identical to the PB pipe compound

The PB compound shall comply with material requirements specified in ISO 15876-1 and ISO 15876-2.

The material shall be tested in form of tubular test pieces.

When tested in accordance with the test methods specified in [Table 1](#), using the indicated parameters, the test pieces shall withstand the hydrostatic test pressure, p_F , given in [Table 6](#), [Table 7](#) or [Table 8](#) without bursting or leakage.

Table 1 — Mechanical characteristic of tubular test pieces made of PB by injection moulding

Characteristic	Requirement	Test parameters for the individual tests				Test method		
		Hydrostatic (hoop) stress MPa	Test temperature °C	Test period h	Number of test pieces			
Resistance to internal pressure	No bursting or leakage during the test period	PB-H	15,5	20	1 ^a	ISO 1167-1 and ISO 1167-3		
			15,2	20	22			
			6,0	95	1 000			
		PB-R	15,3	20	1 ^a		3	
			15,0	20	22		3	
			4,9	95	1 000		3	
			Test parameters for all tests					
			Sampling procedure		b			
			Type of end cap		Type a)			
		Orientation of test piece		Not specified				
	Type of test		Water-in-water					

^a In case of dispute, tests shall be done at 20 °C/22 h.

^b The sampling procedure is not specified. For guidance, see ISO/TS 15876-7[1].

4.1.2 PB fitting material not identical to the PB pipe compound

4.1.2.1 Evaluation of σ_{LPL} -values and control points

The fitting material in form of injection moulded or extruded tubular test pieces shall be evaluated by using the method given in ISO 9080 or equivalent where internal pressure tests are made in accordance with ISO 1167-1 and ISO 1167-3 to find the σ_{PL} -values. The σ_{LPL} -values thus determined shall be used to determine the design stress, σ_{DF} , (see ISO 15876-2) and values of hydrostatic stress, σ_F , corresponding to the temperature and time control points given in Table 2.

NOTE One equivalent way of evaluation is to calculate the σ_{LPL} -value for each temperature (for example, 20 °C, 70 °C and 95 °C) individually.

If evaluation using the method given in ISO 9080 or equivalent is available from long-term internal pressure tests relative to extruded pipes of the same compound as used for the fitting, the relevant test temperature shall be equal to or higher than the maximum design temperature, T_{max} , for the service condition class.

Table 2 — Control points for testing fitting materials with tubular test pieces relative to classification of service conditions

	All application classes	Application			
		Class 1	Class 2	Class 4	Class 5
Maximum design temperature, T_{max} , in °C	—	80	80	70	90
Test temperature, T_{test} , in °C	20	95 ^a	95 ^a	80	95
Test duration, in h	1	1 000	1 000	1 000	1 000

^a Conducted at 95 °C to match existing test facilities.

It is recommended that the nominal diameter of the tubular test pieces should be in the range of the nominal diameters of fittings normally produced by the manufacturer.

4.1.2.2 Thermal stability

When testing the thermal stability by hydrostatic pressure testing in accordance with ISO 1167-1 at 110 °C for 8 760 h, using a test piece in pipe form or a fitting connected to pipes, the test piece shall withstand the test without bursting. The test shall be conducted in water-in-air at an internal pressure equivalent to the hydrostatic stress used in the pipe material thermal stability test.

If a fitting connected to pipes is used as a test piece and the pipe connection fails, then the thermal stability test shall be repeated using a test piece in pipe form.

4.1.3 Plastics fitting material other than PB

Plastics material, other than PB, for fittings intended to be used in PB piping systems for hot and cold water within buildings for the conveyance of water, whether or not for human consumption (domestic systems) and for heating systems, shall conform to [4.3](#).

4.2 Metallic fitting material

Metallic material for fittings intended to be used with components conforming to ISO 15876 shall conform to the requirements given in EN 1254-3, EN 1254-6, EN 1254-8 or EN 10088-1, as applicable.

4.3 Influence on water intended for human consumption

The material shall conform to ISO 15876-1.

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5 General characteristics (standards.iteh.ai)

5.1 Appearance

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When viewed without magnification, the internal and external surfaces of fittings shall be smooth, clean and free from scoring, cavities and other surface defects to an extent that would prevent conformity to this document. The material shall not contain visible impurities. Slight variations in appearance of the colour shall be permitted. Each end of a fitting shall be square to its axis.

5.2 Opacity

Fittings that are declared to be opaque shall not transmit more than 0,2 % of visible light when tested in accordance with ISO 7686.

This test is not necessary when the fitting body is made from a compound already declared opaque for the production of pipes.

6 Geometrical characteristics

6.1 General

Dimensions shall be measured in accordance with ISO 3126.

6.1.1 Nominal diameter(s)

The nominal diameter(s), d_n , of a fitting shall correspond to and be designated by the nominal outside diameter(s) of the pipe(s) conforming to ISO 15876-2, for which they are designed.

6.1.2 Angles

The preferred nominal angles of non-straight fittings are 45° and 90°.