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**Plastics piping systems for hot  
and cold water installations —  
Polypropylene (PP) —**

**Part 5:  
Fitness for purpose of the system**

**iTeh STANDARD PREVIEW**  
*Systemes de canalisations en plastique pour les installations d'eau  
chaude et froide — Polypropylène (PP) —  
(standards.iteh.ai)  
Partie 5: Aptitude à l'emploi du système*

[ISO 15874-5:2013](https://standards.iteh.ai/catalog/standards/sist/ec3076b7-24db-4f06-8493-a7b2f07f312/iso-15874-5-2013)

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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 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 15874-5 was prepared by Technical Committee CEN/TC 155, *Plastics piping systems and ducting systems*, in collaboration with Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, and 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 15874-5:2003), which has been technically revised. In 4.2, Tables 2, 3 and 4, values have been adjusted; in Table 5, the material PP-RCT has been included; and in 4.3, Tables 6, 7 and 8, values have been adjusted.

ISO 15874 consists of the following parts<sup>1)</sup> under the general title *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*:

- Part 1: General; [ISO 15874-5:2013](https://standards.iteh.ai/catalog/standards/sist/cc3076b7-24db-4f06-8493-a7b2f07f312/iso-15874-5-2013)
- Part 2: Pipes; <https://standards.iteh.ai/catalog/standards/sist/cc3076b7-24db-4f06-8493-a7b2f07f312/iso-15874-5-2013>
- Part 3: Fittings;
- Part 5: Fitness for purpose of the system;
- Part 7: Guidance for the assessment of conformity [Technical specification].

This corrected version of ISO 15874-5:2013 incorporates the following correction:

- A footnote has been added to Table 11.

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1) For ancillary equipment separate standards can apply. Guidance on installation of plastics piping systems made from different materials intended to be used for hot and cold water installations is given by CEN/TR 12108 [1].

## Introduction

This part of ISO 15874 specifies the requirements for a piping system and its components when made from polypropylene (PP). The piping system is intended to be used for hot and cold water installations.

Regarding potential undesirable effects on the quality of water intended for human consumption, caused by the product covered by ISO 15874

- no information is provided as to whether the product can be used without restriction, and
- existing national regulations concerning the use and/or the characteristics of this product remain in force.

Requirements and test methods for components of the piping system are specified in ISO 15874-1, ISO 15874-2 and ISO 15874-3. ISO/TS 15874-7 gives guidance for the assessment of conformity.

This part of ISO 15874 specifies the characteristics of fitness for purpose of the piping systems.

At the date of publication of this part of ISO 15874, the following system International Standards for piping systems of other plastics materials used for the same application are

- ISO 15875, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)*
- ISO 15876, *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*
- ISO 15877, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*
- ISO 22391, *Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT)* [ISO 15874-5:2013](https://standards.iteh.ai/catalog/standards/sist/ec3076b7-24db-4f06-8493-)

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# Plastics piping systems for hot and cold water installations — Polypropylene (PP) —

## Part 5: Fitness for purpose of the system

### 1 Scope

This part of ISO 15874 specifies the characteristics of the fitness for purpose of polypropylene (PP) 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 Table 1 of ISO 15874-1:2013).

This part of ISO 15874 covers a range of service conditions (classes of application) and design pressure classes. For values of  $T_D$ ,  $T_{max}$  and  $T_{mal}$  in excess of those in Table 1 of ISO 15874-1:2013 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 test parameters for the test methods referred to in this part of ISO 15874.

In conjunction with the other parts of ISO 15874, it is applicable to PP pipes, fittings, their joints and to joints with components of other plastics and non-plastics materials intended to be used for hot and cold water installations.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 712, *Thermoplastics piping systems End-load bearing mechanical joints between pressure pipes and fittings Test method for resistance to pull-out under constant longitudinal force*

EN 713, *Plastics piping systems Mechanical joints between fittings and polyolefin pressure pipes Test method for leak tightness under internal pressure of assemblies subjected to bending*

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 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces*

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*

EN 12294, *Plastics piping systems — Systems for hot and cold water — Test method for leak tightness under vacuum*

## ISO 15874-5:2013(E)

ISO 15874-1:2013, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 1: General*

ISO 15874-2:2013, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 2: Pipes*

ISO 19893, *Plastics piping systems — Thermoplastics pipes and fittings for hot and cold water — Test method for the resistance of mounted assemblies to temperature cycling*

ISO 19892, *Plastics piping systems — Thermoplastics pipes and fittings for hot and cold water — Test method for the resistance of joints to pressure cycling*

### 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 15874-1 apply.

### 4 Fitness for purpose of the joints and the piping system

#### 4.1 General

Intended combinations of materials of pipes and fittings, e.g. PP-RCT pipes and PP-R fittings, shall fulfil the corresponding requirements of the pipe materials.

When tested in accordance with the applicable test methods as specified in [Table 1](#), using the indicated parameters given in [4.2](#) to [4.7](#), as applicable, the combinations of PP types for pipes and fittings shall have characteristics conforming to the requirements of the pipes given in the applicable clauses.

For the tests described the fittings shall be connected to the pipe with which they are intended to be used.

[Table 1](#) specifies the tests applicable for each different type of jointing system covered by this part of ISO 15874.

**Table 1 — Joint tests**

Test	Jointing system <sup>a</sup>			Test parameters	Test method
	SW	EF	M		
Internal pressure test	Y	Y	Y	Shall conform to <a href="#">4.2</a>	ISO 1167-1, ISO 1167-2, ISO 1167-3 and ISO 1167-4
Bending test	N	N	Y	Shall conform to <a href="#">4.3</a>	EN 713
Pull-out test	N	N	Y	Shall conform to <a href="#">4.4</a>	EN 712
Thermal cycling test	Y	Y	Y	Shall conform to <a href="#">4.5</a>	ISO 19893
Pressure cycling test	N	N	Y	Shall conform to <a href="#">4.6</a>	ISO 19892
Vacuum test	N	N	Y	Shall conform to <a href="#">4.7</a>	EN 12294

<sup>a</sup> SW - Socket welded joint  
EF - Electro fusion joint  
M - Mechanical joint  
Y - denotes test applicable  
N - denotes test not applicable



## 4.2 Internal pressure test

When tested in accordance with ISO 1167-1, ISO 1167-2, ISO 1167-3 and ISO 1167-4 using the test parameters given in Table 2, 3, 4 or 5 for the relevant classes the joint assemblies shall not leak.

The test pressure,  $p_J$ , for a given time to failure and test temperature shall be determined by the following equation:

$$p_J = p_D \times \frac{\sigma_P}{\sigma_{DP}}$$

where:

- $p_J$  is the hydrostatic test pressure, in bar<sup>2)</sup>, to be applied to the joint assembly during the test period;
- $\sigma_P$  is the hydrostatic stress value, in megapascals, for the pipe material corresponding to time to failure/test temperature points given in Table 2, 3, 4 or 5;
- $\sigma_{DP}$  is the design stress value, in megapascals, for the pipe material as determined for each class and listed in Table 2 of ISO 15874-2:2013;
- $p_D$  is the design pressure of 4 bar or 6 bar or 8 bar or 10 bar, as applicable.

**Table 2 — Derivation of test pressure  $p_J$  for PP-H**

	Application class			
	Class 1	Class 2	Class 4	Class 5
<b>Max. design temperature</b> $T_{max}$ , in °C	80	80	70	90
<b>Design stress of pipe material</b> , $\sigma_{DP}$ , in MPa	2,88	1,99	3,23	1,82
<b>Test temperature</b> <sup>a</sup> , $T_{test}$ , in °C	95	95	80	95
<b>Test duration</b> , $t$ , in h	1 000	1 000	1 000	1 000
<b>Hydrostatic stress of pipe material</b> , $\sigma_P$ , in MPa	3,6	3,6	5,0	3,6
<b>Test pressure</b> , $p_J$ , in bars, for a design pressure, $p_D$ , of:	5,7 <sup>b</sup>	7,2	8,0 <sup>b</sup>	7,8
4 bar	7,5	10,8	9,3	11,8
6 bar	9,9	14,4	12,4	15,7
8 bar	12,4	18,0	15,5	19,6
10 bar				
<b>Number of test pieces</b>	3	3	3	3
<sup>a</sup> Generally the highest test temperature is taken to be $(T_{max} + 10)$ °C with an upper limit of 95 °C. However to match existing test facilities the highest test temperature for classes 1 and 2 is also set at 95 °C. The hydrostatic stresses given correspond to the given test temperatures.				
<sup>b</sup> The 20 °C, 10 bar, 50 years, cold water requirement, being higher, determines this value (see ISO 15874-1:2013, Clause 4).				

2) 1 bar =  $10^5$  N/m<sup>2</sup> = 0,1 MPa.