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**Multilayer piping systems for hot and  
cold water installations inside  
buildings —**

**Part 1:  
General**

**iTeh STANDARD PREVIEW**  
*Systemes de canalisations multicouches pour installations d'eau  
chaude et froide à l'intérieur des bâtiments —*  
**(standards.iteh.ai)**  
*Partie 1. Généralités*

[ISO 21003-1:2008](https://standards.iteh.ai/catalog/standards/sist/955d79c1-73b0-46be-9fc1-1aaa3075d0c5/iso-21003-1-2008)

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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.

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.

ISO 21003-1 was prepared by 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*.

ISO 21003 consists of the following parts, under the general title *Multilayer piping systems for hot and cold water installations inside buildings*:

— *Part 1: General*

[ISO 21003-1:2008](https://standards.iteh.ai/catalog/standards/sist/955d79c1-73b0-46be-9fc1-1aaa3075d0c5/iso-21003-1-2008)

— *Part 2: Pipes*

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— *Part 3: Fittings*

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

— *Part 7: Guidance for the assessment of conformity* [Technical Specification]

NOTE ISO 21003 does not include a Part 4: *Ancillary equipment*, or a Part 6: *Guidance for installation*.

## Introduction

The system standard of which this is Part 1 specifies the requirements for a multilayer piping system.

The multilayer piping system is intended to be used for hot and cold water installations inside buildings.

In respect of potentially adverse effects on the quality of water intended for human consumption caused by the products covered by ISO 21003:

- no information is provided as to whether the products 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 these products remain in force.

Requirements and test methods for components of the piping system are specified in ISO 21003-2 and ISO 21003-3. Characteristics relating to fitness for purpose (mainly for joints) are covered in ISO 21003-5. ISO/TS 21003-7 gives guidance on the assessment of conformity.

This part of ISO 21003 specifies the general aspects of multilayer piping systems.

For ancillary equipment, separate standards can apply.

Guidance on installation of plastics piping systems made from various materials intended to be used for hot and cold water installations is given in ENV 12108.

Other system standards which, at the date of publication of this part of ISO 21003, had been published for plastics piping systems used for the same application are listed in Annex A.

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# Multilayer piping systems for hot and cold water installations inside buildings —

## Part 1: General

### 1 Scope

This part of ISO 21003 specifies the general aspects of multilayer piping systems intended to be used for hot and cold water installations inside buildings for the conveyance of water — whether or not the water is intended for human consumption (domestic systems) or heating systems — under specified design pressures and temperatures appropriate to the class of application (see Table 1).

ISO 21003 is a reference product standard (see 3.4.3). It is applicable to multilayer pipes, fittings, their joints, and also to joints with components made of other plastics and non-plastics materials intended to be used for hot and cold water installations. This part of ISO 21003 is intended for use only in conjunction with all the other parts of ISO 21003.

ISO 21003 applies only to multilayer pipes with their inner layer made of plastics.

It covers a range of service conditions (application classes) and design pressures. It is not applicable for values of design temperature,  $T_D$ , maximum design temperature,  $T_{max}$ , and malfunction temperature,  $T_{mal}$ , in excess of those in Table 1.

NOTE 1 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.

The polymeric materials used for the stress-designed layers are the following: polybutylene (PB), polyethylene of raised temperature resistance (PE-RT), crosslinked polyethylene (PE-X), polypropylene (PP) and chlorinated poly(vinyl chloride) (PVC-C).

The PE-X used shall be fully crosslinked and shall comply with the requirements of the relevant reference product standard (ISO 15875).

NOTE 2 For the purposes of ISO 21003, crosslinked polyethylene (PE-X) as well as adhesives are considered as thermoplastic materials.

Solid-wall pipes with thin outer layers (applied as protection layers or barrier layers, for instance) are not covered by ISO 21003 but are specified in the Amendments to ISO 15874-2, ISO 15875-2 and ISO 15876-2. The total thickness of such outer layers, including the thickness of the adhesives used, shall be  $\leq 0,4$  mm.

## 2 Normative references

The following referenced documents are indispensable for the application 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 3, *Preferred numbers — Series of preferred numbers*

ISO 472, *Plastics — Vocabulary*

ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

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

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

ISO 15874-3, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 3: Fittings*

ISO 15874-5, *Plastics piping systems for hot and cold water installations — Polypropylene (PP) — Part 5: Fitness for purpose of the system*

ISO 15875-1, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 1: General*

ISO 15875-2, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 2: Pipes*

ISO 15875-3, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 3: Fittings*

ISO 15875-5, *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X) — Part 5: Fitness for purpose of the system*

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

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

ISO 15876-3, *Plastics piping systems for hot and cold water installations — Polybutylene (PB) — Part 3: Fittings*

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

ISO 15877-1, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 1: General*

ISO 15877-2, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 2: Pipes*

ISO 15877-3, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 3: Fittings*



ISO 15877-5, *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C) — Part 5: Fitness for purpose of the system*

ISO 21003-2, *Multilayer piping systems for hot and cold water installations inside buildings — Part 2: Pipes*

ISO 21003-3, *Multilayer piping systems for hot and cold water installations inside buildings — Part 3: Fittings*

ISO 21003-5, *Multilayer piping systems for hot and cold water installations inside buildings — Part 5: Fitness for purpose of the system*

ISO/TS 21003-7, *Multilayer piping systems for hot and cold water installations inside buildings — Part 7: Guidance for the assessment of conformity*

ISO 22391-1, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 1: General*

ISO 22391-2, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 2: Pipes*

ISO 22391-3, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 3: Fittings*

ISO 22391-5, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 5: Fitness for purpose of the system*

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### 3 Terms and definitions (standards.iteh.ai)

For the purposes of this document, the terms and definitions given in ISO 3 and ISO 472, and the following, apply.

[ISO 21003-1:2008](#)

<https://standards.iteh.ai/catalog/standards/sist/955d79c1-73b0-46be-9fc1-1aa3075d0c5/iso-21003-1-2008>

#### 3.1 Definitions related to construction

##### 3.1.1

##### **multilayer pipe**

pipe comprised of different stress-designed layers

##### 3.1.2

##### **multilayer M-pipe**

pipe comprised of polymeric stress-designed layers and one or more metallic stress-designed layers (e.g. PE-Xb/Al/PE-Xb or PE-RT/Al/PE-Xb)

NOTE The wall thickness of the pipe consists of at least 60 % of polymeric material.

##### 3.1.3

##### **multilayer P-pipe**

pipe comprised of more than one polymeric stress-designed layer (e.g. PVC-C/PE-Xb or PE-Xb/EVOH/PE-Xb)

NOTE Pipes consisting of one polymeric stress-designed layer and an outer polymeric layer which is not stress-designed are covered by the appropriate reference product standard (see Annex A).

##### 3.1.4

##### **inner layer**

layer in contact with the fluid which is conveyed

##### 3.1.5

##### **outer layer**

layer exposed to the outer environment