

**WATER DISTRIBUTION OR DRAINAGE PIPES****Technical document  
08-03 Traditional**

Heating and/or domestic distribution  
and/or distribution of chilled water –  
Fittings for PEX/PB pipes

Technical document 08-03 Traditional rev. 01  
17/04/2023

*The English version is provided for information. In case of doubt or dispute, the French version only is valid.*

CSTB (Centre Scientifique et Technique du Bâtiment), a public establishment supporting innovation in construction, has four key activities—research, expertise, assessment and dissemination of knowledge—organised to meet the challenges of ecological and energy transition in the construction sector. Its fields of expertise include construction materials, buildings and their integration into districts and towns.

With over 900 employees, its subsidiaries and networks of national, European and international partners, the CSTB group works for all the stakeholders in the construction sector to advance building quality and safety.

Any reproduction or representation, in whole or in part, by whatever means, of the pages published in this technical document and executed without the authorisation of CSTB is illegal and constitutes a counterfeit. The only authorised exceptions are 1) reproductions strictly reserved for the use of the typist and not intended for any collective use or 2) analyses and short quotations required due to the scientific or informational nature of the work in which they appear (article L.122-5 of the Intellectual Property Code). This document has been drawn up under the initiative and direction of CSTB, which has brought together the opinions of all interested parties.

© CSTB

## MODIFICATION HISTORY

Revision No.	Application date	Modifications
00	16/11/2018	Update to the document layout and reference  Content modifications: Creation of technical document following transition of the products covered by this document to traditional status
01	17/04/2023	<ul style="list-style-type: none"><li>- - Part 2 Fields of application</li><li>- - §3.4 Specifications</li><li>- - Part 5 Marking</li><li>- - §7.1. Tests carried out upon admission and extension to CSTB</li></ul>

## Contents

<b>1. STANDARDS.....</b>	<b>5</b>
1.1. Product standards.....	5
1.2. Test standards.....	5
1.3. Associated implementation documents.....	6
<b>2. FIELDS OF APPLICATION .....</b>	<b>7</b>
<b>3. CERTIFIED CHARACTERISTICS AND TEST METHODS.....</b>	<b>9</b>
3.1. Certified and optional characteristics.....	9
3.2. Other certified characteristics.....	11
3.3. Test methods.....	11
3.4. Specifications .....	13
<b>4. VERIFICATION REGIME .....</b>	<b>15</b>
<b>5. MARKING.....</b>	<b>15</b>
5.1. Fittings .....	15
5.2. Labelling/Packaging of fittings .....	15
<b>6. CHECKS PERFORMED BY THE MANUFACTURER.....</b>	<b>16</b>
6.1. For raw materials .....	16
6.2. Fittings .....	16
<b>7. MONITORING ARRANGEMENTS BY CSTB .....</b>	<b>17</b>
7.1. Tests performed for admission and extension at CSTB .....	17
7.2. Tests performed during follow-up at CSTB.....	19
<b>8. SAMPLING FOR TESTS AT CSTB.....</b>	<b>20</b>
8.1. Sampling for admission or extension applications to the CSTB .....	20
8.2. Sampling for follow-up at CSTB .....	20

The requirements and provisions specified in this Technical Document will be updated in the case of new components or products.

## 1. STANDARDS

### 1.1. Product standards

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

NF EN ISO 15876-3: Plastics piping systems for hot and cold water installations - Polybutene (PB) - Part 3: Fittings

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

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

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

### 1.2. Test standards

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

NF EN 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

NF EN 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

NF EN ISO 3126: Plastics Piping Systems - Plastics components - Determination of dimensions

**NF EN ISO 3501: Plastic piping systems – Mechanical joints between fittings and pressure pipes – Test method for resistance to pull-out under constant longitudinal force**

**NF EN ISO 3503: Plastic piping systems – Mechanical joints between fittings and pressure pipes – Test method for leaktightness under internal pressure of assemblies subject to bending**

NF EN 12293: Plastics piping systems - Thermoplastics pipes and fittings for hot and cold water - Test method for the resistance of mounted assemblies to temperature cycling

NF EN 12294: Plastics piping systems - Systems for hot and cold water - Test method for leaktightness under vacuum

NF EN 12295: Plastics piping systems - Thermoplastics pipes and associated fittings for hot and cold water - Test method for resistance of joints to pressure cycling

ISO 6957-1988: Copper alloys. Ammonia test for stress corrosion resistance

**Test method for the analysis of the chemical composition of brass fittings of all kinds of tubes: NF EN 15079: Copper and copper alloys – Analysis by spark optical emission spectrometry (SEO-E)**

Test method for the analysis of the chemical composition of brass fittings of all kinds of tubes: ICP (Inductively Coupled Plasma) method: The carbon and sulfur contents are determined by combustion of the sample under a current of oxygen the dosage of CO<sub>2</sub> and SO<sub>2</sub> formed by infrared detection. The other elements are determined by plasma emission spectrometry after dissolving the sample.

Test method for the analysis of the chemical composition of metal fittings (with the exception of brass) of all types of tubes: CSTB protocol inspired by the NF EN 15079 standard.: The test consists of measuring the intensity of radiation, the wavelength of which is characteristic of each element, generated by the spark resulting from the application of an electric discharge between the sample, constituting an electrode, and an inert counter-electrode. The element concentrations are determined by plotting the intensities measured from the test samples on calibration curves established from reference materials.

### 1.3. Associated implementation documents

Implementation must be carried out:

- For class 4 (heated floors): in accordance with DTU 65.14 "Implementation of heated floors with hot water".
- For classes 2 and 5: in accordance with the "Technical Specifications (CPT) for the implementation of pipe systems based on synthetic pipes - Semi-rigid LWC pipes" (CSTB specification 2808\_V2 – November 2011).

## 2. FIELDS OF APPLICATION

This Technical Document covers the applications indicated in the table below. These applications are drawn from the ISO 10508 standard.

Applications classes 2, 4 and 5 comply with the ISO 10508 standard. According to this standard, the reader is reminded that regardless of the application class selected, the system must also comply with conveyance of cold water at 20 °C for 50 years and a service pressure of 10 bar.

It also covers the "Chilled water" application class corresponding to air conditioning and cooling systems with a minimum temperature of 5 °C.

Classes	Service conditions	Maximum conditions	Accidental conditions	Typical application
Class 2	70 °C 49 years	80 °C 1 year	95 °C 100 hours	Domestic hot and cold water supply
Class 4	20 °C - 2.5 years and 40 °C - 20 years and 60 °C - 25 years	70 °C 2.5 years	100 °C 100 hours	Low temperature radiators, underfloor heating
Class 5	20 °C - 14 years and 60 °C - 25 years and 80 °C - 10 years	90 °C 1 year	100 °C 100 hours	High temperature radiators

For a system that does not aim for class 2, the marking will be supplemented by the mention 'NON POTABLE WATER'.

For a system which only targets underfloor heating in class 4, the marking will be supplemented by the mention 'PCRBT\*'.  
\* : Low Temperature Cooling Underfloor Heating

\*: Low Temperature Cooling Underfloor Heating

The dimension groups are defined in §4.2.1.2. of Standard XP CEN ISO/TS 15875-7:

Dimension group	Nominal diameter, dn
1	10 < dn < 63
2	63 ≤ dn < 160

The holder must produce group 1 fittings every year and over a cycle of 2 years produce group 2 fittings of dimensions at least once.

## Contact with potable water

The pipes, fittings and components (particularly seals) must comply with French regulations currently in force for products designed to come into contact with potable water. In particular, they must have a currently valid ACS certification (or a self-declaration, if applicable). These documents must be presented during audits.

### Additional requirements for pipes and fittings

The holder must make its installation instructions public in French, on its commercial documents, on its website or when delivering products (optional).

### Specific implementation instructions

Prerequisite: crimp fittings must be associated with at least one crimper brand / crimp profile pair.

If special tools are required (crimping) to install the pipes and fittings, the holder shall indicate the specific crimper(s) used and the corresponding crimp profiles, as well as the crimping force to be applied, for which they shall have provided evidence of suitability for use in installing the fittings.

These instructions shall be defined in a manual associated to the holder's commercial documents or in the technical data sheets, as well as on its website.

These documents shall be provided to CSTB upon admission and whenever they are modified.

This requirement will be verified annually at each audit in order to ensure that the tests performed at the Mark laboratory are aligned with the holder's instructions.

In the holder's technical documents, the following points shall be precisely defined:

- Product reference for the crimper and associated crimp profiles (jaw references)

**Information related to the associated maintenance of this equipment**



## 3. CERTIFIED CHARACTERISTICS AND TEST METHODS

### 3.1. Certified and optional characteristics

The characteristics listed in the table below will comply with the specifications given in paragraph 3.3.

#### Optional certified characteristics

The certification of the additional FUNCTIONALITY characteristics "QB F" guarantees the compliance of QB-certified products with the requirements of the CSTB Technical Guide (Specification 3597\_V2). These options are based on a more detailed analysis of the durability and suitability for use of these products by means of the following tests and specifications:

"QB F" option:

- Experimental heating circuits at 110°C (functionality)

Certified characteristics	Nature of the component or system	
	Metal fittings	Synthetic fittings
Dimensional characteristics	X	X
Melt mass-flow rate (MFR)		X
Analysis of chemical composition	X	
Resistance to internal pressure	X	X

**Fittings**

Suitability for use		
Internal pressure	X	X
Bending under internal pressure	X	X
Pull-out	X	X
Thermal cycle	X	X
Cyclic pressure	X	X
Leaktightness under vacuum	X	X
Experimental heating circuits at 110°C (if QB F option)	X	X

## 3.2. Other certified characteristics

### 3.2.1. Fittings with compression ends (NF EN 1254-3)

Certified characteristics	
Resistance to corrosion under stress	X

### 3.2.2. Crimp fittings (NF EN 1254-8)

Certified characteristics	
Resistance to corrosion under stress	X

### 3.2.3. Push-fit fittings (NF EN 1254-6)

Certified characteristics	
Resistance to corrosion under stress	X
Disconnection and reuse (if applicable)	X
Rotation of fitting	X

## 3.3. Test methods

The conditions for verification of the characteristics certified at CSTB are listed in the tables below.

### 3.3.1. Fittings

Certified characteristics	Metal fittings	Synthetic fittings
Dimensional characteristics	EN ISO 3126	EN ISO 3126
Melt mass-flow rate (MFR)		NF EN ISO 1133
Analysis of chemical composition	CSTB protocol inspired by standard NF EN 15079 or ICP method	
Resistance to internal pressure	EN ISO 1167-1-2-3	EN ISO 1167-1-2-3

<b>Suitability for use</b>	
Internal pressure	NF EN ISO 1167 1-2-3
Bending under internal pressure	NF EN ISO 3503
Pull-out	NF EN ISO 3501
Thermal cycle	NF EN 12293
Cyclic pressure	NF EN 12295
Leaktightness under vacuum	NF EN 12294
Experimental heating circuits at 110°C (if QB F option)	<p>Experimental circuits are made up of pipes and fittings of different diameters representing the range proposed by the applicant.</p> <p>For crimp fittings, the full range of proposed tools must be represented.</p> <p style="text-align: center;"><b>Specialised Technical Guide</b></p> <p style="text-align: center;"><b>Specification 3597-2</b></p>

### 3.3.2. Fittings with compression ends (NF EN 1254-3)

#### Additional specifications

Tests	Test Methods
Resistance to corrosion under stress	§5.2 of NF EN 1254-8 and Appendix A

### 3.3.3. Crimp fittings (NF EN 1254-8)

#### Additional specifications and tools (crimping tools, crimp profile, etc.)

Tests	Test Methods
Resistance to corrosion under stress	§5.2 of NF EN 1254-8 and Appendix A

### 3.3.4. Push-fit fittings (NF EN 1254-6)

#### Additional specifications and tools

Tests	Test Methods
Resistance to corrosion under stress	§5.1.14 of NF EN 1254-6 and ISO 6957:1988, appendix J
Disconnection and reuse (if applicable)	§5.1.12 of NF EN 1254-6 and Appendix H followed by Appendix A
Rotation of fitting	§5.1.13 of NF EN 1254-6 and Appendix I followed by Appendix A

## 3.4. Specifications

### 3.4.1. Fittings

Measurements or tests	Specifications	
	Metal fittings	Synthetic fittings
Dimensional characteristics	Complies with <b>NF EN 1254-3-6-8</b> standards	Compliant with <b>NF EN 15875-3 and NF EN 15876-3</b> standards
Melt mass-flow rate (MFR)		Compliant with product standards under consideration
Analysis of chemical composition	Compliant with grade declared to CSTB at admission	Compliant with grade declared to CSTB at admission
Resistance to internal pressure	95°C - t > 1000 h: Same test pressure as the associated pipe	95°C - t > 1000 h: Compliant with <b>NF EN 15875-3 and NF EN 15876-3</b> standards

Suitability for use	
Tests	Specifications
<b>Internal pressure (Same test pressure as the tube associated with it)</b> <b>bending under internal pressure</b> <b>Pull-out</b> <b>Thermal cycle</b> <b>Cyclic pressure</b> <b>Leaktightness under vacuum</b>	No leaks in assembly No leaks in assembly No separation of assembly No leaks in assemblies No leaks in assembly Pressure variation under vacuum $\leq 0.05$ bar
Experimental heating circuits at 110°C (if QB F option)	No leaks 110°C – 4 bar

### 3.4.2. Fittings with compression ends (NF EN 1254-3)

#### Additional specifications

Tests	Test Methods
Resistance to corrosion under stress	No cracking

### 3.4.3. Crimp fittings (NF EN 1254-8)

Additional specifications and tools (crimping tools, crimp profile, etc.)

Tests	Test Methods
Resistance to corrosion under stress	No cracking

### 3.4.4. Push-fit fittings (NF EN 1254-6)

Additional specifications and tools

Tests	Test Methods
Resistance to corrosion under stress	No cracking
Disconnection and reuse (if applicable)	No leaks
Rotation of fitting	No leaks

## 4. VERIFICATION REGIME

	12 months following admission	After the 12 months following admission
Fittings	Half-yearly	Annual

## 5. MARKING

### 5.1. Fittings

The fittings must bear, individually, at least the indelible marking described below. The information must be marked on the fitting:

- the name of the holder or the distributor (1) (name, acronym or logo, if the acronym or logo is not explicit, this must be registered with CSTB) or the commercial name of the product,
- the nominal diameter of the associated tube,
- the identification of the material (if the connection is to be welded or to be glued),
- the QB logo (not mandatory for family B fittings) or QB letters  
in case of impossibility
- the manufacturing marks allowing traceability comprising at least:
- the period of manufacture, at least the month and the year, in numbers or in code,

### 5.2. Labelling/Packaging of fittings

last two parts of the certificate number.

The following information must be marked on a label affixed to the fitting or its packaging.

- the name of the holder or the distributor (1) (name, acronym or logo, if the acronym or logo is not explicit, this must be registered with CSTB) and the commercial name of the product,
- the nominal diameter of the associated tube,

- the nominal wall thickness of the associated pipe (except for welded and glued fittings),
- the Application Classes (for example: 2, 4, 5) supplemented by their service pressures and their corresponding maximum service temperatures, (for example: "[Class 2 – 6 bar –] [Class 4 – 6 bar ] [Class 5 – 6 bar]",
- the mention "PCRBT" when only class 4 underfloor heating is covered if applicable,
- the statement "NON-DRINKING WATER" when class 2 is not targeted, if applicable
- the number of the standard
- the QB logo followed by the last two parts of the certificate number
- the manufacturing marks allowing traceability comprising at least:
- the period of manufacture, at least the month and the year, in numbers or in code,

PCRBT: Low Temperature Cooling Underfloor Heating

(1) A distributor is the beneficiary of a commercial extension.

## 6. CHECKS PERFORMED BY THE MANUFACTURER

The checks performed by the manufacturer and the measurements of the various characteristics are carried out in accordance with the inspection plan and the operating procedures defined in the reference standards cited in paragraph 1.1 of this technical document no. 08-03 Traditional, and at least complying with the frequencies defined in the tables below:

### 6.1. For raw materials

Measurements or tests	Minimum sampling frequency
Supplier analysis certificate	At each delivery
Melt flow rate (EN ISO 1133) (1)	once per week and per line

(1) If applicable

### 6.2. Fittings

Measurements or tests	Specifications	Minimum sampling frequency	
		Metal fittings	Synthetic fittings
Dimensional characteristics	EN ISO 3126	Once every 8 hours per machine	Once every 8 hours per machine
Melt mass-flow rate (MFR)	Compliant with product standards under consideration		Once a week
Resistance to internal pressure 95°C – 1000 h	EN ISO 1167	1 specimen per year per dimension group	1 specimen per year per dimension group



## 7. MONITORING ARRANGEMENTS BY CSTB

### 7.1. Tests performed for admission and extension at CSTB

For the ranges of pipes and fittings covered by the QB 08 certification application, the applicant must provide a type test report according to the series of standards EN 1254, EN ISO 15875 or NF EN 15876 drawn up by an accredited laboratory ISO 17025 for testing - by an EA member accreditation body. The type tests to be carried out according to the EN ISO 15875, EN 15876 and EN 1254 standards are listed in the NF EN 1254-3-6-8, ISO/TS 15875-7 and ISO/TS 15876-7 standards.

The admissibility of test reports is subject to CSTB approval.

#### 7.1.1. Fittings

Measurement or test	Metal fittings	Synthetic fittings
Dimensional characteristics	All the types submitted for admission	All the types submitted for admission
Melt mass-flow rate (MFR)		1 test / material
Analysis of chemical composition	1 test / material	
Resistance to internal pressure	1 test per dimension group	1 test per dimension group

#### 7.1.2. Suitability for use (Pipes and fittings)

PRODUCTS/TESTS	
Internal pressure	a test report from an organization in accordance with §7.1
Bending under internal pressure	a test report from an organization in accordance with §7.1
Pull-out	a test report from an organization in accordance with §7.1
Thermal cycle	a test report from an organization in accordance with §7.1
Cyclic pressure	a test report from an organization in accordance with §7.1
Leaktightness under vacuum	a test report from an organization in accordance with §7.1
Experimental heating circuits at 110°C 1000 h 6 bar (if QB F option)	1 assembly as defined below *

\* Experimental heating circuits: The experimental circuits will consist of tubes and fittings of different diameters representative of the range proposed by the applicant.

Treatment of extensions: resin modification, adjuvant modification, range modification treated as an admission

### 7.1.3. Fittings with compression ends (NF EN 1254-3)

<b>Certified characteristics</b>	
Resistance to corrosion under stress	a test report from an organization in accordance with §7.1

### 7.1.4. Crimp fittings (NF EN 1254-8)

<b>Certified characteristics</b>	
Resistance to corrosion under stress	a test report from an organization in accordance with §7.1

### 7.1.5. Push-fit fittings (NF EN 1254-6)

<b>Certified characteristics</b>	
Resistance to corrosion under stress	a test report from an organization in accordance with §7.1
Disconnection and reuse (if applicable)	a test report from an organization in accordance with §7.1
Rotation of fitting	a test report from an organization in accordance with §7.1

## 7.2. Tests performed during follow-up at CSTB

### Tests performed half-yearly

Measurement or test	Metal fittings	Synthetic fittings
Dimensional characteristics*	All the types submitted for admission	All the types submitted for admission
Melt mass-flow rate (MFR)		1 test / material
Analysis of chemical composition	1 test / material	
Resistance to internal pressure	1 DN	1 DN

\*: dimensional characteristics can be verified during the factory audit.

## 8. SAMPLING FOR TESTS AT CSTB

### 8.1. Sampling for admission or extension applications to the CSTB

Collection of samples in cases of admission or extension is left to CSTB's discretion.

### 8.2. Sampling for follow-up at CSTB

Synthetic fittings		Metal fittings
Fittings	Virgin material	
10 to 20 straight fittings necessary for the performance of pressure tests	1 sachet of fitting virgin material	10 to 20 ** straight threaded fittings per DN

\*\* quantity to be adjusted according to the needs of the laboratory in building the test circuits