



BSI Standards Publication

Sanitary tapware — Shower hoses for sanitary tapware for water supply systems of type 1 and type 2 — General technical specification

National foreword

This British Standard is the UK implementation of EN 1113:2015. It supersedes BS EN 1113:2008+A1:2011 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/504, Water supply.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Sanitary tapware - Shower hoses for sanitary tapware for water supply systems of type 1 and type 2 - General technical specification

Robinetterie sanitaire - Flexibles de douches pour robinetterie sanitaire pour les systèmes d'alimentation type 1 et type 2 - Spécifications techniques générales

Sanitärarmaturen - Brauseschläuche für Sanitärarmaturen für Wasserversorgungssysteme vom Typ 1 und Typ 2 - Allgemeine technische Spezifikation

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Foreword

This document (EN 1113:2015) has been prepared by Technical Committee CEN/TC 164 "Water supply", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1113:2008+A1:2011.

The main change to this standard is the introduction of 2 classes for hoses for supply systems of type 1. See Table 1 and Table 3.

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Introduction

In respect of potential adverse effects on the quality of water intended for human consumption caused by the product covered by this European Standard:

- This European Standard provides no information as to whether the product may be used without restriction in any of the Member States of the EU or EFTA.
- While awaiting the adoption of verifiable European criteria, existing national regulations concerning the use and/or the characteristics of this product remain in force.

1 Scope

This European Standard specifies:

- the dimensional, leaktightness, mechanical and hydraulic characteristics with which shower hoses should comply;
- the procedures for testing these characteristics.

This European Standard applies to shower hoses of any material used for ablutionary purposes and intended for equipping and supplementing sanitary tapware for baths and showers.

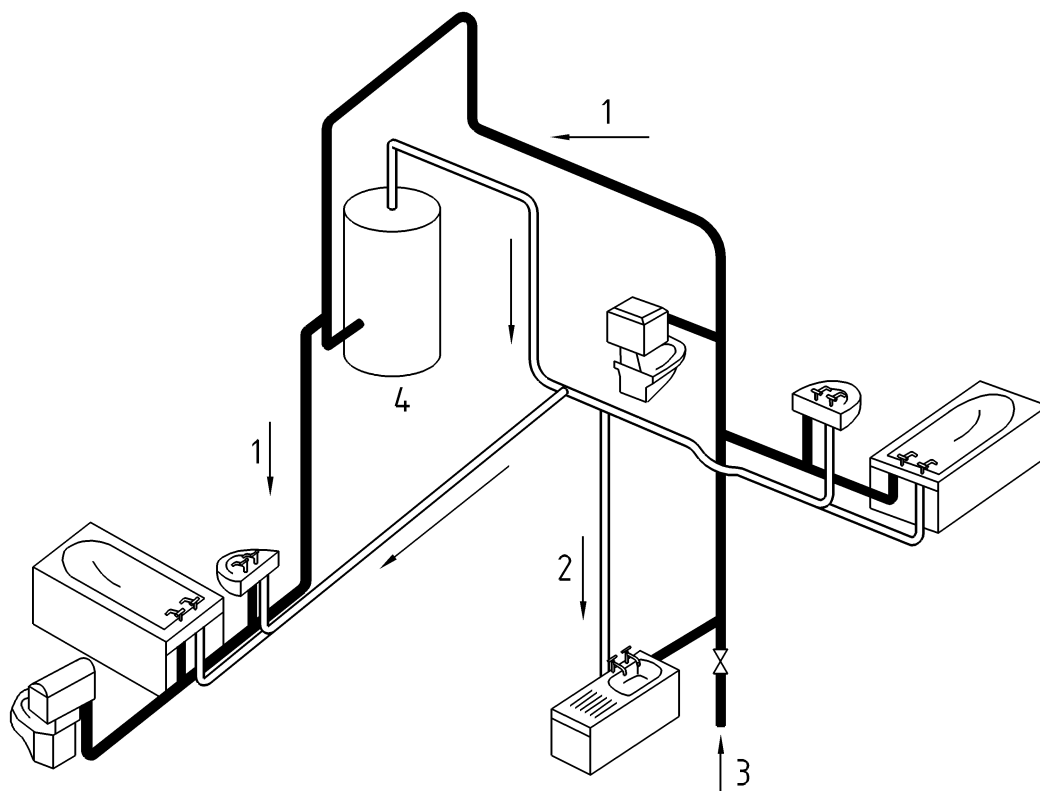
This European Standard applies to shower hoses connected downstream of the obturator of the tapware.

Hoses which are an integral part of sanitary tapware (sink and wash basin mixing valves) or hoses intended to connect sanitary tapware to the water supplies are not covered by this European Standard.

Details of pressures and temperatures are given in Table 1.

Table 1 — Conditions of use/Classifications

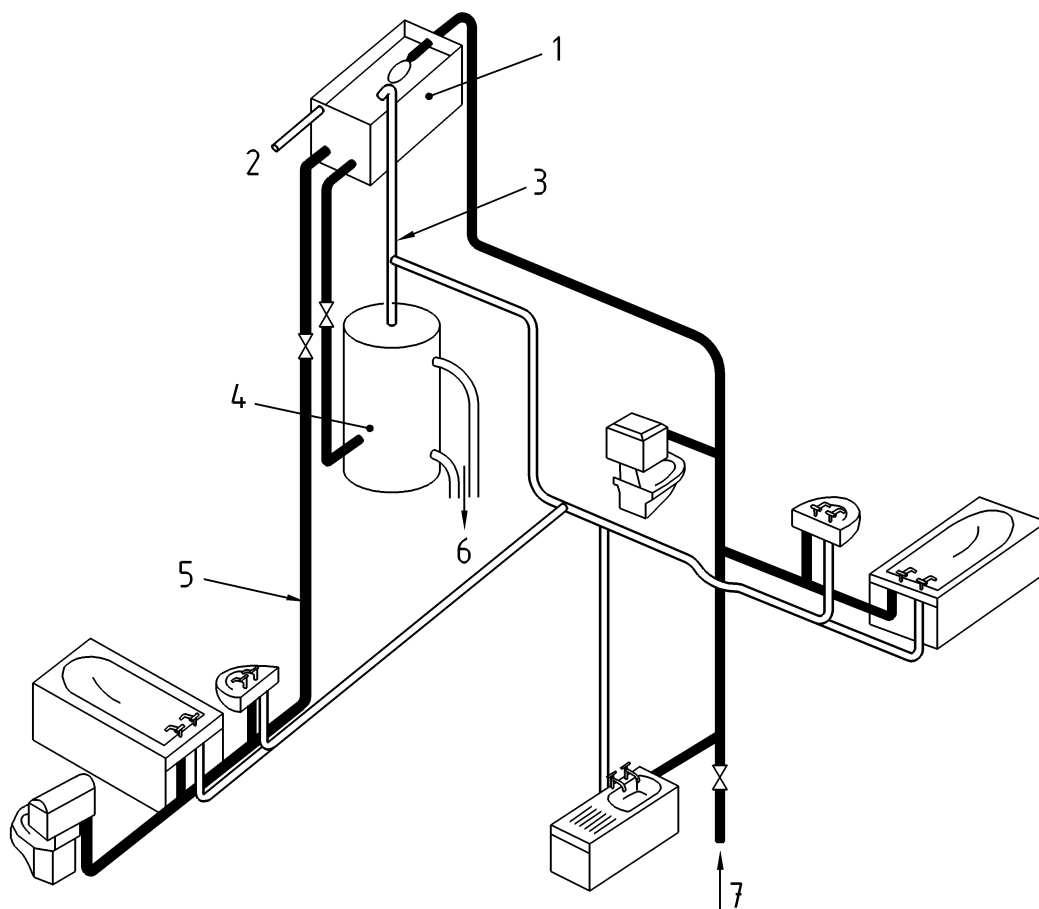
Water Supply system	Operating range of shower hoses		Flow rates
	Limits	Recommended	See Table 3
Type 1 see Figure 1	<u>Dynamic Pressure</u> (0,05 to 0,5) MPa [(0,5 to 5) bar]	<u>Dynamic Pressure</u> (0,1 to 0,3) MPa [(1,0 to 3,0) bar]	Class 1 0,42 l/s ≤ Q (25,2 l/min ≤ Q) at (0,3 ₀ ^{+0,02}) MPa [(3 ₀ ^{+0,2}) bar]
			Class 2 0,20 l/s ≤ Q < 0,42 l/s (12 l/min ≤ Q < 25,2 l/min) at (0,3 ₀ ^{+0,02}) MPa [(3 ₀ ^{+0,2}) bar]
Type 2 see Figure 2	<u>Dynamic Pressure</u> (0,01 to 0,2) MPa [(0,1 to 2) bar]	<u>Dynamic Pressure</u> (0,02 to 0,10) MPa [(0,2 to 1,0) bar]	Class E 0,06 l/s < Q < 0,18 l/s (3,6 l/min < Q < 10,8 l/min.) at (0,01 ₀ ^{+0,0005}) MPa [(0,1 ₀ ^{+0,005}) bar]
			Class H 0,18 l/s ≤ Q (10,8 l/min ≤ Q) at (0,01 ₀ ^{+0,0005}) MPa [(0,1 ₀ ^{+0,005}) bar]
Temperature	T ≤ 70°C	T ≤ 42°C	



Key

- 1 cold water
- 2 hot Water
- 3 mains supply pipe (Supply pressures up to 10 bar)
- 4 water heater

Figure 1 — Type 1 Water supply system with a pressure range of (0,05 – 1,0) MPa [(0,5 - 10) bar]



Key

- 1 cold water storage cistern (cover omitted for clarity)
- 2 warning pipe
- 3 vent pipe
- 4 hot water cylinder
- 5 alternative cistern fed cold supply to sanitary appliances
- 6 to boiler
- 7 mains supply pipe (Supply pressures up to 10 bar)

**Figure 2 — Type 2 Water supply system - with a pressure range of (0,01 – 1,0) MPa, [(0,1 - 10) bar].
A vented domestic hot water and cold water supply system incorporating gravity hot water, mains cold water and alternative gravity cold water supply to sanitary appliances**

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 248, *Sanitary tapware — General specification for electrodeposited coatings of Ni-Cr*

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

3 Terms and definitions

For the purposes of this document, the following term and definition applies.

3.1

shower hose

flexible supply pipe which connects sanitary tapware to a shower handset

4 Designation

Hoses complying with this European Standard are designated by:

- the connecting thread dimensions G 1/2 × G 1/2 or G 1/2 × G 3/4;
- reference to this European Standard: EN 1113;
- the length;
- the material of the external sheath (plastic, metal);
- the type of nuts and if conical the dimension C;
- flow rate class (see Table 1).

EXAMPLE Shower hose G 1/2, cone 26 × G 3/4, length 1,5 m, metal sheath, EN 1113, class H.

5 Marking

Hoses complying with this European Standard shall be marked permanently and legibly with the manufacturer's mark or the supplier's mark.

6 Materials

6.1 Chemical and hygienic requirements

All materials coming into contact with water intended for human consumption shall not present any risk to health at temperatures up to the maximum working temperature. They shall not cause any deterioration to water intended for human consumption in terms of quality, appearance, smell or taste.

Within the recommended limit for correct operation (see Table 1) the materials shall not undergo any change which would impair the performance of shower hoses.

6.2 Exposed surface condition and quality of coating

Visible chromium plated surfaces and Ni-Cr coatings shall comply with the requirements of EN 248.

7 Dimensional characteristics

7.1 General

- The design and construction of components without defined dimensions permits various design solutions to be adopted by the manufacturer.
- Permitted deviations from the defined dimensions are specified in 7.3.

7.2 Connecting dimensions

The connecting dimensions of shower hoses are specified in Table 2 and Figures 3, 4 and 5.

Table 2 — Connecting dimensions

Dimensions	Values	Comments
A	G 1/2 or G 3/4	Connecting thread (tap side) EN ISO 228-1
B	G 1/2	Connecting thread (shower side) EN ISO 228-1
C	$\varnothing 23 \begin{smallmatrix} +0,5 \\ -0,1 \end{smallmatrix}$ mm or $\varnothing 26 \begin{smallmatrix} +0,5 \\ -0,1 \end{smallmatrix}$ mm	Major diameter of conical nut (if provided)
G	$8,5 \begin{smallmatrix} 0 \\ -1 \end{smallmatrix}$ mm	Functional dimension on seal depth
I	$1,5 \begin{smallmatrix} +0,5 \\ 0 \end{smallmatrix}$ mm	Thread counterbore
K	≥ 30 mm	Total length of conical nut
α	$3 \begin{smallmatrix} 0 \\ -1 \end{smallmatrix}^\circ$	Cone angle (if provided)
L	≥ 1250 mm	Total length of hose

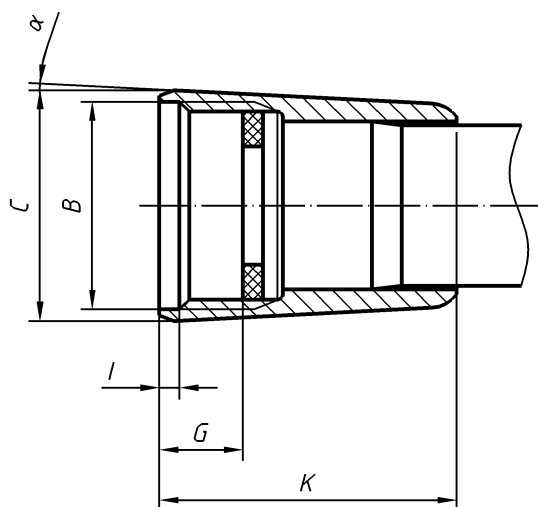


Figure 3 — Conical nut

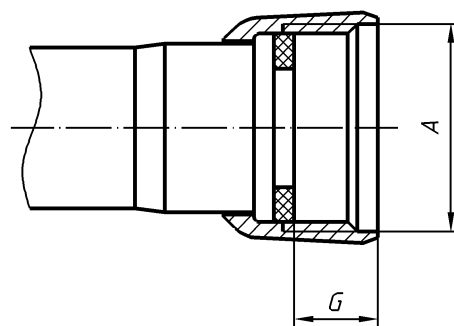


Figure 4 — Nut (shape unspecified)

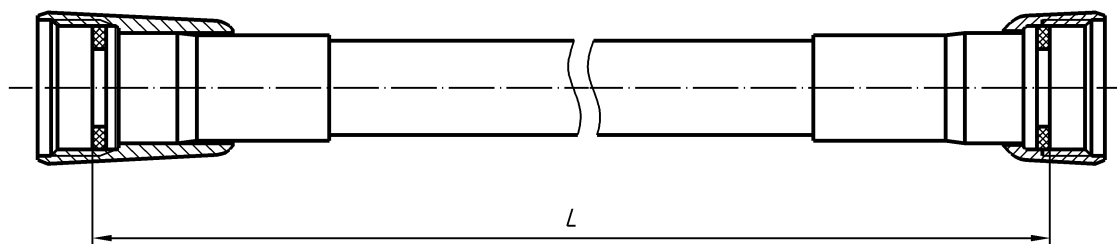


Figure 5 — Hose length

7.3 Special cases

Shower hoses intended for special applications e.g. when dimensional interchangeability is not a requirement, can incorporate dimensional deviations provided:

- connection to the installation is guaranteed;
- threaded connections are in compliance with ISO standards;
- all other requirements of this European Standard are satisfied;
- the manufacturer's literature, including the installation instructions supplied with the shower hose, indicates clearly that the shower hose is a special case.

8 Hydraulic characteristics

8.1 General

The test described is a type test (laboratory test) and not a quality control test carried out during manufacture.

8.2 Flow rate

8.2.1 Test method

This clause describes a method for testing the flow rate of hoses.

8.2.2 Principle

The principle consists of a method for measuring the flow rate through the shower hose using cold water ($T \leq 30 \text{ }^{\circ}\text{C}$) in order to determine the flow rate class (see Table 1).

8.2.3 Apparatus

The test apparatus shown in Figure 6, comprises:

- 1) A supply circuit comprising:
 - a) a means for measuring and maintaining the required pressure of Table 1 with an accuracy of $\pm 1 \%$ of the test value;
 - b) a device for measuring the flow rate with an accuracy of 2% of the test value;
 - c) a DN15 regulating valve;
 - d) a straight DN15 pipe;
 - e) a pressure take off tee (see Figure 7);
 - f) a pressure measuring device with an accuracy of $\pm 1 \%$.
- 2) A test circuit comprising:
 - a) a support to maintain the hose in a straight and horizontal position.

8.2.4 Procedure

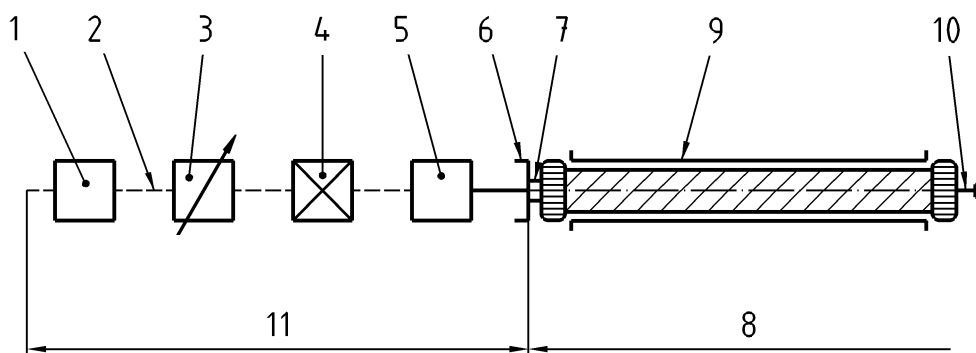
- Connect the G 1/2 size nut of the shower hose to the pressure take off tee, supporting the hose in a horizontal position.
- Apply the required dynamic pressure using the horizontal axis of the hose as a datum.
- Record the flow rate “Q” after stabilization.

8.2.5 Requirements

Shower hoses shall be classified according to the flow rate value “Q” at the required pressure shown in Table 3.

Table 3 — Flow rate classes

Supply system		Flow rate / pressure
Of Type 1	Class 1	$0,42 \text{ l/s} \leq Q$ ($25,2 \text{ l/min} \leq Q$) at $(0,3_0^{+0,02}) \text{ MPa}$ [$(3_0^{+0,2}) \text{ bar}$]
	Class 2	$0,20 \text{ l/s} \leq Q < 0,42 \text{ l/s}$ ($12 \text{ l/min} \leq Q < 25,2 \text{ l/min}$) at $(0,3_0^{+0,02}) \text{ MPa}$ [$(3_0^{+0,2}) \text{ bar}$]
Of Type 2	Class E	$0,06 \text{ l/s} < Q < 0,18 \text{ l/s}$ ($3,6 \text{ l/min} < Q < 10,8 \text{ l/min.}$) at $(0,01_0^{+0,0005}) \text{ MPa}$ [$(0,1_0^{+0,0005}) \text{ bar}$]
	Class H	$0,18 \text{ l/s} \leq Q$ ($10,8 \text{ l/min} \leq Q$) at $(0,01_0^{+0,0005}) \text{ MPa}$ [$(0,1_0^{+0,0005}) \text{ bar}$]



Key

11 a supply circuit:

- 1 a means for supplying and maintaining the required pressures and temperatures
- 2 a pipe
- 3 a device for measuring the flow rate with an accuracy of 2 % of the test value
- 4 a stop valve
- 5 a pressure measuring device with an accuracy of $\pm 1 \%$
- 6 a temperature measuring device with an accuracy of $\pm 1 \text{ }^\circ\text{C}$
- 7 a hose connector

8 a test circuit:

- 9 a rigid tube for supporting the hose
- 10 a free outlet

Figure 6 — Flow rate test rig

Dimensions in millimetres

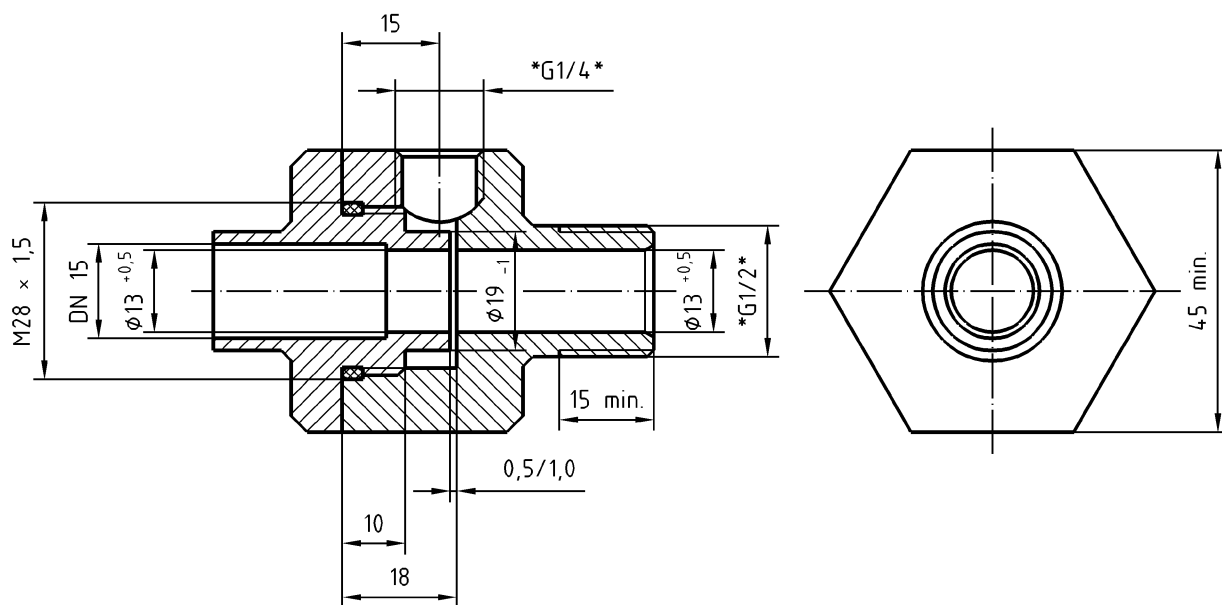


Figure 7 — Pressure take-off tee (unspecified tolerances $\pm 0,5$)

9 Mechanical and leaktightness characteristics

9.1 General

The tests described are type tests (laboratory tests) and not quality control tests carried out during manufacture. Each test has to be conducted using a new test sample.

9.2 Tensile strength

9.2.1 Test method

This clause describes a method for testing the tensile strength of hoses.

9.2.2 Principle

The principle of the test is to subject the hose to a tensile force for a specified time.

9.2.3 Apparatus

Equipment which allows the hose to be subjected to a longitudinal tensile force of 500 N.

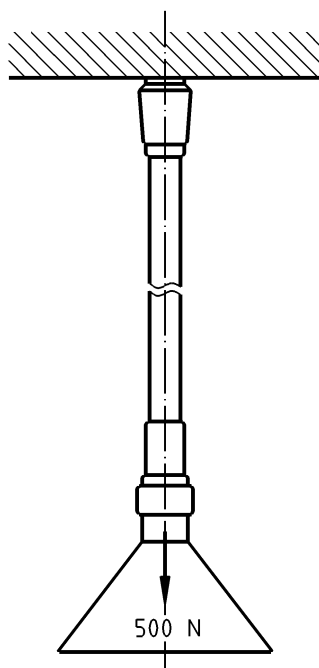


Figure 8 — Tensile force apparatus

9.2.4 Procedure

The test is carried out at ambient temperature.

Condition the hose to be tested by storing for 3 h minimum at ambient temperature.

Connect one end of the hose by its nut to a fixed union as shown in Figure 8 and apply a force of (500 ± 10) N at the other end for (300 ± 10) s.

9.2.5 Requirements

There shall be no rupture and no permanent deformation that will affect the function of the hose. In order to verify that the function of the hose is maintained, the leaktightness of the hose shall be carried out according to 9.5.

9.3 Resistance to flexing

9.3.1 Test Method

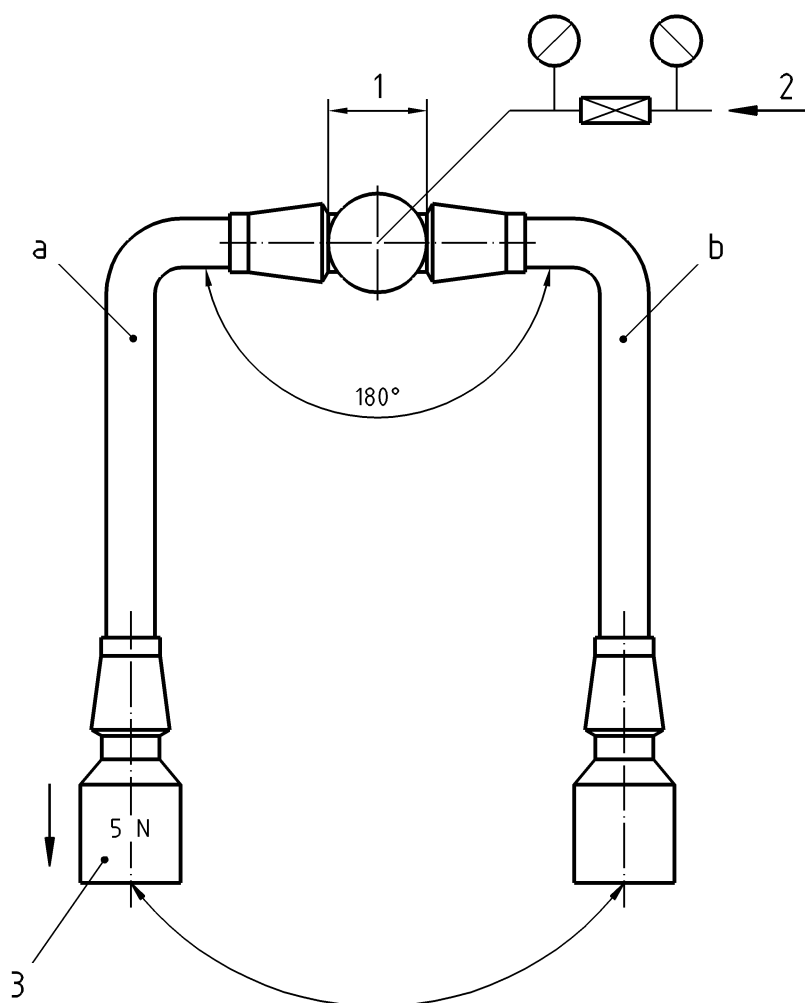
This clause describes a method for testing the flexing durability of the hose.

9.3.2 Principle

This test is intended to verify the durability of the hose when it is subjected to flexing in the area adjacent to the connecting nut.

9.3.3 Apparatus

The apparatus is detailed in Figure 9.



Key

The apparatus shown in Figure 9 comprises:

1. horizontal shaft:
 - capable of rotating through an angle of 180° starting in position (a) turning anticlockwise to position (b) and returning clockwise to position (a);
 - having a diameter of (50 ± 5) mm;
 - with nipples of G 1/2 or G 3/4 on the exterior of the shaft in order to fix the test samples
2. means for applying and maintaining air pressure in the test samples via the shaft:
 - pressure measuring device for the supply pressure with an accuracy of $\pm 1\%$;
 - adjustable orifice with a diameter of approximately $(0,2)$ mm;
 - pressure measuring device with an accuracy of $\pm 1\%$ for showing pressure drops in the event of a leaking hose.
3. means of applying a force F of $(5 \pm 0,5)$ N to the free end of the hose e.g. by means of a weight.

Figure 9 — Apparatus for testing flexing durability

9.3.4 Procedure

- Connect the hose as shown in Figure 9.
- Apply an air pressure of $(0,1 \pm 0,02)$ MPa [$(1 \pm 0,2)$] bar to the test sample.
- Rotate the shaft at a speed of (20 ± 5) cycles per minute for 5 000 cycles (one cycle is the movement from (a) to (b) and back again).
- Carry out the test at ambient temperature.

9.3.5 Requirement

There shall be no rupture and no permanent deformation that will affect the function of the hose. In order to verify that the function of the hose is maintained, the leaktightness of the hose shall be carried out according to 9.5.

9.4 Pressure resistance at elevated temperature

9.4.1 Test method

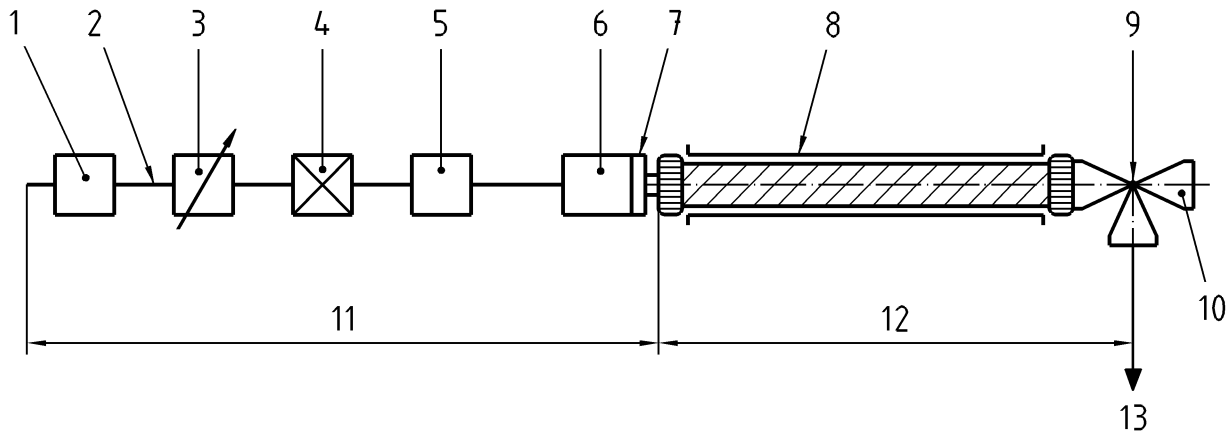
This clause defines a method of testing the pressure and temperature resistance of hoses at the upper limits of use indicated in Table 1.

9.4.2 Principle

The principle of this test is to subject the hose for a specified time, to a pressure and temperature higher than shown in the recommended limits of use indicated in Table 1.

9.4.3 Apparatus

The apparatus is detailed in Figure 10.



Key

- 11 supply circuit:
- 1 means for supplying and maintaining the required pressures and temperatures;
 - 2 pipe;
 - 3 device for measuring the flow rate with an accuracy of 2 % of the test value;
 - 4 stop valve;
 - 5 pressure measuring device with an accuracy of $\pm 1\%$;
 - 6 temperature measuring device with an accuracy of $\pm 1\text{ }^\circ\text{C}$;
 - 7 hose connector.
- 12 test circuit:
- 8 rigid tube for supporting the hose;
 - 9 3-way valve with;
 - 10 free outlet;
 - 13 restricted outlet.

Figure 10 — Apparatus for testing the pressure resistance under elevated temperatures

9.4.4 Procedure

Connect the hose as shown in Figure 10. In order to heat the hose to the test temperature of $(70 \pm 2)\text{ }^\circ\text{C}$, pass water at the test temperature through the hose at a flow rate between 0,08 and 0,12 l/s for 5 min. Then adjust the 3-way valve to give a flow rate which maintains the test temperature.

Apply the appropriate dynamic pressure to the hose as specified in Table 4 and maintain for $(300 \pm 10)\text{ s}$.

Table 4 — Pressure conditions

Supply system	Pressure
Type 1	(0,5 ± 0,02) MPa [(5 ± 0,2) bar]
Type 2	(0,2 ± 0,02) MPa [(2 ± 0,2) bar]

9.4.5 Requirements

- There shall be no visible leakage.
- There shall be no permanent deformation which affects the function of the hose.

9.5 Leaktightness after tensile strength and resistance to flexing tests

9.5.1 Test method

This clause defines the method to verify leaktightness after the tensile strength test (9.2) and the resistance to flexing test (9.3).

9.5.2 Principle

The principle of the test is to subject the hose to an appropriate pressure as specified in Table 4, using cold water only.

9.5.3 Apparatus

The apparatus is detailed in Figure 10.

9.5.4 Procedure

Connect the hose as shown in Figure 10, but use in place of valve (9) a plug or a valve with a closed position. Fill the hose with water and apply the test pressure for (60 ± 10) s.

9.5.5 Requirements

There shall be no visible leakage.

9.6 Thermal shock test

9.6.1 Test method

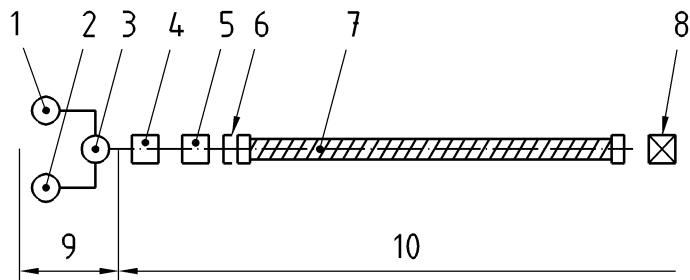
This clause defines the method to verify resistance against alternating temperatures.

9.6.2 Principle

The principle of the test is to verify the leaktightness of the hose under the effect of alternating temperatures.

9.6.3 Apparatus

The apparatus is detailed in Figure 11.



Key

- 9 supply circuit comprising:
 - 1 means for supplying and maintaining the hot water temperature and pressure for the duration of the test;
 - 2 means for supplying and maintaining the cold water temperature and pressure for the duration of the test;
 - 3 means for alternating from hot to cold water and vice versa within 2 s.
- 10 test circuit comprising:
 - 4 means for measuring pressure with an accuracy of $\pm 1\%$ of the test value;
 - 5 means for measuring temperature with an accuracy of $\pm 1\text{ }^{\circ}\text{C}$;
 - 6 hose connection;
 - 7 test sample;
 - 8 regulating valve adjusted to give the specified flow rate.

Figure 11 — Apparatus for thermal shock test

The test circuit shall be capable of providing both hot water at $(70 \pm 2)\text{ }^{\circ}\text{C}$ and cold water at $(20 \pm 2)\text{ }^{\circ}\text{C}$ at a pressure of $(0,1 \pm 0,01)\text{ MPa}$ [$(1 \pm 0,1)\text{ bar}$], at a flow rate of approximately $0,1\text{ l/s}$.

9.6.4 Procedure

Connect the hose to the water supply and subject it to cycles of $(120 \pm 10)\text{ s}$ of cold water then $(120 \pm 10)\text{ s}$ of hot water each at a flow rate between $0,08\text{ l/s}$ and $0,12\text{ l/s}$. Repeat this cycle continuously 300 times.

9.6.5 Requirements

There shall be no visible leakage.

There shall be no visible leakage between the internal and external hose in the case of multi-wall hoses.

10 Rotary connection

10.1 General

The test described is a type test (laboratory test) and not a quality control test carried out during manufacture.

If a shower hose has a rotary connection permitting the hose to turn freely in relation to a shower outlet, this connection shall be capable of functioning correctly and shall prevent twisting of the hose.

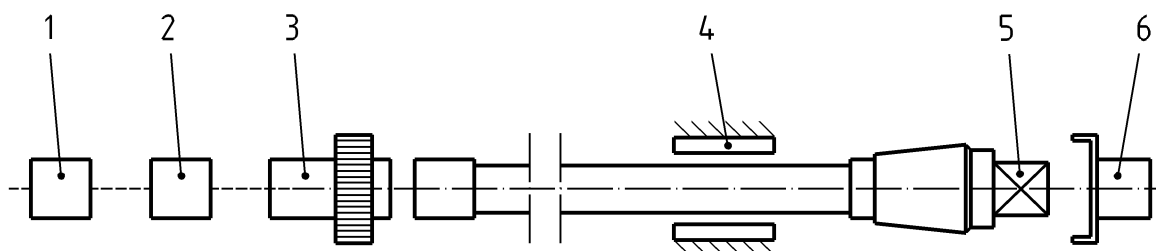
10.2 Test Method

10.2.1 Principle

This test is intended to check the function of any rotary connection.

10.2.2 Apparatus

The apparatus is detailed in Figure 12.



Key

- 1) means of providing and maintaining the test pressure;
- 2) means to measure the pressure with an accuracy of $\pm 1\%$ of the test value;
- 3) connection to the supply;
- 4) device for clamping the hose;
- 5) sealing plug with system for applying a torque;
- 6) means for measuring the torque with an accuracy of $\pm 5\%$.

Figure 12 — Rotary connection test apparatus

10.2.3 Procedure

- Connect the hose to the supply circuit.
- Seal the rotary connection with the plug and clamp the hose.
- Apply a static pressure according to Table 5 using cold water at $T \leq 30\text{ °C}$.
- Measure the torque necessary to initiate rotation of the plug in relation to the hose.

Table 5 — Pressure conditions for rotary connection test

Supply system	Pressure
Type 1	$(0,3 \pm 0,02)$ MPa [$(3 \pm 0,2)$ bar]
Type 2	$(0,1 \pm 0,01)$ MPa [$(1,0 \pm 0,1)$ bar]

10.2.4 Requirement

The initial torque shall not exceed 0,1 Nm.

Bibliography

- [1] EN 1112, *Sanitary tapware — Shower outlets for sanitary tapware for water supply systems of type 1 and type 2 — General technical specification*

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