BS EN 16145:2012

BSI Standards Publication

Sanitary tapware — Extractable outlets for sink and basin mixers — General technical specification

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National foreword

This British Standard is the UK implementation of EN 16145:2012.

The UK participation in its preparation was entrusted to Technical Committee B/504/-/8, Sanitary tapware.

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

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Robinetterie sanitaire - Douchettes extractibles pour mitigeurs d'éviers et de lavabos - Spécifications techniques générales

Sanitärarmaturen - Ausziehbare Ausläufe für Waschtisch- und Spülbeckenarmaturen - Allgemeine technische Spezifikation

This European Standard was approved by CEN on 10 November 2012.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 16145:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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.

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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 standard:

— This 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.

— 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.

— This European Standard specifies requirements for shower outlets suitable for use in water supply systems of Type 1 and Type 2.

1 Scope

This European Standard specifies:

— the dimensional, leaktightness, mechanical, hydraulic and acoustic characteristics with which extractable outlets with or without spray mode selector function need to comply;

— the procedures for testing these characteristics.

It applies to extractable outlets made from any material which is intended for equipping and supplementing sanitary tapware for sinks and wash-basins used for culinary or ablutionary purposes. Such extractable outlets shall only be connected downstream of the obturator of the tapware.

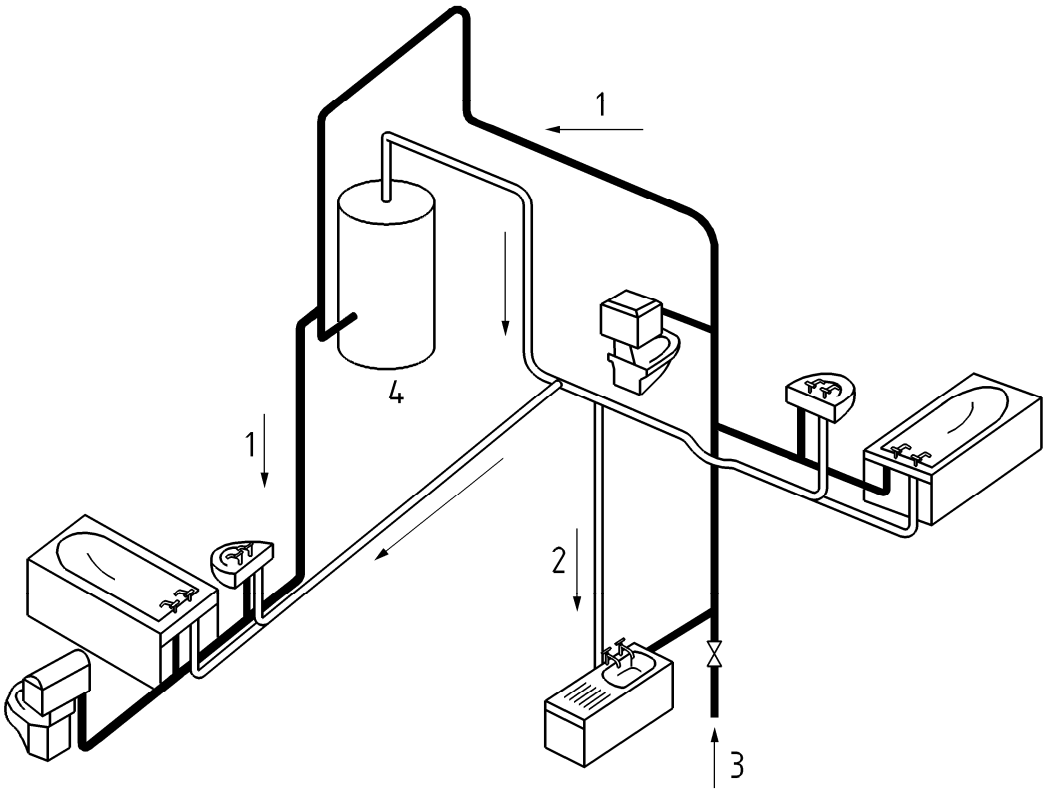
Extractable outlets with total closing device fitted after the obturator of the tapware are not covered by this standard. Such products will be tested in accordance with EN 200, EN 817, EN 1111, EN 1286 or EN 1287 (see [1], [2], [3], [5] and [6]).

The conditions of use and classification are specified in Table 1.

Table 1 — Conditions of use/Classifications

<table>
<tr><th rowspan="2">Water Supply system</th><th colspan="2">Operating range of extractable shower outlets</th><th colspan="2">Flow rate classes</th><th>Acoustics</th><th>Marking</th></tr>
<tr><th>Limits</th><th>Recommended</th><th colspan="2"></th><th>See Clause 13</th><th>See Clause 4</th></tr>
<tr><td rowspan="7">Type 1
see Figure 1</td><td rowspan="7">Dynamic Pressure
(0,05 to 0,5) MPa
((0,5 to 5,0) bar)</td><td rowspan="7">Dynamic Pressure
(0,1 to 0,3) MPa
((1,0 to 3,0) bar)</td><td>ZE</td><td>(0,066 7 ≤ Q < 0,12) l/s
((4 ≤ Q < 7,2) l/min)</td><td rowspan="7">Group I</td><td rowspan="7">for example
I A</td></tr>
<tr><td>Z</td><td>(0,12 ≤ Q < 0,15) l/s
((7,2 ≤ Q < 9) l/min)</td></tr>
<tr><td>A</td><td>(0,15 ≤ Q < 0,25) l/s
((9 ≤ Q < 15) l/min)</td></tr>
<tr><td>S</td><td>(0,25 ≤ Q < 0,33) l/s
((15 ≤ Q < 20) l/min)</td></tr>
<tr><td>B</td><td>(0,33 ≤ Q < 0,42) l/s
((20 ≤ Q < 25) l/min)</td></tr>
<tr><td>C</td><td>(0,42 ≤ Q < 0,50) l/s
((25 ≤ Q < 30) l/min)</td></tr>
<tr><td>D</td><td>(0,50 ≤ Q < 0,63) l/s
((30 ≤ Q < 38) l/min)</td></tr>
<tr><td rowspan="3">Type 2
see Figure 2</td><td rowspan="3">Dynamic Pressure
≥ (0,01 to 0,2) MPa
((0,1 to 2,0) bar)</td><td rowspan="3">Dynamic Pressure
(0,02 to 0,1) MPa
((0,2 to 1,0) bar)</td><td>EE</td><td>(0,025 ≤ Q < 0,06) l/s
((1,5 ≤ Q < 3,6) l/min)
at 0,01 MPa (0,1 bar)</td><td rowspan="3">(unclassified)</td><td rowspan="3"></td></tr>
<tr><td>E</td><td>(0,06 ≤ Q < 0,14) l/s
((3,6 ≤ Q < 8,4) l/min)
at 0,01 MPa (0,1 bar)</td></tr>
<tr><td>H</td><td>(Q ≥ 0,14) l/s
((Q ≥ 8,4) l/min)
at 0,01 MPa (0,1 bar)</td></tr>
<tr><td>Temperature</td><td>T ≤ 70 °C</td><td>T ≤ 42 °C (wash-basin)
T ≤ 60 °C (sink)</td><td colspan="4"></td></tr>
</table>

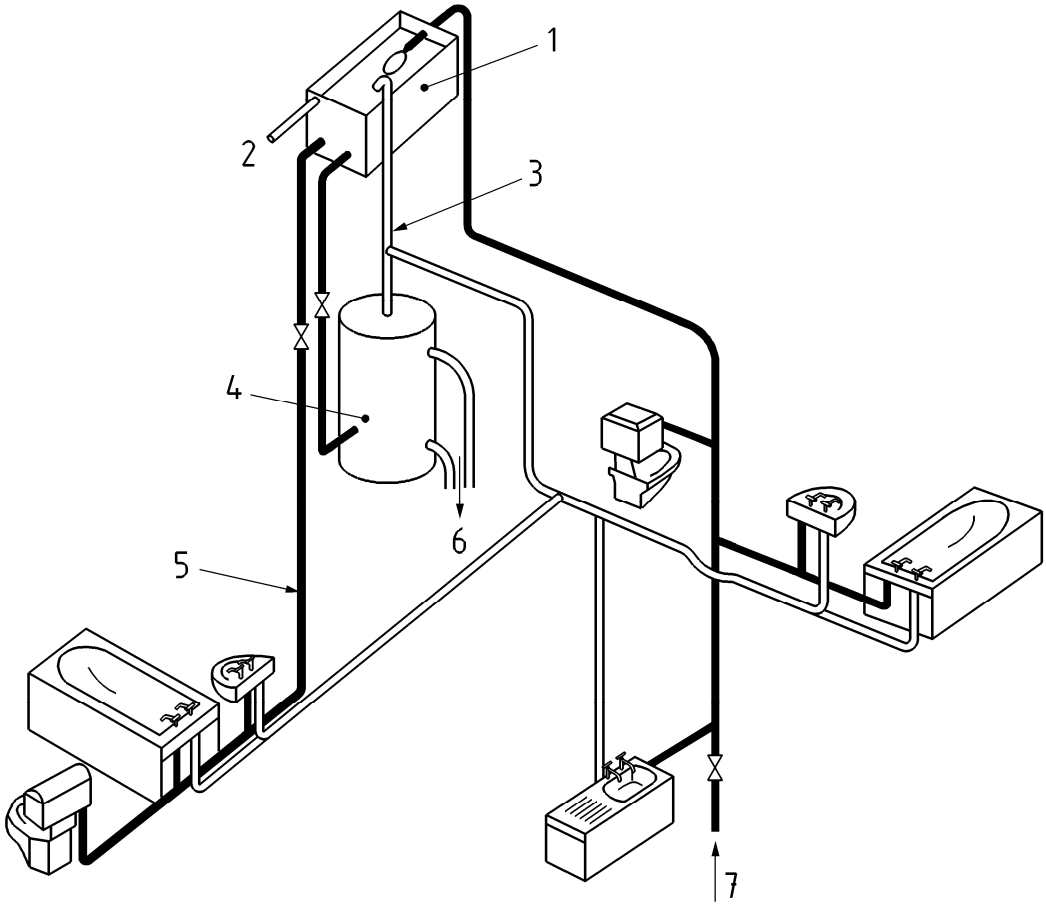
For low pressure extractable outlets complying with this standard there are no acoustical requirements. Low pressure extractable outlets complying with this standard may also be used with inlet supply pressures in the range from 0,1 MPa to 0,2 MPa (1,0 bar to 2,0 bar) on condition that acoustical performance is not a requirement of the installation.



Key

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

Figure 1 — Supply system type 1 with a pressure range of 0,05 MPa to 1,0 MPa (0,5 bar to 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 1 MPa (10 bar))

Figure 2 — Supply system type 2 with a pressure range of 0,01 MPa to 1,0 MPa (0,1 bar - 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 1717, *Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow*

EN 16146, *Sanitary tapware — Extractable shower hoses for sanitary tapware for supply systems type 1 and type 2 — General technical specification*

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)*

EN ISO 3822-1, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 1: Method of measurement (ISO 3822-1)*

EN ISO 3822-4, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 4: Mounting and operating conditions for special appliances (ISO 3822-4)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
spray outlet
device for culinary and ablutionary purposes which allows water to be emitted in the form of jets or water droplets

3.2
spray plate
device with orifices through which water passes and forms a spray of water with separate, definable jets or water droplets

Note 1 to entry: A spray forming mechanism is a device which generates a spray by other means.

3.3
spray mode selector
device providing the possibility of selecting different spray modes

Note 1 to entry: Later described as mode (a), (b), (c).

4 Classification

Extractable outlets are moveable hand held outlets which are connected to the sanitary tapware via a hose, complying with EN 16146. They can be mounted directly on the tapware or designed as a side spray located on an appropriate support.

5 Designation

Extractable outlets covered by this standard are designated by:

— their connecting thread dimension;

— their flow rate class (see Table 1);

— their acoustic group (where applicable);

— reference to this standard: EN 16145.

EXAMPLE Extractable outlet G ½ flow rate class E, EN 16145.

6 Marking

Extractable outlets complying with this standard shall be marked permanently and legibly with the manufacturer's mark or the supplier's mark.

The acoustic group (where applicable) and the highest flow rate class shall appear on the product but it need not be permanent.

Extractable outlets with special connection (see 12.3) delivered together with the tapware need not be marked individually.

7 Materials

7.1 Chemical and hygienic requirements

All materials coming into contact with water intended for human consumption shall present no risk to health.

They shall not cause any change of the drinking water in terms of quality, appearance, smell or taste.

7.2 Exposed surface condition and quality of coating

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

8 Dimensional Characteristics

8.1 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 given in 8.3.

8.2 Connecting Dimensions

The connecting dimensions of extractable outlets are specified in Table 2.

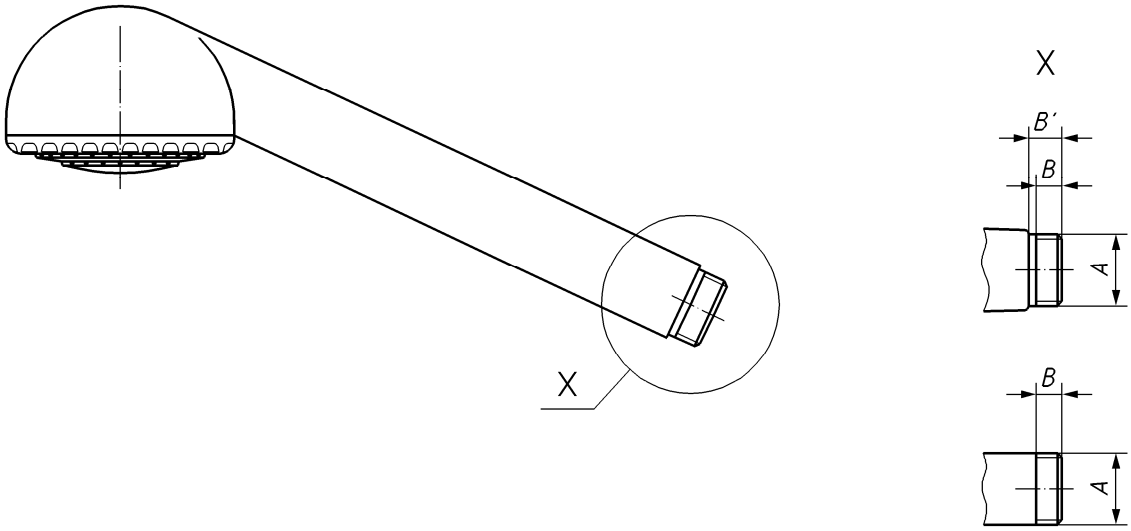


Figure 3 — Extractable outlet

Table 2 — Connecting dimensions

Dimension	Values	Comments
A	G 1 / 2 B	EN ISO 228-1
B	≥ 7,5 mm	
B’	≥ 9,5 mm	

8.3 Special Cases

For extractable outlets intended for special applications e.g., when interchangeability is not a requirement, the following incorporate dimensional deviations are provided:

— connection to the tapware is guaranteed;

— threaded connections are in compliance with ISO standards;

— all other requirements of this standard are satisfied;

— the manufacturer's literature, including the installation instructions supplied with the extractable outlet indicates clearly that the extractable outlet is a special case.

9 Leaktightness Characteristics

9.1 Leaktightness of the inlet connection and the spray plate

9.1.1 General

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

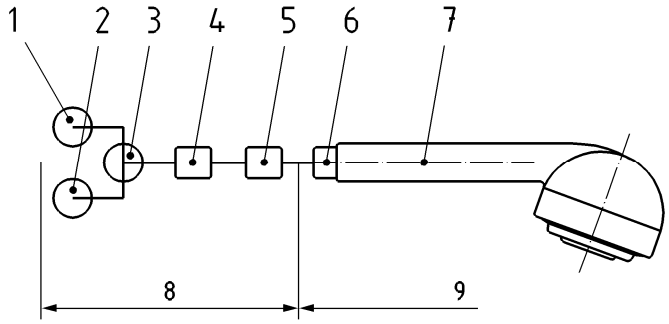
9.1.2 Test Method

9.1.2.1 Principle

The test is based on the principle of checking the leaktightness of the extractable outlet with positive internal water pressure.

9.1.2.2 Apparatus for leaktightness (this apparatus is also used for thermal shock tests; refer to 10.4)

The test circuit is detailed in Figure 4.



Key

8 supply circuit:
- 1) means for supplying and maintaining hot water temperature and pressure for the duration of the test
- 2) means for supplying and maintaining cold water temperature and pressure for the duration of the test
- 3) means for alternating from hot to cold water and vice versa
- 4) means for measuring pressure with an accuracy of ± 1 %
- 5) means for measuring temperature with an accuracy of ± 1 °C

9 test circuit:
- 6) connection
- 7) test sample

Figure 4 — Test circuit for testing leaktightness and thermal shock

For the leaktightness test, cold water shall be used.

9.1.2.3 Procedure

Connect the extractable outlet as supplied to the test circuit. With water flowing at a temperature ≤ 30 °C, apply the appropriate test pressure specified in Table 3 and maintain for (300 ± 10) s. In the case of multifunction extractable outlets, the test shall be carried out for each function.

Table 3 — Pressure conditions for leaktightness test

Extractable outlet for installation Type 1	(0,5 ± 0,02) MPa ((5,0 ± 0,2) bar)
Extractable outlet for installation Type 2	(0,2 ± 0,02) MPa ((2,0 ± 0,2) bar)

9.1.2.4 Requirements

For the duration of the test there shall be no leakage between the connecting point and body or at the connection between the spray plate and body.

9.2 Leaktightness of manually operated spray mode selector

9.2.1 General

Spray mode selectors allow users to select different spray patterns. Separate tests are described for manual selection and pre-set types. For the purposes of testing, the different spray positions are referred to as 'pre-set' or 'a' or 'b' etc.

9.2.2 Procedure for manually set spray mode selectors: flow to mode (a)

— Connect the extractable outlet to the test circuit shown in Figure 4.

— Put the spray mode selector in position (a) or leave it in the pre-set position.

— Apply an appropriate dynamic water pressure specified in Table 4 for (60 + 5) s.

— Repeat the test with reduced pressure specified in Table 4 for (60 + 5) s.

— Check for leakage at the other modes.

9.2.3 Requirement

There shall be no leakage from the other modes.

9.2.4 Procedure: flow to additional spray modes

Repeat the test for all other spray modes.

9.3 Leaktightness and operation of spray mode selectors with automatic return

9.3.1 Procedure: flow to preset position

— Connect the extractable outlet in its preset position of use, to the test circuit shown in Figure 4.

— Apply an appropriate dynamic pressure as specified in Table 4 for (60 + 5) s.

— Check for leakage at the other spray modes.

9.3.2 Requirement

There shall be no leakage at the other spray modes.

9.3.3 Procedure: flow to mode (b) position

— With the spray mode selector in the pre-set position apply an appropriate initial pressure an specified in Table 4 for (60 + 5) s.

— Put the spray mode selector into the flow to mode (b) position.

— Check for leakage at the preset mode outlet (a).

— Gradually reduce the appropriate pressure to the holding pressure specified in Table 4 and maintain it for (60 +5) s.

— Check the spray mode selector position and check for leakage at the preset mode outlet.

— Close the water supply.

— Check the spray mode selector position.

9.3.4 Requirement: flow to mode (b) position

There shall be no leakage at the pre-set mode outlet whilst the spray mode selector remains in the mode (b).

The spray mode selector shall not return to the pre-set mode position at any pressure higher than holding pressure according to Table 4.

The spray mode selector shall return to the normal mode position when the water supply is closed.

Table 4 — Pressure conditions for spray mode selector test

	Extractable outlet for installation in Type 1 water supply systems	Extractable outlet for installation in Type 2 water supply systems
Manually operated selectors		
Starting pressure	(0,5 ± 0,02) MPa ((5,0 ± 0,2) bar)	(0,2 ± 0,02) MPa ((2,0 ± 0,2) bar)
Reduced pressure	(0,05 ± 0,002) MPa (0,5 ± 0,02) bar)	(0,01 ± 0,001) MPa ((0,1 ± 0,01) bar)
Automatically operated selectors		
Starting pressure	(0,5 ± 0,02) MPa ((5,0 ± 0,2) bar)	(0,2 ± 0,02) MPa ((2,0 ± 0,2) bar)
Holding pressure	(0,05 ± 0,002) MPa ((0,5 ± 0,02) bar)	(0,01 ± 0,001) MPa ((0,1 ± 0,01) bar)

10 Mechanical Characteristics

10.1 General

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

10.2 Mechanical Strength

10.2.1 Test Method

This clause defines a test method to establish the mechanical strength of the extractable outlet.

10.2.2 Principle

A force F is applied to the extractable outlet as shown in Figure 5.

10.2.3 Apparatus

A device into which the extractable outlet connecting thread is screwed and a means for applying a force to the extractable outlet.

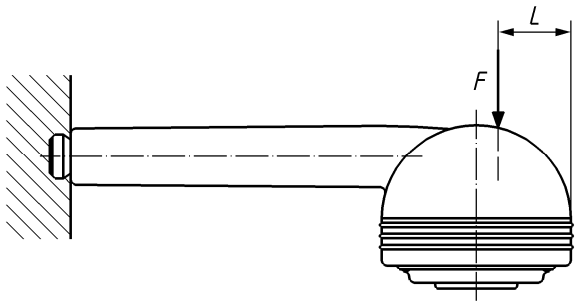
10.2.4 Procedure

Attach the extractable outlet to the fixing device by its connecting thread so that there is no play.

Apply a force F as shown in Figure 5 for duration of (300 ± 10) s.

10.2.5 Requirements

After the test there shall be no cracking or permanent visible deformation.



Key

F = (100 ± 2) N

L = (20 ± 5) mm

Figure 5 — Extractable outlet with rigid connection

10.3 Mechanical endurance of spray mode selectors

10.3.1 General

This clause describes two methods, one for manual spray mode selectors and one for spray mode selectors with automatic return, of evaluating the mechanical endurance of spray mode selectors of extractable outlets, and specifies the test criteria.

10.3.2 Test method

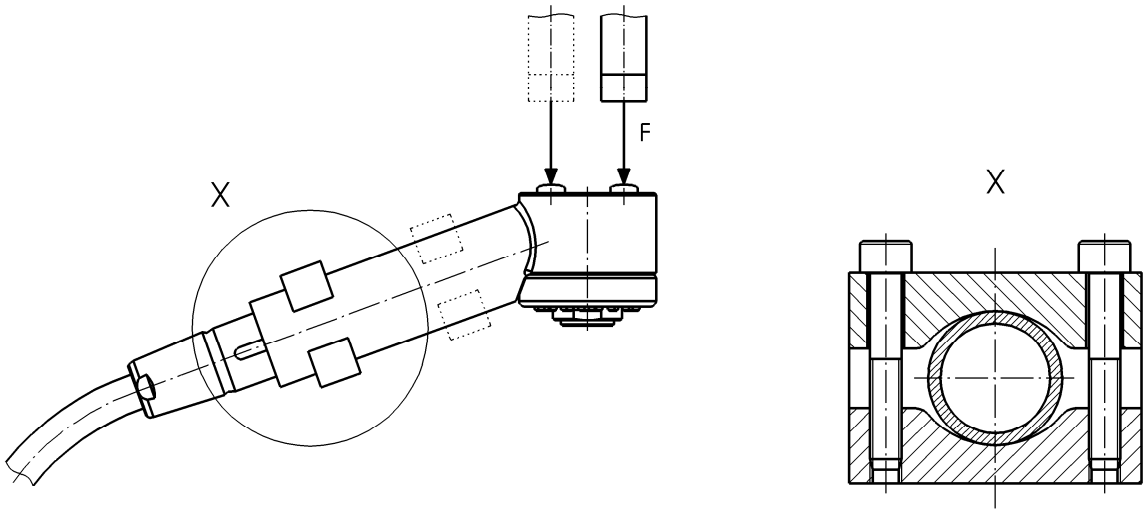


Figure 6 — Apparatus for spray mode selector endurance test

10.3.3 Principle

The spray mode selector is subjected to a specified number of operations while being supplied alternately with cold water and with hot water to test its behaviour over a period of time.

10.3.4 Apparatus

For manual spray mode selector, an automatic machine that ensures alternate operations at the rate of (15^{-1}) cycles per minute and supply circuits with a pump or similar device to supply the required cold water static pressure at a temperature of ≤ 30 °C and the required hot water static pressure at (65 ± 2) °C.

For spray mode selector with automatic return, a mechanism for moving the spray mode selector to the preset position of use to an alternative position under the conditions specified in 9.3 and supply circuits identical to those specified above with, in addition, an automatic quick-acting valve to cut off the supply to the combination tap under test.

10.3.5 Procedure

a) For manual spray mode selector:

   1) Install the extractable outlet as supplied, on to the test rig.

   2) Connect the drive device to the spray mode selector operating member by means of a flexible component.

   3) Adjust the static water pressure of both the hot and the cold supply circuits:

      i) for taps for supply systems of Type 1 to (0,4 ± 0,05) MPa ((4,0 ± 0,5) bar);

      ii) for taps for supply systems of Type 2 to (0,02 ± 0,002) MPa ((0,2 ± 0,02) bar);

      iii) with the spray mode selector in the “flow to preset” position, allow water to flow for (3 ± 0,2) s;

      iv) move the spray mode selector to an alternative position within a maximum of 2 s;

      v) allow water to flow through the extractable outlet for (3 ± 0,2) s;

      vi) move the spray mode selector to the “flow to preset” position within a maximum of 2 s.

   4) Subject the spray mode selector to a test of 8 000 cycles, each comprising a movement from the normal or preset position to an alternative position(s) and back. Throughout the test, supply the extractable outlet alternately with cold water for (15 ± 1) min, then with hot water for (15 ± 1) min.

b) For spray mode selector with automatic return:

   1) Install the extractable outlet, as supplied, on to the test rig and connect both inlets to both supply circuits.

   2) Connect the drive device to the spray mode selector operating member by means of a flexible component.

   3) Adjust the static pressure of both the hot and the cold supply circuits:

      i) for taps for supply systems of Type 1 to (0,4 ± 0,05) MPa ((4,0 ± 0,5) bar);

      ii) for taps for supply systems of Type 2 to (0,02 ± 0,002) MPa ((0,2 ± 0,02) bar).

   4) Subject the spray mode selector to a test of 8 000 cycles, one cycle being defined as follows:

      i) with the spray mode selector in the “flow to preset” position, allow water to flow for (3 ± 0,2) s;

      ii) move the spray mode selector to an alternative position;

iii) allow water to flow through the extractable outlet for (3 ± 0,2) s;

iv) use the quick acting valve to cut off the supply to the extractable outlet, allowing the spray mode selector to return to the preset position, and then reopen the supply.

Throughout the test, supply the extractable outlet alternately with cold water for (15 ± 1) min, then with hot water for (15 ± 1) min.

10.3.6 Requirement

Throughout the test, there shall be no incidents of leaks, failure of spray mode selector to reset, blockage etc.

On completion of 8 000 cycles the assembly shall be leaktight when tested as specified in 9.2 for manual spray mode selectors or as specified in 9.3 for spray mode selectors with automatic return. The actuating force of the actuation shall not exceed 25 N during the test.

Table 5 — Summary of test conditions for spray mode selectors

Conditions	**Field of application**	
	Supply system	
	Type 1	**Type 2**
Pressure of: Cold and hot water	(0,4 ± 0,05) MPa ((4,0 ± 0,5) bar)	(0,02 ± 0,002) MPa ((0,2 ± 0,02) bar)
Temperature: Cold water Hot water	 ≤ 30 °C (65 ± 2) °C	
Timing of supply: Cold or hot water	(15 ± 1) min	
Time of flow: to mode a and mode b	(3 ± 0,2) s	
Flow rate: - to mode a - to mode b	 (6 ± 1) l/min (6 ± 1) l/min	
Number of cycles	8 000	

10.4 Thermal Shock Test

10.4.1 General

This test simulates use under conditions of extreme temperature changes.

10.4.2 Principle

The principle consists of subjecting the extractable outlet to cycles of hot and cold water at a temperature equal to the limits of use.

This test shall be conducted in the mode providing the highest flow rate.

10.4.3 Apparatus

The test apparatus is detailed in 9.1.2.2

The supply circuit for the thermal shock test shall be capable of providing the maximum recommended pressure, specified in Table 1, with hot water at (70 ± 2) °C and cold water at (20 ± 2) °C.

There shall be a switching device to change from hot water to cold water within a maximum time of 2 s.

10.4.4 Procedure

Connect the extractable outlet to the test circuit and subject it to cycles of (120 ± 10) s cold water and then (120 ± 10) s hot water with the flow rate between 0,08 l/s and 0,12 l/s, but the pressures specified in Table 6 shall not be exceeded:

Table 6 — Pressure conditions for thermal shock test

	Pressure
Type 1	(0,3 ± 0,02) MPa ((3,0 ± 0,2) bar)
Type 2	(0,1 ± 0,01) MPa ((1,0 ± 0,1) bar)

Repeat this cycle continuously 300 times.

10.4.5 Requirements

During and after this test there shall be no visible leakage, cracking, permanent deformation or deterioration in function.

After testing, the extractable outlet shall satisfy the requirements for leaktightness specified in 9.1.

11 Hydraulic Characteristics

11.1 General

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

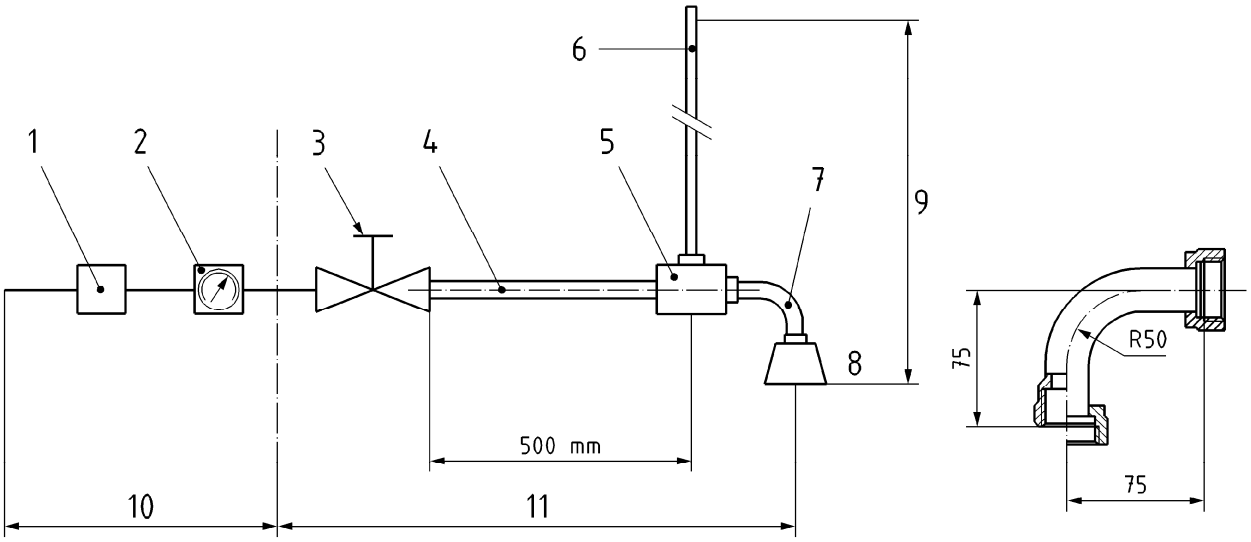
11.2 Flow rate – Test method

11.2.1 Principle

The principle consists for measuring the flow rate through the extractable outlet using cold water ($T \leq 30$ °C) in order to determine the flow rate class of the extractable outlet (see Table 1).

The flow rate of extractable outlets with special connection (see 12.3) delivered together with the tapware is measured in combination with the complete sanitary tapware.

11.2.2 Apparatus



Key

10 supply circuit comprising:
- 1) a device for providing and for measuring the flow rate with an accuracy of ± 2 %
- 2) a means for providing and for measuring and maintaining the required pressure with an accuracy of ± 1 %

11 test circuit comprising:
- 3) a DN15 regulating valve
- 4) a straight DN15 pipe
- 5) a pressure take off tee (see Annex A)
- 6) a manometer to measure the appropriate pressure specified in Table 1 with an accuracy of ± 1 %
- 7) an adapter to connect the inlet of the extractable outlet
- 8) datum
- 9) test pressure

Figure 7 — Apparatus for hydraulic characteristics

The supply circuit shall be capable of delivering the appropriate pressure specified in Table 1, when the extractable outlet under test is installed.

11.2.3 Procedure

— Connect the extractable outlet to the supply and test circuits using an adapter (7).

— Rotate the adapter around its horizontal axis until the spray plate or spray forming mechanism is in a horizontal position with a vertically downwards discharge.

— Apply the appropriate pressure specified in Table 7 using the centre of the spray plate or spray forming mechanism as a datum.

— Record the flow rate "Q" after stabilisation.

11.2.4 Requirement

Extractable outlets shall be classified according to the flow rate value "Q" specified in Table 1 with water supplied at the appropriate pressure specified in Table 7.

Table 7 — Pressure conditions for flow rate test

	Pressure
Type 1	(0,3 + 0,02) MPa ((3,0 + 0,2) bar)
Type 2	(0,01 + 0,002) MPa ((0,1 + 0,02) bar)

For multi-functional or vario-functional extractable outlets, the maximum flow rate shall determine the flow rate class.

For multi-functional extractable outlets, the manufacturer shall indicate in his literature the minimum pressure required for each function.

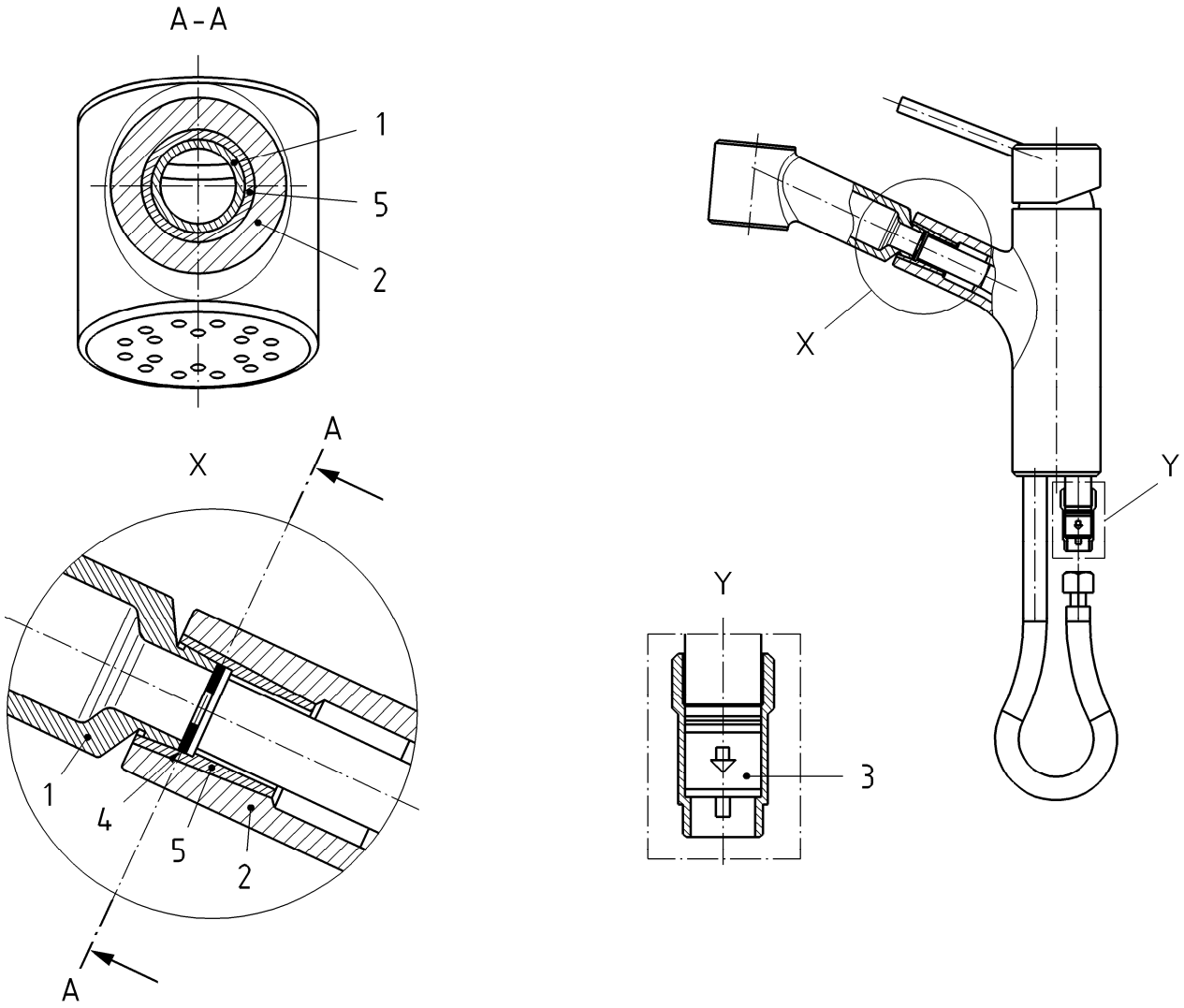
12 Backflow protection

12.1 General

Backflow protection shall be provided using appropriate devices referenced in EN 1717.

In case of using a backflow preventer, this clause describes the possibilities of positioning the backflow preventer.

12.2 Standard connection



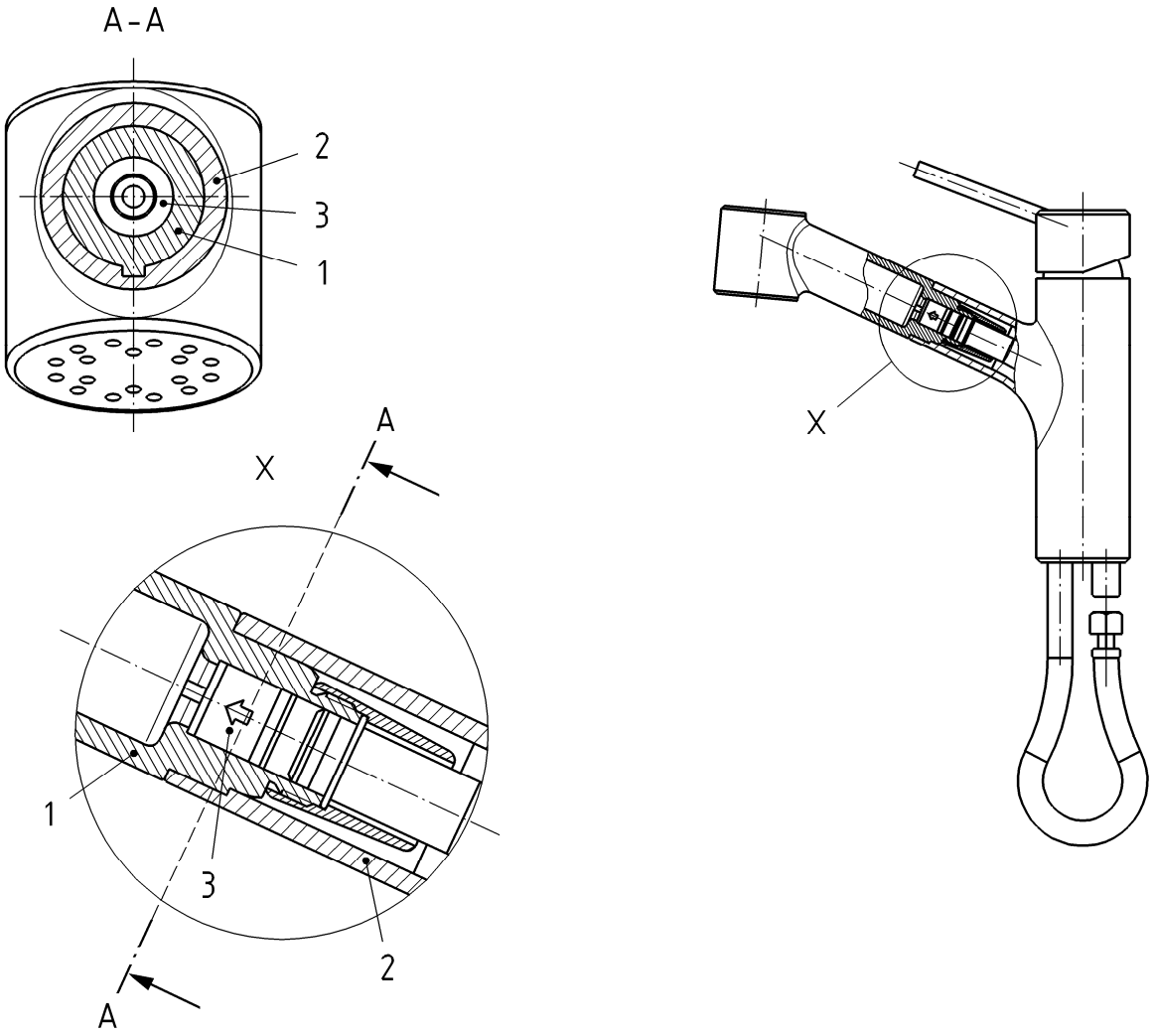
Key

1 shower outlet
2 mixer body
3 backflow preventer
4 washer
5 cone

Figure 8 — Standard connection

Standard connection is when the outlet is fixed at the connection point with the body only by the cone of the hose, and a ½ inch thread (see Figure 8). In this case, the backflow preventer needs to be at the outlet of the faucet.

12.3 Special connection



Key

1 shower outlet
2 mixer body
3 backflow preventer

Figure 9 — Special connection

Special connection is when the outlet has a geometrical fixation with the body beside the cone of the hose, for example oval or with any recess which keeps the outlet in the defined position (see Figure 9). In this case, the backflow preventer can be placed in the extractable outlet.

This applied also when the leaktightness is achieved with a special connection between hose and shower outlet.

13 Acoustic characteristics

13.1 General

This clause specifies the method of classifying extractable outlets by acoustic group and flow class.

Extractable outlets with special connection (see 12.3) delivered together with the tapware are classified in combination with the complete sanitary tapware.

13.2 Procedure

The method of measurement shall be in accordance with EN ISO 3822-1 using the procedure specified in EN ISO 3822-4.

Extractable outlets are tested as supplied and the flow rate obtained at the test pressure of (0,3 ± 0,02) MPa ((3,0 ± 0,2) bar) is reported.

13.3 Expression of results

The results of the measurements taken in accordance with EN ISO 3822-4 are expressed by the noise emission of the extractable outlet $L_{ap,}$ in dB(A).

13.4 Determination of acoustic group

The acoustic group is determined by the value of L_{ap} obtained at a flow pressure of 0,3 MPa (3 bar) and is classified in acoustic group I as shown in Table 8.

Table 8 — Acoustic group

Group	L_{ap} dB(A)
I	≤ 15

14 Rotary connection

14.1 General

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

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

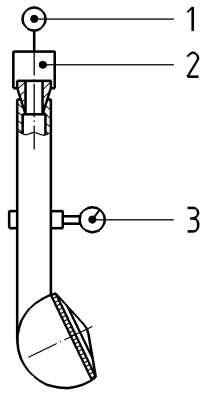
14.2 Test method

14.2.1 Principle

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

14.2.2 Apparatus

The apparatus is detailed in Figure 10.



Key

1 water supply capable of supplying and maintaining the appropriate test pressure specified in Table 9

2 rigid supply pipe for holding the extractable outlet at the connection thread so that the extractable outlet hangs down vertically

3 device which engages with the extractable outlet in order to enable measurement of the initial torque necessary to rotate the extractable outlet relative to the rotary connection

Figure 10 — Rotary connection test apparatus

14.2.3 Procedure

— Seal the spray forming device so that it is watertight.

— Connect the rotary connection of the extractable outlet to the supply pipe.

— Apply cold water ≤ 30 °C at the appropriate pressure specified in Table 9.

— Measure the torque necessary to initiate rotation of the extractable outlet relative to the rotary connection.

Table 9 — Pressure conditions for rotary connection test

	Pressure
Type 1	(0,3 ± 0,02) MPa ((3,0 ± 0,2) bar)
Type 2	(0,1 ± 0,01) MPa ((1,0 ± 0,1) bar)

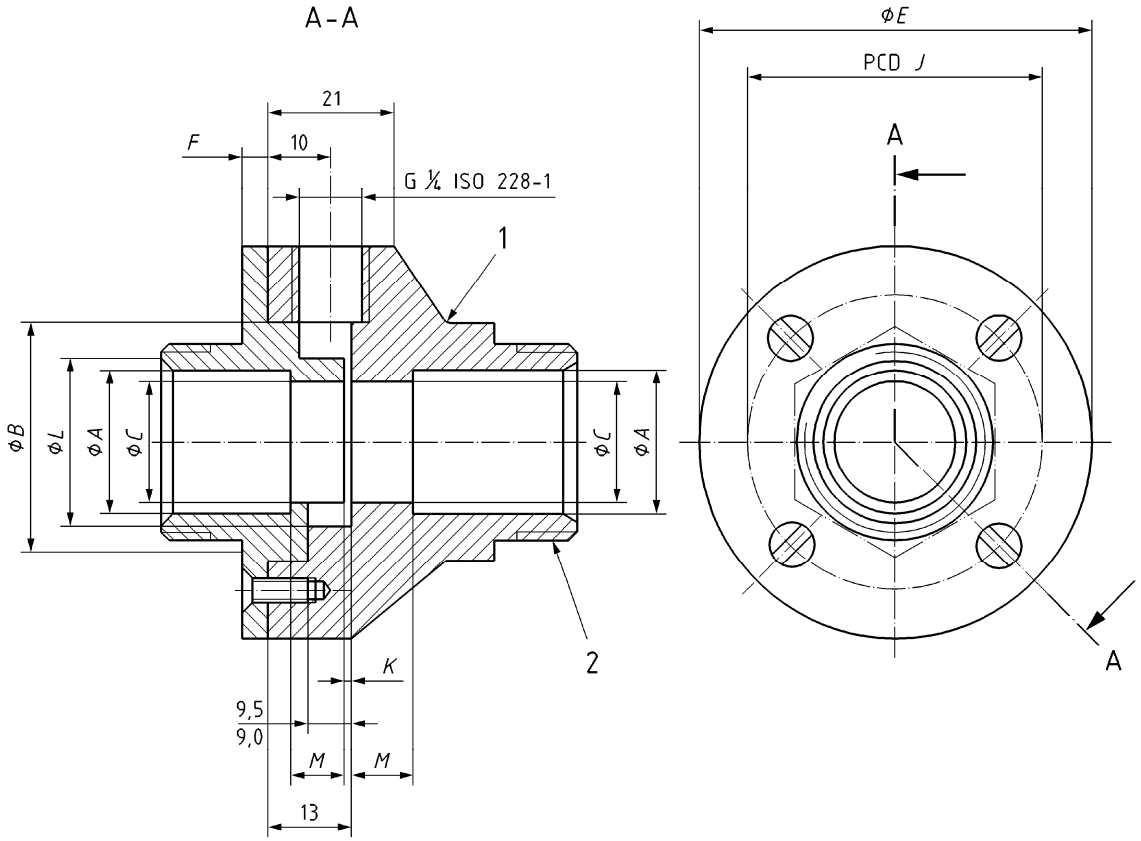
14.2.4 Requirements

The initial torque shall not exceed 0,1 Nm.

Annex A
(informative)

Pressure take-off tee

Dimensions in millimetres



Key

1 hex. or spanner flats

2 both ends conforming to type A, EN 1254-2 (see [5])

NOTE Unspecified tolerances are ± 1.

Figure A.1 — Pressure take-off tee (test rig Type 1 taps)

Table A.1 — Dimensions of the pressure take-off tee

Dimensions of the pressure take-off tee																
Nominal size of tap	A		B		C		E	F	J	K		L		M	Screws	
	max.	min.	max.	min.	max.	min.				max.	min.	max.	min.		No	Size
½	15,25	15,15	26	25	13,95	13,80	40	4	37	0,7	0,6	19	18	5,5	4	M4 x 15
¾	22,30	22,20	36	35	20,75	20,50	50	4	47	0,8	0,6	26	25	9,0		

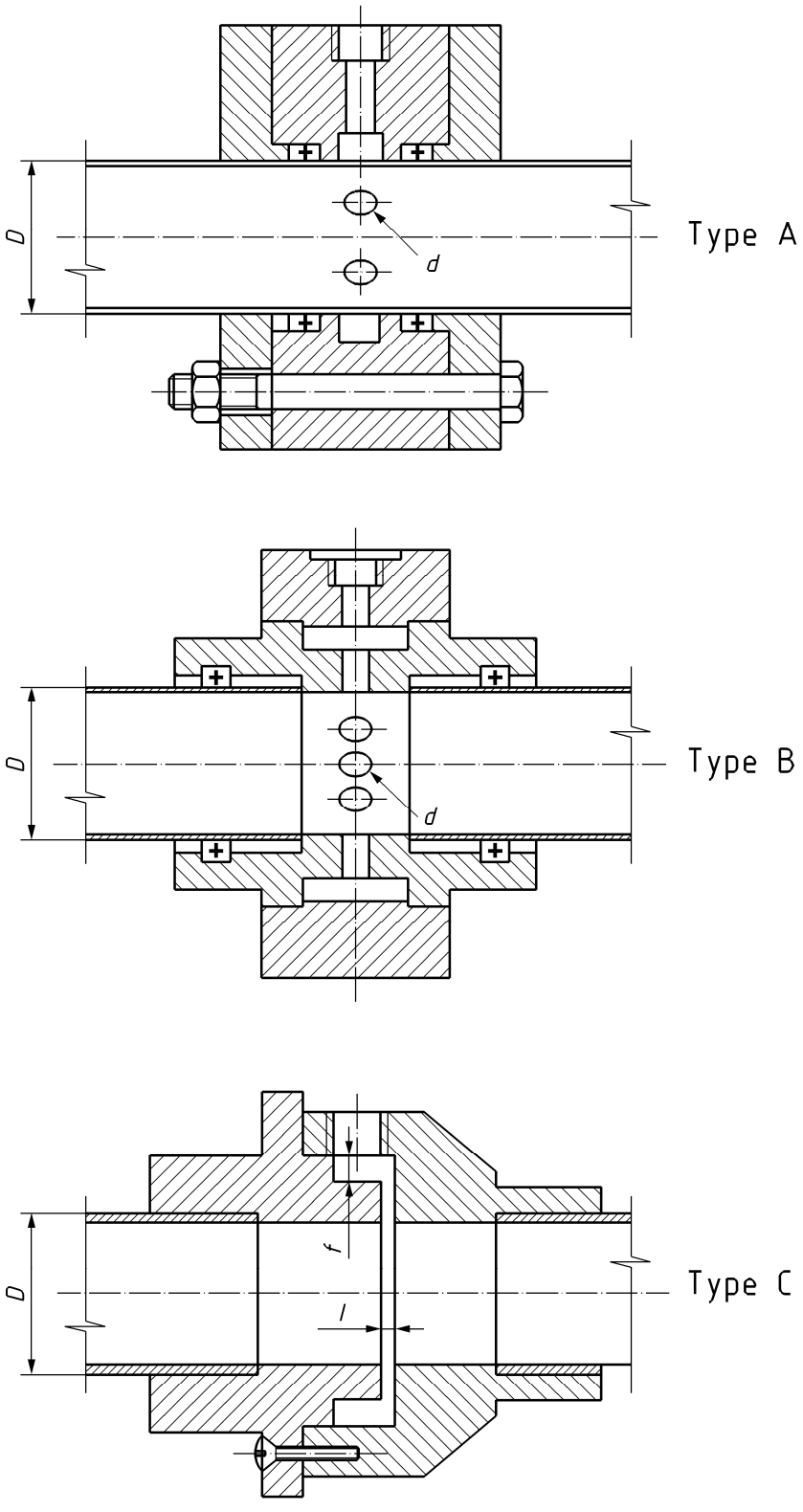


Figure A.2 — Schematic examples of pressure take-off tees (test rig Type 1 taps)

Recommendation for the design of pressure take-off tees:

Figure A.2 shows three examples of pressure take-off tees giving equivalent results:

— individual: types A and B;

— annular slit: type C.

Requirements relating to the design and manufacture of pressure take-off tees are given in EN ISO 5167-1 (see [7]).

The main principles are:

a) Individual type:

1) The axis of the pressure orifices shall intersect the axis of the piping (or the casing) and be perpendicular to it; the opening of the orifice shall be circular and the edges flush with the wall of the piping (or the casing) with an angle as sharp as possible. Slight rounding at entry is permitted (radius ≤ 1/10 diameter of the pressure orifice).

2) The diameter of the pressure orifice shall be less than 0,1 D (with D being the internal diameter of the tube or casing).

3) There shall be an even number (at least four) of the pressure orifices. The angles formed by the arcs of the pressure orifices shall be approximately equal.

4) The area of the free cross section of the annular chamber of the casing shall be greater than or equal to the half total area of the orifices connecting the chamber to the piping.

b) Annular slit:

1) The thickness f of the annular slit shall be equal to or greater than twice the width i of the slit.

2) The area of the free section of the annular chamber should be equal to or greater than half the total area of the annular slit connecting the chamber to the piping.

3) All surfaces coming into contact with the fluid measured shall be clean and well finished.

4) The width of the annular slit shall be nominally 1 mm.

Bibliography

[1] EN 200, *Sanitary tapware — Single taps and combination taps for water supply systems of type 1 and type 2 — General technical specification*

[2] EN 817, *Sanitary tapware — Mechanical mixing valves (PN 10) — General technical specifications*

[3] EN 1111, *Sanitary tapware — Thermostatic mixing valves (PN 10) — General technical specification*

[4] EN 1254-2, *Copper and copper alloys — Plumbing fittings — Part 2: Fittings with compression ends for use with copper tubes*

[5] EN 1286, *Sanitary tapware — Low pressure mechanical mixing valves — General technical specification*

[6] EN 1287, *Sanitary tapware — Low pressure thermostatic mixing valves — General technical specifications*

[7] EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1)*

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