
International Standard



3822/4

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Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations —

Part 4 : Mounting and operating conditions for special appliances

Acoustique — Mesurage en laboratoire du bruit émis par les robinetteries et les équipements hydrauliques utilisés dans les installations de distribution d'eau — Partie 4 : Conditions de montage et de fonctionnement des équipements spéciaux

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3822/4 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations —

Part 4 : Mounting and operating conditions for special appliances

0 Introduction

The method of measurement for laboratory tests on noise emission from appliances and equipment used in water supply installations is specified in ISO 3822/1.

The mounting and operating conditions for draw-off taps are described in ISO 3822/2, whereas ISO 3822/3 describes the mounting and operating conditions for in-line valves and appliances.

This part of ISO 3822 describes the mounting and operating conditions for laboratory tests of appliances of such construction that they cannot easily be considered as draw-off taps, or in-line valves or appliances.

1 Scope and field of application

This part of ISO 3822 specifies the mounting and operating conditions to be used for a number of appliances which cannot be regarded as draw-off taps, or in-line valves or appliances, when measuring the noise emission resulting from water flow.

2 References

ISO 7/1, *Pipe threads where pressure-tight joints are made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 48, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD).*

ISO 49, *Malleable cast iron fittings threaded to ISO 7/1.*

ISO 228/1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Designation, dimensions and tolerances.*

ISO 2768, *Permissible machining variations in dimensions without tolerance indication.*

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

ISO 3822/2, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installa-*

tions — Part 2: Mounting and operating conditions for draw-off taps.

ISO 3822/3, *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 3: Mounting and operating conditions for in-line valves and appliances.*

ISO 6708, *Pipe components — Definition of nominal size.*

3 Mounting and operating conditions

3.1 Float-operated valves

3.1.1 General

A float-operated valve not forming part of a particular flushing unit shall be tested in a standard test cistern for which the internal dimensions are given in table 1.

Table 1 — Internal dimensions of standard test cisterns

Nominal size (DN) of the float-operated valves		Length mm	Height mm	Width mm
DN ¹⁾	Designation of thread			
10	3/8	400	300	125
15	1/2			
20	3/4	1 050	540	350
25	1			

1) See ISO 6708. DN is the symbol for "nominal size"; the nominal size value is loosely related to the inside diameter, in millimetres, of the special appliance.

Float-operated valves forming part of a flushing unit, e.g. a toilet flushing unit, shall be tested together with the cisterns in which they are mounted and also with the stop-valve if it forms part of the unit.

3.1.2 Mounting conditions

If the appliance is fitted with a copper connecting pipe, it shall be at least 10 diameters in length, though not more than 300 mm. If another type of connection is supplied, the connection to the test pipe shall be made, as far as possible, as in the field. When a compression fitting is used, a copper connecting pipe shall be inserted into the appliance, according to the

manufacturer's instructions. There shall be no stop-valve between the appliance and the appliance connection at the end of the test pipe, unless it belongs to the unit.

NOTE — The test cistern should be firmly fixed to a solid or rigid support which is independent of the test wall, so as to minimize the transmission of extraneous noise.

3.1.3 Operating conditions

Float-operated valves shall be tested at flow pressures of 0,3 and 0,5 MPa*, adjusted when the valve is in the fully open position. If required, additional tests shall also be carried out at flow pressures of 0,1, 0,2 and/or 0,4 MPa.

The specified minimum filling of the cistern shall be adjusted at a flow pressure of 0,3 MPa.

The highest sound pressure level during the steady flow phase and the closing phase of the valve shall be measured and recorded.

3.2 Flushing valves

3.2.1 Mounting conditions

Flushing valves shall be connected directly to the test pipe. The outlet of the valve shall be connected to a hose of about 500 mm in length and of the same bore as the outlet of the flushing valve. At the end of the hose, the water shall be discharged quietly.

3.2.2 Operating conditions

Flushing valves shall be tested at flow pressures in accordance with table 2, adjusted when the valve is in the fully open position.

Table 2 — Flow pressures for testing flushing valves

Nominal size of flushing valve DN	Flow pressure MPa
15	0,25 and 0,4
20	0,25 and 0,4
25	0,15 and 0,3
32	0,1

The highest sound pressure level during the steady-flow phase and the closing phase of the valve shall be measured and recorded.

If the flushing valve can be adjusted manually, it shall be adjusted so that the maximum flow-rate acceptable according to national or other standards is achieved. For flow pressures at which this flow-rate cannot be achieved, the measurements shall be carried out at the maximum possible flow-rate. In each case, the flow-rate used shall be stated in the test report.

* 1 MPa = 10 bar

3.3 Water-heating appliances

3.3.1 Mounting conditions

The water-heating appliances shall be connected to the test pipe by means of a tube at least 10 diameters in length, though not more than 500 mm. They shall be mounted rigidly on a wall other than the test wall or on a frame.

3.3.2 Operating conditions

The water-heating appliance shall be tested with water at a temperature not higher than 25 °C.

Water-heating appliances with an integral draw-off tap shall be tested in accordance with ISO 3822/2.

3.3.3 Special requirements

Instantaneous heaters in which the draw-off tap (single or mixing valve) is integral with the water-heating appliance shall be tested in accordance with ISO 3822/2.

If the instantaneous heater has to be combined with a non-integral draw-off tap, it shall be tested in accordance with ISO 3822/2. The test shall be carried out with a low-noise flow resistance instead of a draw-off tap. The flow resistance shall be adjusted so that the value of the maximum flow-rate, expressed in litres per second, is numerically equal to 1/120 of the value of the nominal heating power, expressed in kilowatts, of the water-heating appliance. If this flow-rate cannot be achieved, the test shall be carried out at the maximum possible flow-rate.

If the instantaneous heater incorporates an adjustable flow control, it shall be set to the maximum possible flow-rate. An instantaneous heater in which no flow control is incorporated or with a flow control which cannot be adjusted or which has an automatic function shall be tested as it is.

For all tests, the low-noise flow resistance (see example given in ISO 3822/3) shall be adjusted from a zero flow-rate up to the maximum flow-rate, as mentioned above. An instantaneous heater with a flow control functioning as a temperature selector shall be tested under conditions of both minimum and maximum temperature. Checks shall be made to ascertain whether there are any peculiarities in the sound pressure level in the intermediate range.

If there are stop-valves in the connections, they shall be in the fully open position, unless they are intended to be used as flow adjusters, in which case they shall be considered as such.

If a manufacturer issues instructions as to the adjustment of flow adjusters, these shall be complied with.

3.4 Mixing valves for instantaneous heaters

3.4.1 Mounting conditions

Both inlets of the mixing valve shall be connected to the test pipe in accordance with ISO 3822/2.

3.4.2 Operating conditions

The cold water side shall be tested in accordance with ISO 3822/2.

For testing the hot water side, the flow pressure shall be regulated so that with the valve fully open the value of the flow-rate, expressed in litres per second, is numerically equal to 1/120 of the value of the maximum nominal power, expressed in kilowatts, of the heater with which the appliance is expected to be used.

If the appliance is provided with a flow pressure control, it shall be set to 0,3 MPa at the flow-rate mentioned above. If the appliance is intended to be used in combination with heaters of various nominal heating powers, the flow-rate shall also be adjusted in accordance with the minimum nominal heating power. Using different settings of the flow control, checks shall be made to ascertain whether there are any peculiarities in the sound pressure level, within the range of the two flow-rates.

If the appliance is provided with an automatic regulator, the measurements shall be carried out at 0,3 MPa and at the flow-rate which has been regulated automatically.

3.5 Overflow mixing valves for open-outlet electric storage water heaters

3.5.1 Mounting conditions

Overflow mixing valves for open-outlet electric storage water heaters are connected by their inlet to the test pipe. In place of the tank or vessel, a by-pass shall be used.

3.5.2 Operating conditions

Overflow mixing valves for open-outlet electric storage water heaters with a flow adjuster shall be tested at flow pressures of 0,3 MPa and 0,5 MPa with the minimum and the maximum flow-rates adjusted in accordance with their practical applications (for example, at 0,1 l/s for 5 l water-heaters and at 0,3 l/s for 80 l water heaters).

If the flow-rate can be adjusted continuously, the range between the minimum and the maximum flow-rate shall be checked to ascertain whether there are any peculiarities in the sound pressure level.

Overflow mixing valves for open-outlet electric storage water heaters with a device for temperature regulation shall be tested in the "cold" position only. A check for any peculiarities in the sound pressure level shall be made by operating the temperature control.

3.6 Fittings for the connection of household equipment

Fittings for the connection of household equipment (washing-machines, dish-washers, etc.) shall be tested as in-line valves (see ISO 3822/3) or as draw-off taps (see ISO 3822/2), as applicable.

3.7 Outlet fittings

3.7.1 Mounting conditions

Aerators and shower heads shall be connected to the test pipe by means of the device shown in figure 1. For connecting outlet fittings to a vertical test pipe, an additional long sweep bend is necessary.

The appliances shall be mounted in their nominal operating position.

Hand-held shower heads with hose shall be tested without the hose.

Adjustable outlet fittings shall be tested in the position giving the maximum sound pressure level. Diverters shall be tested in all positions used in normal practice.

Ball joints, anti-backsiphonage valves and flow controls shall be connected to the test pipe as described above. The outlet of these appliances shall be connected to the low-noise flow resistance with calibrated flow-rates, as described in annex A, and shall be fitted, by means of adaptors, as shown in the examples given in annex B.

Flow controls shall always be tested with a flow resistance having a flow-rate of 0,25 l/s at a flow pressure of 0,3 MPa.

When several outlet appliances comprise a unit, for example a flow control and/or ball joint with the aerator, they shall be mounted and tested like an aerator, that is as a unit.

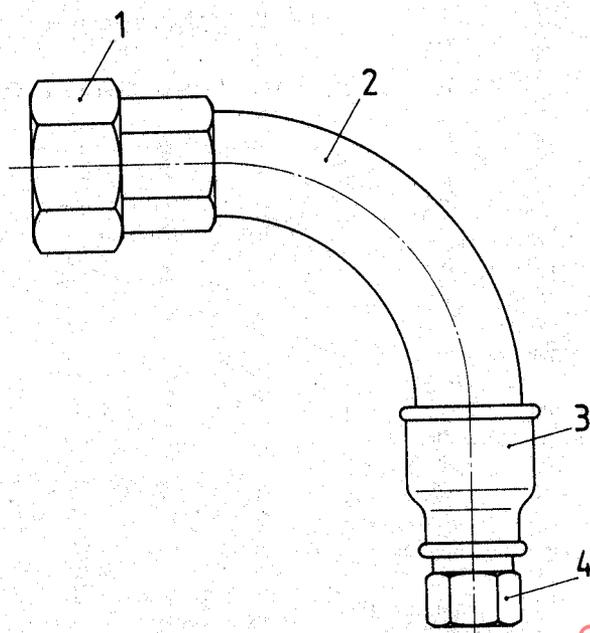
3.7.2 Operating conditions

The sound pressure levels of outlet fittings shall be tested at flow pressures of 0,3 and 0,5 MPa and the flow-rates shall be recorded. If required, tests shall also be carried out at flow pressures of 0,1, 0,2 and 0,4 MPa.

4 Test report

The test report shall include the following information :

- a) the information required by ISO 3822/1;
- b) the mounting of the appliance tested;
- c) the flow pressures and flow-rates used, the outlet used and the sound pressure levels obtained;
- d) a description of the appliance tested, including the type, nominal size, manufacturer and manufacturer's number;
- e) the number of the clauses in this part of ISO 3822 relevant to the appliance (see also ISO 3822/2 and ISO 3822/3) and in accordance with which the tests were carried out, together with descriptions of any peculiarities observed;
- f) for float-operated valves, a description of the cistern used and the stop-valve, if any.



- 1 Union, taper seat 1, U11, complying with the requirements of ISO 49, galvanized
- 2 Male and female long sweep bend 1, G8, complying with the requirements of ISO 49, galvanized
- 3 Socket M2, 1 × 3/4, complying with the requirements of ISO 49, galvanized
- 4 Adaptor, brass, complying with the requirements of annex C.

Figure 1 — Device for connecting outlet fittings to the horizontal test pipe

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Annex A

Low-noise flow resistances with calibrated flow-rates

(This annex forms an integral part of the standard.)

The body and the tubes shall be made from brass. Permissible machining variations in dimensions without tolerance indication shall be in accordance with those specified for the medium series in ISO 2768.

Rubber having a hardness of 75 ± 5 IRHD, in accordance with ISO 48, shall be used for the seals.

The appliance sound pressure level L_{ap} of the flow resistances shall be less than 10 dB, that is $D_s > 35$ dB at a flow pressure of 0,3 MPa (see 3.7).

Dimensions in millimetres

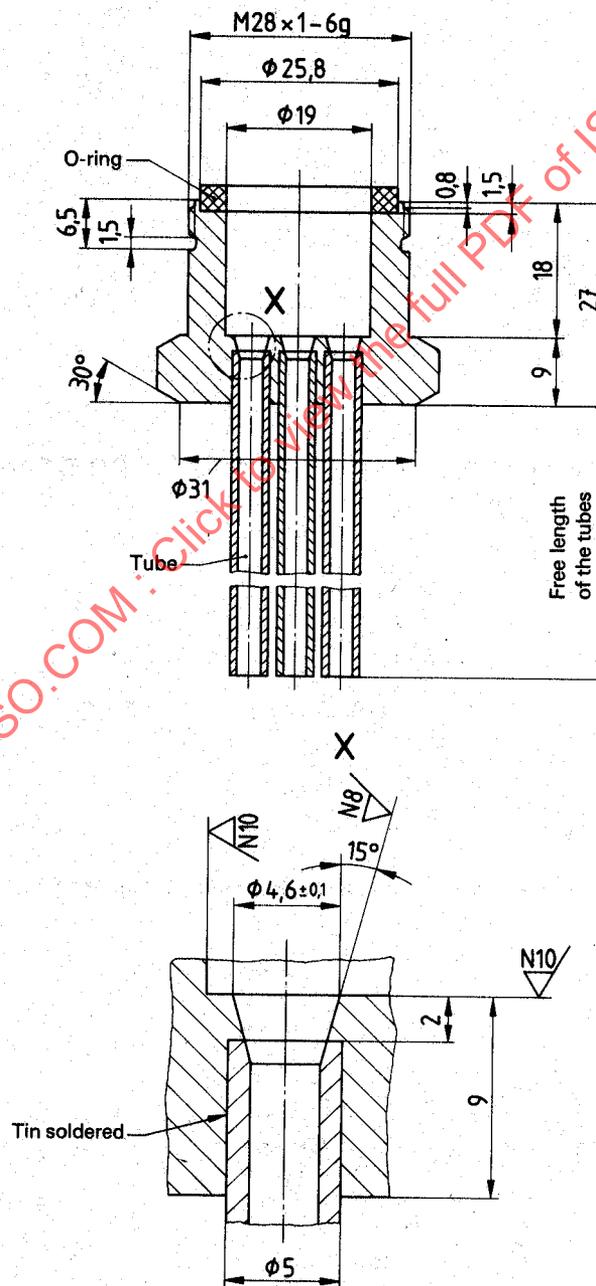


Figure 2 – Flow resistance with calibrated flow-rate (R)

Table 3 — Length and number of tubes required for flow resistances with calibrated flow-rate

Designation	Flow-rate l/s	Tube		
		Free length, approximately mm	Number	Arrangement in accordance with figure
Resistance ISO 3822-R25	0,25	450	3	3
Resistance ISO 3822-R33	0,33	300	3	3
Resistance ISO 3822-R42	0,42	450	5	4
Resistance ISO 3822-R50	0,50	300	5	4
Resistance ISO 3822-R63	0,63	350	6	5

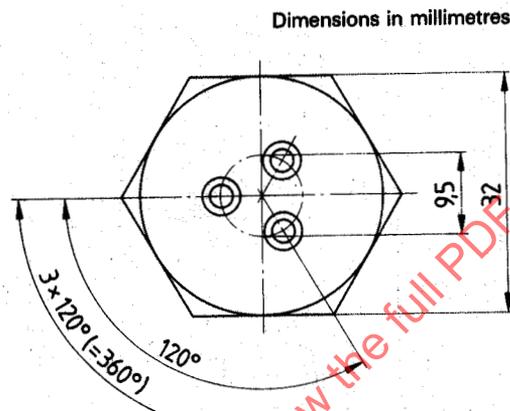


Figure 3 — Arrangement of the tubes for resistances ISO 3822-R25 and ISO 3822-R33

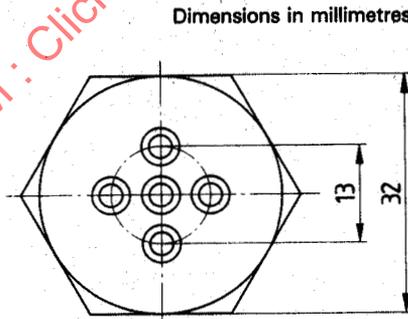


Figure 4 — Arrangement of the tubes for resistances ISO 3822-R42 and ISO 3822-R50

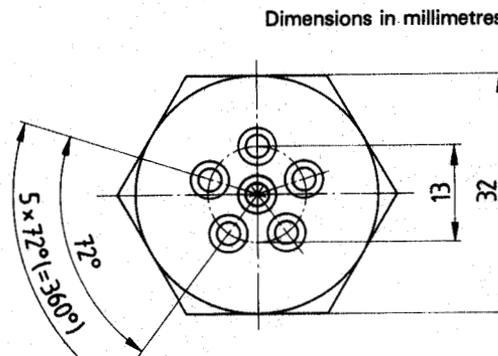


Figure 5 — Arrangement of the tubes for resistance ISO 3822-R63

Annex B

Examples of adaptors for the connection of low-noise flow resistances with calibrated flow-rate

(This annex does not form part of the standard.)

The adaptors shall be made of brass. Permissible machining variations in dimensions without tolerance indication shall be in accordance with those specified for the medium series in ISO 2768.

Rubber having a hardness of 75 ± 5 IRHD, in accordance with ISO 48, shall be used for the sealings shown in figures 6 and 7.

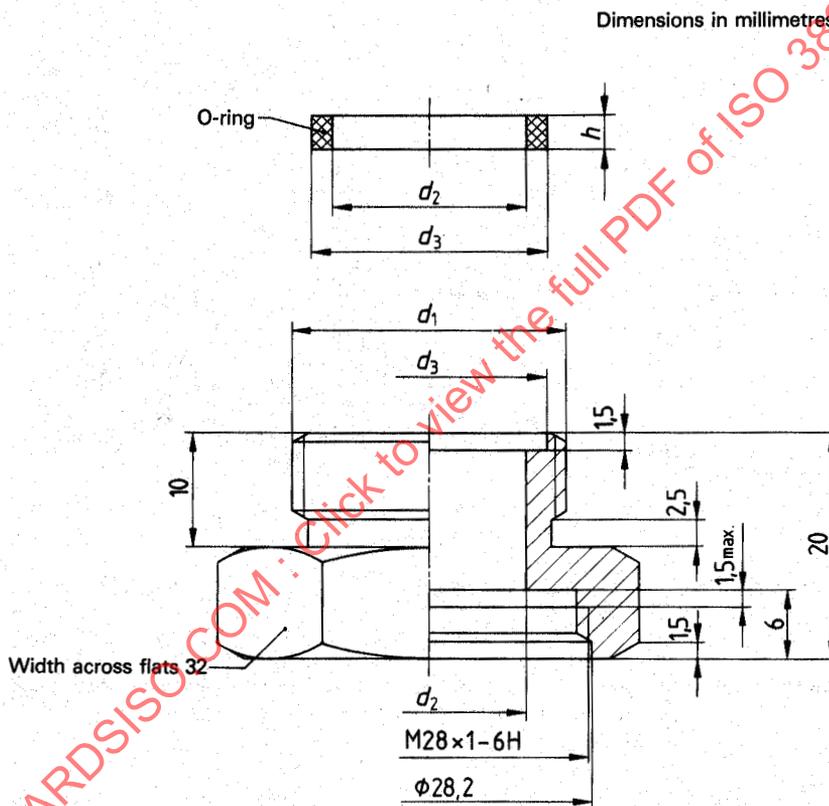


Figure 6 — Adaptor with an outside thread (A1) for the connection of low-noise flow resistances with calibrated flow-rate

Table 4 — Dimensions of adaptors with an outside thread (A1)

Designation	Dimensions			
	d_1	d_2	d_3	h
Adaptor ISO 3822-A1 — M24 x 1	M24 x 1 — 6g	17	20,8	3
Adaptor ISO 3822-A1 — G 1/2 B	ISO 228 — G 1/2 B	13	18	3,5
Adaptor ISO 3822-A1 — G 3/4 B	ISO 228 — G 3/4 B	19	23,5	4,5