
**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*



Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3822-4 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 3822-4:1985), which has been technically revised.

ISO 3822 consists of the following parts, under the general title *Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations*:

- *Part 1: Method of measurement*
- *Part 2: Mounting and operating conditions for draw-off taps and mixing valves*
- *Part 3: Mounting and operating conditions for in-line valves and appliances*
- *Part 4: Mounting and operating conditions for special appliances*

Annexes A, B, C and D form an integral part of this part of ISO 3822. Annex E is for information only.

© ISO 1997

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isoscs; s=central

Printed in Switzerland

Content

Foreword	iv
0 Introduction	iv
1 Scope	1
2 Normative references	1
3 Mounting and operating conditions	1
3.1 Connection of appliances	1
3.2 Float-operated valves	2
3.3 Flushing valves	3
3.4 Water Heating Appliances	3
3.5 Mixing valves for instantaneous heaters of the closed type	6
3.6 Mixing valves for overflow (open outlet) type water heaters	6
3.7 Fittings for the connection of household equipment	7
3.8 Outlet fittings	8
4 Test report	8
Annex A (normative) Low-noise flow resistances with calibrated flow rate	10
Annex B (normative) Adaptors for the connection of low-noise flow resistances with calibrated flow rate	18
Annex C (normative) Adaptors for the connection of outlet fittings	20
Annex D (normative) Arrangement for testing shower handsets	22
Annex E (informative) Summary of water heater types and test configurations	24

Foreword

The text of EN ISO 3822-4 :1997 has been prepared by Technical Committee CEN/TC 126 "Acoustic properties of building components and of buildings" the secretariat of which is held by AFNOR in collaboration with the Technical Committee ISO/TC 43 "Acoustics".

The content of this part of the European Standard EN ISO 3822 is not identical with the International Standard ISO 3822-4:1985 "Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 4 : Mounting and operating conditions for special appliances".

Working group CEN/TC 126/WG 3 was instructed, in May 88, to examine and take into account the comments on ISO 3822-4, following the primary questionnaire.

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 July 1997, and conflicting national standards shall be withdrawn at the latest by July 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

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

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

This part of EN 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 or in-line appliances, e.g. water heaters, shower heads, etc.

1 Scope

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

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 7/1	Pipe threads where pressure-tight joints are made on the threads - Part 1: Designation, dimensions and tolerances.
ISO 48	Vulcanised 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 6708	Pipe components - Definition of nominal size.
EN ISO 3822-1	Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 1: Method of measurement.
EN ISO 3822-2	Acoustics - Laboratory tests on noise emission from appliances and equipment used in water supply installations - Part 2: Mounting and operating conditions for draw-off taps and mixing valves.
EN 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.

3 Mounting and operating conditions

3.1 Connection of appliances

The test pipe shall end with a galvanised union (hot-dip zinc coated), taper seat size 1, U11 complying with ISO 49.

Special appliances, including connecting pipe, shall be connected to the union using if necessary a combination of galvanised (hot-dip zinc coated) fittings complying with ISO 49.

Changes in direction shall be accomplished by means of long sweep bends size 1 only. Reduction or enlargement of size shall only be made at the inlet connection of the appliance or connecting pipe. The combination of fittings used shall result in the appliance being mounted in the normal position of use (see figure 1).

3.2 Float-operated valves

3.2.1 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 valve		Length mm	Height mm	Width mm
DN	Designation of thread			
10 15	3/8 1/2	400	300	125
20 25	3/4 1			
NOTE : DN is the symbol for "nominal size" (see ISO 6708); 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.

3.2.2 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.

The test cistern shall be fixed acoustically independent of the test wall.

3.2.3 Operating conditions

Float-operated valves shall be tested at flow pressures of 0,3 MPa and 0,5 MPa ¹⁾, adjusted when the valve is in the fully open position and maintained during closing.

The minimum rate of filling of the cistern specified by the appropriate product standard ²⁾, or the manufacturer, shall be adjusted at a flow pressure of 0,3 MPa.

¹⁾ 1 MPa = 10 bar

²⁾ The appropriate EN product standard is prEN 12541 and the document CEN/TC163/WG3/GAH3N64

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

3.3 Flushing valves

3.3.1 Mounting conditions

Flushing valves shall be connected directly to the test pipe (see 3.1). 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.

3.3.2 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. The maximum static pressure when closed (all sizes) shall be 0,7 MPa.

Table 2 : Flow pressures for testing flushing valves

Nominal size of flushing valve DN	15		20		25		32
Flow pressure with valve fully open MPa	0,25	0,4	0,25	0,4	0,1	0,25	0,1

If the flushing valve can be site adjusted manually, it shall be adjusted to the flow rates specified by the appropriate product standard ³⁾, or the manufacturer. 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.

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

3.4 Water Heating Appliances

3.4.1 General

Testing of complete water heaters of all types is only necessary when the heater incorporates a device which influences the flow rate or pressure of the water.

3.4.2 Mounting conditions

Water heating appliances shall be connected to the test pipe using a connecting pipe of the same nominal bore as the appliance inlet connection. This connecting pipe shall have a length at least equal to 10 times its nominal bore, but shall not be longer than 500 mm. The appliance shall be rigidly mounted on a wall other than the test wall, or on a frame.

³⁾ The appropriate EN product standard is EN 816

3.4.3 Operating conditions

Water heating appliances shall be tested with water at a temperature not higher than 25 °C. The tests specified in 3.4.3.1; 3.4.3.2; 3.4.3.3; 3.4.3.4 shall be carried out at flow pressures of 0,3 MPa and 0,5 MPa. Additional tests are necessary in some cases when flow adjusters are incorporated into the appliance.

Stop valves incorporated into the appliance shall be fully open unless they are intended to be used as flow adjusters.

3.4.3.1 Cistern type storage water heaters

Float operated valves used in cistern type water heaters shall be tested in accordance with 3.2.

3.4.3.2 Storage water heaters of the closed type

a) If the water heater incorporates an integral draw-off tap or mixing valve, it shall be tested in accordance with EN ISO 3822-2, including requirements for flow adjusters.

b) Water heaters without an integral draw-off tap or mixing valve, but incorporating some device which influences the flow rate or pressure of the water, such as a flow adjuster, shall be tested with an adjustable low-noise flow resistance (see example given in EN ISO 3822-3) connected to the outlet. The adjustable low-noise flow resistance shall be set so that at a flow pressure of 0,3 MPa the maximum flow rate is in accordance with table 1 of EN ISO 3822-3 for the size of the heater inlet, or outlet, whichever is the smaller. If this flow rate cannot be achieved the test shall be carried out at the maximum possible flow rate.

During the test the adjustable low-noise flow resistance shall be adjusted from the maximum setting specified above down to zero flow rate. The sound pressure level shall be measured during this procedure, and the highest level reported.

If the water heater incorporates a flow adjuster which can be manually set, the setting shall be in accordance with clause 4.1.5 of EN ISO 3822-2. Flow adjusters with a fixed setting or automatic function shall be left as supplied.

3.4.3.3 Instantaneous water heaters of the closed type

a) If the water heater incorporates an integral draw-off tap or mixing valve, it shall be tested in accordance with EN ISO 3822-2, including requirements for flow adjusters.

If the water heater uses a flow adjuster, or other supplementary flow control, as a temperature selector, tests shall be carried out at both maximum and minimum settings. Checks shall also be made for any greater sound pressure level at intermediate settings.

b) Water heaters without an integral draw-off tap or mixing valve shall be tested with an adjustable low-noise flow resistance (see example given in EN ISO 3822-3) connected to the outlet. The adjustable low-noise flow resistance shall be set so that at a flow pressure of 0,3 MPa the maximum flow rate is a value, in litres per second, equal to 1/120 of the nominal heating power, expressed in kilowatts, of the water heater. If this flow rate cannot be achieved the test shall be carried out at the maximum possible flow rate.

During the test the adjustable low-noise flow resistance shall be adjusted from the maximum setting specified above down to zero flow rate. The sound pressure level shall be measured during this procedure and the highest level reported.

If the water heater incorporates a flow adjuster which can be manually set, it shall be set to the maximum possible flow rate. Flow adjusters with a fixed setting or automatic function shall be left as supplied.

If the water heater uses a flow adjuster, or other supplementary flow control, as a temperature selector, tests shall be carried out at both maximum and minimum settings. Checks shall also be made for any greater sound pressure level at intermediate settings.

Before repeating the test at a flow pressure of 0,5 MPa the adjustable low-noise flow resistance shall be reset, at a flow pressure of 0,3 MPa, to the flow rate specified above. Then increase the flow pressure to 0,5 MPa.

3.4.3.4 Water heaters of the overflow (open outlet) type - both storage and instantaneous

a) If the water heater incorporates an integral draw-off tap or mixing valve, it shall be tested in accordance with EN ISO 3822-2, including requirements for flow adjusters.

If the water heater is supplied with a removable outlet accessory such as a shower hose, shower head, flow straightener etc., the test shall be carried out with this in place. Otherwise nothing shall be connected to the heater outlet during the test.

If the water heater uses a flow adjuster, or other supplementary flow control, as a temperature selector, tests shall be carried out at both maximum and minimum settings. Checks shall also be made for any greater sound pressure level at intermediate settings.

b) Water heaters without an integral draw-off tap or mixing valve, but incorporating some device which influences the flow rate or pressure of the water such as a flow adjuster, shall be tested as they are.

If the water heater is supplied with a removable outlet accessory such as a shower hose, shower head, flow straightener etc., the test shall be carried out with this in place. Otherwise nothing shall be connected to the heater outlet during the test.

If the water heater incorporates a flow adjuster which can be manually set, it shall be set to the maximum possible flow rate. Flow adjusters with a fixed setting or automatic function shall be left as supplied.

If the water heater uses a flow adjuster, or other supplementary flow control, as a temperature selector, tests shall be carried out at both maximum and minimum settings. Checks shall also be made for any greater sound pressure level at intermediate settings.