
**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**

*Acoustique — Mesurage en laboratoire du bruit émis par les robinetteries et
les équipements hydrauliques utilisés dans les installations de distribution
d'eau —*

*Partie 3: Conditions de montage et de fonctionnement des robinetteries et
des équipements hydrauliques en ligne*



Foreword

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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 3822-3 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 3822-3:1984), 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*

Annex A of this part of ISO 3822 is for information only.

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Foreword

The text of EN ISO 3822-3:1997 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 3822-3:1984 "Acoustics - Laboratory test on noise emission from appliances and equipment used in water supply installations - Part 3 : Mounting and operating conditions for in-line valves and appliances".

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

This part of EN ISO 3822 gives detailed descriptions for mounting and operating in-line valves and appliances, which control the flow, pressure or temperature of the water in water supply installations in such laboratory tests.

NOTE : An in-line valve is one through which water flows and which is permanently installed in a system of rigid pipework upstream of the outlet fitting.

These in-line valves and appliances are for use with cold and/or hot water in buildings (stopcocks, check valves, in-line thermostatic and mechanical mixing valves, domestic water meters, valve combinations for installation in water heater feed pipes, pressure reducing valves, flow restrictors, water governors, service valves, in-line temperature and pressure relief valves, etc.).

1 Scope

This part of EN ISO 3822 specifies the mounting and operating conditions to be used for in-line valves and appliances which control the flow, pressure or temperature of the water in water supply installations, when measuring noise emission resulting from water flow

It is applicable to in-line valves and appliances of maximum nominal size DN 32 ¹⁾ and to systems in which the maximum water flow rate does not exceed 2 l/s.

The procedure described are for general use for all types of in-line valves of conventional design.

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 49 | Malleable cast iron fittings threaded to ISO 7/1 |
| ISO 274 | Copper tubes of circular section - Dimensions |
| 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 6708 | Pipe components - Definition of nominal size |

¹⁾ See ISO 6708 ; DN is the symbol for "nominal size". The number of the nominal size is loosely related to the inside diameter (in millimetres) of the in-line valves and appliances.

3 Mounting

3.1 General

In-line valves shall be inserted between two straight pieces of pipe of the type and sizes appropriate to the end-connections of the valve. Each straight piece of pipe shall be at least ten diameters long.

3.1.1 Installation

The in-line valve or appliance shall be installed in its normal working position, which is generally vertical or horizontal.

The test shall be carried out for the noisiest of the two positions, which shall be determined by a short preliminary test.

If the manufacturer specifies that the appliance may be installed in other positions, then the short preliminary test shall be carried out for these positions.

3.1.2 Connection

The in-line valve or appliance shall be connected to the test pipe in accordance with the appropriate description in 3.3 to 3.7. The connection shall be made so that no air will be trapped therein.

In-line valves or appliances fitted with connections not covered by 3.3 to 3.5 inclusive shall be connected to the test pipe and to the discharge system so as to provide a rigid and watertight connection in accordance with good practice and workmanship.

3.2 Fitting to the test pipe

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

In line valves and appliances, including connecting pipe (see 3.1) 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 connecting pipe. The combination of fittings used shall result in the appliance being in the normal position of use.

3.3 Mounting of in-line valves and appliances with screwed connections

In-line valves and appliances with screwed connections for galvanised pipes (see 3.1) shall be connected to the test pipe as specified in 3.2.

3.4 Mounting of in-line valves and appliances with provision for soldering in copper connecting pipes

In-line valves and appliances with provision for soldering in copper connecting pipes shall have a piece of copper pipe of the appropriate diameter and at least ten diameters in length, though not more than 300 mm, soldered in each connection. This copper pipe shall be connected to the test pipe as specified in 3.2 and 3.5.

3.5 Mounting of in-line valves and appliances fitted with copper connecting pipes

In-line valves and appliances fitted with copper connecting pipes, which shall be extended, if necessary, to at least ten diameters in length, though not more than 300 mm, shall be connected to the test pipe, as specified in 3.2, using couplings made either by soldering a nipple on to the pipe and using a cap nut or by means of a compression fitting.

3.6 Mounting of in-line valves or appliances with two inlets

In-line valves or appliances with two inlets shall be connected to the test pipe, as specified in 3.3, 3.4 or 3.5, by means of a twin outlet (see EN ISO 3822-1).

3.7 Discharge connection

The discharge system specified in 4.1.4 shall be connected to the outlet of the in-line valve or appliance by one of the methods specified in 3.3 to 3.5.

4 Test procedure

4.1 General test conditions

4.1.1 General

In-line valves and appliances shall be tested by the method specified in EN ISO 3822-1.

4.1.2 Water temperature

All in-line valves and appliances, including those which are normally operated with both hot and cold water, shall be tested with water at a temperature not exceeding 25 °C at all inlets.

4.1.3 Outlets

In-line valves and appliances with more than one outlet shall be tested for each outlet separately. The unused outlet(s) shall be closed by a drain cock for venting the valve or appliance.

4.1.4 Flow regulating and discharge system

In-line valves and appliances shall be tested with an adjustable low noise flow resistance connected downstream of the valve.

The noise produced by this flow resistance, including the intrinsic noise of the test arrangement, shall be lower than that of the appliance to be tested by at least 10 dB. An example of such a low noise flow resistance is given in annex A.

If the specified water flow rate cannot be obtained by adjusting the low noise flow resistance connected to the valve under test, the flow resistance shall be replaced by 1m of smooth bore flexible hose of the same bore as the outlet of the valve.

4.1.5 Test pressures

The procedures specified in 4.2, 4.3, 4.4, 4.6 or 4.7 shall be carried out at a flow pressure of 0,3 Mpa ²⁾ and then at a flow pressure of 0,5 MPa, without altering the specified setting of the adjustable flow resistance.

4.2 Procedure for stop valves

4.2.1 For stop valves and appliances having an external control which stops the flow, operate this control so that the maximum water flow rate is obtained.

4.2.2 Adjust the water flow pressure (see 4.1.5) at the inlet and keep this pressure constant at this value throughout the following steps.

4.2.3 Adjust the low noise flow resistance which is connected to the stop valve so that the water flow rate specified in table 1 is obtained.

For service valves intended to be installed before draw-off taps for wash basins, sinks and bidets, the water flow rate shall be adjusted to 0,25 l/s and/or 0,42 l/s.

²⁾ 1 Mpa = 10 bar.

Table 1 : Water flow rates

| Nominal size of in-line valve or appliance | Water flow rate at 0,3 MPa l/s |
|--|-----------------------------------|
| DN6 | 0,07 |
| DN8 | 0,12 |
| DN 10 | 0,20 |
| DN 15 | 0,50 |
| DN 20 | 0,80 |
| DN 25 | 1,30 |
| DN 32 | 2,00 |

4.2.4 Measure the water flow rate and the sound pressure level in the test room.

4.3 Procedure for control valves

4.3.1 For control valves having an external control which regulates and stops the flow, carry out the procedure specified in 4.2.

4.3.2 Operate (close) the control until the flow of water has stopped. Determine the maximum sound pressure level during this closing procedure and measure the water flow rate at which this maximum occurs.

4.4 Procedure for valves and appliances operated by water flow

NOTE : For valves and appliances operated by water flow (for example water meters, check valves, combined check and stop valves), the flow rate during the test depends on the water flow pressure and the setting of the low noise flow resistance.

4.4.1 Adjust the water flow pressure (see 4.1.5) at the inlet and keep the pressure constant at this value throughout the following steps.

4.4.2 Adjust the low noise flow resistance which is connected to the valve or appliance so that the water flow rate specified in table 1 is obtained.

4.4.3 Measure the water flow rate and the sound pressure level in the test room.

4.4.4 Adjust the low noise flow resistance until the flow of water has stopped. Determine the maximum sound pressure level during this closing procedure and measure the water flow rate at which this maximum occurs.

4.5 Procedure for automatic in-line valves or appliances operated by water pressure

NOTE : For in-line valves or appliances which are operated by water pressure (for example pressure reducing valves and pressure limiting valves) the water flow rate during the test depends on the inlet and outlet pressures and the setting of the low noise flow resistance.

4.5.1 For valves intended for use over a range of inlet and/or outlet pressures, maintain the inlet pressure at 0,8 MPa. In the following procedure set the outlet pressure adjustment, if any, at 0,3 MPa, if this pressure is within the range of outlet pressures. Otherwise set the outlet pressure adjustment if any, at 0,1 MPa.

4.5.2 Fully open the low noise flow resistance which is connected to the pressure reducing valve. Then adjust simultaneously the outlet pressure adjustment, if any, of the test sample to 0,3 MPa, or 0,1 MPa, and the water flow rate to the appropriate value given in table 2.

Carry out the tests at water flow rate Q_2 and, if required by the relevant product standard, also at water flow rate Q_1 .

Table 2 : Water flow rates

| Nominal size of in-line valve or appliance | Water flow rate | |
|---|-----------------|--------------|
| | Q_1 l/s | Q_2 l/s |
| DN 10 | 0,20 | 0,15 |
| DN 15 | 0,50 | 0,38 |
| DN 20 | 0,80 | 0,60 |
| DN 25 | 1,30 | 1,00 |
| DN 32 | 2,00 | 1,50 |

4.5.3 Measure the upstream and downstream pressures, the water flow rate and the sound pressure level in the test room.

4.5.4 Adjust the low noise flow resistance until the flow of water has stopped. Determine the maximum sound pressure level during this closing procedure and measure the water flow rate at which this maximum occurs.

4.6 Procedure for automatic in-line valves and appliances operated by water temperature

NOTE : For automatic in-line valves and appliances which are operated by water temperature (for example thermostatic mixing valves), the water flow rate during the test depends on the water flow pressure and the setting of the low noise flow resistance.

4.6.1 Set the temperature control, if any, to its cold setting. Adjust the water flow pressure (see 4.1.5) at the inlet and keep the pressure constant at this value throughout the following steps.

4.6.2 Adjust the low noise flow resistance which is connected to the valve under test so that the water flow rate specified in table 1 is obtained.

4.6.3 Measure the water flow rate and the sound pressure level in the test room.

4.6.4 Operate the temperature control, if any, over the whole of its range in both directions, returning it to its cold setting. Determine the maximum sound pressure level in the test room during this procedure and the water flow rate at which this maximum occurs.

4.7 Procedure for "safety groups"

NOTE : Various combinations of in-line valves are used in cold feed pipes to unvented water heaters. When these are incorporated together into a single unit, this unit is known as a "safety group". Such safety groups typically incorporate stop valves, check valves, expansion valves and pressure relief valves, pressure reducing valves and pressure gauges in various combinations.

4.7.1 Safety groups without a pressure reducing valve

Safety groups which do not include a pressure reducing valve shall be tested as described in 4.2.

4.7.2 Safety groups with a pressure reducing valve

Safety groups which include a pressure reducing valve shall be tested as described in 4.5 with any stop valves or flow regulators fully open.

5 Test report

The test report shall include the following information :

- a) the information required by EN ISO 3822-1 ;
- b) the mounting of the appliance tested ;
- c) the flow pressure and water flow rate(s) used, the outlet used and the maximum sound pressure levels obtained ;
- d) a description and/or drawing of the in-line valve or appliance tested, including the type, nominal size, manufacturer and manufacturer's number ;
- e) the number of the clauses of this part of EN ISO 3822 relevant to the in-line valve or appliance tested, and in accordance with which the tests were carried out, together with descriptions of any peculiarities observed.

Annex A (informative)

Example of low noise flow resistance

A flow resistance with an adjustable flow rate comprises a smooth bore, braided rubber hose (pressure hose) of length at least 1,5 m. The far end of this hose is connected to a low noise flow control valve, if necessary via a muffler for water-borne noise. Depending on the connection of the in-line valve or appliance under test, a rubber hose of appropriate internal diameter, with a hose connector R1 or R $\frac{3}{4}$ and suitable fittings may be used.

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