
British Standard

Laboratory tests on noise emission from appliances and equipment intended for use in water supply installations

Part 4. Method for mounting and operating special appliances

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

Partie 4. Méthode de montage et de fonctionnement des équipements spéciaux

Prüfung des Geräuschverhaltens von Wasserarmaturen und Wasserinstallationsgeräten im Labor

Teil 4. Verfahren zum Anschluß und Betrieb von Sonderarmaturen

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Foreword

This Part of BS 6864 has been prepared under the direction of the Environment and Pollution Standards Committee and is related to 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' published by the International Organization for Standardization (ISO). ISO 3822/4 was prepared by Subcommittee 2, Building acoustics, of ISO Technical Committee 43, Acoustics, with the active participation of the UK.

This Part of BS 6864 differs from ISO 3822/4 principally as follows.

(a) Clause 1 has been amended to limit the scope of the method to special appliances of a nominal size not exceeding 1 (see BS 1212 : Parts 1, 2 and 3) or DN 25 (see the footnote to table 2 and, for example, 2.3 of BS 143 & 1256 : 1986). Consequential changes have been made to table 2.

(b) In table 1, the dimensions of the cistern specified for testing float-operated valves of nominal size 3/8 and 1/2 have been increased in order to allow the testing of float-operated valves complying with BS 1212. Also, nominal sizes in terms of DN, originally given in the table, have been deleted as they are not used in BS 1212.

(c) A number of changes have been made in the fittings quoted in figure 1 and a new drawing has been provided. These changes have been made in order to allow the use of fittings available from BS 143 & 1256, while at the same time retaining the dimensions and flow characteristics of the device depicted in the figure.

(d) Annexes B and C, which contain requirements in their texts, now form an integral part of the standard.

BS 6864 at present comprises the following Parts, which have been published:

- Part 1 Method for measurement
- Part 2 Method for mounting and operating draw-off taps
- Part 3 Method for mounting and operating in-line valves and appliances
- Part 4 Method for mounting and operating special appliances

For ease of production, the text of ISO 3822/4 has been used as the basis of this Part of BS 6864. As a result certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

In British Standards it is current practice to use the symbol 'L' for litre (and in its submultiples) rather than 'l'.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

British Standard

Laboratory tests on noise emission from appliances and equipment intended for use in water supply installations

Part 4. Method for mounting and operating special appliances

0 Introduction

The method of measurement for laboratory tests on noise emission from appliances and equipment intended for use in water supply installations is specified in BS 6864 : Part 1.

The mounting and operating conditions for draw-off taps are described in BS 6864 : Part 2, whereas BS 6864 : Part 3 describes the mounting and operating conditions for in-line valves and appliances.

This Part of BS 6864 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 BS 6864 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.

It applies to appliances with a nominal size not exceeding 1 or DN 25 (see the footnote to table 2 and also 2.3 of BS 143 & 1256 : 1986).

2 References

The titles of publications referred to in this standard are listed on the inside back cover.

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.

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.

* 1 MPa = 10 bar

Table 1 — Internal dimensions of standard test cisterns

Nominal size of the float-operated valve	Length mm	Height mm	Width mm
3/8 1/2	425	300	140
3/4 1	1 050	540	350

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 ¹⁾	Flow pressure MPa
15 20	0,25 and 0,4 0,25 and 0,4
25	0,15 and 0,3

¹⁾ See, for example, 2.3 of BS 143 & 1256 : 1986. DN is the symbol for "nominal size"; the nominal size value is loosely related to the inside diameter, in millimetres, of the special appliance.

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.

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 BS 6864 : Part 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 BS 6864 : Part 2.

If the instantaneous heater has to be combined with a non-integral draw-off tap, it shall be tested in accordance with BS 6864 : Part 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.

* 1 MPa = 10 bar

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 BS 6864 : Part 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 BS 6864 : Part 2.

3.4.2 Operating conditions

The cold water side shall be tested in accordance with BS 6864 : Part 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 BS 6864 : Part 3) or as draw-off taps (see BS 6864 : Part 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 BS 6864 : Part 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 BS 6864 relevant to the appliance (see also BS 6864 : Part 2 and Part 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.