

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

Part 1: Method of measurement

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National foreword

This British Standard is the UK implementation of EN ISO 3822-1:1999+A1:2008. It is identical with ISO 3822-1:1999, incorporating amendment 1:2008. It supersedes BS EN ISO 3822-1:1999 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee EH/1, Acoustics, to Subcommittee EH/1/6, Building acoustics.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments/corrigenda issued since publication

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English version

Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 1: Method of measurement

(ISO 3822-1:1999)

Acoustique — Mesurage en laboratoire du bruit émis par les robinetteries et les équipements hydrauliques utilisés dans les installations de distribution d'eau — Partie 1: Méthode de mesurage
(ISO 3822-1:1999)

Akustik — Prüfung des Geräuschverhaltens von Armaturen und Geräten der Wasserinstallation im Laboratorium — Teil 1: Meßverfahren
(ISO 3822-1:1999)

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Foreword

The text of EN ISO 3822-1:1999 has been prepared by Technical Committee CEN/TC 126 “Acoustic properties of building products and of buildings”, the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 43 “Acoustics”.

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of an identical text or by endorsement, at the latest by November 1999, and conflicting national standards shall be withdrawn at the latest by November 1999.

The content of this part of EN 3822 is not identical with the International Standard ISO 3822-1:1983 “Acoustics — Laboratory tests on noise emission from appliances and equipment used in water supply installations — Part 1: Method of measurement”.

Working group CEN/TC 126/WG 3 was instructed, in May 88, to examine and take into account the comments on ISO 3822-1, following the primary questionnaire.

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Foreword to amendment A1

This document (EN ISO 3822-1:1999/A1:2008) has been prepared by Technical Committee ISO/TC 43 “Acoustics” in collaboration with Technical Committee CEN/TC 126 “Acoustic properties of building elements and of buildings”, the secretariat of which is held by AFNOR.

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Endorsement notice

The text of ISO 3822-1:1999/Amd1:2008 has been approved by CEN as a EN ISO 3822-1:1999/A1:2008 without any modification.

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Introduction

Noise caused by water supply installations may lead to annoyance in adjacent rooms, for example in dwellings, hospitals and hotels, especially at night. This noise has its origin mainly in appliances. Standardised measurements of such noise are needed to permit comparison of the noise of commercial products made in different countries.

This part of EN ISO 3822 describes a method of measurement allowing comparable results to be obtained in laboratory measurements.

It is not possible to describe in detail how a given tap would give the same result in different laboratories. Therefore, the principle of comparing results to an installation noise standard is utilised. This procedure can be regarded as a kind of calibration of the test arrangement. The installation noise standard is described in detail and the basic arrangements for a laboratory water supply installation are given in this part of EN ISO 3822.

The test conditions described herein constitute the standard reference conditions essential for comparisons between laboratories.

Descriptions of the mounting and operating conditions for testing different types of appliances are given in other parts of this European Standard: see EN ISO 3822-2 for draw-off taps and mixing valves, EN ISO 3822-3 for in-line valves and EN ISO 3822-4 for special appliances.

1 Scope

This part of EN ISO 3822 specifies a method of measurement, in the laboratory, of the noise emission resulting from the flow of water through appliances and equipment used in water supply installations.

The items covered include draw-off taps, in-line valves and special appliances, for example pressure reducers and water-heating appliances, all of which are hereafter referred to as “appliances”.

The method specified makes it possible to obtain comparable results of measurements in different laboratories.

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: Dimensions, tolerances and designation*.

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

ISO 65, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*.

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 (ISO 3822-2:1995)*.

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 (ISO 3822-3:1997)*.

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*.

EN 60651, *Sound level meters*.

EN 61260, *Electroacoustics — Octave band and fractional-octave-band filters*.

3 Definitions

For the purposes of this standard the following definitions apply:

3.1

octave band sound pressure level, in decibels

the unweighted sound pressure level in the frequency band of one octave. In this part of EN ISO 3822 octave band sound pressure levels and sound pressure level differences are denoted by the subscript n

3.2

a-weighted sound pressure level, in decibels

the sound pressure level weighted with the A-weighting specified in EN 60651

3.3

appliance sound pressure level, L_{apn} for octave bands

a quantity defined by:

$$L_{apn} = L_n - (L_{sn} - L_{srn}) \quad (1)$$

where

L_n is the average octave band sound pressure level in octave n , in the test room, due to the noise produced by the appliance under the specified test conditions;

L_{sn} is the corresponding octave band sound pressure level in the test room due to the noise produced by the installation noise standard (abbreviation INS) at a flow pressure of 0,3 MPa^a (see clause 7);

L_{srn} is the reference value of the octave band sound pressure level in the octave n for the INS at flow pressure of 0,3 MPa (see clause 7).

^a 1 MPa = 10 bar

3.4

appliance sound pressure level, L_{ap} in decibels

the A-weighted sound pressure level, which is a characteristic value for the noise emission by an appliance. It is defined, in decibels, by:

$$L_{ap} = 10 \lg \sum_{n=1}^6 10^{\frac{[L_n - (L_{sn} - L_{srn}) + k(A)_n]}{10}} \text{ dB} \quad (2)$$

where

$n = 1, 2, 3, \dots, 6$ are the octaves with mid-frequencies from 125 Hz to 4 000 Hz;

$k(A)_n$ are the A-weighting values, in decibels, given in EN 60651 for the six octave mid-frequencies from 125 Hz to 4 000 Hz.

When the sound pressure level difference ($L_{sn} - L_{srn}$) at the octave band mid-frequencies from 125 Hz to 4 000 Hz is constant to within ± 2 dB (see clause 8), the appliance sound pressure level L_{ap} may be obtained directly from the A-weighted sound pressure levels as follows:

$$L_{ap} = L - (L_s - L_{sr}) \quad (3)$$

where

L is the average A-weighted sound pressure level in the test room due to the noise produced by the appliance under the specified test conditions;

L_s is the average A-weighted sound pressure level in the test room due to the noise produced by the INS at a flow pressure of 0,3 MPa;

L_{sr} is the reference A-weighted sound pressure level of the INS at a flow pressure of 0,3 MPa (see clause 7).

The appliance sound pressure level L_{ap} shall always be given rounded to the nearest whole decibel.

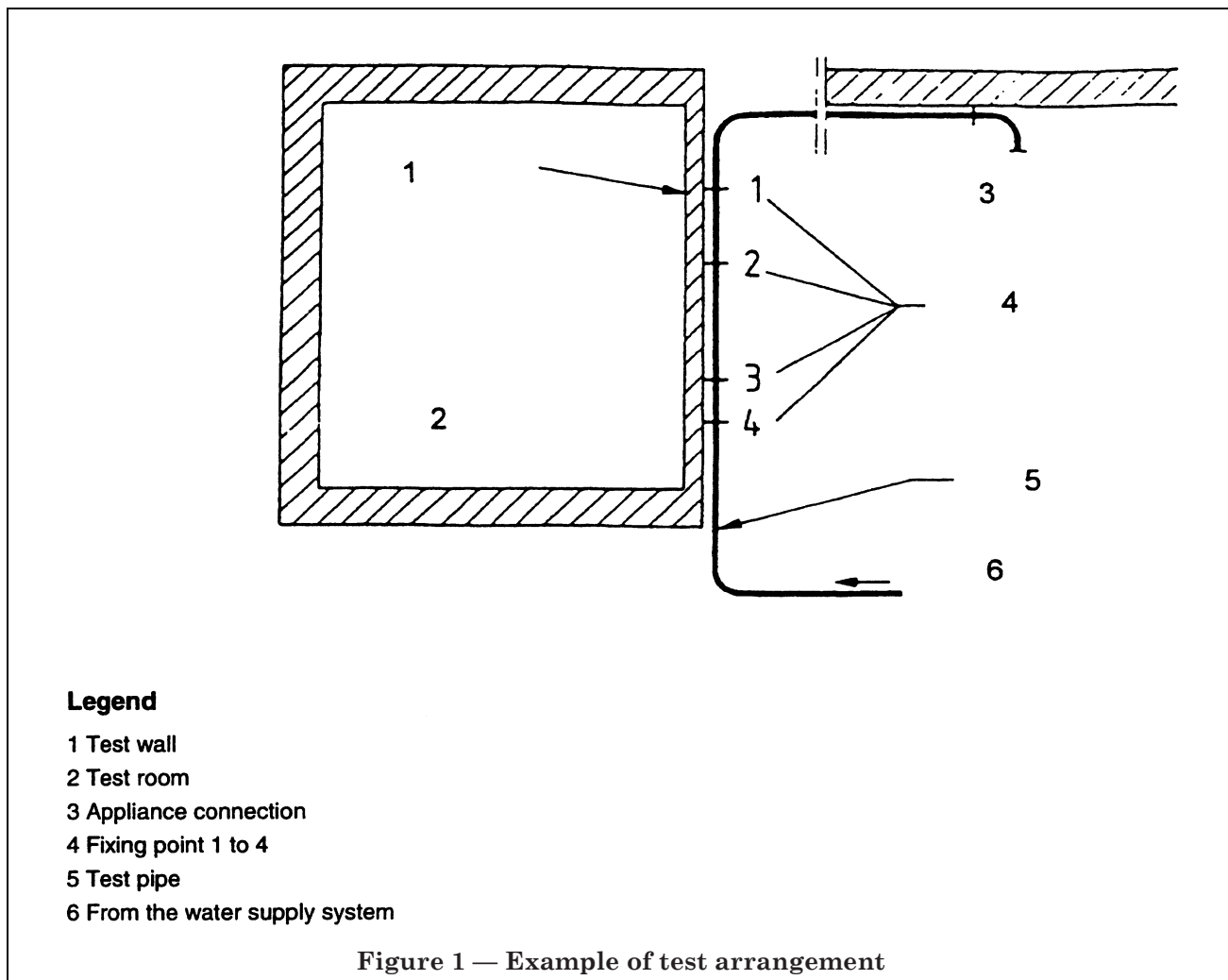
4 Principle

The appliance to be tested is mounted at the end of a water pipe, the test pipe, which is fixed to the wall of a room. The wall is called the test wall, the room the test room (see Figure 1).

The sound generated by the appliance is transmitted from the test pipe to the test wall. The airborne sound which is radiated from the test wall into the test room is measured.

In order to obtain comparable measurements in different laboratories, the noise produced by the appliance is compared with the noise produced by an installation noise standard.

5 Test arrangement (see Figure 1)



5.1 Test room

The test room shall have a volume of at least 30 m³. For new laboratories a volume of approximately 50 m³ is recommended.

Two opposite surfaces of the test room shall not be less than 2,3 m apart.

In the test room, the reverberation time should be between 1 s and 5 s for the octave bands with mid-frequencies from 125 Hz to 2 000 Hz.

The sound field in the test room should be as diffuse as possible.