



SLOVENSKI STANDARD

SIST EN 15036-2:2007

01-februar-2007

Kotli za gretje – Postopek preskušanja emisije hrupa po zraku iz generatorjev toplote – 2. del: Emisija hrupa dimnih plinov na izstopu iz generatorja toplote

Heating boilers - Test regulations for airborne noise emissions from heat generators - Part 2: Flue gas noise emissions at the outlet of the heat generator

Heizkessel - Prüfverfahren für Luftschallemissionen von Wärmeerzeugern - Teil 2: Abgasgeräuschemissionen am Ausgang des Wärmeerzeugers

Chaudières de chauffage - Règles d'essais des émissions de bruit aérien des générateurs de chaleur - Partie 2: Emissions de bruit de cheminée à la sortie du générateur

Ta slovenski standard je istoveten z: EN 15036-2:2006

ICS:

17.140.20	Emisija hrupa naprav in opreme	Noise emitted by machines and equipment
91.140.10	Sistemi centralnega ogrevanja	Central heating systems

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15036-2

September 2006

ICS 17.140.20; 91.140.10

English Version

Heating boilers - Test regulations for airborne noise emissions from heat generators - Part 2: Flue gas noise emissions at the outlet of the heat generator

Chaudières de chauffage - Règles d'essais des émissions
de bruit aérien des générateurs de chaleur - Partie 2:
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Wärmeerzeugern - Teil 2: Abgasgeräuschemissionen am
Ausgang des Wärmeerzeugers

This European Standard was approved by CEN on 14 August 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 15036-2:2006) has been prepared by Technical Committee CEN/TC 57 "Central heating boilers", the secretariat of which is held by DIN.

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 March 2007, and conflicting national standards shall be withdrawn at the latest by March 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

Establishing the A-weighted sound pressure level and its spectral distribution in the flue gas path of a heat generator is significant for estimating the noise emission expected in the vicinity and for the rating of flue gas silencers. This European Standard describes a procedure for measuring sound pressure levels in the flue gas path of heat generators derived from EN ISO 5136:2003.

The sound power radiated from a heat generator through its flue gas path depends to some extent on the design of the flue gas system (changes in direction and cross-section, installations, and natural frequencies) as described by the acoustic impedance. Any measurement procedure therefore requires the measurement duct to be specified unambiguously if comparable readings are to be obtained. In the procedure described here, the measurement duct has a circular cross-section and is fitted with a low-reflection end-piece as described in annex A. The sound power measured under these conditions can be regarded as representative for all practical applications.

The level of measurement uncertainty is described by the standard deviation that is to be expected if the same readings are taken in different laboratories.

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1 Scope

This European Standard applies to heat generators according to EN 15036-1, which are connected to chimneys/ducts which discharge combustion products via a duct into open air.

The data measured according to this European Standard will probably be different from the noise radiated from the end of the chimney.

Readings from forced-draught burners complying with EN 267 or EN 676 are only applicable in practice if they have been taken in conjunction with a boiler. Noise emitted into chimneys/ducts by heat generators operating independently of indoor air can also be measured in accordance with this European Standard.

Boilers supplied with combined air inlet and exhaust terminal configuration where ducts are within an external wall can be measured according to one of the test methods detailed in EN 15036-1.

This European Standard describes the objective procedure for determining sound power levels L_W , at the outlet of a heat generator that is emitting broad-band, narrow-band, or tonal continuous sound.

This European Standard is applicable to boilers designed to be connected to a chimney or flue duct with a duct size greater than or equal to 0,06 m and whose mean flue gas flow at the microphone head is less than 5 m/s.

This European Standard only applies for test purposes under laboratory conditions.

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2 Normative references

SIST EN 15036-2:2007

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 437, *Test gases — Test pressures — Appliance categories*

EN 15036-1, *Heating boilers — Test regulations for airborne noise emissions from heat generators — Part 1: Airborne noise emissions from heat generators*

CEN/TR 1749, *European scheme for the classification of gas appliances according to the method of evacuation of the combustion products (types)*

EN 60942, *Electroacoustics — Sound calibrators (IEC 60942:2003)*

EN 61260, *Electroacoustics — Octave band and fractional-octave-band filters (IEC 61260:1995)*

EN 61672-1, *Electroacoustics — Sound level meters — Part 1: Specifications (IEC 61672-1:2002)*

EN ISO 266, *Acoustics — Preferred frequencies (ISO 266 1997)*

EN 15036-2:2006 (E)**3 Terms and definitions**

For the purposes of this European Standard, the following terms and definitions apply.

3.1 duct**3.1.1 test duct**

duct in which a heat generator's sound power is measured

NOTE The test duct has an anechoic termination.

3.1.2 intermediate duct

duct fitted to the intake side and to the discharge side of the heat generator to ensure desired flow conditions

NOTE The intermediate duct connects to the test duct, if necessary by a transition section.

3.2 sound pressure level

L_p

$$L_p = 10 \lg \frac{p^2}{p_0^2} \text{ dB}$$

where

p is the mean square root value of the sound pressure and the reference sound pressure p_0 is equal to 20 μ Pa

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NOTE 1 The width of a restricted frequency band should be indicated, for example, octave-band sound pressure level, one-third-octave-band sound pressure level.

NOTE 2 L_{p1} , L_{p2} and L_{p3} are sound pressure levels at each of the three measurement positions in the test duct. Sound pressure levels may also be obtained from a continuous circumferential traverse (see 5.2).

\bar{L}_{pm} is the spatially averaged sound pressure level obtained from averaging over three measurements positions in the test duct. It may also be obtained from a continuous circumferential traverse (see 5.2).

\bar{L}_p is the spatially averaged sound pressure level at the measurement plane, corrected for the combined free-field response C (see Table 1 and 8.1)

NOTE 3 The sound pressure level is expressed in decibels (dB).

[EN ISO 5136:2003, definition 3.5]

3.3 sound power level

L_W

$$L_W = 10 \lg \frac{P}{P_0} \text{ dB}$$

where

P is the sound power and the reference sound power P_0 is equal to 1 pW

NOTE 1 The width of a restricted frequency band should be indicated, for example, octave-band sound power level, one-third-octave-band sound power level.

NOTE 2 The sound power level is expressed in decibels (dB).

[EN ISO 5136:2003, definition 3.6]

4 Set-up and measurement equipment

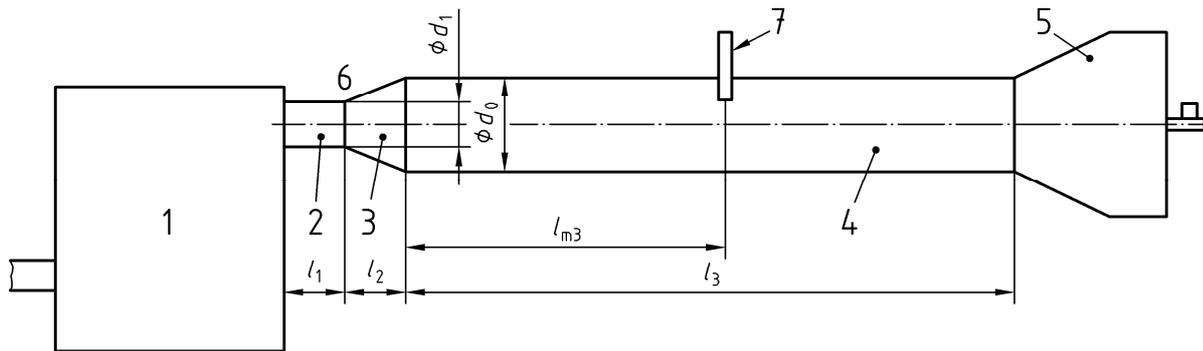
4.1 General

For the tests the boiler shall be installed and fired with fuels in accordance with the appliance manufacturer's instructions. For a gas boiler the test gas shall be in accordance with the appliance category and EN 437. The fuel used for the test shall be stated in the test report.

According to CEN/TR 1749, the test arrangement for type B and type C boilers with non-concentric ducts, shall consist of the boiler under test, an intermediate duct, the test duct with anechoic termination and the instrumentation (see Figure 1 and Figure 2).

According to CEN/TR 1749, the test arrangement for type C boilers with concentric ducts (C1 and C3), shall consist of the boiler under test to which is applied the pressure drop corresponding to the maximum length of flue declared by the manufacturer, its test duct with anechoic termination and the instrumentation. For type C boilers which can only be installed with short flue ducts e. g. 300 mm which are supplied with the boiler by the appliance manufacturer shall be measured using one of the test methods according to EN 15036-1.

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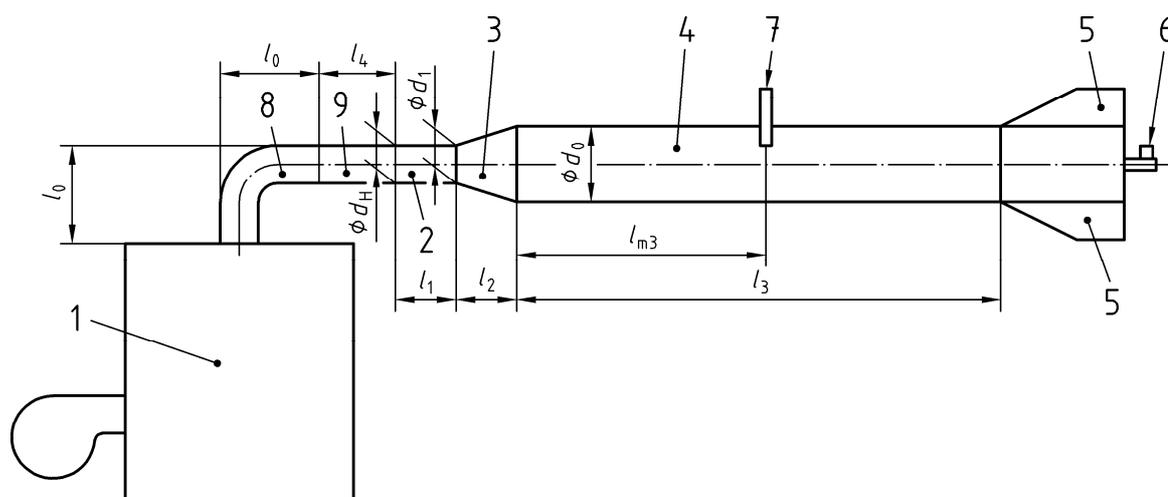
Key

1	boiler	d_0	diameter of test duct, in m (at least 0,06 m)
2	intermediate duct (if required)	d_1	diameter of flue gas outlet from the boiler, in m
3	transitions duct (if required)	l_1	length of intermediate duct, in m
4	test duct (Measurement level)	l_2	length of transitions, in m
5	anechoic termination (see annex A, for details)	l_3	length of test duct, in m
6	pressure outlet point	l_{m3}	distance of the microphone position, in m.
7	microphone		

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Figure 1 — Test configuration for rear outlet



Key

1 boiler	d_0 diameter of test duct, in m (at least 0,06 m)
2 intermediate duct (if required)	d_1 diameter of intermediate duct, in m
3 transitions duct (if required)	d_H diameter of flue gas outlet from the boiler, in m
4 test duct (measurement level)	l_0 length of bent, in m (max 0,25 m)
5 anechoic termination (see annex A for details)	l_1 length of intermediate duct, in m
6 pressure outlet point	l_2 length of transitions, in m
7 microphone	l_3 length of test duct, in m
8 bent	l_4 length of flue gas outlet, in m (max 1 m)
9 flue gas outlet	l_{m3} distance of the microphone position, in m

Figure 2 — Test configuration for top outlet

All connections between the heat generator and the duct shall be rigid unless a vibration-isolated coupling is an integral component part of the heat generator. A mounting for a microphone shall be provided at the point on the measurement duct identified for this purpose in Figure 1 and Figure 2.

The pressure at the outlet of the boiler should be set at the required level given by the manufacturer; any deviation should be recorded.

If the flue gas outlet of the boiler is vertically mounted, a bend shall be installed directly behind this outlet. The test duct shall be connected to this bend. The ratio of the bend's radius to the diameter of the duct shall be as big as possible, in order to minimise the bend's influence on the transmitted noise.

4.2 Specification of the duct

4.2.1 Design of ducts and transitions

The duct shall be straight, coaxial with the outlet of the heat generator, and of a constant circular cross-section all along its length. The duct and transitions shall be made either of steel or of a material with an equivalent area-mass and rigidity, in order to ensure a smooth, reverberate internal surface so that no vibrations can occur that could affect the readings.