



SLOVENSKI STANDARD

SIST EN 16583:2015

01-oktober-2015

Prenosniki toplote - Ventilatorski konvektorji voda/zrak - Ugotavljanje ravni zvočne moči

Heat exchangers - Hydronic room fan coils units - Determination of the sound power level

Wärmeübertrager - Wasser-Luft-Ventilator-konvektoren - Bestimmung des Schalleistungspegels

Échangeurs thermiques - Ventilateurs-convecteurs à eau - Détermination du niveau de puissance acoustique

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27.060.30 Grelniki vode in prenosniki toplote Boilers and heat exchangers

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EUROPEAN STANDARD

EN 16583

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2015

ICS 27.060.30

English Version

Heat exchangers - Hydronic room fan coils units - Determination of the sound power level

Échangeurs thermiques - Ventilateurs-convecteurs à eau -
Détermination du niveau de puissance acoustique

Wärmeübertrager - Wasser-Luft-Ventilator-konvektoren -
Bestimmung des Schalleistungspegels

This European Standard was approved by CEN on 27 June 2015.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 16583:2015) has been prepared by Technical Committee CEN/TC 113 "Heat pumps and air conditioning units", the secretariat of which is held by AENOR.

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of an identical text or by endorsement, at the latest by February 2016, and conflicting national standards shall be withdrawn at the latest by February 2016.

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EN 16583:2015 (E)**1 Scope**

This European Standard applies to hydronic fan coil units (FCU) as factory-made single assemblies which provide the functions of cooling and/or heating but do not include the source of cooling or heating.

The standard covers both air free delivery and air ducted units with a maximum external static pressure due to duct resistance of 120 Pa max.

This European Standard provides methods for the determination of the acoustical performance of fan coil units, defining standard working condition and installation.

It is not the purpose of this standard to specify the tests used for production or field testing.

NOTE For the purpose of remaining clauses, the term "unit" is used to mean "fan coil unit" as defined in 3.1 of EN 1397:2015.

2 Normative references

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

EN 1397:2015, *Heat exchangers - Hydronic room fan coil units - Test procedures for establishing the performance*

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EN ISO 3741, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms (ISO 3741)*

EN ISO 3743-1, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for a hard-walled test room (ISO 3743-1)*

EN ISO 3743-2, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering methods for small, movable sources in reverberant fields - Part 2: Methods for special reverberation test rooms (ISO 3743-2)*

EN ISO 3744, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744)*

EN ISO 3745, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms (ISO 3745)*

EN ISO 9614-1, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points (ISO 9614-1)*

EN ISO 9614-2, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2)*

EN ISO 9614-3, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 3: Precision method for measurement by scanning (ISO 9614-3)*

EN ISO 80000-8:2007, *Quantities and units - Part 8: Acoustics (ISO 80000-8:2007, corrected 2007-08-15)*

3 Terms and definitions

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

3.1

hydronic fan-coil unit

factory-made single assembly which provides one or more of the functions of forced circulation of air, heating, cooling, dehumidification and filtering of air, but which does not include the source of heating or cooling

Note 1 to entry: This device includes at least a liquid-to-air heat exchanger and a fan, and may be designed for free or ducted intake air and/or for free or ducted delivery of supply air.

3.2

total electric power input

total electric power absorbed by the unit, including fan(s) and auxiliary devices but excluding any electrical resistance heater

3.3

standard fan speed

fan speed setting declared by the manufacturer and used for setting the air flow rate conditions of ducted units

Note 1 to entry: The fan speed setting can be declared by the manufacturer as a certain wiring, a switch position or a steering voltage.

3.4

external static pressure

positive pressure difference measured between the air outlet and inlet sections of the unit

3.5

acoustics

for acoustic quantities the definitions of EN ISO 80000-8:2007 apply

4 Measuring instruments

The acoustic instruments shall fulfil the requirements of the acoustic standard used for the test.

Other measurements can be necessary for the tests:

- Electrical: voltage (V), current (A), total electric power input (W);
- Pressure (Pa);
- Rotation speed (min^{-1}).

Measurements for the ambient conditions:

- Relative humidity (%);
- Air Temperature ($^{\circ}\text{C}$);
- Atmospheric pressure (kPa).

Table 1 gives the uncertainties allowed for these measurement values.

Table 1 — Uncertainties of measurement for indicated values

Measured quantity	Unit	Uncertainty of measurement
Air — static pressure difference	Pa	± 3 Pa ($\Delta P \leq 100$ Pa) $\pm 3\%$ ($\Delta P > 100$ Pa)
Electrical quantities — Voltage — Current — Power	V A W	$\pm 0,5\%$ $\pm 0,5\%$ $\pm 1\%$ or minimum 1 W
Rotation speed	min^{-1}	$\pm 1\%$
Relative humidity	HR	5 %
Atmospheric pressure	kPa	1 %
Temperature	$^{\circ}\text{C}$	$\pm 0,5$ K

5 Operation of the unit

The testing conditions are given in EN 1397:2015 except the following:

- The acoustic test shall be performed without connection to water supply, without water staying in the water circuit, with dry coil surface and an inlet air temperatures between 15 $^{\circ}\text{C}$ and 25 $^{\circ}\text{C}$.
- The control of the relative humidity is not required.

If the unit includes flaps, they shall be adjusted in a fixed position according to the manufacturer instructions. If this information is not available, their position shall correspond to the maximum mechanical open position.

NOTE 1 This maximum mechanical open position might differ from the minimum airflow resistance.

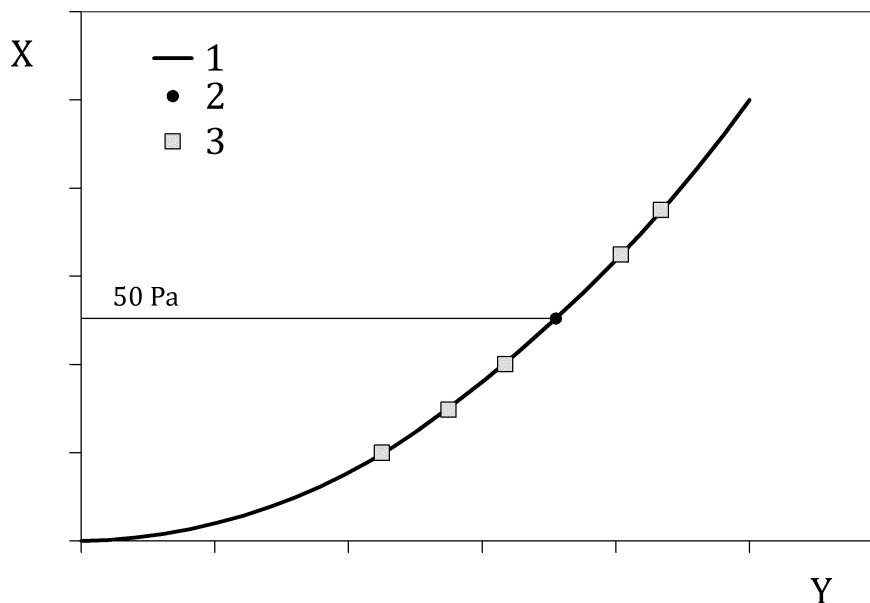
For testing, the unit shall include an air filter but no any other accessory for air inlet or diffusion or others. Dampers for fresh air intake shall be closed.

NOTE 2 No modification such as sealing is made on the unit before testing.

For ducted units, an external static pressure difference of 50 Pa (± 1 Pa) shall be applied to the unit for the standard fan speed declared by the manufacturer.

If other speeds are tested, the same network curve resistance shall be used. See Figure 1.

If the resistance is obtained by using an auxiliary fan, preliminary tests shall be done to determine the external static difference for each additional speed.

**Key**

- 1 ductwork load curve
- 2 reference standard speed
- 3 other speeds
- X external static pressure difference
- Y flow rate

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Figure 1 — Setup external static pressure difference of ducted units for other speeds

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6 Installation**6.1 General**

The typical types of units are presented in the annex of EN 1397:2015.

Tests shall be made in suitable acoustic test chambers.

6.2 Non ducted units**6.2.1 General**

The target is the sound power level radiated by the whole unit, without distinction of inlet or discharge sides nor casing radiation.

6.2.2 Floor mounted unit

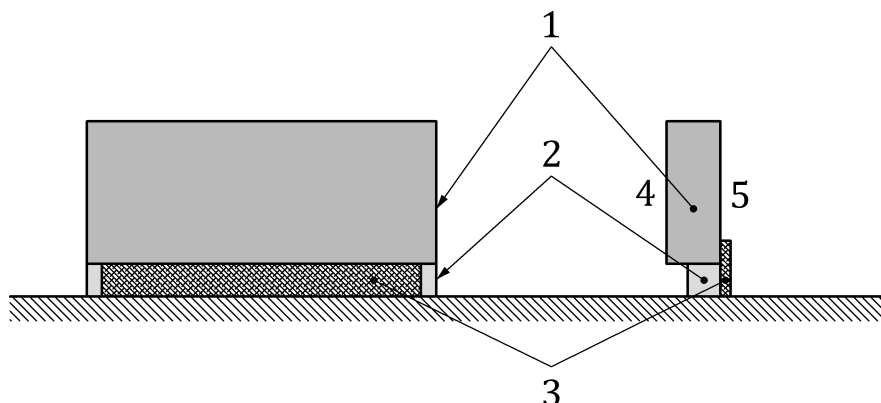
The unit shall be installed on the hard floor at a minimum of 1 500 mm away from any wall out of any symmetry axis.

The feet provided by the manufacturer shall be used.

For aerodynamic purpose, the space between the feet shall be closed in the rear part to simulate the wall, with a rigid and reflective plate, with the same width of the unit and not exceeding its height. See Figure 2.

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This plate shall be in chipboard or equivalent, density 600 kg/m^3 to 700 kg/m^3 , and thickness 19 mm to 22 mm.

**Key**

- 1 fan coil unit
- 2 feet
- 3 plate to close the space between the feet on the rear side
- 4 front side of the fan coil unit
- 5 rear side of the fan coil unit

Figure 2 — Floor mounted unit with a closing plate between the feet

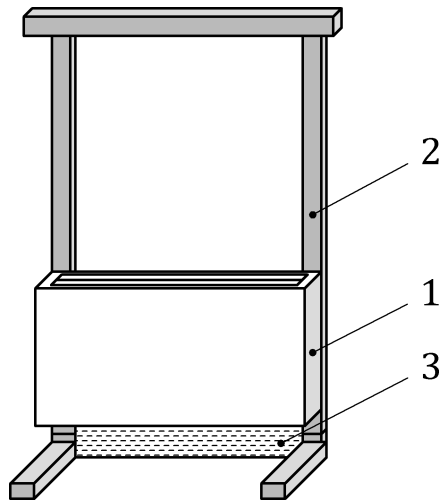
6.2.3 Wall mounted unit

For low-wall mounting units, the distance to the floor given by the manufacturer shall be respected. Without information from the manufacturer, this distance shall be 150 mm.

For aerodynamic purpose, the space between the unit and the floor shall be closed in the rear part to simulate the wall, with a rigid and reflective plane, with the same width of the unit and not exceeding its height. See Figure 3.

The characteristics of the frame shall be such that any impact on the acoustic measurement by the frame radiation may be avoided.

This plate shall be in chipboard or equivalent, density 600 kg/m^3 to 700 kg/m^3 , and thickness 19 mm to 22 mm.

**Key**

- 1 fan coil unit
- 2 supporting frame
- 3 plate to close the space between the unit and the floor, at the rear side

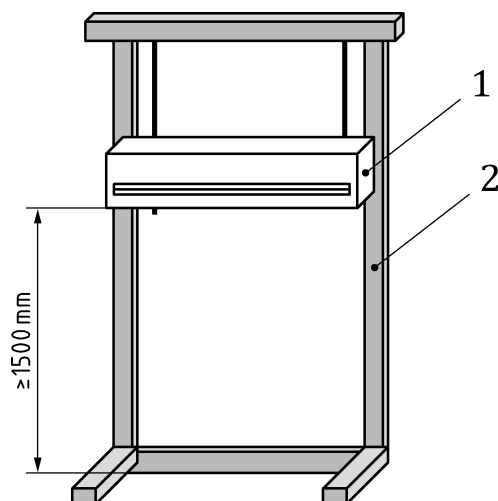
Figure 3 — Example of installation low wall unit mounted on a frame, with the back plate

6.2.4 High wall mounted unit

The unit shall be installed on a frame at a minimum of 1 500 mm away from any wall, out of any symmetry axis.

For high-wall units, the height shall be at a minimum of 1 500 mm from the floor. See Figure 4.

The characteristics of the frame shall be such that any impact on the acoustic measurement by the frame radiation may be avoided.

**Key**

- 1 fan coil unit
- 2 supporting frame

Figure 4 — Example of installation of high wall unit mounted on a frame