SLOVENSKI STANDARD
SIST EN 16583:2022

01-oktober-2022

Nadomešča:
SIST EN 16583:2015

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-Ventilatorkonvektoren - Bestimmung des Schallleistungspegels

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

Ta slovenski standard je istoveten z: **EN 16583:2022**

ICS:

27.060.30	Grelniki vode in prenosniki toplote	Boilers and heat exchangers

SIST EN 16583:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16583

July 2022

ICS 27.060.30

Supersedes EN 16583:2015

English Version

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

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

Wärmeübertrager - Wasser-Luft-Ventilatorkonvektoren - Bestimmung des Schallleistungspegels

This European Standard was approved by CEN on 22 May 2022.

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

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Ref. No. EN 16583:2022 E

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European foreword

This document (EN 16583:2022) has been prepared by Technical Committee CEN/TC 113 “Heat pumps and air conditioning units”, the secretariat of which is held by UNE.

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of an identical text or by endorsement, at the latest by January 2023, and conflicting national standards shall be withdrawn at the latest by January 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16583:2015.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

This document was prepared in the framework of the Commission Regulation (EU) 2016/2281 of 30 November 2016 implementing Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products, with regard to ecodesign requirements for air heating products, cooling products, high temperature process chillers and fan coil units.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document is applicable 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.

This document is applicable to both air free delivery and air ducted units with a maximum external static pressure due to duct resistance of 300 Pa max.

This document specifies 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 document 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”.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 3741:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms (ISO 3741:2010)*

EN ISO 3743-1:2010, *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 3743-1:2010)*

EN ISO 3743-2:2019, *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 3743-2:2018)*

EN ISO 3744:2010, *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 3744:2010)*

EN ISO 3745:2012[1)], *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 3745:2012)*

EN ISO 9614-1:2009, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points (ISO 9614-1:1993)*

EN ISO 9614-2:1996, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2:1996)*

EN ISO 9614-3:2009, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 3: Precision method for measurement by scanning (ISO 9614-3:2002)*

EN ISO 80000-8:2020, *Quantities and units - Part 8: Acoustics (ISO 80000-8:2020)*

1) Document impacted by A1:2017.

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 80000-8:2020 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
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 can be designed for free or ducted intake air and/or for free or ducted delivery of supply air.

3.1.2
total electric power input
total electric power absorbed by the unit, including fan(s) and auxiliary devices but excluding any electrical resistance heater

3.1.3
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.

3.1.4
external static pressure
positive pressure difference measured between the air outlet and inlet sections of the unit

3.2 Symbols

For the purposes of this document, the symbols indicated in Table 1 apply.

Table 1 — Symbols, subscripts and units

Symbol/Subscript	Denomination	Unit
E	duct end correction	—
L_W	sound power level	dB
$L_{w,in}$	sound power level measured inside the duct	dB
$L_{w,out}$	sound power level measured outside the duct	dB
c	celerity of sound	m/s
f	centre frequency band	Hz
S	area of the duct opening in the room	m^2
Ω	solid of the radiation path from the test opening	—

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 (°C);

— Atmospheric pressure (kPa).

Table 2 gives the uncertainties allowed for these measurement values.

Table 2 — Uncertainties of measurement for indicated values

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

5 Operation of the unit

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 temperature from 15 °C to 25 °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 can differ from the minimum airflow resistance.

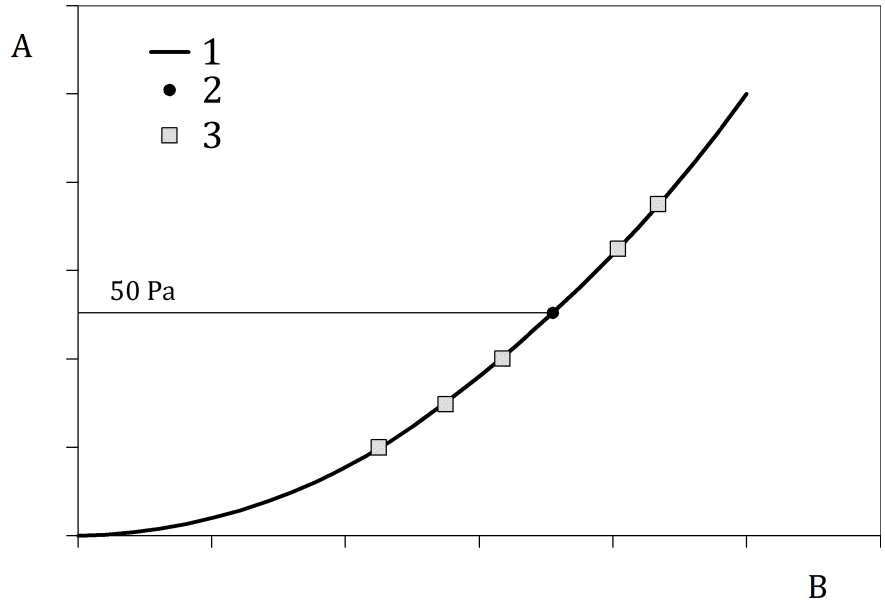
For testing, the unit shall include an air filter but shall not include any other accessory for air inlet or diffusion or others. Dampers for fresh air intake shall be closed.

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, the previous method cannot be applied. The resistance curve shall be calculated from the airflow rate measured at 50 Pa. For other speeds, the airflows rates, for which sound power shall be determined, shall be obtained from the intersections of the pressure/flow rate curves and the resistance curve previously calculated.



Key

1 ductwork load curve

2 reference standard speed

3 other speeds

A external static pressure difference

B flow rate

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

6 Installation

6.1 General

Tests shall be made in suitable acoustic test chambers.

NOTE Typical types of units are presented in EN 1397:2021, Annex A.

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.

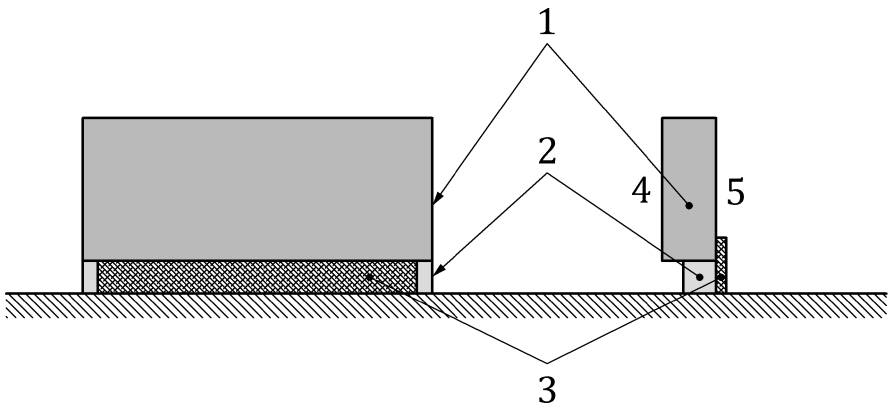
6.2.2 Floor mounted unit

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, as shown in Figure 2.

This plate shall be in chipboard or equivalent, density 600 kg/m³ to 700 kg/m³, 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, as shown in 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/m³ to 700 kg/m³, and thickness 19 mm to 22 mm.