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Prezračevanje stavb - Preskušanje lastnosti stanovanjskih prezračevalnih komponent/izdelkov - 2. del: Odvodne in dovodne zračne naprave

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 2: Exhaust and supply air terminal devices

Lüftung von Gebäuden - Leistungprüfungen von Bauteilen/Produkten für die Lüftung von Wohnungen - Teil 2: Abluft- und Zuluftdurchlässe

Ventilation dans les bâtiments - Essais des performances des composants/produits pour la ventilation des logements - Partie 2: Bouches d'air d'évacuation et d'alimentation

Ta slovenski standard je istoveten z: **EN 13141-2:2010**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

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EUROPEAN STANDARD

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English Version

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 2: Exhaust and supply air terminal devices

Ventilation des bâtiments - Essais des performances des composants/produits pour la ventilation des logements - Partie 2: Bouches d'air d'évacuation et d'alimentation

Lüftung von Gebäuden - Leistungprüfungen von Bauteilen/Produkten für die Lüftung von Wohnungen - Teil 2: Abluft- und Zuluftdurchlässe

This European Standard was approved by CEN on 22 April 2010.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 13141-2:2010) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

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 2011, and conflicting national standards shall be withdrawn at the latest by January 2011.

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

This document supersedes EN 13141-2:2004.

The position of this European Standard in the field of the mechanical building services is shown in Figure 1.

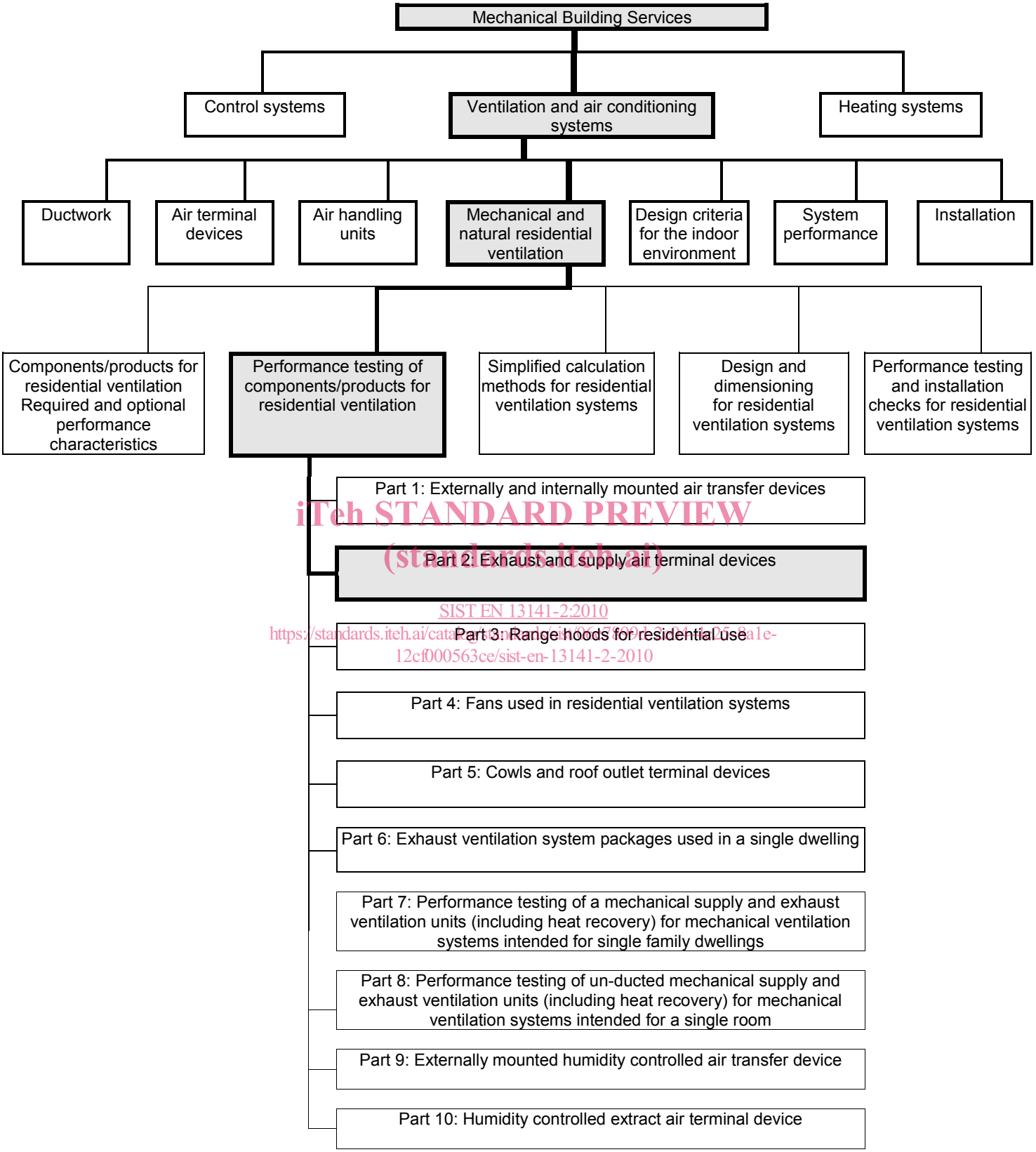


Figure 1 — Position of EN 13141-2 in the field of the mechanical building services

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies laboratory methods for testing exhaust and supply air terminal devices operating under pressure differences.

It applies to devices used in mechanical and natural residential ventilation systems, of the following types:

— device with a manually adjustable opening; or

— device with a fixed opening; or

— pressure difference controlled device.

It describes tests intended to characterize:

— flow rate/pressure;

— air diffusion characteristics (for supply air terminal devices);

— noise production for components of systems;

— insertion loss of component of systems;

— sound insulation.

2 Normative references

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 1506, *Ventilation for buildings — Sheet metal air ducts and fittings with circular cross-section — Dimensions*

EN 12238, *Ventilation for buildings — Air terminal devices — Aerodynamic testing and rating for mixed flow application*

EN 12792:2003, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 13141-1:2004, *Ventilation for buildings — Performance testing of components/products for residential ventilation — Part 1: Externally and internally mounted air transfer devices*

EN ISO 140-3, *Acoustics — Measurement of sound insulation in buildings and of building elements — Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)*

EN ISO 3741, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for reverberation rooms (ISO 3741:1999, including Cor 1:2001)*

EN ISO 5135, *Acoustics — Determination of sound power levels of noise from air-terminal devices, air-terminal units, dampers and valves by measurement in a reverberation room (ISO 5135:1997)*

EN ISO 11691:2009, *Acoustics — Measurement of insertion loss of ducted silencers without flow — Laboratory survey method (ISO 11691:1995)*

EN ISO 7235:2009, *Acoustics — Laboratory measurement procedures for ducted silencers and air-terminal units — Insertion loss, flow noise and total pressure loss (ISO 7235:2003)*

ISO 5221, *Air distribution and air diffusion — Rules to methods of measuring air flow rate in an air handling duct*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003 and the following apply.

3.1
insertion loss
reduction in sound pressure level in the reverberation room due to the mounting of the air terminal device

3.2
test duct
straight, rigid hard-walled duct of constant cross section between sound source and air terminal device

3.3
reverberation room
room specially designed to facilitate the production of approximately diffuse sound fields

3.4
background noise
noise emitted by the whole sources other than the source under testing

4 Performance testing of aerodynamic characteristics

4.1 Flow rate/pressure

4.1.1 Principle

This test consists of measuring several volume flow rates induced through a device by the applied static pressure difference to define the flow rate/pressure characteristic curve in the operating range specified by the manufacturer. In the case of manually adjustable devices this test shall be carried out at maximum and minimum opening conditions specified by the manufacturer.

Some exhaust ATD are of the bi-function type, i.e. they are designed to work under both natural and mechanical ventilation system. In that case the manufacturer may have to specify two operational ranges, and the device shall be tested for each of them according the standard procedure.

4.1.2 Test installation, conditions and uncertainty of measurement

4.1.2.1 Test installation and conditions

The device to be tested shall be installed in accordance with Figure 2a) for exhaust air terminal device or Figure 2b) for supply air terminal device.

The test installation shown in Figure 2a) and Figure 2b) comprises:

— a test duct with an airflow meter, a static pressure gauge and an airflow straightener in accordance with ISO 5221. Other measurement devices may be used, provided they allow measurements with an uncertainty in accordance with 4.1.2.2;

— a fan with means to vary the pressure difference across the device, covering the range of Table 1 given in 4.1.3.

NOTE In order to avoid pumping effect, an adequate device may be added after the airflow meter.

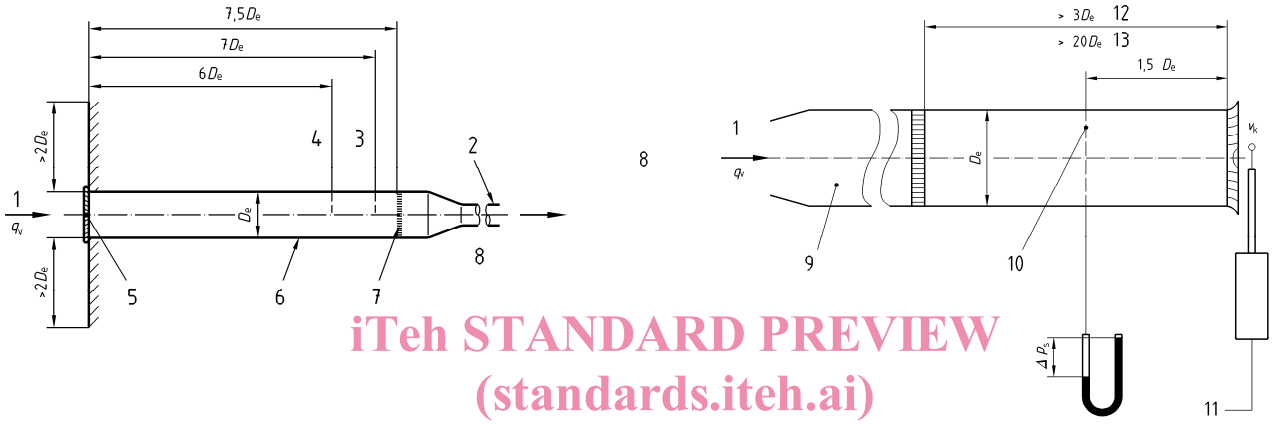
The test facilities shall have a range:

— for extraction: – 300 Pa to 0 Pa;

— for supply: 0 Pa to + 300 Pa.

The air terminal device shall be mounted in a test duct with cross-sectional dimensions equal to the nominal size of the device or to the duct dimensions normally recommended by the manufacturer.

For supply only, the duct shall be straight and at least 20 D_e long to guarantee a uniform velocity profile or shall include an efficient flow straightener located at a position at least 3 D_e from any part of the air terminal device. It is recommended that straightener cells have an axial length at least equal to six times the hydraulic diameter of their cross-section.



a) For exhaust air terminal device **b) For supply air terminal device**

Key

1 airflow
2 airflow meter
3 plane of temperature measurement
4 plane of pressure measurement
5 air terminal device
6 test duct, diameter D_e
7 flow straightener
8 connection to fan, flowrate control and airflow meter
9 transition to test duct size
10 plane of pressure measurement
11 signal to display or computer
12 with flow straightener
13 without flow straightener

Figure 2 — Test installation for exhaust air terminal device (Figure 2a)) and supply air terminal device (Figure 2b))

4.1.2.2 Uncertainty of measurement

In the case of air terminal devices with pressure difference controlled openings:

— the pressure shall be measured with an uncertainty lower than:

$$0{,}2 + 0{,}03 \times (\text{measured value}) \quad \text{(Pa)} \tag{1}$$

— the volume flow rate shall be measured with an uncertainty lower than:

$$0,3 + 0,03 \times (\text{measured value}) \qquad (1 \cdot s^{-1}) \qquad (2)$$

For other air terminal devices:

— the pressure shall be measured with an uncertainty lower than:

$$0,5 + 0,03 \times (\text{measured value}) \qquad (\text{Pa}) \qquad (3)$$

— the volume flow rate shall be measured with an uncertainty lower than:

$$0,3 + 0,03 \times (\text{measured value}) \qquad (1 \cdot s^{-1}) \qquad (4)$$

NOTE The combined uncertainties of measurement will result in a total accuracy of the test method in the range of 3 % to 5 %.

4.1.3 Test procedure

The measurements shall be taken for six points, each taken within one of the pressure difference ranges (bands) given in Table 1 so as to match with / cover the operational range of the device as stated by the manufacturer.

Table 1 — Pressure difference ranges

Pressure difference Δp Pa
3 to 4
4 to 6
6 to 8
8 to 10
13 to 18
18 to 24
24 to 32
32 to 42
42 to 55
55 to75
75 to 100
100 to 130
130 to 170
170 to 225
225 to 300

The environmental conditions existing during the tests such as temperature, barometric pressure shall be recorded.

Air temperature θ_a shall be (20 ± 5) °C. During the test, temperature θ_a shall not vary more than ± 2 °C.

The test shall be carried out by continuously increasing the pressure difference across the device.