



SLOVENSKI STANDARD
SIST EN 13141-2:2004

01-september-2004

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

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

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

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Ta slovenski standard je istoveten z: EN 13141-2:2004

ICS:

91.140.30 Ú!^: !æ^çæ} ã Á|ã æ\ã Ventilation and air-conditioning
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13141-2

January 2004

ICS 91.140.30

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

This European Standard was approved by CEN on 22 October 2003.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13141-2:2004) 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 July 2004, and conflicting national standards shall be withdrawn at the latest by July 2004.

This standard is one of a serie of standard on residential ventilation. The performance characteristics of the components/products for residential ventilation are given in EN 13142.

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

This document includes a bibliography.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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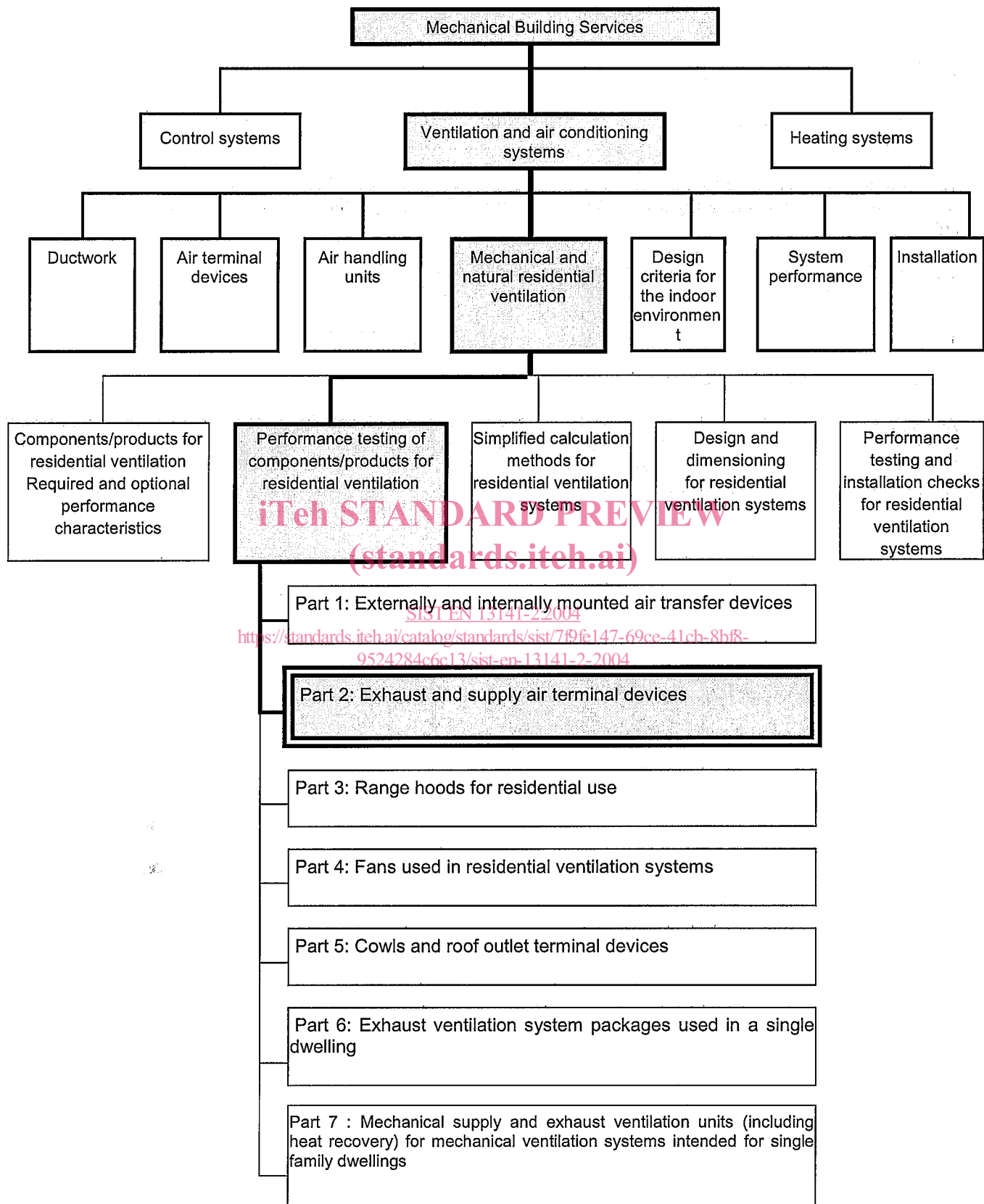


Figure 1 — Position of EN 13141-2 in the field of the mechanical building services

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 powered 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.

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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 here after. For dated references, subsequent amendment 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 (including amendments).

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

EN 12792, *Ventilation for buildings – Symbols, terminology and graphical symbols.*

EN 13141-1:2003, *Ventilation for buildings – Performance testing of components/products for residential ventilation - Part 1: Externally and internally mounted air transfer devices.*

EN 13182, *Ventilation for buildings – Instrumentation requirements for air velocity measurements in ventilated spaces.*

EN 20140-10, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 10: Laboratory measurement of airborne sound insulation of small building elements (ISO 140-10:1991).*

EN ISO 140-1, *Acoustics – Measurement of sound insulation in buildings and of building elements – Part 1: Requirements for laboratory test facilities with suppressed flanking transmission (ISO 141-1:1997).*

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).*

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).*

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EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full - Part 1: General principles and requirements (ISO 5167-1:2003).*

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

ISO 7235:1991, *Acoustics – Measurement procedures for ducted silencers – Insertion loss, flow noise and total pressure loss.*

ISO 11691, *Acoustics – Measurement of insertion loss of ducted silencers without flow – Laboratory survey method.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 12792 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**

sound pressure level at the indicating instrument when the signal to be measured is not present

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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 2 operational ranges, and the device shall be tested for each of them according to the standard procedure.

4.1.2 Test installation, conditions and uncertainty of measurement**4.1.2.1 Test installation and conditions**

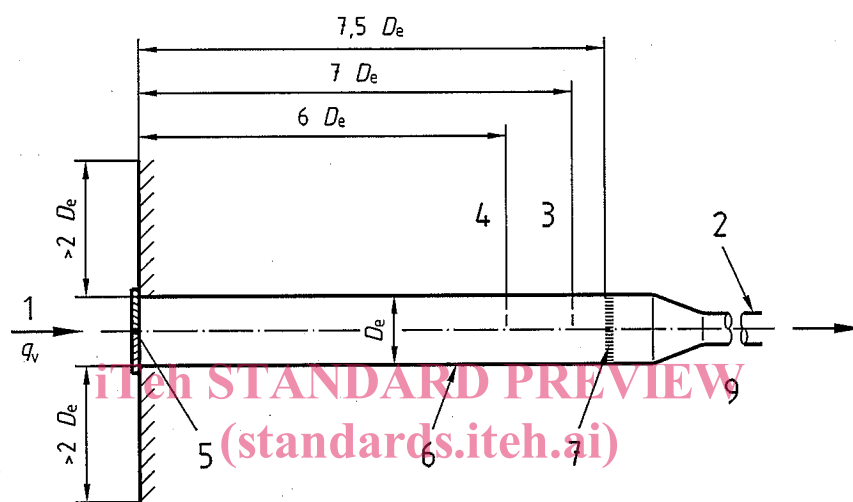
The device to be tested shall be installed in accordance with Figure 2.

The test installation shown in Figure 2 comprises:

- a measuring duct with an air flow 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.

The test facilities shall have a range of -300 Pa to 0 Pa.



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Key

1	Airflow	5	Air terminal device
2	Flow meter	6	Test duct
3	Plane of temperature measurement	7	Flow straightener
4	Plane of pressure measurement	8	Connection to fan, flow rate control and flow rate measuring device

Figure 2 — Test installation

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:

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

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

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

For other air transfer devices:

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

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

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

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

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 6 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 to 75
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.

Where the device contains a movable part, a first serie of measurement shall be made with continuously increasing the pressure difference, then a second with continuously decreasing it.

At each point the couple (pressure difference Δp , volume flow rate $q_{v \text{ meas}}$) shall be recorded when steady state conditions are achieved.

The volume flow rate $q_{v \text{ meas}}$ may be directly measured or alternatively calculated from the measured value of mass flow rate q_m .

4.1.4 Analysis of results

Analysis of result shall be as specified in EN 13141-1:2003, 4.1.3.

4.1.5 Presentation of results

Presentation of result shall be as specified in EN 13141-1:2003, 4.1.3.

4.2 Air diffusion characteristics for supply air terminal devices

Tests shall be carried out and the results presented in accordance with EN 12238.

5 Performance testing of acoustic characteristics

5.1 Noise production for components of systems

5.1.1 General

Air passing through an air terminal device generates noise, some of which is radiated into the room. The method described below determines the acoustic power level of the noise thus emitted.

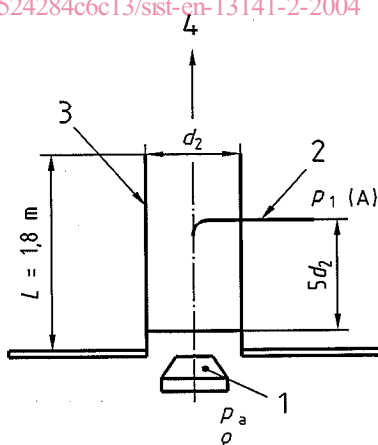
5.1.2 Test installation

5.1.2.1 Characteristics of reverberation room

The measurements shall be made according to EN ISO 5135 in a reverberation room as specified in EN ISO 3741.

The test installation shall be as shown in Figure 2,

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Key

- 1 Air terminal device under test
- 2 Pressure probe
- 3 Test duct
- 4 To flow rate measuring instrument (in accordance with EN ISO 5167-1) and the fan testing device

Figure 3 — Test installation of the air terminal device on its test duct