



SLOVENSKI STANDARD SIST EN 13141-7:2004

01-september-2004

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Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings

STANDARD PREVIEW
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Lüftung von Gebäuden - Leistungsprüfungen von Bauteilen/Produkten für die Lüftung von Wohnungen - Teil 7: Leistungsprüfung von mechanischen Zuluft- und Ablufteinheiten (einschließlich Wärmerückgewinnung) für mechanische Lüftungsanlagen in Einfamilienhäusern

Ventilation des bâtiments - Essais de performance des composants/produits pour ventilation des logements - Partie 7: Centrales double flux (y compris la récupération de chaleur) pour les systemes de ventilation mécanique utilisés en logements individuels

Ta slovenski standard je istoveten z: EN 13141-7:2004

ICS:

91.140.30 Ú!^: !æ^çæ) ã Á|ã æ\ã Ventilation and air-conditioning
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Ventilation for buildings - Performance testing of
components/products for residential ventilation - Part 7:
Performance testing of a mechanical supply and exhaust
ventilation units (including heat recovery) for mechanical
ventilation systems intended for single family dwellings

Ventilation des bâtiments - Essais de performance des
composants/produits pour ventilation des logements -
Partie 7: Essais de performance des bouches
d'alimentation et d'évacuation (y compris la récupération de
chaleur) pour les systèmes des centrales de ventilation
mécanique double flux utilisées en logements individuels

Lüftung von Gebäuden - Leistungsprüfungen von
Bauteilen/Produkten für die Lüftung von Wohnungen - Teil
7: Leistungsprüfung von mechanischen Zuluft- und
Ablufteinheiten (einschließlich Wärmerückgewinnung) für
mechanische Lüftungsanlagen in Einfamilienhäusern

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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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Foreword

This document (EN 13141-7:2004) 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 August 2004, and conflicting national standards shall be withdrawn at the latest by August 2004.

This standard is a part of a series of standards on residential ventilation. It has a parallel standard referring to the performance characteristics of the components/products for residential ventilation.

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

Annex A is informative.

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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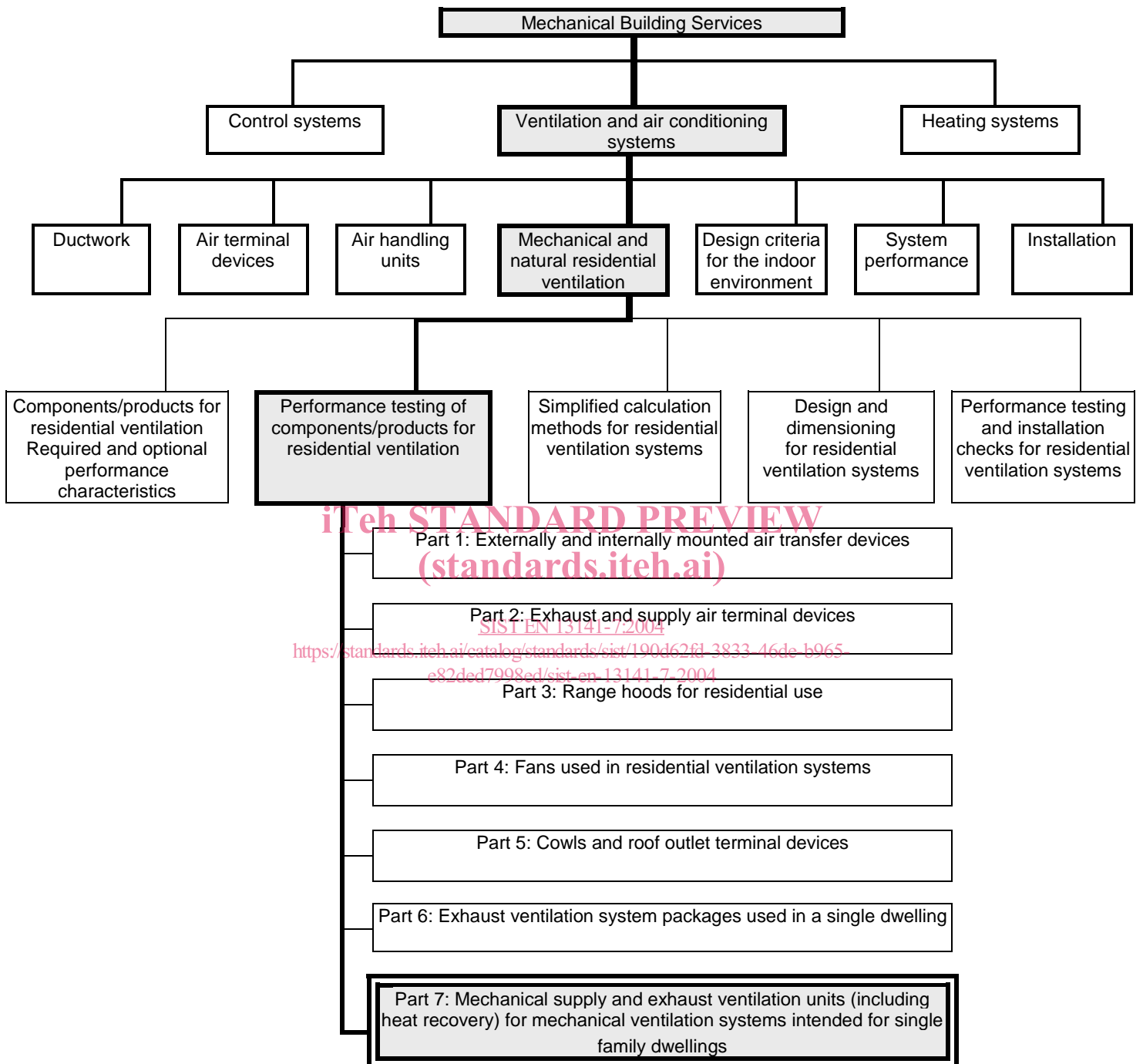


Figure 1 — Position of EN 13141-7 in the field of the mechanical building services

Introduction

This European Standard specifies methods for the performance testing of components used in residential ventilation systems to establish the main characteristics as identified in EN 13142.

This European Standard does not contain any information on ductwork and fittings, which are covered by other European Standards.

This European Standard incorporates many references to other European and International Standards, especially on characteristics other than the aerodynamic characteristics, for instance on acoustic characteristics.

In most cases some additional tests or some additional conditions are given for the specific use in residential ventilation systems.

The standard can be used for the following applications:

- laboratory testing;
- attestation purposes.

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1 Scope

This part of EN 13141 specifies the laboratory test methods and test requirements for the testing of aerodynamic, thermal and acoustic performance, and the electrical power of a mechanical supply and exhaust ventilation unit used in a single dwelling.

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In general such a unit contains:

- supply and exhaust air fans;
- air filters;
- air to air heat exchanger with/without air to air heat pump for exhaust air heat recovery;
- control system.

Such equipment can be provided in more than one assembly, the separate assemblies of which are designed to be used together.

This standard does not deal with non-ducted units.

The method of testing for the performances of the heat pumps for heat recovery is generally given in EN 255-2 and in ENV 12102. Safety requirements are given in EN 60335-2-40 and EN 60335-2-80.

EN 13141-7:2004 (E)**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 hereafter. For dated references, subsequent amendments 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 255-2, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors – Heating mode – Part 2: Testing and requirements for marking for space heating units.*

EN 305, *Heat exchangers – Definitions of performance of heat exchangers and the general test procedure for establishing performance of all heat exchangers.*

EN 308, *Heat exchangers – Test procedures for establishing performance of air to air and flue gases heat recovery devices.*

EN 1886:1998, *Ventilation for buildings – Air handling units – Mechanical performance.*

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

EN 13141-4, *Ventilation for buildings – Performance testing of components/products for residential ventilation - Part 4: Fans used in residential ventilation systems.*

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.*

EN ISO 3744, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994).*

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 5136, *Acoustics – Determination of sound power radiated into a duct by fans and other air-moving devices – In-duct method (ISO 5136:2003).*

EN ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points (ISO 9614-1:1995).*

3 Terms, definitions and classification

For the purposes of this European Standard, the terms and definitions given in EN 12792 together with the following apply.

3.1 Terms and definitions**3.1.1****external leakage**

leakage to or from the air flowing inside the casing of the unit to or from the surrounding air

3.1.2**internal leakage**

leakage inside the unit between the exhaust and the supply air flows

3.1.3**filter bypass leakage**

air bypass around filter cells

3.1.4**declared maximum air volume flow**

defined to correspond to the declared total pressure of the unit at the maximum setting. If the supply and exhaust air volume flows are different, then the declared maximum air volume flow is equal to the smaller.

NOTE To set the declared maximum air volume flow, the declared total pressure corresponds to 50 Pa, or to a lower total pressure if the intended use declared by the manufacturer is less than 50 Pa.

3.1.5**temperature ratio**

temperature difference between inlet and outlet of one of the air flows divided by the temperature difference between the inlets of both air flows

3.1.6**effective power input**

average electrical power input to the equipment within a defined interval of time, in watts, obtained from:

- the power input of the fans;
- the power input for operation of any compressor(s) and any power input for defrosting, excluding additional electrical heating devices not used for defrosting;
- the power input of all control and safety devices of the equipment.

3.1.7**test Voltage**

voltage to be used for supplying the components during the testing

3.2 Classification

There are four classes of leakage depending of the ratios between both leakage air flows and maximum declared air volume.

Table 1 — Leakage classification

Class	Internal leakage (at 100 Pa)		External leakage (at 250 Pa)
1	$\leq 2 \%$	and	$\leq 2 \%$
2	$\leq 5 \%$	and	$\leq 5 \%$
3	$\leq 10 \%$	and	$\leq 10 \%$
not classified	$> 10 \%$	and	$> 10 \%$

Where a test on a single unit results in different classes the product shall receive the higher classification. According to this the unit has only one leakage class.

The tests for air flow/pressure curve and thermal performances shall not be made if the unit is not classified because of measurement uncertainty.

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4 Symbols and abbreviations

For the purposes of this European Standard, the symbols and abbreviations given in EN 12792, together with the following, apply.

D	Diameter of the measurement duct (see Figure 2)	in m
D_{h1}, D_{h2}	Hydraulic diameters of the connecting duct (see Figure 3)	in m
L_W	Sound power level	in dB
L_{WA}	A-weighted sound power level	in dB
p_s	Static pressure	In Pa
P_E	Effective power input	in W
p_{tU}	Total pressure difference between the outlet and the inlet of the unit	in Pa
p_{tUd}	Declared total pressure difference between the outlet and the inlet of the unit	in Pa
q_m	Mass air flow rate	in kg/s or g/s
q_v	Volume flow rate	in m ³ /s or l/s
q_{vd}	Declared maximum air volume flow rate	in m ³ /s or l/s
q_{ve}	External leakage air volume flow rate	in m ³ /s or l/s
q_{vi}	Internal leakage air volume flow rate	in m ³ /s or l/s
v	Air velocity in the measurement duct (see Figure 3)	in m/s

Indice 11 means exhaust air inlet (see Figure 2).
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Indice 12 means exhaust air outlet (see Figure 2).

Indice 21 means supply air inlet (see Figure 2).

Indice 22 means supply air outlet (see Figure 2).

5 Requirements

The characteristics shall be tested, measured, or calculated according to EN 13142.

In addition, to assess correctly the thermal performance, aerodynamic characteristics, including all leakages, shall be tested before or together with any thermal characteristics testing (see 6.3).

Aerodynamic characteristics (see 6.2) include:

- - external leakage;
- - internal leakage;
- - air flow/pressure curve;
- - filter bypass leakage.

6 Test methods

6.1 General

Tests shall be conducted with a unit containing all components as supplied for intended use, and installed according to the manufacturer's instructions.

The mass flows q_{m11} and q_{m22} shall be balanced to within 3 % unless the manufacturer specifies otherwise.

For units which are intended to be used in dwellings of different sizes (e.g. 4, 5 or 6 rooms), the tests shall be made in the "maximum" configuration (i.e. 6 rooms).

Where a single value is assigned by the manufacturer as rated voltage, this shall be the test voltage. Where a voltage range is assigned to the product by the manufacturer that includes 230 V, the test shall be conducted at 230 V. This voltage shall be maintained throughout the testing to ± 1 %.

6.2 Performance testing of aerodynamic characteristics

6.2.1 Leakages

The external and internal leakage shall be tested according to EN 308. For heat exchanger category III (regenerators), both tracer gas and pressurisation tests with the regenerating heat exchanger in operation shall be done.

The external leakage air volume flow q_{ve} at over- and under-pressure of 250 Pa shall be reported as such and also compared to the declared maximum air volume flow of the unit as a percentage.

At least three different measurement points evenly distributed shall be made between 100 Pa and 300 Pa, and reported by means of a curve.

The internal leakage air volume flow q_{vi} at a pressure difference of 100 Pa shall be reported as such and also compared to the declared maximum air volume flow of the unit as a percentage.

Different measurement points shall be made between 50 Pa and 200 Pa, and reported on a curve.

During the pressurisation tests, the fans of the unit under test shall be switched off.

6.2.2 Air flow/pressure curve

The air flow/pressure characteristic, for both supply and exhaust air flows, shall be determined according to EN 13141-4.

Tests shall be made in accordance with category D installation (ducted inlet and outlet) as defined in EN 13141-4. The fans shall be switched on.

Total pressure (difference between the outlet and the inlet) of the unit p_{tu} at different air volume flows q_v and at different fan control adjustments shall be reported, at least at the test voltage.

Examples of test installations for single inlet/outlet units and for multiple inlets/outlets units are given in Figures 2 and 3.

If a connection box is used, it shall be sufficiently described in the test report.

6.2.3 Filter bypass leakage (not applicable to filter classes G1 to G4)

The filter bypass leakage characteristic and classification shall be determined according EN 1886:1998, clause 6, but with a reference test pressure difference determined as follows: