SLOVENSKI STANDARD
oSIST prEN 13141-8:2018

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Prezračevanje stavb - Preskušanje lastnosti sestavnih delov/izdelkov za prezračevanje stanovanjskih stavb - 8. del: Preskušanje lastnosti mehanskih brezkanalnih dovodnih in odvodnih prezračevalnih enot (vključno z enotami za vračanje toplote)

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 8: Performance testing of non-ducted mechanical supply and exhaust ventilation units (including heat recovery)

Lüftung von Gebäuden - Leistungsprüfung von Bauteilen/Produkten für die Lüftung von Wohnungen - Teil 8: Leistungsprüfung von mechanischen Zuluft und Ablufteinheiten ohne Luftführung (einschließlich Wärmerückgewinnung)

Ventilation des bâtiments - Essais de performance des composants/produits pour la ventilation des logements - Partie 8 : Essais de performance des unités de ventilation double flux décentralisées (y compris la récupération de chaleur)

Ta slovenski standard je istoveten z: **prEN 13141-8**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 8: Performance testing of non-ducted mechanical supply and exhaust ventilation units (including heat recovery)

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 156.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 13141-8:2018) has been prepared by Technical Committee CEN/TC 156 “Ventilation for buildings”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13141-8:2014.

In addition to a number of editorial revisions, the following main changes have been made with respect to EN 13141-8:2014:

— scope has been changed, and concerns now non-ducted units which ventilate more than one single room;

— terms and definitions as well as symbols and abbreviations have been updated in accordance with the parameters used in the document;

— new categories of heat exchanger have been added;

— designations in 7.2.1.2 have been changed;

— Table 2 has been moved to prEN 13142;

— reference of the internal and external leakage rates has been changes to the reference air volume flow;

— extrapolation of the leakage rates has been added;

— 7.2.1.5 concerning exhaust air transfer ratio has been added;

— 7.2.2 concerning air flow measurement has been revised;

— formulas to calculate the temperature ratios have been changed;

— wet bulb temperature for the cold climate test has been changed;

— the order of the specific test for alternating units including storage heat exchanges has been changed;

— requirements to determine the thermal performance and the exhaust air transfer ration have been revised;

— the two tables concerning the leakages, mixing and flow balance variations calculations have been moved to prEN 13142.

A list of all parts in the EN 13141 series, published under the general title *Ventilation for buildings — Performance testing of components/products for residential ventilation* can be found on the CEN website.

Introduction

This document specifies methods for the performance testing of components used in residential ventilation systems to establish the performance characteristics as identified in prEN 13142.

This document 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.

This document can be used for the following applications:

— laboratory testing;

— attestation purposes.

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

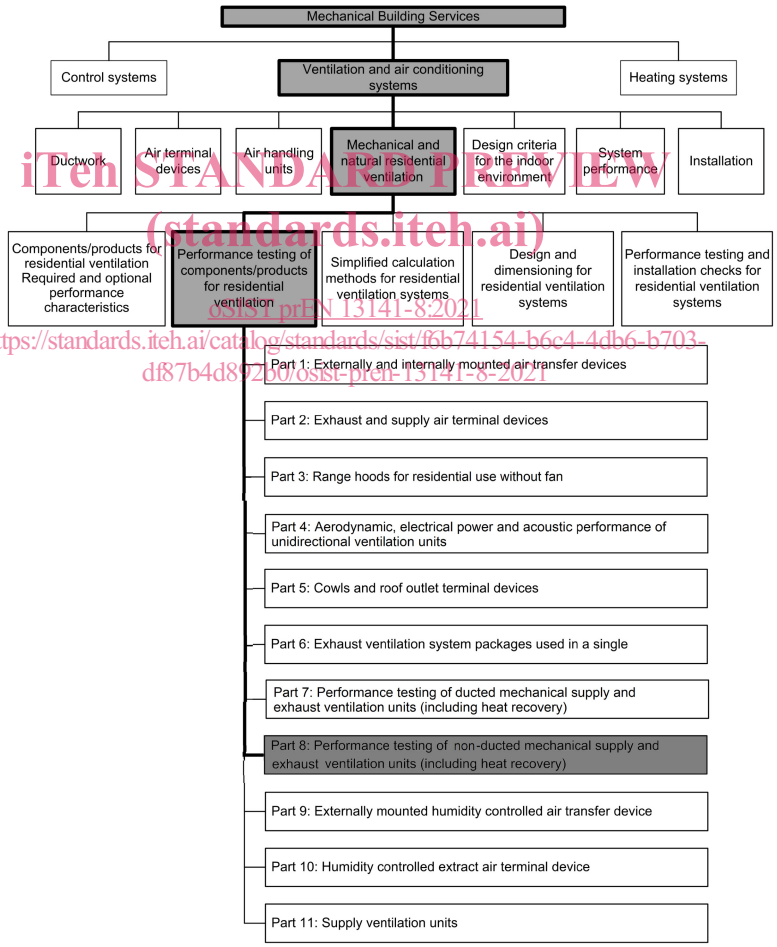

Figure 1 — Position of EN 13141-8 in the field of the mechanical building services

1 Scope

This document specifies the laboratory test methods and test requirements for the testing of aerodynamic, thermal, acoustic and the electrical performance characteristics of non-ducted mechanical supply and exhaust ventilation units used in single dwellings.

The purpose of this document is not to consider the quality of ventilation but to test the performance of the equipment.

In general, a ventilation unit contains:

— fans for mechanical supply and exhaust;

— air filters;

— air-to-air heat exchanger for heat and possibly humidity recovery;

— control system;

— inlet and outlet grilles.

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

Such equipment can contain alternating heat exchangers which provide separate supply and exhaust air flows.

In certain cases, i.e. alternating ventilation unit, the manufacturer may declare that the equipment can be installed in such a way that it serves more than one room. For the purpose of this document, these products are assessed in a single room.

This document does not deal with ducted units or units with heat pumps.

Safety requirements are given in EN 60335-2-40 and EN 60335-2-80.

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 306, *Heat exchangers - Methods of measuring the parameters necessary for establishing the performance*

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

EN ISO 717-1, *Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation (ISO 717-1)*

EN ISO 5801:2017, *Fans - Performance testing using standardized airways (ISO 5801:2017)*

EN ISO 10140-1, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1)*

EN ISO 10140-2, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation (ISO 10140-2)*

EN ISO 10140-5, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment (ISO 10140-5)*

EN ISO 16890 (all parts), *Air filters for general ventilation (ISO 16890 (all parts))*

ISO 13347-2, *Industrial fans - Determination of fan sound power levels under standardized laboratory conditions - Part 2: Reverberant room method*

ISO 13347-3, *Industrial fans - Determination of fan sound power levels under standardized laboratory conditions - Part 3: Enveloping surface methods*

ISO 13347-4, *Industrial fans - Determination of fan sound power levels under standardized laboratory conditions - Part 4: Sound intensity method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792:2003, EN ISO 5801:2017 and the following apply.

ISO and IEC maintain terminological databases for the 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
external leakage
q_{ve}
leakage to or from the air flowing inside the casing of the unit to or from the surrounding air

3.2
internal leakage
q_{vi}
leakage inside the unit between the exhaust and the supply air flows

3.3
filter bypass leakage
air bypass around filter cells

3.4
indoor/outdoor airtightness
q_{vio}
maximum air volume flow at static pressure difference of – 20 Pa and + 20 Pa corresponding to the setting when the fans are off and all additional shutters are closed

3.5
exhaust air transfer ratio
R_s
mass transfer of the discharged air to a zone (in Figure 2, a): from key 11 (extract) to key 22 (supply)) that is actually recirculated air from the same zone, due to internal leakage and external casing leakage

3.6
outdoor mixing
R_{me}
mixing of the two air flows external to the equipment under test between discharge and intake ports at outdoor terminal points caused by short circuiting

3.7
indoor mixing
R_{mi}
mixing of the two air flows external to the equipment under test between discharge and intake ports at indoor terminal points caused by short circuiting

3.8
declared maximum air volume flow
$q_{vmax,d}$
maximum air volume flow of the unit declared by the manufacturer at 0 Pa static pressure difference, between indoor and outdoor

3.9
maximum air volume flow
q_{vmax}
air volume flow corresponding to the maximum achievable fan setting of the unit at 0 Pa static pressure difference, between indoor and outdoor

Note 1 to entry: If the supply and exhaust air volume flows are different, then the maximum air volume flow is equal to the smaller of the two air volume flows.

3.10
reference air volume flow

q_{vref}
air volume flow at 70 % of the maximum air volume flow

Note 1 to entry: If the air volume flow at 70 % of the maximum air volume flow cannot be adjusted on the product itself, the closest value above is selected.

3.11
static fan pressure
p_{fs}
pressure increase induced by the ventilation unit given as difference between the static pressure at the unit outlet and the total pressure at the unit inlet

[SOURCE: EN ISO 5801:2008, 3.40]

3.12
static pressure difference
$p_{s,ext}$
pressure increase induced by the ventilation unit given as difference between the static pressures at the unit outlet and the unit inlet

Note 1 to entry: Static pressure difference is used to determine the maximum air volume flow, the reference air volume flow and the minimum air volume flow.

3.13
air flow sensitivity
v
maximum relative deviation of the maximum air volume flow q_{vmax} due to a static pressure difference of + 20 Pa and – 20 Pa

Note 1 to entry: Unbalanced (unequal) supply and exhaust air streams influence the thermal efficiency of the ventilation unit and its air exchange capacity.

3.14
temperature ratio
η_θ
temperature difference between inlet and outlet of one of the air flows divided by the temperature difference between the inlets of both air flows

3.15
humidity ratio
η_x
difference of water content between inlet and outlet of one of the air flows divided by the difference of water content between the inlets of both air flows

3.16
electrical power input
P_E

average over all electrical power input to the equipment within a defined interval of time for standard air conditions obtained from the power input of the fans, controller(s), compressor(s), safety devices of the equipment(s) excluding additional electrical heating devices not used for defrosting

Note 1 to entry: P_E is expressed in watts.

3.17
maximum electrical power input
$P_{E,max}$
electrical power input at maximum air volume flow q_{vmax}

3.18
electrical power input at the reference volume flow
$P_{E,ref}$
electrical power input at reference air volume flow q_{vref}

3.19
exhaust air transfer ratio
$R_{s(1;2)}$
mass fraction of the discharged air to a zone (see Figure 2: from key 11 (extract) to key 22 (supply)) that is actually recirculated air from the same zone, due to internal leakage, external casing leakage and short circuiting

3.20
supply air transfer ratio
R_e
mass fraction of the discharged air to a zone (see Figure 2: from key 21 (outdoor) to key 12 (exhaust)) that is actually recirculated air from the same zone, due to internal leakage, external casing leakage and short circuiting

3.21
alternating ventilation unit
pair of mechanical ventilation devices using storage heat exchangers operating in opposite, periodically changing air flow direction incorporated in common or two separate casing(s)

3.22
ventilation mode
constant operating mode where the alternating devices are running in a opposite direction with no heat recovery

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in EN 12792 and in Table 1 apply.

Table 1 — Symbols

Symbol	Designation	Unit
c	concentration of tracer gas	ppm
$D_{n,e}$	airborne sound insulation in third octave bands	dB
$D_{n,e,w}$	global airborne sound insulation index	dB
L_W	sound power level	dB
L_{WA}	A-weighted sound power level	dB
P_E	electrical power input	W
$P_{E,ref}$	electrical power input at the reference volume	W
$P_{E,max}$	maximum electrical power input	W
p_{fs}	fan static pressure	Pa
p_{qvmax}	pressure at maximum air volume flow	Pa
p_{ref}	reference pressure	Pa
$p_{s,ext}$	static pressure difference	Pa
q_m	mass air flow rate	$kg.s^{-1}$ or $kg\ h^{-1}$ or $g.s^{-1}$
q_v	air volume flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vmax}	maximum air volume flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
$q_{vmax,d}$	declared maximum air volume flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
$q_{vmax,0}$	maximum air volume flow at 0 pressure	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{v0}	air volume flow at 0 pressure	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vio}	indoor/outdoor airtightness	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vies}	internal leakage from exhaust to supply flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vise}	internal leakage from supply to exhaust flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vref}	reference air volume flow	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$
q_{vd}	declared maximum air volume flow rate	$m^3.s^{-1}$ or $m^3\ h^{-1}$ or $l.s^{-1}$

Symbol	Designation	Unit
q_{ve}	external leakage air volume flow rate	$m^3 .s^{-1}$ or $m^3 h^{-1}$ or $l.s^{-1}$
q_{vi}	internal leakage air volume flow rate	$m^3 .s^{-1}$ or $m^3 h^{-1}$ or $l.s^{-1}$
R_s	transfer ratio	%
R_e	supply air transfer ratio	%
t_1	"on" period of the cycle with alternating ventilation units working in one way	s
t_2	"off" period of the cycle for alternating ventilation units	s
t_3	"on" period of the cycle with alternating ventilation units working in the other way	s
t_4	"off" period of the cycle for alternating ventilation units	s
t_{cycle}	time of an operating cycle for alternating ventilation units	s
v	air flow velocity	$m.s^{-1}$
v	air flow sensitivity	%
V_a	volume of the casing	l
V_c	air volume content of device	l
θ	air temperature	°C
θ_w	wet bulb temperature	°C
x	water content	kg water/kg dry air
21	outdoor air (ODA) (see Figure 2)	—
22	supply air (SUP)(see Figure 2)	—
11	extract air (ETA) (see Figure 2)	—
12	exhaust air (EHA)(see Figure 2)	—
$\eta_{\theta,ex}$	temperature ratio of the unit on exhaust air side	—
$\eta_{\theta,su}$	temperature ratio of the unit on supply air side	—
$\eta_{x,ex}$	humidity ratio of the unit on exhaust air side	—
$\eta_{x,su}$	humidity ratio of the unit on supply air side	—
ρ	density of the air	kg/m^3

5 Categories of heat exchangers

Categories of heat exchangers are given in Table 2.