SLOVENSKI STANDARD
SIST EN 13141-5:2021

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Prezračevanje stavb - Preskušanje lastnosti sestavnih delov/izdelkov za prezračevanje stanovanjskih stavb - 5. del: Prezračevalne kape in strešni iztoki na strehah

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 5: Cowls, assisted cowls and roof outlet terminal devices

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Lüftung von Gebäuden - Leistungsprüfung von Bauteilen/Produkten für die Lüftung von Wohnungen - Teil 5: Hauben und Dach-Fortluftdurchlässe

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Ventilation des bâtiments - Essais de performance des composants/produits pour la ventilation des logements - Partie 5 : Extracteurs statiques, extracteurs statiques assistés et dispositifs de sortie en toiture

Ta slovenski standard je istoveten z: EN 13141-5:2020

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

SIST EN 13141-5:2021 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13141-5

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English Version

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 5: Cowls, assisted cowls and roof outlet terminal devices

Ventilation des bâtiments - Essais de performance des composants/produits pour la ventilation des logements - Partie 5 : Extracteurs statiques, extracteurs statiques assistés et dispositifs de sortie en toiture

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This European Standard was approved by CEN on 8 June 2020.

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European foreword

This document (EN 13141-5:2020) 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of an identical text or by endorsement, at the latest by April 2021, and conflicting national standards shall be withdrawn at the latest by April 2021.

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 13141-5:2004.

In addition to a number of editorial revisions, the following main changes have been made with respect to EN 13141-5:2004:

— modification of the title and scope to add assisted cowls;

— exclusion from the scope of roof exhaust fans which are tested according to EN 13141-4;

— reorganization of the clause concerning the performance testing of aerodynamic characteristics (now Clause 5) in order to have a more homogeneous organization and modification of all the figures to make them more understandable;

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— modification of the subclause concerning test installation for aerodynamic characteristics (now 5.1), which includes the modification of all tests installation requirements as well as the distinction between requirements that apply to all the tests and those that apply only to the wind tunnel use;

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— modification of the volume flow rate correction (see 5.2 concerning pressure drop);

— modification of the formula used to characterize the suction effect of a cowl (see 5.3.2 concerning the measurements and calculations);

— renaming of “Preliminary test” as “Least favourable horizontal wind approach angle for the suction effect” (see 5.3.3.1);

— replacement of “a wind of sufficient speed to give easily measurable pressure differences” by “a wind of 8 m/s” (see 5.3.3.1);

— removal of the two following measurements points: V = 0,5 m/s and 1,5 m/s (see 5.3.3.2);

— more precise definition of the three series of measurements to carry out (i.e. v_{duct} = 0m/s, v_{duct} = 4m/s and 0 m/s < v_{duct} < 4 m/s) (see 5.3.3.3);

— for additional testing (e.g. acoustics and aerodynamic) for fan assisted cowls, reference to EN 13141-4 is replaced by reference to EN ISO 5801 and more developed information are given;

— addition of a test method for measuring the combined effect of natural wind and wind from the fan assisted cowl;

— addition of a detailed clause concerning the test report;

— review of the entire document in order to make it more accessible regarding the changes made.

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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.

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.

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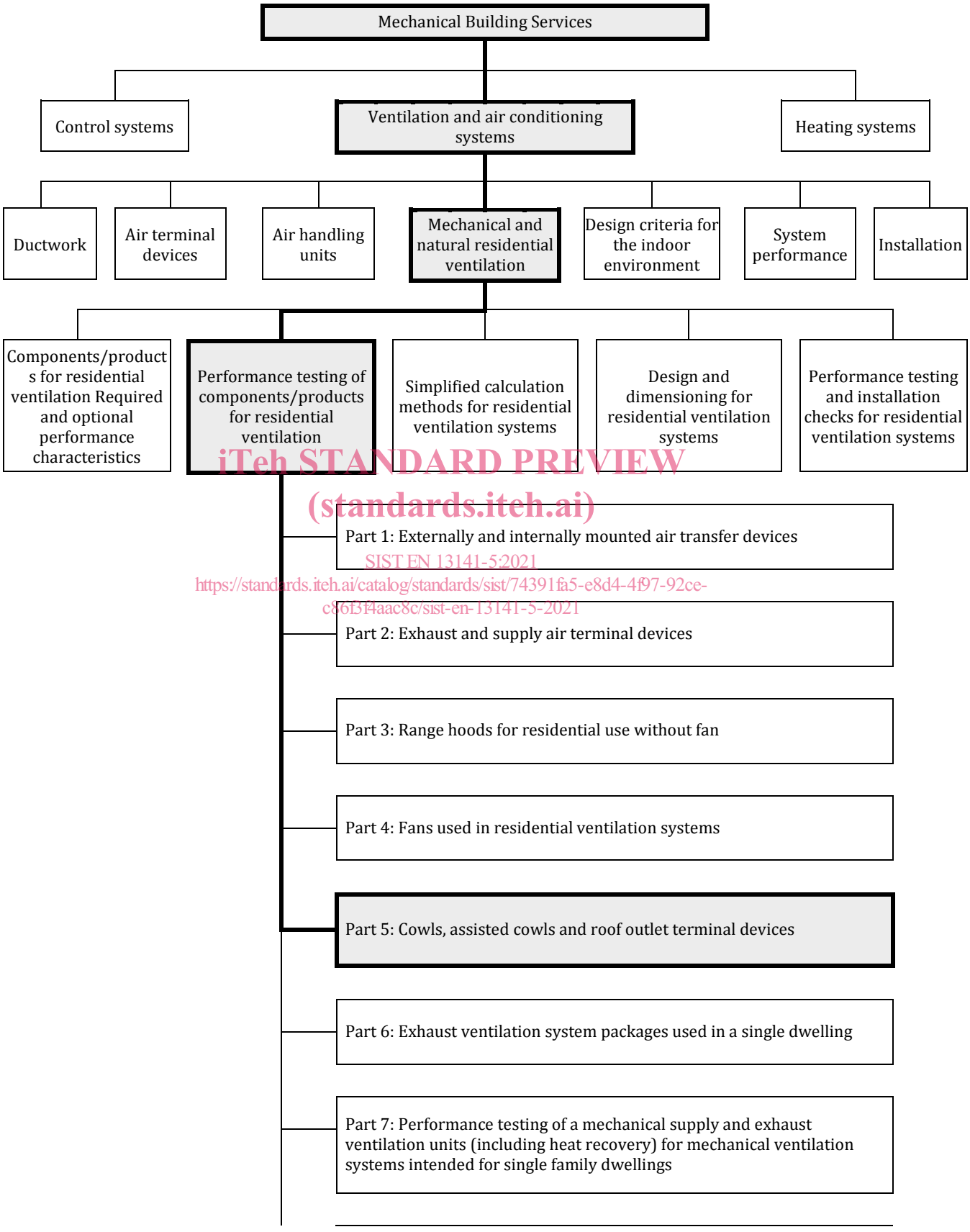
Introduction

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



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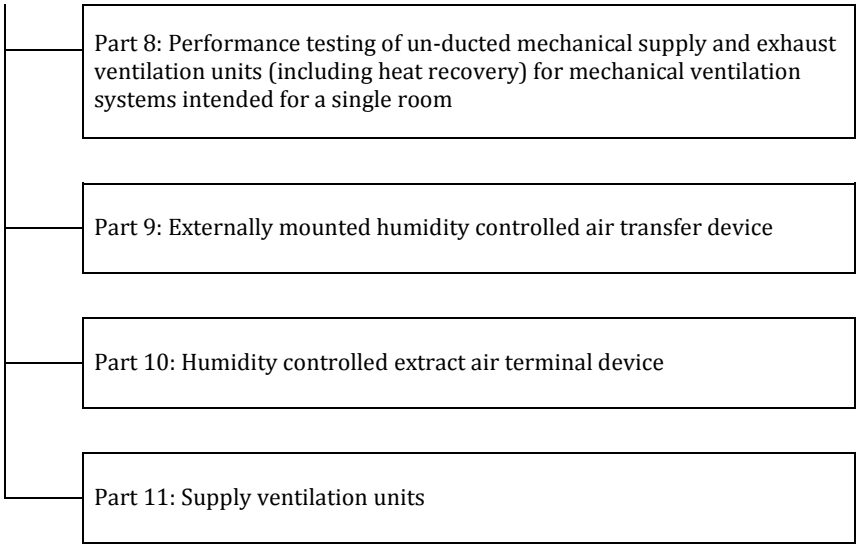

Figure 1 — Position of EN 13141-5 in the field of the mechanical building services

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1 Scope

This document specifies methods for measuring:

— the aerodynamic characteristics of cowls, fan assisted cowls and roof outlets;

— the electrical and acoustic characteristics of fan assisted cowls.

This document is applicable to cowls, assisted cowls and roof outlets used in natural, hybrid or mechanical ventilation and that are meant to be fitted onto ducts which project above the roof surface.

This document does not apply to:

— assisted cowls assisted by a device other than a fan (e.g. injection assisted cowls);

— roof exhaust fans (see EN 13141-4).

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

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

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

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

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EN ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2017)*

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 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 https://www.iso.org/obp

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3.1
cowl
exhaust air terminal device with or without moving component, intended to be fitted on top of a duct, with aim, by creating negative pressure depending on the wind speed, to avoid reverse flow and to increase the exhaust air flow rate in presence of wind

[SOURCE: EN 12792:2003, 92, modified – reformulation of the definition in a single sentence]

3.2
assisted cowl
cowl fitted with an auxiliary device using an energy source other than wind to compensate for lack of suction effect

[SOURCE: EN 12792:2003, 46, modified – removal of "such as a fan and" and replacement of "pressure difference" by "suction effect"]

3.3
fan assisted cowl
assisted cowl where the auxiliary device is a fan

3.4
roof outlet
exhaust air terminal device without moving component, intended to be fitted on top of a duct

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4 Symbols and abbreviated terms

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

No abbreviated terms are listed in this document.

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Table 1 — Symbols

Symbol	Quantity	Unit
$C(\alpha, v_{tunnel}, v_{duct})$	pressure factor	—
D	duct diameter	m
L	duct length	m
L_W	sound power level	dB
L_{WA}	A-weighted sound power level	dB(A)
L_{wo}	radiated sound power in the outdoor space (including casing)	dB
p_a	atmospheric pressure	Pa
$p_{d,duct}$	dynamic pressure in the test duct	Pa
$p_{d,tunnel}$	dynamic pressure in the wind tunnel	Pa
$p_{s,duct}$	static gauge pressure in the test duct	Pa

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Symbol	Quantity	Unit
$p_{s,tunnel}$	average static gauge pressure in the wind tunnel	Pa
P_E	electrical power input	W
$q_{v,cor}$	corrected volume flow rate	m^3/s
$q_{v,meas}$	measured volume flow rate	m^3/s
r	coefficient of determination of the regression line	—
v_{duct}	mean air speed in the test duct	m/s
v_{tunnel}	air speed in the wind tunnel (wind speed)	m/s
α	vertical wind approach angle	degree
β	horizontal wind approach angle	degree
Δp	pressure drop	Pa
Δp_{cowl}	difference between the total pressure in the test duct approaching the cowl under test and the static pressure in the tunnel	Pa
$\Delta p_{f,duct}$	pressure drop due to friction in the test duct between the pressure tapping and the bottom of the cowl	Pa
ζ	pressure drop coefficient	—
θ_a	temperature of the air in the test duct	°C
ρ_{ref}	density of 1 204 kg/m^3 corresponding to the air under standard conditions (20 °C, 101 325 Pa)	kg/m^3
ρ_{tunnel}	air density in the wind tunnel	kg/m^3

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5 Performance testing of aerodynamic characteristics

5.1 Test installation

5.1.1 General

The aerodynamic characteristics of the air terminal device shall be tested in a test installation as shown in Figure 2. For pressure drop (see 5.2) and mechanical tests without wind (see 5.3.3.4), the wind tunnel is not necessary. The test installation shall comprise the following:

— an adjustable air supply incorporating a flow rate measuring device with an uncertainty in accordance with 5.1.3 (e.g. orifice plate or venturi tube conforming with EN ISO 5167-1, or other flow meter, such as a rotameter). The air supply passes via an airtight duct;

— means to stabilize the flow and pressure upstream the test duct, e.g. airtight plenum chamber (with a side length at least 4 times the diameter of the test duct) containing flow settling screens at the air entry zone and a smooth outlet;

— an airtight test circular duct (test duct) to carry the air terminal device under test, of diameter D chosen according to EN 1506:2007, Table 1 to suit the air terminal device, and with a minimum length as given by Formula (1).

$$L = 6 \cdot D \tag{1}$$

In case of assisted cowl, the test installation shown in Figure 2 shall be in accordance with Category C installation as defined in EN ISO 5801:2017, 11.5, ducted inlet and free outlet.

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The test shall be performed according to the intended use of the air terminal device.

The pressure measurement point in the test duct (Figure 2, Key 6) shall be located 3D upstream of the air terminal device (D being the diameter of the test duct).

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In order to reach high pressure values, a device to increase the pressure drop in the test duct (e.g. iris) may be used (Figure 2, Key 15). In order to reach low pressure values, a fan with flow rate adjusted device may be used (Figure 2, Key 12).

5.1.2 Wind tunnel

Static pressure shall be measured using two pressure probes (or more) located in the working section (see Figure 2, section A-A). The pressure probes should be situated far enough from the cowl to avoid side effects, at each side of the wind cross section. The reference pressure is the average of the two (or more) static pressures.

The wind speed measurement shall be made at 1 m upstream from the air terminal device and in front of it.

During the suction effect tests, the volume flow rate in the test duct shall not exceed 2 % of the volume flow rate from the wind tunnel.

If the tests are carried out in a confined working section as shown in Figure 2, then the cross-section area of the working section (in projection along the axis of the wind tunnel) shall be at least 20 times the cross section area of the cowl and duct in the wind.

If the tests are carried out using an open jet type wind tunnel, then the cross section area of the jet shall be at least 10 times the cross-section area (in projection along the axis of the wind tunnel) of the cowl and duct in the wind.

In order to avoid side effects from the wind tunnel, the test duct part located in the working section (see Figure 2, section A-A) of the wind tunnel (i.e. the duct part blown by the wind) shall be at least 5 times the duct diameter.