SLOVENSKI STANDARD
SIST EN 13141-8:2014

01-september-2014

Nadomešča:
SIST EN 13141-8:2006

Prezračevanje stavb - Preskušanje lastnosti stanovanjskih prezračevalnih komponent/izdelkov - 8. del: Preskušanje lastnosti mehanskih brezkanalnih dovodnih in odvodnih prezračevalnih enot (vključno z rekuperacijo toplote) za mehanske prezračevalne sisteme za mehansko prezračevanje posameznih prostorov

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room

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

Ventilation des bâtiments - Essais de performance des composants/produits pour la ventilation des logements - Partie 8: Essais de performance des unités de soufflage et d'extraction (y compris la récupération de chaleur) pour les systèmes de ventilation mécaniques non raccordés prévus pour une pièce

Ta slovenski standard je istoveten z: **EN 13141-8:2014**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

SIST EN 13141-8:2014 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13141-8

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ICS 91.140.30

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English Version

Ventilation for buildings - Performance testing of components/products for residential ventilation - Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room

Ventilation des bâtiments - Essais de performance des composants/produits pour la ventilation des logements - Partie 8 : Essais de performance des unités de soufflage et d'extraction (y compris la récupération de chaleur) pour les systèmes de ventilation mécaniques non raccordés prévus pour une pièce

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

This European Standard was approved by CEN on 6 February 2014.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13141-8:2014) 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 September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

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 13141-8:2006.

In comparison to EN 13141-8:2006 the following changes have been made:

— alternating ventilation units including a storage type heat exchangers have been included;

— measurement of the deviation of air flow rate due to façade pressures in normal use has been introduced;

— temperature conditions have been modified to be the same as in EN 13141-7 that is to say 7 °C / 20 °C.

EN 13141 consists of the following parts, under the general title *Ventilation for buildings — Performance testing of components/products for residential ventilation*:

— *Part 1: Externally and internally mounted air transfer devices;*

— *Part 2: Exhaust and supply air terminal devices;*

— *Part 3: Range hoods for residential use;*

— *Part 4: Fans used in residential ventilation systems;*

— *Part 5: Cowls and roof outlet terminal devices;*

— *Part 6: Exhaust ventilation system packages used in a single dwelling;*

— *Part 7: Performance testing of a mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for single family dwellings;*

— *Part 8: Performance testing of un-ducted mechanical supply and exhaust ventilation units (including heat recovery) for mechanical ventilation systems intended for a single room;*

— *Part 9: Externally mounted humidity controlled air transfer device;*

— *Part 10: Humidity controlled extract air terminal device.*

— *Part 11: Positive pressure ventilation systems.*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard specifies methods for the performance testing of components used in residential ventilation systems to establish the performance characteristics as identified in EN 13142 [1].

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.

This European Standard can be used for the following applications:

— laboratory testing;

— attestation purposes.

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

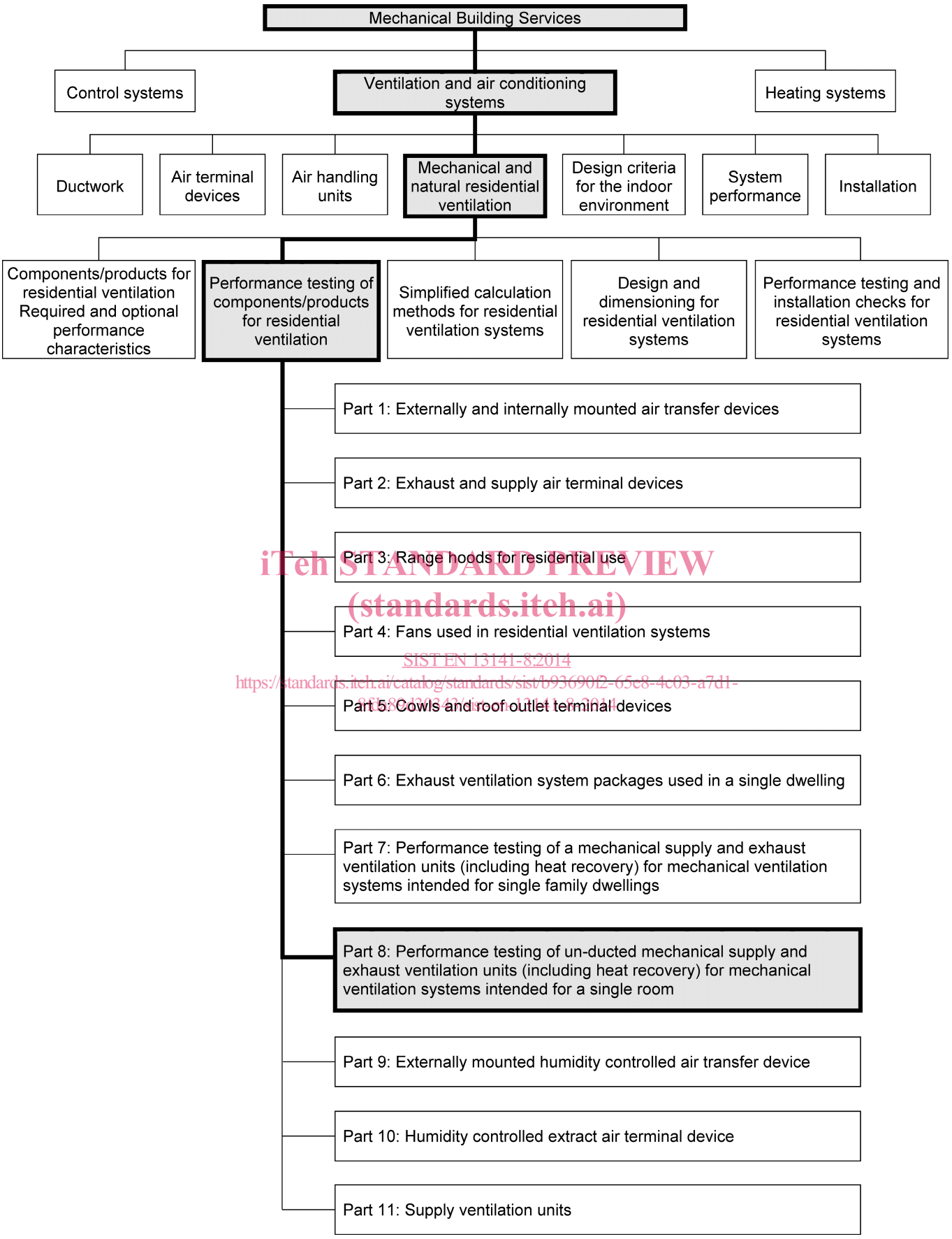

Figure 1 — Position of EN 13141-8 in the field of the mechanical building services

1 Scope

This European Standard specifies the laboratory test methods and test requirements for the testing of aerodynamic, thermal and acoustic performance, and the electrical power of an un-ducted mechanical supply and exhaust ventilation unit used in a single room.

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

In general, a ventilation unit contains:

— supply and exhaust air fans;

— air filters;

— air to air heat exchanger or air storage mass for exhaust air heat and 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 recommend that the equipment can be installed in such a way that it serves more than one room. For the purpose of this European Standard, these products are assessed in a single room.

This European Standard does not deal with ducted units or units with heat pumps.

Safety requirements are given in EN 60335-2-80:2003 [2].

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 779, *Particulate air filters for general ventilation - Determination of the filtration performance*

EN 12792:2003, *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 717-1, *Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation (ISO 717-1)*

EN ISO 3741, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for reverberation test rooms (ISO 3741)*

EN ISO 3743-1, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for small movable sources in reverberant fields - Part 1: Comparison method for a hard-walled test room (ISO 3743-1)*

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 (ISO 3743-2)*

EN ISO 3744, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744)*

EN ISO 3745, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Precision methods for anechoic rooms and hemi-anechoic rooms (ISO 3745)*

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)*

EN ISO 9614-2, *Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 2: Measurement by scanning (ISO 9614-2)*

EN ISO 10140-1:2010, *Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products (ISO 10140-1:2010)*

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)*

3 Terms, definitions and classification

For the purpose of this document, the terms and definitions given in EN 12792:2003 and 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 air external to the equipment under test

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
indoor/outdoor airtightness
maximum of air flow at – 20 Pa and + 20 Pa corresponding to the setting when the fans are off

3.1.5
outdoor mixing
mixing of the two airflows external to the equipment under test between discharge and intake ports at outdoor terminal points caused by short circuiting

3.1.6
indoor mixing
mixing of the two airflows under test between discharge and intake ports at indoor terminal points caused by short circuiting

3.1.7
maximum air volume flow
air flow corresponding to that at the maximum setting and at no pressure difference, 0 Pa, 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.

3.1.8
minimum air volume flow
air flow corresponding to that at the minimum setting and at no pressure difference, 0 Pa, between indoor and outdoor

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

3.1.9
reference air volume flow
airflow at 70 % of the maximum air volume flow

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

Note 2 to entry: If the air volume flow cannot be adjusted on the product itself, the closest value above 70 % is selected.

3.1.10
air flow sensitivity
sensitivity to variations in the balance between supply airflow and exhaust airflow due to pressure difference variations over the façade

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

3.1.11
air exchange capacity
ability of the ventilation unit to exchange the used indoor air by fresh outdoor air in a room, under the varying occurring circumstances

3.1.12
temperature ratio
temperature difference between inlet and outlet of one of the airflows divided by the temperature difference between the inlets of both airflows

3.1.13
humidity ratio
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

3.1.14
effective power input
average electrical power input to the equipment within a defined interval of time obtained from:

— power input of the fans;

— power input for operation of any power input including the control, the transformer and for defrosting, excluding additional electrical heating devices not used for defrosting;

— power input of all controls, transformers, power supplies and safety devices of the equipment

Note 1 to entry: Effective power input is expressed in watts.

3.1.15
test voltage
voltage used for supplying the components during the testing

3.2 Classification

The classification of heat exchangers is the following:

— Category I: Recuperative heat exchangers (e.g. air-to-air plate or tube heat exchanger)

Recuperative heat exchangers are designed to transfer thermal energy (sensible or total) from one air stream to another without moving parts. Heat transfer surfaces are in form of plates or tubes. This heat exchanger may have parallel flow, cross flow or counter flow construction or a combination of these. Plate and tube heat exchangers with vapour diffusion (for instance cellulose) are also in this category.

— Category II: Regenerative heat exchangers (e.g. rotary or alternating heat exchanger)

A rotary heat exchanger is a device incorporating a rotating “thermal wheel” for the purpose of transferring energy (sensible or total) from one air stream to the other. It incorporates material allowing latent heat transfer, a drive mechanism, a casing or frame, and includes any seals which are provided to retard bypassing and leakage or air from one air stream to the other. Regenerative heat exchangers have varying degrees of moisture recovery, depending on the material used (e.g. “condensation rotor/non hygroscopic rotor”, “hygroscopic rotor” and “sorption rotor” heat exchangers).

4 Symbols and abbreviations

For the purpose of this document, the symbols and abbreviations given in EN 12792:2003 and the following apply.

The symbols used in this document are listed in Table 1.

Table 1 — Symbols

Symbol	Designation	Unit
θ	Air temperature	°C
θ_{11}	Air temperature for extract air	°C
θ_{12}	Air temperature for exhaust air	°C
θ_{21}	Air temperature for outdoor air	°C
θ_{22}	Air temperature for supply air	°C
θ_{w11}	Wet bulb temperature for extract air	°C
θ_{w21}	Wet bulb temperature for outdoor air	°C
$\eta_{\theta, ex}$	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	—
11	Extract air (see Figure 2)	—

12	Exhaust air (see Figure 2)	—
21	Outdoor air (see Figure 2)	—
22	Supply air (see Figure 2)	—
C_{11}	Concentration of tracer gas on extract air side using one of the test configuration a), b), c) or d) of Figure 2 or Figure 4	mg/m^3
C_{22}	Concentration of tracer gas on supply air side using one of the test configuration a), b), c) or d) of Figure 2 or Figure 4	mg/m^3
C_{12}	Concentration of tracer gas on exhaust air side using one of the test configuration a), b), c) or d) of Figure 2 or Figure 4	mg/m^3
$D_{n,e}$	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	Electric power input	W
p_s	Static pressure	Pa
q_m	Mass air flow rate	$kg.s^{-1}$ or $g.s^{-1}$
q_{m11}	Mass extract air flow rate	$kg.s^{-1}$ or $g.s^{-1}$
q_{m12}	Mass exhaust air flow rate	$kg.s^{-1}$ or $g.s^{-1}$
q_{m21}	Mass outdoor air flow rate	$kg.s^{-1}$ or $g.s^{-1}$
q_{m22}	Mass supply air flow rate	$kg.s^{-1}$ or $g.s^{-1}$
q_{me}	Outdoor mixing (calculated)	%
q_{mi}	Indoor mixing	$m^3.s^{-1}$ or $l.s^{-1}$
q_v	Volume air flow rate	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vd}	Maximum air flow rate	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vmax}	Maximum air volume flow rate	$m^3.s^{-1}$ or $l.s^{-1}$
q_{ve}	External leakage air volume flow rate	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vi}	Internal leakage air volume flow rate	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vio}	Average volume flow rate for alternating ventilation unit	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vies}	Internal leakage from exhaust to supply flow	$m^3.s^{-1}$ or $l.s^{-1}$
q_{vise}	Internal leakage from supply to exhaust flow	$m^3.s^{-1}$ or $l.s^{-1}$
$q_{vmeasured}$	Measured air volume flow rate	$m^3.s^{-1}$ or $l.s^{-1}$