SLOVENSKI STANDARD
oSIST prEN 13053:2017

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Prezračevanje stavb - Klimati - Ocenitev in lastnosti klimatov, sestavnih delov in sekcij

Ventilation for buildings - Air handling units - Rating and performance for units, components and sections

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Leistungskenndaten für Geräte, Komponenten und Baueinheiten

Ventilation des bâtiments - Caissons de traitement d'air - Classification et performance des unités, composants et sections

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Ta slovenski standard je istoveten z: **prEN 13053**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

oSIST prEN 13053:2017 **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

DRAFT
prEN 13053

February 2017

ICS 91.140.30

Will supersede EN 13053:2006+A1:2011

English Version

Ventilation for buildings - Air handling units - Rating and performance for units, components and sections

Ventilation des bâtiments - Caissons de traitment d'air - Classification et performance des caissons, composants et sections

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Leistungskenndaten für Geräte, Komponenten und Baueinheiten

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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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 13053:2016) 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 13053:2006+A1:2011.

This document has been revised and includes new requirements according to Ecodesign requirements for ventilation units given in EU Commission Regulation No 1253/2014.

This European Standard is a part of a series of standards for air handling units used for ventilation and air conditioning of buildings for human occupancy. It considers the ratings and the performance of air handling units as a whole, the requirements and performance of specific components and sections of air handling units including hygiene requirements. The position of this standard in the field of mechanical building services is shown in Figure 1.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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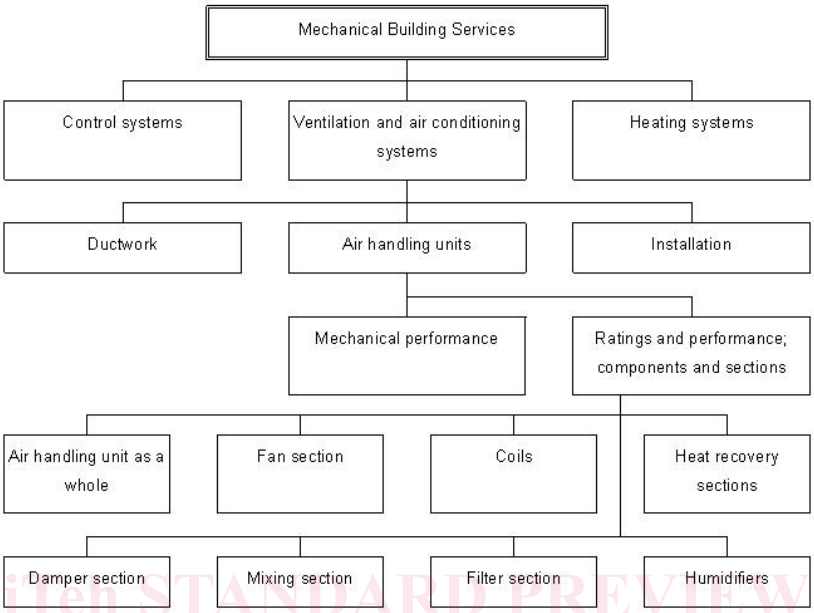

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Figure 1 — Position of this standard in the field of mechanical building services

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1 Scope

This European Standard specifies requirements and testing for rating and performance of non-residential Air Handling Units (AHU). It specifies requirements, classifications and testing of components and sections of ventilation units.

For many components and sections it refers to component standards, but it also specifies restrictions or applications of standards developed for stand-alone components.

This European Standard applies to tests in a laboratory and in situ. This European Standard is applicable both for mass produced air handling units and tailor made Air Handling Units.

This European Standard applies to AHU and individual sections of AHU with the designed air flow > 250 m^3/h.

NOTE Units complying with this European Standard can be used in multi dwelling residential buildings.

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

EN 779, *Particulate air filters for general ventilation — Determination of the filtration performance*

EN 1216, *Heat exchangers — Forced circulation air-cooling and air-heating coils — Test procedures for establishing the performance*

EN 1751, *Ventilation for buildings — Air terminal devices — Aerodynamic testing of damper and valves*

EN 1886, *Ventilation for buildings — Air handling units — Mechanical performance*

EN 12599:2012 *Ventilation for buildings — Test procedures and measurement methods to hand over air conditioning and ventilation systems*

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

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 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 3746, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746)*

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

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)*

EN ISO 5801:2008, *Industrial fans — Performance testing using standardized airways (ISO 5801:2007 including Cor 1:2008)*

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

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 9614-3, *Acoustics — Determination of sound power levels of noise sources using sound intensity — Part 3: Precision method for measurement by scanning (ISO 9614-3)*

ISO 3966, *Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes*

ISO 16956, *Thermal performance in the built environment — Determination of air flow rate in building applications by field measuring methods*

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3 Terms and definitions

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

3.1
air handling unit
factory made encased assembly consisting of sections containing a fan or fans and other necessary equipment to perform one or more of the following functions:, filtrating, heating, cooling, heat recovery, humidifying, dehumidifying and mixing air

3.2
section of air handling unit
functional element of an air handling unit consisting of one or more components in a single casing

3.3
component of air handling unit
smallest functional element of an air handling unit

3.4
blow-through unit
air handling unit with a section or sections downstream of the supply air fan

3.5
casing of an air-handling unit
enclosure of the unit, within which the components are mounted

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3.6
openings for outdoor air, supply air, extract air, recirculation air and exhaust air
aperture through which air is taken in or discharged from the air handling unit, such as openings for outdoor air, supply air, recirculation air and exhaust air

3.7
damper section
section of air handling unit including a damper or valve

3.8
mixing section
section where e.g. outdoor air flow and the recirculation air flow are mixed in a controlled way. The section generally consists of one damper per air flow and a mixing chamber

3.9
filter section
section including a filter or filters and an associated filterframe

3.10
heat recovery section
section in which heat (and possibly also moisture) is transferred from one airstream into another, either directly or using an intermediary heat transfer medium

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3.11
air heating and cooling coils
heat exchangers by means of which heat is transferred from a heat transfer medium to air (heating coil) or the other way round (cooling coil)

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3.12
sound attenuation section
section in which sound transfer into a ductwork or into ambient air is reduced

3.13
humidifier section
section in which moisture is added to the air

3.14
fan section
section in which one or more fans are installed for moving air

3.15
combined section
section within which two or more functions are combined

3.16
functions
3.16.1
air treatment
process by which the state of the air is modified with respect to one or more of its characteristics such as temperature, moisture content, dust content, bacterial count, gas and vapour content

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3.16.2
air type
designation of air moving through a ventilation, air conditioning or air treatment installation as a function of its location relative to the installation, e.g. outdoor air, exhaust air, extract air etc

3.16.3
cooling
removal of latent and/or sensible heat

3.16.4
dehumidification
controlled reduction of water vapour from the air

3.16.5
filtration
removal of particulate material from the airstream

3.16.6
heating
transfer of heat from one body or medium to another medium

3.16.7
humidification
controlled addition of water vapour to an air stream or space

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3.16.8
sound reduction
controlled reduction of sound energy

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3.17
characteristics
3.17.1
air flow
movement of air within set boundaries (such as ducts)

3.17.2
air flow rate
mass or volume flow of air passing a given plane divided by time

3.17.3
bypass factor
ratio of the diverted air flow to the sum of the main air flow and the diverted air flow

3.17.4
bypass leakage
unwanted and uncontrolled passing of untreated air into the treated air between the components within a casing, such as filters and coils

3.17.5
deflection of a casing
deformation in mm of the external surfaces of the enclosure when subjected to a positive (bulging) or negative (caving) pressure. It is given as the measured difference in distance between a reference plane and the maximum point of deflection when subjected to air pressure

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3.17.6
defrosting heat factor
ratio between the energy transferred into the air supply and the maximum recoverable energy in exhaust air, excluding the energy input for defrosting

3.17.7
air leakage factor f_L
air tightness expressed as the air leakage per unit envelope area and pressure difference (external air leakage)

3.17.8
external total pressure difference
difference between the total pressure at the outlet of the air handling unit and the total pressure at the inlet

3.17.9
external static pressure difference
difference between the static pressure at the outlet of the air handling unit and the static pressure at the inlet

3.17.10
humidification efficiency
ratio between the mass of water evaporated by the humidifier and the theoretical mass needed to achieve saturation at a given temperature

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3.17.11
internal air leakage rate
air leakage in between the two air streams within a section

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3.17.12
thermal bridging factor
ratio between the lowest temperature difference between any point on the external surface and the mean internal air temperature and the mean air to air temperature difference

3.17.13
thermal transmittance
heat flow per unit of area and temperature difference

3.18
mass produced air handling unit
air handling units manufactured to the same design and by the same manufacturing process, with a range of performance characteristics for which the duty point is not defined

Note 1 to entry: Mass produced air handling units (AHUs) are designed for an undefined duty point and mostly produced in large quantities. Their capacity is generally given in ranges so that they can be used in different buildings and/or applications.

3.19
tailor made air handling unit
air handling unit individually designed and manufactured for a specific duty point, with defined and known parameters, designed on a specific order and for a specific purpose

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3.20
nominal external pressure, $\Delta p_{s,ext}$
declared design external static pressure difference at nominal flow rate, expressed in pascals (Pa)

3.21
internal pressure drop of ventilation components, $\Delta p_{s,int}$
sum of the static pressure drops of a reference configuration of a BVU or an UVU at nominal flow rate, expressed in pascals (Pa)

3.22
internal pressure drop of additional non-ventilation components, $\Delta p_{s,add}$
remainder of the sum of all internal static pressure drops at nominal flow rate and nominal external pressure after subtraction of the internal pressure drop of ventilation components (Δps,int), in pascals (Pa)

3.23
internal specific fan power of ventilation components SFP_{int}
ratio between the internal pressure drop of ventilation components and the fan efficiency, determined for the reference configuration, expressed in watts per cubic meter per second ($W \cdot m^{-3} \cdot s$)

3.24
nominal duty point
point where air flow rate is at its maximum at the declared external pressure and is in compliance with the requirements of the maximum SFPint and the minimum thermal efficiency

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3.25
reference configuration of a NRVU-BVU
product configured with a casing, at least two fans with variable speed or multi-speed drives, a HRS, a clean fine filter (minimum F7) on the supply air side and a clean medium filter (minimum M5) on the exhaust air side

3.26
reference configuration of a NRVU-UVU supply air
product configured with a casing and at least one fan with variable speed or multi-speed drive, and in case the product is intended to be equipped with a filter, this filter shall be a clean fine filter (minimum F7)

3.27
reference configuration of a NRVU-UVU exhaust air
product configured with a casing and at least one fan with variable speed or multi-speed drive, and in case the product is equipped with a filter, no filter class is specified

4 Symbols and abbreviations

For the purposes of this standard, symbols and units given in EN 12792:2003 and in Table 1 apply together with those defined by the formulas, text and annexes of this standard.

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Table 1 — Symbols, terms, units and subscripts

Symbol	Term	Unit
A	Surface area	m^2
A_c	Cross sectional area of a duct	m^2
c	Sound velocity in the air	$m \times s^{-1}$
E	Duct end correction value	dB
f_L	Air leakage factor	$l \times (s \times m^2)^{-1}$
f	Frequency	Hz
n	Number of measurements within the total measuring time	-
k	Leakage factor	%
L_p	Sound pressure level	dB
L_W	Sound power level	dB
L_{WA}	A-weighted sound power level	dB(A)
n_F	Rotational speed of the fan	s^{-1}
P_{El}	Electrical motor input power	W
$P_{el\ aux}$	Auxiliary electric power input (e.g. pumps, etc.)	W
p_a	Atmospheric pressure	Pa
p_d	Dynamic pressure	Pa
p_s	Static pressure	Pa
p_t	Total fan pressure	Pa
p_{tu}	External total pressure difference of the unit	Pa
$\dot{Q}_{defr}$	Total energy input for defrosting during one complete frosting/defrosting cycle	J
$\dot{Q}_{HRS}$	Heat Recovery Capacity	W
p_v	Partial pressure of water vapour	Pa
q_{mn}	Nominal air mass flow rate of the recovery device	$kg \times s^{-1}$
q_m	Air mass flow rate	$kg \times s^{-1}$
q_v	Air volume flow rate	$m^3 \times s^{-1}$
q_{vm}	Measured and converted air volume flow rate	$m^3 \times s^{-1}$
q_{vs}	Specified air volume flow	$m^3 \times s^{-1}$
q_w	Mass flow of water inlet	$kg \times s^{-1}$
q_d	Mass flow of water drain and overflow	$kg \times s^{-1}$
S	Section area	m^2
SFP_{int}	Specific Fan Power, internal	$W \times m^{-3} \times s$
t_a	Dry-bulb temperature	°C

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