

Nederlandse norm

# NEN-EN 13053+A1

(en)

Ventilatie van gebouwen -  
Luchtbehandelingsseenheden - Nominale  
waarden en prestatie voor bouwelementen en  
bouwgroepen

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

Vervangt NEN-EN 13053:2006;  
NEN-EN 13053:2006/Ontw. A1:2010

ICS 91.140.30

juli 2011

Als Nederlandse norm is aanvaard:  
 - EN 13053:2006+A1:2011,DT

Voorbeeld  
 Preview

Normcommissie 351074 "Klimaatberedering in gebouwen"



**THIS PUBLICATION IS COPYRIGHT PROTECTED**

**DEZE PUBLICATIE IS AUTEURSRECHTELIJK BESCHERMD**

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Netherlands Standardization Institute.

The Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Nederlands Normalisatie-instituut niets uit deze uitgave worden veelevoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor veelevoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprorecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Nederlands Normalisatie-instituut gepubliceerde uitgaven.

## Nederlands voorwoord

Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 308	NEN-EN 308	Warmtewisselaars - Beproeversprocedures voor het vaststellen van prestatie-eisen van warmteterugwinningsapparatuur
EN 779	NEN-EN 779	Luchtfilters voor ventilatiedoeleinden - Bepaling van de filterprestatie
EN 1216	NEN-EN 1216	Warmtewisselaars - Luchtcoolers en luchtverwarmers met gedwongen convectie - Beproeversprocedures voor het vaststellen van de prestatie
EN 1751	NEN-EN 1751	Ventilatie van gebouwen - Onderdelen van het luchtverdeelsysteem - Aerodynamische beproeving van dempers en afsluiters
EN 1886:1998	NEN-EN 1886:1998	Ventilatie van gebouwen - Luchtbehandelingskasten - Mechanische eigenschappen en beproevingsmethoden
EN 12792:2003	NEN-EN 12792:2003	Ventilatie van gebouwen - Symbolen, terminologie en grafische symbolen
EN 13779	NEN-EN 13779	Ventilatie voor utiliteitsgebouwen - Prestatie-eisen voor ventilatie- en luchtbehandelingssystemen
EN ISO 3741	NEN-EN-ISO 3741	Akoestiek - Bepaling van geluidvermogen-niveaus en geluidenergieniveaus van geluidbronnen met behulp van geluiddrukmetingen - Precisiemethode voor nagalmkamers
EN ISO 3744	NEN-EN-ISO 3744	Akoestiek - Bepaling van geluidvermogen-niveaus en geluidenergieniveaus van geluidbronnen met behulp van geluiddrukmetingen - Technische methoden voor vrij-veldomstandigheden boven een reflecterend oppervlak
EN ISO 3746	NEN-EN-ISO 3746	Akoestiek - Bepaling van geluidvermogen-niveaus en geluidenergieniveaus van geluidbronnen met behulp van geluiddrukmetingen - Globale methode met behulp van een omhullend meetoppervlak boven een reflecterend oppervlak
EN ISO 5136	NEN-EN-ISO 5136	Akoestiek - Bepaling van het geluidvermogen dat door ventilatoren en andere luchtverplaatsende toestellen in kanalen wordt afgestraald - Methode voor metingen in het kanaal
EN ISO 5167-1	NEN-EN-ISO 5167-1	Metingen van gas- en vloeistofstromen in leidingen met volledige stroming en een cirkelvormige doorsnede met gebruik van drukverschilmeters - Deel 1: Algemene principes en voorwaarden
EN ISO 7235	NEN-EN-ISO 7235	Akoestiek - Laboratorium meetprocedures voor geluiddempers in kanalen en luchtverdeelsystemen - Tussenschakelverzwakking, stromingsgeluid en totaal drukverlies
ISO 5221	-	-
ISO 5801:1997	NEN-ISO 5801:1997	Industriële ventilatoren - Prestatiebeproeving met genormeerde luchtkanalen
ISO 13348	NEN-ISO 13348	Industriële ventilators - Toleranties, conversiemethode en technische gegevenspresentatie

Voorbeeld  
Preview

EUROPEAN STANDARD

**EN 13053:2006+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2011

ICS 91.140.30

Supersedes EN 13053:2006

English Version

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

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

Lüftung von Gebäuden - Zentrale raumluftechnische  
Geräte - Leistungskenndaten für Geräte, Komponenten und  
BauEinheiten

This European Standard was approved by CEN on 26 June 2006 and includes Amendment 1 approved by CEN on 19 May 2011.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

**Contents**

Page

Foreword.....	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions.....	8
4 Symbols and abbreviations.....	10
5 Ratings and performance of the entire air handling unit.....	13
5.1 General.....	13
5.2 Testing of aerodynamic performance.....	13
5.2.1 Characteristics and quantities.....	13
5.2.2 Test method.....	15
5.2.3 Measurement procedure.....	15
5.2.4 Evaluation of results.....	17
5.3 Testing of acoustic performance.....	17
5.3.1 General.....	17
5.3.2 Specific requirements concerning the set-up of acoustic tests.....	18
5.4 Tolerances.....	22
5.5 Test report.....	23
6 Ratings and performance of the entire air handling unit.....	26
6.1 General.....	26
6.2 Casing.....	26
6.3 Fan section.....	28
6.3.1 General.....	28
6.3.2 <input type="checkbox"/> Power input of fans <input type="checkbox"/>	29
6.4 Coils.....	30
6.4.1 General.....	30
6.4.2 Testing.....	30
6.4.3 Construction.....	30
6.4.4 Cooler/Droplet Eliminator.....	30
6.5 Heat recovery sections.....	31
6.5.1 General.....	31
6.5.2 Classifications and requirements.....	31
6.5.3 Testing.....	34
6.6 Damper sections.....	34
6.6.1 General.....	34
6.6.2 Requirements and testing.....	34
6.7 Mixing sections.....	34
6.7.1 General.....	34
6.7.2 Categories and characteristics.....	35
6.7.3 Requirements.....	35
6.7.4 Measurements.....	37
6.7.5 Field testing of mixing efficiency.....	38
6.8 Humidifiers.....	38
6.8.1 General.....	38
6.8.2 Categories.....	39
6.8.3 Requirements.....	39
6.9 Filter sections.....	41
6.9.1 General requirements.....	41
6.9.2 Filters installed in air handling units.....	42
6.10 Passive sound attenuation sections.....	43
7 Extended hygiene requirements for special applications.....	43

7.1	General.....	43
7.2	Accessibility.....	43
7.3	Smoothness.....	43
7.4	Inspection windows and lights.....	44
7.5	Drainage/prevention of condensation, humidifiers.....	44
7.6	Air leakage.....	44
8	Instructions for installation, operation and maintenance.....	44
8.1	Installation.....	44
8.2	Operation and maintenance.....	44
8.3	Documentation and labelling.....	45
<b>Annex A (informative) Air handling units - Heat recovery – Defrosting - Requirements and testing.....</b>		
A.1	General.....	46
A.2	Defrosting.....	46
A.2.1	Defrosting heat factor.....	46
A.2.2	Non-cyclic defrosting.....	46
A.2.3	Cyclic defrosting.....	46
A.3	Testing.....	47
A.3.1	Test rig.....	47
A.3.2	Duty points.....	48
A.3.3	Test procedures.....	48
A.3.4	Testing of defrosting heat factor.....	48
A.3.5	Total measuring time.....	48
A.4	Test report.....	49
A.4.1	The heat recovery device.....	49
A.4.2	The defrosting heat factor.....	49
<b>Annex B (informative) <del>A1</del> Air handling units – Heat recovery – Characteristics <del>A1</del>.....</b>		
B.1	Efficiency of the heat recovery.....	50
B.2	Evaluation.....	52
B.3	Evaluation of auxiliary energies.....	52
B.4	Further characteristics.....	52
B.5	Efficiency.....	53
B.6	View of yearly energy.....	53
Bibliography.....		54

## Foreword

This document (EN 13053:2006+A1:2011) 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 January 2012, and conflicting national standards shall be withdrawn at the latest by January 2012.

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  $\text{A}_1$  EN 13053:2006  $\text{A}_1$ .

This document includes Amendment 1, approved by CEN on 2011-05-19.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\text{A}_1$   $\text{A}_1$ .

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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



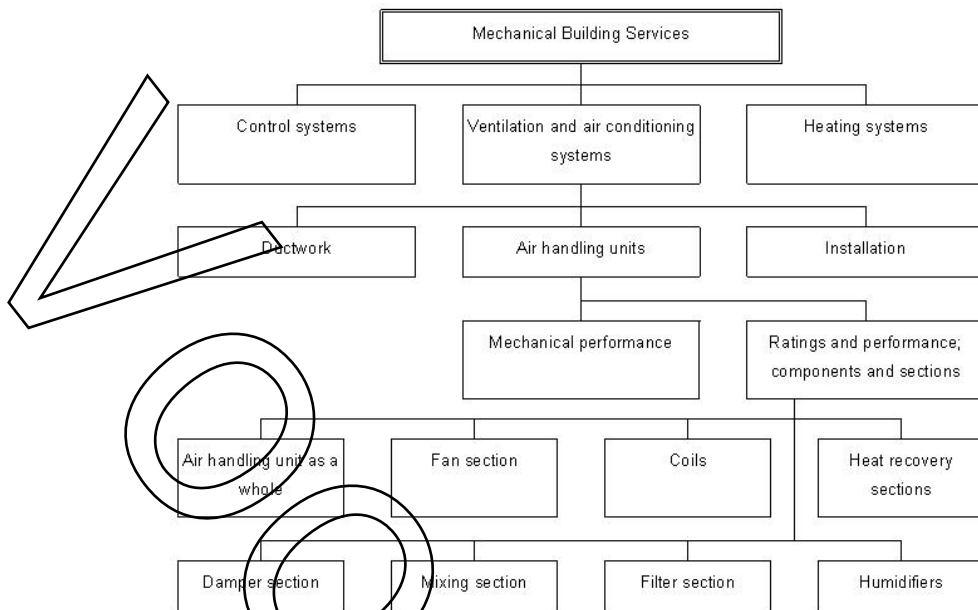


Figure 1 — Position of this standard in the field of mechanical building services

## 1 Scope

This European Standard specifies requirements and testing for ratings and performance of air handling units as a whole. It also specifies requirements, recommendations, classification, and testing of specific components and sections of air handling 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 standard is applicable both to standardised designs, which may be in a range of sizes having common construction concepts, and also to custom-design units. It also applies both to air handling units, which are completely prefabricated, and to units which are built up on site. Generally the units within the scope of this standard include at least a fan, a heat exchanger and an air filter.

This standard is not applicable to the following:

- a) air conditioning units serving a limited area in a building, such as fan coil units;
- b) units for residential buildings;
- c) units producing ventilation air mainly for a manufacturing process.

## 2 Normative references

The following referenced documents are indispensable for the application 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 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 dampers and valves*

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

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

EN 13779, *Ventilation for non-residential buildings — Performance requirements for ventilation and room-conditioning systems*

EN ISO 3741, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Precision methods for reverberation rooms (ISO 3741:1999)*

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 3746, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane (ISO 3746:1995)*

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 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 5167-1:2003)*

EN ISO 7235, *Acoustics — Laboratory measurement procedures for ducted silencers and air-terminal units — Insertion loss, flow noise and total pressure loss (ISO 7235:2003)*

ISO 5221, *Air distribution and air diffusion — Rules to methods of measuring air flow rate in an air-handling duct*

ISO 5801:1997, *Industrial fans — Performance testing using standardized airways*

ISO 13348, *Industrial Fans — tolerances, methods of conversion and technical data presentation*

Copyright  
Preview

### 3 Terms and definitions

For the purposes of this European Standard, 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: circulating, 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

#### 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

#### 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)

#### 3.12

##### **sound attenuation section**

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

# Bestelformulier

# NEN

## Stuur naar:

NEN Standards Products & Services  
t.a.v. afdeling Klantenservice  
Antwoordnummer 10214  
2600 WB Delft

## NEN Standards Products & Services

Postbus 5059  
2600 GB Delft

Vlinderweg 6  
2623 AX Delft

T (015) 2 690 390  
F (015) 2 690 271

[www.nen.nl/normshop](http://www.nen.nl/normshop)

## Ja, ik bestel

\_\_ ex. NEN-EN 13053:2006+A1:2011 en Ventilatie van gebouwen -  
Luchtbehandelingseenheden - Nominale waarden en prestatie voor  
bouwelementen en bouwgroepen

€ 87.29

**Wilt u deze norm in PDF-formaat? Deze bestelt u eenvoudig via  
[www.nen.nl/normshop](http://www.nen.nl/normshop)**

### Gratis e-mailnieuwsbrieven

Wilt u op de hoogte blijven van de laatste ontwikkelingen op het gebied van normen,  
normalisatie en regelgeving? Neem dan een gratis abonnement op een van onze  
e-mailnieuwsbrieven. [www.nen.nl/nieuwsbrieven](http://www.nen.nl/nieuwsbrieven)

### Retourneren

Fax: (015) 2 690 271  
E-mail: [klantenservice@nen.nl](mailto:klantenservice@nen.nl)  
Post: NEN Standards Products  
& Services,  
t.a.v. afdeling Klantenservice  
Antwoordnummer 10214,  
2600 WB Delft  
(geen postzegel nodig).

## Gegevens

Bedrijf / Instelling

T.a.v.  O M O V

E-mail

Klantnummer NEN

Uw ordernummer  BTW nummer

Postbus / Adres

Postcode  Plaats

Telefoon  Fax

**Factuuradres** (indien dit afwijkt van bovenstaand adres)

Postbus / Adres

Postcode  Plaats

Datum  Handtekening

### Voorwaarden

- De prijzen zijn geldig tot 31 december 2016, tenzij anders aangegeven.
- Alle prijzen zijn excl. btw, verzend- en handelingskosten en onder voorbehoud bij o.m. ISO- en IEC-normen.
- Bestelt u via de normshop een pdf, dan betaalt u geen handeling en verzendkosten.
- Meer informatie: telefoon (015) 2 690 391, dagelijks van 8.30 tot 17.00 uur.
- Wijzigingen en typfouten in teksten en prijsinformatie voorbehouden.
- U kunt onze algemene voorwaarden terugvinden op: [www.nen.nl/leveringsvoorwaarden](http://www.nen.nl/leveringsvoorwaarden).