SLOVENSKI STANDARD
oSIST prEN 1886:2024

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Prezračevanje stavb - Centralne enote - Mehanske lastnosti in merilni postopki

Ventilation for buildings - Air handling units - Mechanical performance

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Mechanische Eigenschaften und Messverfahren

Ventilation des bâtiments - Caissons de traitement d'air - Performances mécaniques

Ta slovenski standard je istoveten z: **prEN 1886**

ICS:		
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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Ventilation for buildings - Air handling units - Mechanical performance

Ventilation des bâtiments - Caissons de traitement d'air - Performances mécaniques

Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte - Mechanische Eigenschaften und Messverfahren

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

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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 1886:2024) 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 1886:2007.

The main changes with respect to the previous edition are:

— a model box definition suitable for air handling unit ranges that are only manufactured using a single casing without intermediatory casing joint has been included;

— for the mechanical strength of the casing, pressure classes have been introduced with the requirement that the test pressure class be declared. In addition, the testing procedure has been clarified;

— for the casing leakage, the test pressure is changed to 400 Pa and - 400 Pa to be in line with legal requirements. In addition, reference to the relevant standard for filters has been updated and test procedures clarified;

— for the filter bypass leakage, the option of using a foil to cover the filter has been deleted. The filter is to be blanked off by a blanking plate; the design of which is specified;

— a new test method is defined for the measurement of the internal leakage in bidirectional units with an internal separation of the air streams;

— for the thermal performance of the casing, a classification of the thermal transmittance is introduced with the T1 to T5 becoming U1 to U3 and with the requirement that the casing materials be declared. In addition, the testing procedure is more detailed and clearer;

— for the acoustic performance, the specification of the test setup and execution is more detailed and clearer;

— requirements for the content of the test report is added in a new annex.

Introduction

This document provides test methods, classifications and requirements for air handling units (AHU) including mechanical strength, air leakage, thermal insulation and acoustic insulation properties of the casing.

This document also includes recommendations for fire protection and mechanical safety for AHUs. It is the intention of CEN/TC 156 that these sections will be later moved to a new standard.

The performance of AHU components is specified in EN 13053.

1 Scope

This document specifies test methods, test requirements and classifications for the casings of non-residential air handling units (AHU).

The test methods and requirements are applicable to both complete units and any separate sections, except for the thermal and acoustic performance of the casing.

The test method for the thermal performance of the casing is applicable for the comparison of different casing constructions, but not for the calculation of thermal losses through casing or the risk of condensation.

The test method for the acoustic performance of the casing is applicable for the comparison of different constructions, but not for the provision of accurate acoustic data for specific units.

This document is not applicable for fan-coil units and similar products.

The filter bypass test specified in this document is not applicable to high efficiency particulate air filter (HEPA) installations.

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 13053, *Ventilation for buildings — Air handling units — Rating and performance for units, components and sections*

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

EN ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100)*

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 3744:2010, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 9614 (all parts), *Acoustics — Determination of sound power levels of noise sources using sound intensity (ISO 9614 all parts)*

EN ISO 11546-2:2009, *Acoustics — Determination of sound insulation performances of enclosures — Part 2: Measurements in situ (for acceptance and verification purposes) (ISO 11546-2:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792, EN 13053 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
air handling unit
AHU
encased assembly containing components to perform one or more of the following functions: ventilation, heating, cooling, sensible or latent heat energy recovery, humidifying, dehumidifying and mixing air

3.2
model box
box made with the casing design of the real unit for the purpose of making casing performance tests and classification

4 Requirements for the model box

4.1 General requirements

A model box is to be used by the manufacturer for real units in normal production. Different designs shall not be combined. If more than one type of construction or assembly method is available, the construction adopted for each test shall be clearly stated.

The model box shall be manufactured in accordance with the following specifications:

a) its height and width shall have external dimensions of between 0,9 m and 1,4 m;

b) its total external surface area shall be between 10 m^2 and 30 m^2;

c) it shall consist of at least two casing sections joined in accordance with the normal methods for the design under test;

d) it shall have a statement regarding which panels are stiffened by means of additional material or components and which panels are not;

e) its material and material finish used for the internal and external sheet shall be declared;

f) it shall be mounted on a base frame or feet with a height between 50 mm and 150 mm to allow free movement of air under the unit and to facilitate handling;

g) its access side of each section shall have at least one hinged door and one fixed panel;

h) its door shall have standard handles, latches and locks, used in the real unit;

i) none of its windows shall be fitted;

j) its casing shall be manufactured using the same components and design as that of the real unit;

k) its screws shall be tightened as in normal production.

For the filter bypass test, a filter frame without the filter medium shall be installed. The filter frame shall be in place during all tests. The filter frame shall be placed away from the section joints so that negative pressure impinges on the joint during the filter bypass leakage test. In this way the effect of the joint on the casing air leakage is included in the measurement.

The roof or roofing membrane of units intended for outdoor installation shall not be fitted during testing.

4.2 Requirements for a model box for single casing section AHU ranges

Referring to 4.1, the model box for a single section non-residential AHU shall have minimum dimensions 600 mm wide by 600 mm high and a surface area of at least 5 m^2.

The model box shall consist of a single casing section.

The filter frame shall be mounted near the end wall in the same way as for the normal model box.

Model boxes for compact units having an internal dividing wall shall be supplied with a large rectangular hole in the wall (or floor) leaving 5 cm between the edge of the hole and the casing wall, see Table 1.

Table 1 — Testing and classification of casing performance

Test criteria	Type of casing	
	Model box (M)	Real unit (R)
Mechanical strength	Testing procedures only	Testing and classification of casing construction
External casing air leakage	Testing procedures only	Testing and classification of casing construction
Internal casing air leakage for bidirectional units	--	Testing and classification of casing construction
Filter bypass leakage	Testing procedures only	Testing and classification of casing construction
Thermal transmittance	Testing and classification of casing construction	--
Thermal bridging	Testing and classification of casing construction	--
Acoustic insulation	Testing of casing construction	--

4.3 Reference to real unit or model box in classification

The relevant denotation “M” or “R” shall always be declared in documentation when referring to the casing performance class.

Classification for the thermal transmittance and thermal bridging only exist for the model box with denotation “M”. Classification for the mechanical strength, casing air leakage and filter bypass only exist for the real unit with denotation “R”.

For the acoustic insulation there is no classification, and the measured values are declared.

5 Mechanical strength of casing

5.1 General testing procedure

5.1.1 General

In some cases, the test pressure can deform the casing so it is recommended that the mechanical strength of the casing test is performed first. If this test is not to be performed, then at least the steps 14 to19 in Table 5 shall be performed once.

NOTE For an example for calculation of deformation see Annex C.

5.1.2 Classification of maximum pressure

The pressure class of the model box to be tested for the permanent deflection shall be declared, see Table 2. The pressure class refers to the maximum allowable difference between ambient and internal air pressure.

The pressure class shall be higher than the maximum pressure developed by the fans used in the real unit.

The test of the model box can be made at a pressure higher than 2 000 Pa, if required, and that pressure shall then be defined as Pxxxx, where xxxx is the pressure in Pa.

Table 2 — Pressure class

Pressure class
P2000
P1600
P1250
P1000

5.1.3 Casing strength classification

AHU casing strength shall be classified according to Table 3.

Table 3 — Casing strength classification of AHU

Casing class	Maximum relative deflection mm/m
D1	≤ 4
D2	≤ 10
D3	> 10

The leakage test shall be carried out after the strength test.

Class D1 and Class D2 casings shall be designed and selected so that the maximum deflection of any span of the panels, frames or both does not exceed the limits in Table 3.

According to Table 4 the casings of class D1, D2 and D3 shall withstand the maximum test pressure achieved by a gradual increase. No permanent deflection (hysteresis maximum: 2,0 mm per meter of post or panel span) of the structural parts (structures and supports) or damage of the casing may occur.

Table 4 — Test pressures

Test criteria	Type of casing	
	Model box (M / CM)	**Real unit (R)**
Deflection	1 000 Pa	The pressure related to the selected design fan speed
Permanent deflection	Pressure class	Maximum fan pressure at selected design fan speed

When a real unit is tested the sign of the test pressure shall correspond to that of the actual unit. This means that where the parts of the unit will run under positive pressure, the test pressure shall be positive and vice versa.

Deviating test pressures shall be clearly noted in the test report according to Annex B. The classification described in Table 3 is then not applicable.

On special request the real unit testing may include a test at the maximum pressure achievable with the fan(s). This is achieved by blanking off openings appropriately in the casing and running the fan at its maximum speed or the speed specified.

Any special requirements, for example the ability to survive shock loading caused by sudden closure of fire dampers, are not covered by this document.

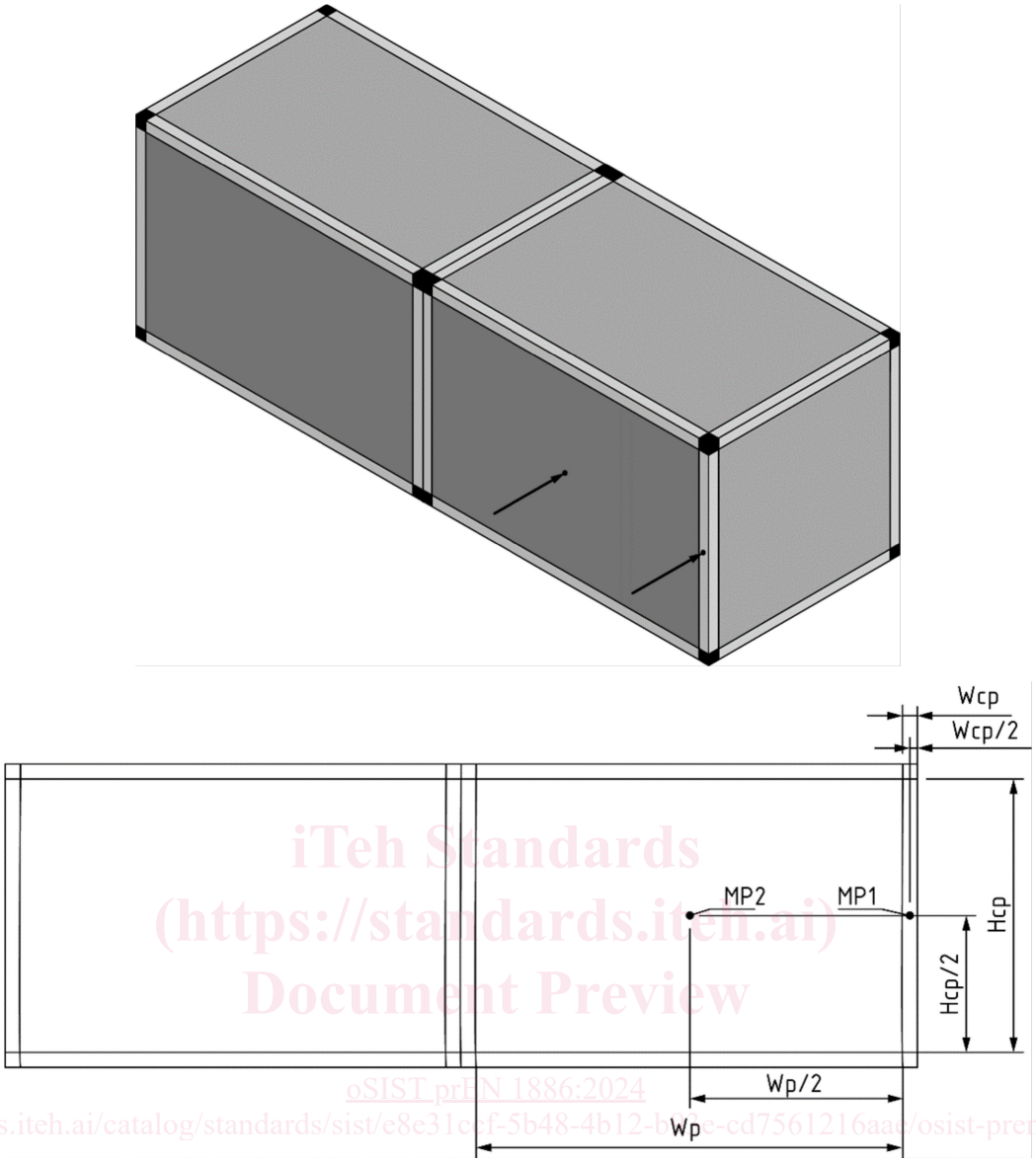
Deflection shall be measured within an accuracy of ± 0,1 mm whilst the air handling unit is operating under test conditions.

5.1.4 Test preparation

The model box shall be placed on the test room floor for the measurement.

The locations of the measuring points are shown in Figures 1 to 3, depending on the construction of the casing.

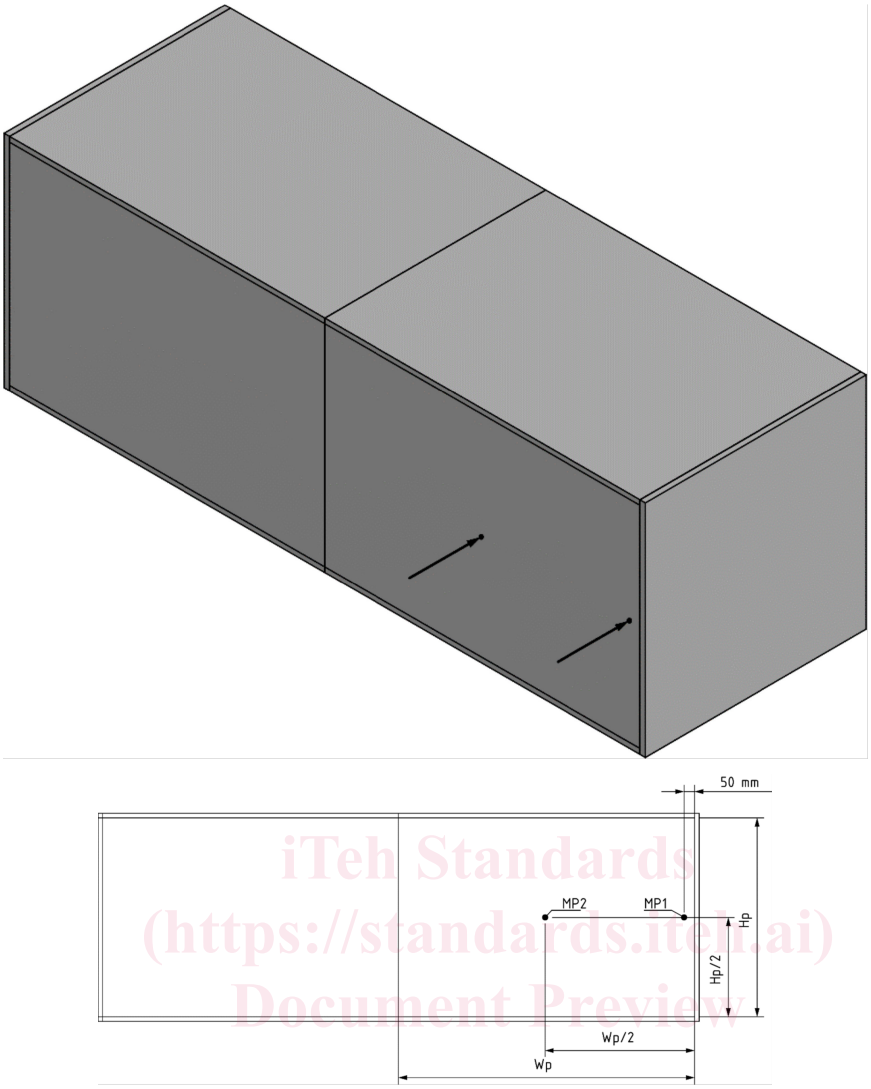
The deflection of the casing shall be measured on the centre of the vertical corner post and on the centre of the panel with longest diagonal dimension that is not stiffened or supported by component parts, for example filter frame, fan or panel stiffener. Because of the influence of gravity, measurements on the roof shall be avoided.



Key

Wp	width of the panel
Hcp	height of the corner post
Wcp	width of the corner post

Figure 1 — External frame, panel construction



Key

Wp	width of the panel
Hp	height of the panel
MP1	measuring point 1
MP2	measuring point 2

Figure 2 — Frameless (or internal frame) panel construction

The position of MP1 for frameless construction in Figure 2 shall be 50 mm from the edge of the panel.