SLOVENSKI STANDARD

SIST EN 13053:2007/kFprA1:2011

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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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91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

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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 raumlufttechnische Geräte - Leistungskenndaten für Geräte, Komponenten und Baueinheiten

This draft amendment is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 156.

This draft amendment A1, if approved, will modify the European Standard EN 13053:2006. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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Foreword

This document (EN 13053:2006/FprA1:2010) 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 Unique Acceptance Procedure.

Introduction

The aim of this amendment is to modify the essential energy-related characteristics of air handling units, and to give additional information to enable a better and more practical energy classification.

1 Modification to 6.3, Fan section

In 6.3.1, replace Table 4 with the following:

"

Table 4 — Classes of average air velocity levels inside the casing

Class	Air velocity m/s
Class V1	maximum 1,6
Class V2	> 1,6 to 1,8
Class V3	> 1,8 to 2,0
Class V4	> 2,0 to 2,2
Class V5	> 2,2 to 2,5
Class V6	> 2,5 to 2,8
Class V7	> 2,8 to 3,2
Class V8	> 3,2 to 3,6
Class V9	> 3,6
NOTE The air velocity in the unit has a large influence on energy consumption. The velocities are calculated for air velocity in AHU cross-section. The velocity is based on the square area of filter section of a unit, or if no filter is installed, it is based on the square area of the fan section.	

".

Add below Table 4, a NOTE 2 and replace "NOTE" with "NOTE 1".

"NOTE 2 Common velocity classes are V2 to V7 dependant on application. To reduce energy consumption it is strongly recommended to reduce the velocity.".

Add a new subclause 6.3.2, Power consumption of fans as follows:

"

6.3.2 Power consumption of fans

The power consumption of drives can be defined in classes. The maximum power consumption has to be calculated by the following equation:

$$Pm_{ref} = (\Delta p_{stat} / 450)^{0,925} \times (q_v + 0,08)^{0,95} \quad (6)$$

where

Pm_{ref} is the reference power consumption, [kW];

Δp_{stat} is the static pressure to be measured at the fan section, [Pa];

q_v is the air flow of the fan, [m3/h].

Table 5 defines the power consumption (Pm_{max}) classes:

Table 5 — Classes of power consumption of drives (fans)

Class	P_m max [kW]
Class P1	$\leq Pm_{ref} \times 0,85$
Class P2	$\leq Pm_{ref} \times 0,90$
Class P3	$\leq Pm_{ref} \times 0,95$
Class P4	$\leq Pm_{ref} \times 1,00$
Class P5	$\leq Pm_{ref} \times 1,06$
Class P6	$\leq Pm_{ref} \times 1,12$
Class P7	$> Pm_{ref} \times 1,12$
Each fan shall be specified in the power consumption classes. All values are based on nominal conditions with a density of 1,2 kg/m³.	

NOTE 1 The power consumption is the useful power supplied from the mains (including any motor control equipment).

NOTE 2 Common power consumption classes are P2 to P5 dependant on application.".

2 Modification to 6.5.2, Classifications and requirements

Replace Table 5 and the text below including Table 6 with the following:

"The following characteristic values define the thermal efficiency of a heat recovery system (HRS) under balanced mass flows conditions (1:1). The following values shall be indicated.

NOTE 1 For further information see Annex B.

Temperature efficiency (η_t) under dry condition:

$$\eta_t = (t_2'' - t_2') / (t_1' - t_2') \quad (7)$$

where

t_2'' is the temperature of the supply air, [°C];

t_2' is the temperature of the outside air, [°C];

t_1' is the temperature of the exhaust air, [°C].

Pressure losses of the heat recovery system

$$\Delta p_{HRS} = \Delta p_{Supply} + \Delta p_{Exhaust} \quad (8)$$

where

Δp_{HRS} is the sum of pressure losses, supply and exhaust, of the HRS, [Pa];

Δp_{Supply} is the pressure loss of the HRS supply air, [Pa];

$\Delta p_{Exhaust}$ is the pressure loss of the HRS exhaust air, [Pa].

NOTE 2 All HRS based pressure changes have to be considered (e.g. add. filters).

Electric power consumption (P_{el}) based on pressure losses:

$$P_{el} = q_v \times \Delta p_{HRS} \times 1 / \eta_D + P_{el\ aux.} \quad (9)$$

with

q_v is the air flow, in m³/s (standard density of 1,2 kg/m³);

η_D is the 0,6 average overall static efficiency of power consumption, [./.];

$P_{el\ aux.}$ is the auxiliary electric power consumption (e.g. pumps, etc.), [kW].

NOTE 3 All electric power consumptions influenced by the thermal capacity of HRS should be considered (e.g. water pumps).

NOTE 4 $P_{el\ aux.}$ for pumps: $P_{el\ Pump} = q_v \times \Delta p_{HRS\ media} \times 1 / \eta_D$

Coefficient of performance (ε):

$$\varepsilon = Q_{HRS} / P_{el} \quad (10)$$

Energy efficiency (η_e):

$$\eta_e = \eta_t \times (1 - 1 / \varepsilon) \quad (11)$$

The combined values (ε, φ and η) shall be indicated by the following basic conditions according to EN 308: t_2' = + 5 °C and t_1' = 25 °C. These values are not valid for all operating conditions. The primary energy influence is not considered, since it concerns a reference value contrary to annual values.

Table 6 defines the heat recovery classes at balanced mass flow conditions (1:1):

Table 6 — Classes of heat recovery

Class	$\eta_{e\ 1:1}$ min [%]
Class H1	≥ 71
Class H2	≥ 64
Class H3	≥ 55
Class H4	≥ 45
Class H5	≥ 36
Class H6	No requirement
NOTE 5 The values are valid for balanced mass flows (1:1). The classes define the quality of the HRS and they have a strong influence on the thermal energy consumption. In Nordic countries higher classes and in southern countries lower classes are common.	

NOTE 6 Yearly energy computations, depending on the location and the mode of operation of the heat recovery unit should supply the reference values for the necessary classification based on this table. National regulations for the determination of the heat recovery efficiency may deviate from this classification.

NOTE 7 If the airflows are not balanced and no specific HRS values are available, the values may be calculated by the empiric equation:

$$\eta_t = \eta_{t\ 1:1} \times (q_{m1} / q_{m2})^{0,4}$$

NOTE 8 It is not possible to use the formula for combined values. η_e should be recalculated with η_t and ε.

NOTE 9 The table is based on following calculation:

Class	η_t	Δp_{HRS} [Pa]	ε	η_e
H1	0,75	2 x 280	19,5	0,71
H2	0,67	2 x 230	21,2	0,64
H3	0,57	2 x 170	24,2	0,55
H4	0,47	2 x 125	27,3	0,45
H5	0,37	2 x 100	26,9	0,36

".

3 Addition of Annex B

Add a new Annex B as follows: