SLOVENSKI STANDARD
kSIST FprEN 16211:2014

01-november-2014

Prezračevanje stavb - Meritve pretoka zraka v sistemu ventilacije - Metode

Ventilation for buildings - Measurement of air flows on site - Methods

Lüftung von Gebäuden - Luftvolumenstrommessung in Lüftungssystemen - Verfahren

Systèmes de ventilation pour les bâtiments - Mesurages de débit d'air dans les systèmes de ventilation - Méthodes

Ta slovenski standard je istoveten z: **FprEN 16211**

ICS:

91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

kSIST FprEN 16211:2014 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

FINAL DRAFT
FprEN 16211

September 2014

ICS 17.120.10; 91.140.30

English Version

Ventilation for buildings - Measurement of air flows on site - Methods

Systèmes de ventilation pour les bâtiments - Mesurages de débit d'air dans les systèmes de ventilation - Méthodes

Lüftung von Gebäuden - Luftvolumenstrommessung in Lüftungssystemen - Verfahren

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

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Foreword

This document (FprEN 16211:2014) 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.

Measurement methods which are both correct and easy to use are developed and standardized to enable the commissioning and operational monitoring of air processing installations. Interior climate and air quality can often be improved considerably if the heating and ventilation system is managed in a way that ensures good functioning in the long term. It is thus important that the system is designed and constructed to allow measurement and monitoring to be performed using established and approved methods.

1 Scope

This European Standard specifies simplified methods for the measurement of air flows on site. It provides a description of the air flow methods and how measurements are performed within the margins of stipulated method uncertainties.

One measurement method is to take point velocity measurements across a cross-section of a duct to obtain the air flow. This simplified method is an alternative to the method described in ISO 3966 and EN 12599. This European Standard requests certain measurement conditions (length of straight duct and uniform velocity profile) to be met to achieve the stipulated measurement uncertainties for the simplified method.

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 12792, *Ventilation for buildings - Symbols, terminology and graphical symbols*

EN 14277, *Ventilation for buildings - Air terminal devices - Method for airflow measurement by calibrated sensors in or close to ATD/plenum boxes*

3 Symbols and definitions

For the purposes of this European Standard, the terms and definitions of EN 12792 apply.

The following symbols are used in the report.

Symbol	Description	SI Unit	Symbol	Description	SI Unit
t	Time	s	O	Perimeter	m
ρ	Density	kg/m^3	p	Pressure	Pa
ρ_s	Standard conditions air density = *1,2*	kg/m^3	p_d	Dynamic pressure	Pa
ρ_r	Real density	kg/m^3	p_s	Static pressure	Pa
$\rho_{\vartheta\ tracer}$	Tracer gas density	kg/m^3	p_t	Total pressure	Pa
$\rho_{\vartheta\ duct}$	Duct air density	kg/m^3	p_u	Measured pressure	Pa
A	Cross-section Area	m^2	Δp	Differential pressure	Pa
$a,b,c...$	Dimensions of length	mm	Δp_u	Measured differential pressure	Pa
L	Mixing length	mm	q	Air flow	m^3/s, l/s
H	Height of duct	mm	q_k	Corrected air flow	m^3/s, l/s

W	Width of duct	mm	q_s	Tracer gas flow	m^3/s, l/s
B	Barometric pressure	hPa	$q_{s\vartheta duct}$	Tracer gas flow at duct temperature	m^3/s, l/s
C	Contaminant concentration	ppm	$q_{stracer}$	Tracer gas flow at rotameter temperature	m^3/s, l/s
C_i	Initial tracer gas concentration	ppm	q_t	Total air flow	m^3/s, l/s
C_s	Tracer gas concentration in stationary condition	ppm	q_u	Measured air flow	m^3/s, l/s
D	Diameter	mm	ϑ	Temperature	°C
D_h	Hydraulic diameter	mm	ϑ_{duct}	Temperature in duct	°C
k_c	coverage factor	-	ϑ_{tracer}	Temperature of tracer gas	°C
k_1	Correction factor for density	-	V	Volume	m^3
k_2	Correction factor for duct shape	-	v	Air velocity	m/s
k	Flow factor	-	v_s	Standard air velocity	m/s
L_1	Smaller dimension of a rectangular duct	mm	v_r	Real air velocity	m/s
L_2	Larger dimension of a rectangular duct	mm	v_m	Air velocity, mean value	m/s
u_1	Standard Instrument uncertainty	-			
u_2	Standard Method uncertainty	-			
u_3	Standard Reading uncertainty	-			
u_m	Standard measurement uncertainty	-			
U_m	Expanded measurement uncertainty	-			

4 Principles and parameters of influence

4.1 Hydraulic diameter

The hydraulic diameter is the diameter of a circular duct which will cause the same pressure drop at equal air velocity and equal friction coefficient, and is defined by the following formula:

$$D_h = 4 \cdot A/O \quad (1)$$