SLOVENSKI STANDARD

SIST EN 14989-2:2008

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Dimniki - Zahteve in preskusne metode za kovinske dimnike in od materialov neodvisne kanale za dovod zraka za ogrevalne naprave v zaprtih prostorih - 2. del: Kanali za odvod dima in dovod zraka v zaprtih prostorih

Chimneys - Requirements and test methods for metal chimneys and material independent air supply ducts for roomsealed heating applications - Part 2: Flue and air supply ducts for room sealed appliances

Abgasanlagen — Anforderungen und Prüfverfahren für Metall-Abgasanlagen und materialunabhängige Luftleitungen für raumluftunabhängige Anlagen — Teil 2: Abgas- und Luftleitungen für raumluftunabhängige Feuerstätten

Conduits de fumée et systèmes d'alimentation en air pour appareils étanches - Exigences et méthodes d'essai - Partie 2 : Conduits de fumée et d'alimentation en air pour appareils étanches individuels

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Chimneys - Requirements and test methods for metal chimneys and material independent air supply ducts for roomsealed heating applications - Part 2: Flue and air supply ducts for room sealed appliances

Conduits de fumée - Exigences et méthodes d'essai pour conduits de fumée métalliques et conduits d'alimentation en air pour tous matériaux pour des appareils de chauffage étanches - Partie 2: Conduits de fumée et d'alimentation en air pour appareils étanches

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This European Standard was approved by CEN on 10 November 2007.

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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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 14989-2:2007) has been prepared by Technical Committee CEN/TC 166 “Chimneys”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by September 2009.

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).

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

EN 14989 *Chimneys — Requirements and test methods for metal chimneys and material independent air supply ducts for roomsealed heating applications* consists of the following parts:

Part 1: Vertical air/flue terminals for C6-type appliances

Part 2: Flue and air supply ducts for room sealed appliances

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, 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 the United Kingdom.

Introduction

This European Standard covers flue and air supply ducts for room sealed appliances meaning the combination of chimney and air supply duct needed for the correct functioning of a room sealed appliance.

The requirements in this European Standard have been drawn up in connection with the widespread use of so-called room sealed appliances in which the combustion air supply duct and flue duct may be separate or as a concentric configuration.

The requirements for flue ducts for separate air/flue configurations are in EN 1856-1.

The requirements for terminals for room sealed appliances type C62 and C63 are covered by EN 14989-1.

1 Scope

This European Standard specifies requirements and test methods for metal flue ducts material independent air supply ducts for room sealed appliances.

It also specifies the requirements for marking, manufacturer's instruction, product information and evaluation of conformity.

NOTE 1 Recommendations for preferred dimensions of products are given in the informative Annex A.

NOTE 2 In this European Standard, only general requirements are specified for elastomeric and plastic components. Elastomeric and plastic products used in flue systems are covered by separate standards, i.e. EN 14241-1 and EN 14471.

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 1443:2003, *Chimneys — General requirements*

EN 1856-1:2003, *Chimneys — Requirements for metal chimneys — Part 1: System chimney products*

EN 1856-2:2004, *Chimneys — Requirements for metal chimneys — Part 2: Metal liners and connecting flue pipes*

EN 1859:2000, *Chimneys — Metal chimneys — Test methods*

EN 14241-1, *Chimneys — Elastomeric seals and elastomeric sealants — Material requirements and test methods — Part 1: Seals in flue liners*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

BS 1042-2.1, *Measurement of fluid flow in closed conduits — Velocity area method — Method using Pitot static tubes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1443:2003, EN 1856-1:2003, EN 1856-2:2004, EN 1859:2000 and the following apply.

3.1
air supply duct
independent duct in a building or an integral part of an air/flue configuration conveying combustion air to a room sealed appliance

3.2
concentric air/flue configuration
configuration in which the chimney flue is fully surrounded by the air supply duct

3.3
flow resistance
difference between the static pressures in the flue connection and the air supply duct connection under dynamic conditions

3.4
flue duct
duct for conveying the products of combustion

3.5
nominal diameter (size)
whole number representing the diameter of the flue, expressed in millimetres

3.6
nominal flow rate
amount of air which flows at the nominal velocity through a duct with nominal diameter

3.7
nominal velocity
velocity in a duct which characterises the velocity used in the test (the actual test velocity may differ from the nominal velocity, because the actual inside diameter differs from the nominal diameter)

3.8
push-in spigot
part of a pipe or fitting which is pushed into the socket of another pipe or fitting, thus resulting in a connection

3.9
room sealed appliance
appliance in which the combustion circuit (air supply, combustion chamber, heat exchanger and evacuation of the products of combustion) is sealed with respect to the room in which the appliance is installed

3.10
separate air/flue configuration
configuration in which the air supply duct and the chimney flue are separate (non-concentric)

3.11
socket
part of a pipe or fitting which is pushed over the push-in spigot of another pipe or fitting, thus resulting in a connection

3.12
terminal adapter
part of the terminal used to connect the terminal to the air supply duct and the flue. It may include the transition from parallel to concentric configuration

4 Symbols and abbreviations

α_a	coefficient of heat transfer between the supply air and the outer surface of the flue duct	in	$\frac{W}{m^2 \cdot K}$
α_{aB}	coefficient of heat transfer between the outside of the air supply duct and the ambient air	in	$\frac{W}{m^2 \cdot K}$
α_i	coefficient of heat transfer between the flue gas and the inner surface of the flue duct	in	$\frac{W}{m^2 \cdot K}$

α_{iB}	coefficient of heat transfer between the supply air and the inner surface of the air supply duct	in	$\frac{W}{m^2 \cdot K}$
η_A	dynamic viscosity of air for T_m	in	$\frac{N \cdot s}{m^2}$
η_B	dynamic viscosity of air for T_{mB}	in	$\frac{N \cdot s}{m^2}$
λ_A	Thermal conductivity of air for T_m	in	$\frac{W}{m \cdot K}$
λ_B	thermal conductivity of air for T_{mB}	in	$\frac{W}{m \cdot K}$
$\left(\frac{1}{\Lambda}\right)$	thermal resistance of the flue duct	in	$\frac{m^2 \cdot K}{W}$
$\left(\frac{1}{\Lambda}\right)_B$	thermal resistance of the air supply duct	in	$\frac{m^2 \cdot K}{W}$
ρ	density of air at 20 °C = 1,2	in	$\frac{kg}{m^3}$
ρ_e	density of air for T_e	in	$\frac{kg}{m^3}$
ρ_m	density of air for T_m	in	$\frac{kg}{m^3}$
ρ_{mB}	density of air for T_{mB}	in	$\frac{kg}{m^3}$
ψ	coefficient of friction of the flue	-	
ψ_B	the higher of the value of the coefficient of friction of the inside of the air supply duct and the outside of the flue duct	-	
ψ_{smooth}	coefficient of friction of the flue for hydraulically smooth flow	-	
$\psi_{smoothB}$	coefficient of friction of the air supply for hydraulically smooth flow	-	
ζ	flow resistance factor, friction factor	-	
ζ_A	declared flow resistance factor of the air supply duct	-	
ζ_F	declared flow resistance factor of the flue duct	-	
A_B	cross-sectional area of the air supply passage	in	m²
c_p	specific heat capacity of air for T_m	in	$\frac{J}{kg \cdot K}$
c_{pB}	specific heat capacity of air for T_{mB}	in	$\frac{J}{kg \cdot K}$
d_1	external diameter of the push-in spigot of the flue duct	in	mm
d_2	internal diameter of the socket of the flue duct	in	mm
D_1	external diameter of the push-in spigot of the air supply	in	mm
D_2	internal diameter of the duct socket of the air supply duct	in	mm
D_h	hydraulic diameter of the flue	in	m
D_{ha}	hydraulic diameter of the outside of the flue duct	in	m

D_{haB}	hydraulic diameter of the outside of the air supply duct	in	m
D_{hB}	hydraulic diameter of the air supply passage	in	m
D_{hiB}	hydraulic diameter of the inside of the air supply duct	in	m
D_n	declared nominal diameter of the flue duct	in	mm
k_b	coefficient of heat transmission between the flue and the air supply passage at temperature equilibrium	in	$\frac{W}{m^2 \cdot K}$
k_{Bb}	coefficient of heat transmission between the supply air and the ambient air at temperature equilibrium	in	$\frac{W}{m^2 \cdot K}$
L	length of the test segment	in	m
L_0	available insertion length	in	mm
Nu	Nusselt number for the flue	-	
Nu_a	Nusselt number for the outside of the flue duct	-	
Nu_B	Nusselt number for a reference pipe flow	-	
Nu_{iB}	Nusselt number for the inside of the air supply duct	-	
Δp	static pressure difference, measured friction	in	Pa
Pr	Prandtl number of the flue duct	-	
Pr_B	Prandtl number of the supply air duct	-	
r	mean value of roughness of the inner wall of the flue duct	in	m
r_B	the higher of the value of the mean value of roughness of the inside of the air supply duct and the outside of the flue duct	in	m
Re	Reynolds number of the flue	-	
Re_B	Reynolds number of the air supply passage	-	
S_{rad}	correction factor for radiation from the outer surface of the flue duct to the inner surface of the air supply duct	-	
T_a	ambient test temperature	in	°C
T_e	air temperature at the flue inlet	in	°C
T_{eB}	air temperature at the air supply inlet	in	°C
T_m	mean temperature in the flue	in	°C
T_{mB}	mean temperature in the air supply	in	°C
T_o	air temperature at the flue outlet	in	°C
T_{oB}	air temperature at air supply outlet	in	°C
T_u	ambient air temperature	in	°C
U	circumference of the inside of the flue	in	m
U_a	circumference of the outside of the flue duct	in	m
U_{iB}	circumference of the inside of the air supply duct	in	m
$\dot{V}$	test flow rate	in	$\frac{m^3}{s}$
w_n	velocity of the flow inside the flue under nominal operating conditions	in	$\frac{m}{s}$
w_{mB}	average velocity of the supply air	in	$\frac{m}{s}$

w_w	Wind speed	in	$\frac{m}{s}$
x	centre to centre distance of the air supply duct and the flue duct for separate air/flue configuration	in	mm

5 Manufacturer's declaration for type testing

The manufacturer shall provide the relevant information in Clause 8 and, in addition, shall declare, for the flue and air supply duct:

a) the manufacturing drawings including declared internal diameter and tolerances of manufacture;

b) materials of manufacture, and the minimum thicknesses;

c) the nominal diameter (size);

d) the minimum wall thickness after manufacture, the maximum installed length, maximum external diameters, total mass and design loads of the fittings or sections.

6 Dimensions and tolerances

6.1 The thickness of material of the flue and air supply duct shall be not less than that declared by the manufacturer.

6.2 The declared internal diameter of the flue duct shall not vary by more than ± 5 mm from the nominal size. The measured internal diameter of the flue and air supply duct shall be not less than the manufacturer's declared diameter.

7 Performance requirements

7.1 General

Unless otherwise stated, performance requirements for fittings shall be the same as those for ducts. Flue ducts for separate air/flue configurations shall meet the requirements of EN 1856-1.

7.2 Mechanical resistance and stability

7.2.1 Compressive strength

7.2.1.1 Flue and air supply ducts

The manufacturer shall declare the relevant design loads.

For concentric air/flue configurations where the air supply duct is load bearing when tested according to 12.1.1.1, the configuration shall withstand a load of at least three times the manufacturer's declared design load.

For concentric air/flue configurations where the flue duct is load bearing when tested according to 12.1.1.1, the configuration shall withstand a load of at least four times the manufacturer's declared design load.

For separate configurations the air supply duct when tested according to 12.1.1.1, shall withstand a load of at least three times the manufacturer's declared design load.

7.2.1.2 Flue and air supply duct supports

The manufacturer shall declare the relevant design loads.

When tested according to 12.1.1.2, the maximum displacement of the air supply duct support or the flue duct support shall not be greater than 5 mm in the direction of the load, when the manufacturer's declared design load is applied.

The support shall withstand an intensity of loading of at least three times the manufacturer's declared design load.

7.2.2 Tensile strength

The manufacturer shall declare the relevant design loads.

When tested according to 12.1.2, the parts of the air/flue configuration which the manufacturer declares may be suspended shall withstand a load of at least one and a half times the manufacturer's declared design load.

7.2.3 Lateral strength

7.2.3.1 Non-vertical installation

When the concentric air/flue configuration or the air supply duct of a separate configuration, declared by the manufacturer as suitable for non-vertical installation, e.g. according to the installation instruction, is tested according to the test method described in 12.1.3.1, the deflection of any part of the test sample shall not be more than 2 mm/m in distance between supports.

7.2.3.2 Components subject to wind load

When the concentric air/flue configuration or the air supply duct of a separate configuration declared by the manufacturer as suitable for external installation, e.g. according to the installation instruction, are tested according to the test method described in 12.1.3.2, the test sample shall withstand a minimum load of 1,5 kN/m^2 of projected outer surface area.

7.3 Resistance to fire

7.3.1 Internal to external

The manufacturer shall declare the minimum distance to combustible material according to 7.5.1.2.

7.3.2 External to external

Until a European test method is available the resistance to fire, external to external, shall be evaluated and declared according to national regulations.

7.4 Hygiene, health and environment

7.4.1 Gastightness of the flue duct

When a flue duct is tested according to the test methods described in 12.2.1.2.2, the leakage rate shall not be greater than that given in Table 5, both before and after the thermal performance tests and where appropriate after the sootfire test.

7.4.2 Gastightness of the air supply duct

When an air supply duct is tested according to the test method described in 12.2.1.2.3 with a positive pressure of 40 Pa in the air supply duct section, the leakage shall not exceed 0,28 $l \cdot s^{-1} \cdot m^{-2}$ of surface of the air supply duct before and after the thermal performance test and where appropriate after the sootfire test.

7.5 Safety in use

7.5.1 Thermal performance

7.5.1.1 Thermal shock

NOTE A concentric air/flue configuration made of sections and/or fittings is thermal shock resistant when it meets the gas tightness after the thermal tests.

7.5.1.2 Distance to adjacent combustible surfaces

7.5.1.2.1 Heat stress

The concentric air/flue configuration shall be tested in accordance with 12.3.1.2.1. The maximum temperature of the adjacent combustible material shall not be greater than 85 °C related to an ambient temperature of 20 °C.

7.5.1.2.2 Sootfire

The concentric air/flue configuration designated sootfire resistant shall be tested in accordance with 12.3.1.3.2. The maximum temperature of the adjacent combustible material shall not be greater than 100 °C related to an ambient temperature of 20 °C.

7.5.1.3 Temperature of additional materials and components

Any additional materials or components in the flue and/or air supply duct shall be tested in accordance with 12.3.1.3.3. The maximum temperature of these materials or components shall not exceed their specified working temperature.

7.5.1.4 Temperature cycling test

The flue/air supply duct and its components shall be tested in accordance with 12.3.1.3.4.

No part of air/flue configuration or its components shall show any permanent deformation, blisters or cracks that may affect its performance.

The elongation of the test air/flue configuration shall not exceed 0,005 m, and meet the gas tightness given in 7.4.1 and 7.4.2.

7.5.1.5 Accidental human contact

Where accidental human contact of a flue is possible, the outer wall surface temperature of the concentric air/flue configuration, when measured during the test of 12.3.1.3.1, shall not be greater than the appropriate value given in Table 1.