SLOVENSKI STANDARD
SIST EN 12237:2004

01-februar-2004

Prezraļevanje stavb - Razvod zraka - Okrogli ploļevinasti zraļni kanali - Odpornost in tesnost - Zahteve in preskuġanje

Ventilation for buildings - Ductwork - Strength and leakage of circular sheet metal ducts

Lüftung von Gebäuden - Luftleitungen - Festigkeit und Dichtheit von Luftleitungen mit rundem Querschnitt aus Blech

Ventilation des bâtiments - Réseau de conduits - Résistance et étanchéité des conduits circulaires en tôle

Ta slovenski standard je istoveten z: **EN 12237:2003**

ICS:

91.140.30	Prezraļevalni in klimatski sistemi	Ventilation and air-conditioning

SIST EN 12237:2004 **en**

EUROPEAN STANDARD

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EN 12237

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ICS 91.140; 91.140.30

English version

Ventilation for buildings - Ductwork - Strength and leakage of circular sheet metal ducts

Ventilation des bâtiments - Réseau de conduits - Résistance et étanchéité des conduits circulaires en tôle

Lüftung von Gebäuden - Luftleitungen - Festigkeit und Dichtheit von Luftleitungen mit rundem Querschnitt aus Blech

This European Standard was approved by CEN on 18 December 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

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Contents

Foreword

This document (EN 12237:2003) 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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

Annex A is informative.

The standard is one of a series of standards for ductwork used for ventilation and air conditioning of buildings for human occupancy. The position of this standard in the field of mechanical building services is shown in Figure 1.

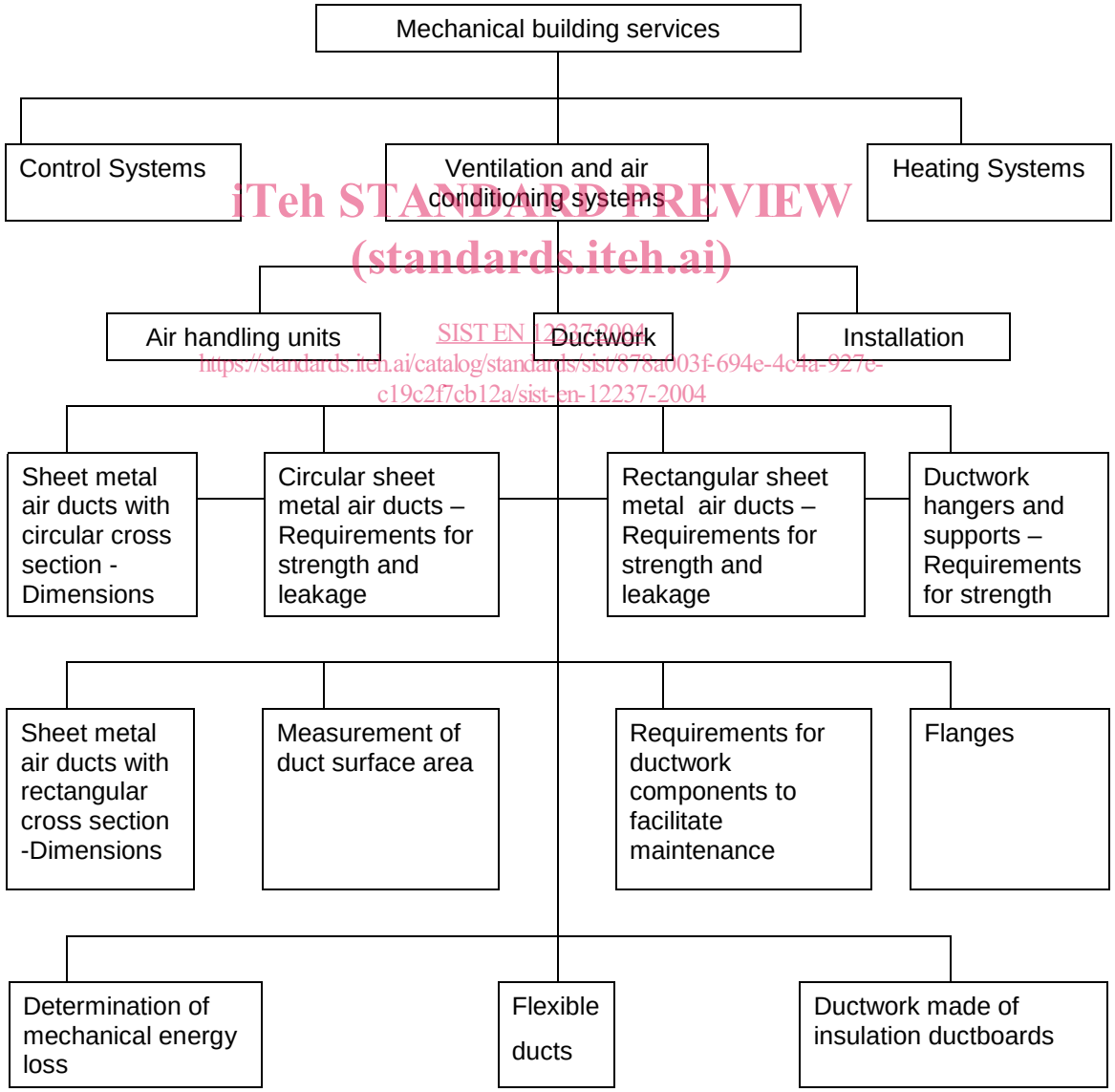

Figure 1 – Position of EN 12237 in the field of mechanical building services

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies requirements and test methods for strength and air leakage of circular ductwork used in air conditioning and ventilation systems in buildings.

The standard is intended to establish the mechanical strength and leakage required to verify the fitness for the intended service as installed ductwork.

The standard is intended for testing specific installations as well as product series in general under in-situ or laboratory conditions. The requirements and methods are applicable also to rectangular ductwork in respect of air leakage.

A recommended procedure, if the permitted air leakage rate is exceeded when testing a specific installation, is given in informative annex A.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

CR 12792:1997, *Ventilation for buildings – Symbols and terminology.*

prEN 14239:2001, *Ventilation for buildings – Ductwork – Measurement of ductwork surface area.*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this European Standard the terms and definitions given in CR 12792:1997 apply.

3.1.1
duct surface area A_j
surface area of the ductwork under test

[see prEN 14239:2001]

3.1.2
total joint length L
actual total length of the periphery of the installation joints included in the test section of the ductwork

3.1.3
test pressure p_{test}
static air pressure difference between the pressure within the ductwork to be tested and the pressure of the surrounding air

3.1.4
design operating pressure p_{design}
maximum static air pressure difference at which the installed ductwork is designed to operate under normal conditions

3.1.5
static pressure limit p_s
maximum design operating pressure for the ductwork according to its air tightness class

NOTE The static pressure limits, positive and negative, for the appropriate air tighness class are specified in Table 2.

3.1.6
air leakage rate q_v
air leakage flow rate of the ductwork under test

3.1.7
measured air leakage rate $q_{vImeasured}$
air leakage flow rate before correction

3.1.8
air temperature t
temperature of the air during the test

3.1.9
atmospheric pressure p_a
barometric pressure of ambient air during the test

3.1.10
air leakage factor f
leakage flow rate per unit surface area of the duct ($f = q_v / A_s$)

3.1.11
air leakage limit f_{max}
maximum permitted leakage factor for the ductwork according to its air tightness class

3.2 Symbols

The nomenclature shown in Table 1 is used throughout this European Standard.

Table 1 – Symbols

Symbol	Quantity	Units
Aj	Duct surface area	m^2
f	Air leakage factor	$m^3 \cdot s^{-1} m^{-2}$
f_{max}	Air leakage limit	$m^3 \cdot s^{-1} m^{-2}$
L	Total joint length	m
p	Absolute static pressure	Pa
p_a	Atmospheric pressure	Pa
p_d	Velocity pressure	Pa
p_{design}	Design operating pressure	Pa
p_r	Stagnation (or absolute total pressure)	Pa
p_s	Static pressure limit ($p - p_a$)	Pa
p_{test}	Test pressure	Pa
$q_{vlmeasured}$	Measured air leakage volume rate	$m^3 \cdot s^{-1}$ *or* $l \cdot s^{-1}$
q_v	Volume rate of air flow at the flow meter	$m^3 \cdot s^{-1}$ *or* $l \cdot s^{-1}$
q_{vl}	Leakage volume rate of air flow	$m^3 \cdot s^{-1}$ *or* $l \cdot s^{-1}$
t	Air temperature	°C

4 Classification

The air tightness classes shall be as specified in Table 2.

Table 2 – Ductwork Classification

Air tightness class	Static pressure limit (p_s) Pa		Air leakage limit (f_{max}) $m^3 \cdot s^{-1} m^{-2}$
	Positive	Negative	
A	500	500	$0{,}027 \cdot p_t^{0{,}65} \cdot 10^{-3}$
B	1 000	750	$0{,}009 \cdot p_t^{0{,}65} \cdot 10^{-3}$
C	2 000	750	$0{,}003 \cdot p_t^{0{,}65} \cdot 10^{-3}$
D [a]	2 000	750	$0{,}001 \cdot p_t^{0{,}65} \cdot 10^{-3}$
[a] Ductwork for special applications.			

5 Requirements

5.1 Leakage

The leakage factor (f) shall be lower than the air leakage limit (f_{max}), corresponding to the required air tightness class, specified in Table 2 for any test pressure (p_{test}) lower than or equal to the design operating pressure (p_{design}). The requirements shall be satisfied for positive and negative pressures.

5.2 Strength

The ductwork shall withstand the static pressure limits (p_s) specified in Table 2 without permanent deformation, or any sudden change in leakage flow rate or test pressure. A deformation shall be reported only when it gives a cross section area reduction of at least 10 %.

6 Test rig specification

The test rig shall be inspected by the user before use on site and shall have a calibration certificate, chart or graph, indicating satisfactory calibration within one year of the test for which it is to be used.

7 Test procedure strength and leakage

7.1 Test sample

7.1.1 Sample for testing a specific installation in situ

The section to be tested shall be sealed off from the rest of the system before commencing the test. The test sample shall contain a representative variety of duct dimensions and fittings. The ductwork surface area of the section shall be at least 10 % of the total ductwork surface area, and if possible, at least 10 m^2.

NOTE The normal ratio between the total joint length (L) and ductwork surface area (A_j) is:

$$1 \leq \frac{L}{A_j} \leq 1{,}5 \text{ in m}^{-1}$$

7.1.2 Sample for testing a product series in general

The test sample shall contain a representative variety of duct dimensions and fittings. Straight ducts of a minimum length of 2,5 m shall be included in the test section. The ductwork surface area to be tested shall be at least 10 m^2. The ratio between the total joint length (L) and ductwork surface area (A_j) shall be:

$$\frac{L}{A_j} \geq 1 \text{ in m}^{-1}$$

7.2 Test method

7.2.1 Method for testing a specific installation

The section to be tested shall be subjected to test pressures, positive and negative, not lower than its design operating pressure (p_{design}). The leakage rate readings shall be recorded under stable conditions, i.e. when each test pressure has been maintained within ± 5 % of the specified value for 5 minutes.

NOTE A recommended procedure for the case of excessive air leakage rate is given in annex A.