

Ventilation for buildings — Air terminal devices — Aerodynamic testing and rating for displacement flow applications

The European Standard EN 12239:2001 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN 12239:2001.

The UK participation in its preparation was entrusted to Technical Committee RHE/2, Air distribution and air diffusion, which has the responsibility to:

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- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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aérodynamiques et caractérisation pour applications
déplacement d'air

Lüftung von Gebäuden — Luftdurchlässe —
Aerodynamische Prüfung und Bewertung für Anwendung
bei Verdrängungsströmung

This European Standard was approved by CEN on 22 June 2001.

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by February 2002, and conflicting national standards shall be withdrawn at the latest by February 2002.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies methods for the laboratory aerodynamic testing and rating of low velocity air terminal devices for displacement flow applications, including the specification of suitable test facilities and measurement techniques.

The standard gives only tests for the assessment of characteristics of the air terminal devices under non-isothermal conditions.

This standard applies to Class IV air terminal devices as defined in EN 12238.

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 the 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).

EN 12238, *Ventilation for buildings — Air terminal devices — Aerodynamic testing and rating for mixed flow applications*.

prEN 13182:1998, *Ventilation for buildings — Instrumentation requirements for air velocity measurements in ventilated spaces*.

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full (ISO 5167-1:1991)*.

CR 12792, *Ventilation for buildings — Symbols and terminology*.

ISO 5221, *Air distribution and air diffusion — Rules to methods of measuring airflow rate in an air handling duct*.

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, together with the following, apply.

3.1.1

low velocity air terminal device

air terminal device which is designed for thermally controlled ventilation e.g. displacement flow applications

3.1.2

primary airflow rate q_p

volume of air entering the air terminal device in unit time from an upstream duct

3.1.3

internally induced airflow rate q_i

volume of air in unit time induced into the primary airflow inside the air terminal device

3.1.4

total airflow rate q_t

volume of air in unit time, discharged into the room from the air terminal device

3.1.5**primary air temperature θ_p**

air temperature of the primary airflow

3.1.6**induced air temperature θ_i**

air temperature of the internally induced airflow

3.1.7**total air temperature θ_t**

air temperature of the total airflow from the air terminal device

3.1.8**reference air temperature of the room θ_r**

average of at least five measurements of the air temperature at a height of 1,1 m from the floor and outside the area directly influenced from the device

3.1.9**primary air temperature difference $\Delta\theta_p$**

algebraic difference of the primary air temperature and the reference air temperature of the occupied zone

3.1.10**isovel**

loci of points of equal mean velocity

3.1.11**length of the specified isovel a_v**

maximum horizontal distance from the air terminal device (or wall) to the rectangle circumscribing the specified isovel, independent of the distance from the floor as shown in Figure 4

3.1.12**width of the specified isovel b_v**

maximum width of the rectangle circumscribing the specified isovel perpendicular to a_v , independent of the distance from the floor as shown in Figure 4

3.1.13**height of the specified isovel h_v**

maximum height above floor of the specified isovel as shown in Figure 5

3.1.14**induction rate i**

the ratio of the internally induced airflow rate and primary airflow rate $i = q_i / q_p$

3.1.15**static pressure p_s**

static pressure relative to the atmosphere

3.1.16**dynamic pressure p_d**

dynamic pressure corresponding to the mean velocity in the connecting duct. For plenum connection without duct, the dynamic pressure is equal to zero

3.1.17**total pressure p_t**

sum of the static and dynamic pressures

3.1.18**equivalent diameter D_e**

equivalent diameter of the nominal size of the duct