Ventilation for buildings - Air terminal devices - Aerodynamic testing of damper and valves

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 1751:2024 sisaldab Euroopa standardi EN 1751:2024 ingliskeelset teksti.	This Estonian standard EVS-EN 1751:2024 consists of the English text of the European standard EN 1751:2024.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 22.05.2024.	Date of Availability of the European standard is 22.05.2024.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.140.30

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1751

May 2024

ICS 91.140.30

Supersedes EN 1751:2014

English Version

Ventilation for buildings - Air terminal devices - Aerodynamic testing of damper and valves

Ventilation des bâtiments - Bouches d'air - Essais aérodynamiques des registres et clapets

Lüftung von Gebäuden - Geräte des Luftverteilungssystems - Aerodynamische Prüfungen von Drossel- und Absperrelementen

This European Standard was approved by CEN on 15 April 2024.

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COMITÉ EUROPÉEN DE NORMALISATION
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Ref. No. EN 1751:2024 E

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European foreword

This document (EN 1751:2024) has been prepared by Technical Committee CEN/TC 156 “Air terminal devices”, 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of an identical text or by endorsement, at the latest by November 2024, and conflicting national standards shall be withdrawn at the latest by November 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1751:2014.

In comparison with the previous edition, EN 1751:2014, the following technical modifications have been made:

— Annex C Classification of a damper or valve leakage;

- Closed blade leakage now has the addition of formulae for the calculation of classification levels and an improved graph;
- Case leakage now has formulae for classification which are based on ductwork leakage classes in EN 16798-3:2017, Table19 taking a reference case length of 1 m and also an improved graph.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies methods for the testing and rating of dampers and valves used in air distribution systems with pressure differences up to 2 000 Pa.

The tests incorporated in this document will address:

— leakage past a closed damper or valve (for classification, see Annex C);

— casing leakage (for classification, see Annex C);

— flow rate/pressure requirement characteristics;

— torque: (see Annex A);

— thermal transmittance: (see Annex B).

The tests specified above are applicable to the following:

— measurement of leakage past a closed damper or valve;

— measurement of casing leakage;

— determination of flow rate and pressure requirements;

— measurement of torque characteristics (see Annex A);

— measurement of thermal transfer characteristics to determine insulation properties (see Annex B).

This document does not apply to the acoustic testing of dampers and valves.

NOTE Certain aspects of the dynamic performance of dampers and/or valves are dependent upon the air distribution system to which they are connected and are, therefore, difficult to measure in isolation. Such considerations have led to the omission of these aspects of the dynamic performance measurements from this document. Also, in common with other air distribution components, the results from tests carried out in accordance with this document might not be directly applicable if the damper or valve is situated in an area of non-uniform flow.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 12792, *Ventilation for buildings — Symbols, terminology and graphical symbols*

EN 16798-3:2017, *Energy performance of buildings — Ventilation for buildings — Part 3: For non-residential buildings — Performance requirements for ventilation and room-conditioning systems (Modules M5-1, M5-4)*

CEN/TS 17153, *Ventilation for buildings — Correction of air flow rate according to ambient conditions*

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1)*

EN ISO 5167-2, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 2: Orifice plates (ISO 5167-2)*

EN ISO 5167-3, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 3: Nozzles and Venturi nozzles (ISO 5167-3)*

EN ISO 5167-4, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 4: Venturi tubes (ISO 5167-4)*

3 Terms, definitions, symbols and suffixes

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12792 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org/

3.2 Symbols

The symbols used in this document are given in Table 1.

Table 1 — Symbols

Symbol	Quantity	Unit
A	Internal cross-sectional area of duct	m^2
C_D	Coefficient of discharge	-
D_e	Equivalent diameter Circular ducts: $\sqrt{\frac{4A}{\pi}}$ Square/Rectangular ducts: $\frac{2ab}{a+b}$	m
p	Absolute pressure	Pa
p_a	Atmospheric pressure	Pa
p_d	Velocity pressure $1/2\ \rho\ v^2$	Pa
p_t	Stagnation or absolute total pressure	Pa
p_s	Static gauge pressure (p - p_a)	Pa
Δp_s	Pressure difference across the damper or valve under test	Pa
Δp	Flow meter differential pressure	Pa
Δp_t	Conventional total pressure difference for an air density of 1,2 $kg \cdot m^{-3}$ at the inlet to the damper or valve under test	Pa
q_v	Volume rate of air flow at the flow meter	$l \cdot s^{-1}$
q_{vL}	Leakage volume rate of air flow	$l \cdot s^{-1}$
q_{vLBA}	Closed blade air leakage factor, volume rate of air flow per unit duct cross-sectional area	$l \cdot s^{-1} \cdot m^{-2}$