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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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ICS 91.140.30

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EUROPEAN STANDARD

**EN 1751**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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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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-CENELEC Management Centre has the same status as the official versions.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>	<b>Page</b>
<b>European foreword</b> .....	<b>3</b>
<b>1 Scope</b> .....	<b>4</b>
<b>2 Normative references</b> .....	<b>4</b>
<b>3 Terms, definitions, symbols and suffixes</b> .....	<b>5</b>
<b>3.1 Terms and definitions</b> .....	<b>5</b>
<b>3.2 Symbols</b> .....	<b>5</b>
<b>3.3 Suffixes</b> .....	<b>6</b>
<b>4 Instrumentation</b> .....	<b>6</b>
<b>4.1 Air flow rate measurement</b> .....	<b>6</b>
<b>4.2 Pressure measurement</b> .....	<b>7</b>
<b>4.3 Temperature measurement</b> .....	<b>7</b>
<b>5 Leakage tests</b> .....	<b>8</b>
<b>5.1 General</b> .....	<b>8</b>
<b>5.2 Damper and valve leakage</b> .....	<b>8</b>
<b>5.3 Casing leakage</b> .....	<b>8</b>
<b>6 Flow rate and pressure tests</b> .....	<b>9</b>
<b>6.1 Ducted method</b> .....	<b>9</b>
<b>6.2 Chamber method</b> .....	<b>10</b>
<b>6.2.1 General</b> .....	<b>10</b>
<b>6.2.2 Size relationship</b> .....	<b>10</b>
<b>6.2.3 Tests</b> .....	<b>10</b>
<b>6.3 Calculations and report</b> .....	<b>11</b>
<b>Annex A (informative) Mechanical testing of dampers and valves</b> .....	<b>18</b>
<b>A.1 General</b> .....	<b>18</b>
<b>A.2 Instrumentation: Torque measurement</b> .....	<b>18</b>
<b>A.3 Pressure test to determine limiting value for structural stability</b> .....	<b>18</b>
<b>A.4 Torque tests to determine the torque required to operate the damper or valve and the limiting value to avoid structural damage</b> .....	<b>19</b>
<b>Annex B (informative) Thermal transmittance through dampers and valves</b> .....	<b>21</b>
<b>B.1 General</b> .....	<b>21</b>
<b>B.2 Thermal loss test using a substitution method</b> .....	<b>21</b>
<b>Annex C (normative) Classification of a damper or valve leakage</b> .....	<b>24</b>
<b>C.1 General</b> .....	<b>24</b>
<b>C.2 Leakage through closed blade(s)</b> .....	<b>24</b>
<b>C.3 Casing leakage</b> .....	<b>26</b>
<b>Annex D (informative) Effect of duct configuration on pressure loss coefficient</b> .....	<b>28</b>
<b>D.1 General</b> .....	<b>28</b>
<b>D.2 Application of correction factor</b> .....	<b>29</b>
<b>Bibliography</b> .....	<b>30</b>

## 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, Table 19 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 <sup>2</sup>
$C_D$	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
$\Delta p_s$	Pressure difference across the damper or valve under test	Pa
$\Delta p$	Flow meter differential pressure	Pa
$\Delta p_t$	Conventional total pressure difference for an air density of 1,2 kg·m <sup>-3</sup> at the inlet to the damper or valve under test	Pa
$q_v$	Volume rate of air flow at the flow meter	l·s <sup>-1</sup>
$q_{vL}$	Leakage volume rate of air flow	l·s <sup>-1</sup>
$q_{vLBA}$	Closed blade air leakage factor, volume rate of air flow per unit duct cross-sectional area	l·s <sup>-1</sup> ·m <sup>-2</sup>