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Acoustics — Determination of airflow resistance —

Part 1: Static airflow method

Acoustique — Détermination de la résistance à l'écoulement de l'air —

Partie 1: Méthode statique

Reference number
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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 2, *Building acoustics*.

This first edition of ISO 9053-1 cancels and replaces ISO 9053:1991, which has been technically revised. The main changes are as follows:

— title changed;

— alternating airflow method deleted.

A list of all parts in the ISO 9053 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Acoustics — Determination of airflow resistance —

Part 1: Static airflow method

1 Scope

This document specifies the measurement of the determination of the static airflow resistance[1,2], in a laminar flow regime, of porous materials for acoustical applications.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
airflow resistance
R
quantity defined by

$$R = \frac{\Delta p}{q_v}$$

where

Δp is the air pressure difference, in pascal, across the test specimen with respect to the atmosphere;

q_v is the volumetric airflow rate, in cubic metre per second, passing through the test specimen.

Note 1 to entry: It is expressed in pascal second per cubic metre.

3.2
specific airflow resistance
R_s
quantity defined by

$$R_s = R \times A$$

where

R is the airflow resistance, in pascal second per cubic metre, of the test specimen;

A is the cross-section area, in square metre, of the test specimen perpendicular to the direction of flow.

Note 1 to entry: It is expressed in pascal second per metre.

3.3
airflow resistivity
σ
quantity defined by the following formula if the material is considered as being homogeneous

$$\sigma = \frac{R_s}{d}$$

where

R_s is the specific airflow resistance, in pascal second per metre, of the test specimen;

d is the thickness, in metre, of the test specimen in the direction of flow.

Note 1 to entry: lt is expressed in pascal second per square metre.

3.4
linear airflow velocity
u
quantity defined by

$$u = \frac{q_v}{A}$$

where

q_v is the volumetric airflow rate, in cubic metre per second, passing through the test specimen;

A is the cross-sectional area, in square metre, of the test specimen.

Note 1 to entry: lt is expressed in metre per second.

3.5
permeability
k_0
quantity defined by the following equation if the material is considered as being homogeneous

$$k_0 = \frac{\eta}{\sigma}$$

where

η is the dynamic viscosity of air in newton second per square metre (approximately $1{,}82 \times 10^{-5}$ for the air at 20 °C and 1 atmosphere of static pressure);

σ is the static airflow resistivity in pascal second per square metre, of the test specimen.

Note 1 to entry: lt is expressed in square metres.