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Acoustics — Determination of static airflow resistance

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

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Foreword

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

This second edition cancels and replaces the first edition (ISO 9053:1991), which has been technically revised. The main changes compared to the previous edition are as follows:

— title changed;

— alternating airflow method deleted.

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Acoustics — Determination of static airflow resistance

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.

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3.3
static 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.

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