

INTERNATIONAL STANDARD

**ISO
9053**

First edition
1991-07-01

Acoustics — Materials for acoustical applications — Determination of airflow resistance

*Acoustique — Matériaux pour applications acoustiques — Détermination
de la résistance à l'écoulement de l'air*



Reference number
ISO 9053:1991(E)
AVA Documents
Document Sharing Hub

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9053 was prepared by Technical Committee ISO/TC 43, *Acoustics*.

Annex A of this International Standard is for information only.

© ISO 1991

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

The airflow resistance of porous materials indicates, in an indirect manner, some of their structural properties. It may be used to establish correlations between the structure of these materials and some of their acoustical properties (for example, absorption, attenuation, etc.).

This International Standard is, therefore, useful for two purposes:

- a) in relating some of the acoustical properties of porous materials to their structure and their method of manufacture;
- b) in ensuring product quality (quality control).

This page intentionally left blank

Acoustics — Materials for acoustical applications — Determination of airflow resistance

1 Scope

This International Standard specifies two methods for the determination of the airflow resistance of porous materials for acoustical applications.

It is applicable to test specimens cut from products of porous materials.

NOTE 1 Details of publications relating to flow behaviour under both laminar and turbulent conditions are given in annex A.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 airflow resistance, R : A quantity defined by

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

where

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

q_V is the volumetric airflow rate, in cubic metres per second, passing through the test specimen.

It is expressed in pascal seconds per cubic metre.

2.2 specific airflow resistance, R_s : A quantity defined by

$$R_s = RA$$

where

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

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

It is expressed in pascal seconds per metre.

2.3 airflow resistivity, r : If the material is considered as being homogeneous, that quantity defined by

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

where

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

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

It is expressed in pascal seconds per square metre.

2.4 linear airflow velocity, u : A quantity defined by

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

where

q_V is the volumetric airflow rate, in cubic metres per second, passing through the test specimen;

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

It is expressed in metres per second.