AES information document for room acoustics and sound reinforcement systems — Characterization and measurement of surface scattering uniformity

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Abstract

This document provides guidelines for characterizing the uniformity of scattering produced by surfaces from measurements or predictions of scattered polar responses.

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Foreword

[This foreword is not a part of *AES information document for room acoustics and sound reinforcement systems—Characterization and measurement of surface scattering uniformity,* AES-4id-2001.]

This document was prepared by a writing group of the SC-04-02 Working Group on Characterization of Acoustical Materials of the SC-04 Subcommittee on Acoustics in partial fulfillment of project AES-X06, Measuring and Modeling Acoustical Materials: Specification of Measuring Methods, Computer Models, and Transportable Computer Data Files Compatible with Room Simulators and Auralizers. The project was initiated in 1994.

Trevor Cox headed the writing group for the final draft in cooperation with the International Organization for Standardization (ISO) TC 43 SC 2 Building Acoustics working group (WG25) under AES project AES-X81.

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SC-04-02
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1 Scope

This document provides guidelines for characterizing the uniformity of scattering produced by surfaces from measurements or predictions of scattered polar responses. In this context, the surface scattering is quantified in terms of a single diffusion coefficient. The diffusion coefficient is a measure of quality designed to be used by producers and users of surfaces that, either deliberately or accidentally, diffuse sound. It is also intended for use when needed by developers and users of geometric room acoustic models. The diffusion coefficient is not intended, however, to be blindly used as an input to current diffusion algorithms in geometric room acoustic models. The diffusion coefficient characterizes the sound reflected from a surface in terms of the uniformity of the scattered polar distribution. The information document details a free-field characterization method.

2 Normative references

No standards contain provisions that, through reference in this text, constitute provisions of this document.

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1
reference flat surface
plane, rigid, and thin surface, with the same projected shape or footprint as the test surface

3.2
reference normal
outward-pointing vector perpendicular to the front face of the reference flat surface

3.3
reference point
geometric center of gravity of the reference flat surface

3.4
sound ray
line following one possible direction of sound propagation from a source point

3.5
specular reflection
incident sound ray that undergoes specular reflection such that Snell's law (that is, the angle of reflection equals the angle of incidence) is obeyed, when the wavelength of sound is small compared to the dimensions of the reference flat surface

    NOTE   Following Fermat's principle the actual path between source and receiver via the panel will be the one that is traversed in the least time.