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Sound absorption coefficient measurement and analysis for multisection perforation microperforated panel

Abstract

The microperforated panel (MPP) is a resonant-type sound-absorbing material considered the next-generation sound-absorption material due to its attractive characteristics. However, the drawback of narrow bandwidth sound absorption remains a matter of concern. This study explored the impact of varying backing cavity depths and different combinations of multi-section perforation sizes on the sound absorption performance of microperforated panels (MPP). A two-microphone impedance tube was used to obtain the sound absorption coefficient (SAC) of MPP following the ISO 10534-2 standard. MPP with single-size perforation diameters of 0.5, 0.7, and 1.0 mm which were compared to multi-section MPP with combinations perforation sizes of 0.5 & 0.7, 0.7 & 1.0, and 0.5 & 1.0 mm. The investigation reveals that increasing the backing cavity depth from 1.0 cm to 3.0 cm generally shifts the sound absorption coefficient (SAC) peak to a lower frequency range and decreases the SAC peak across all MPP samples. A higher SAC peak and wider absorption bandwidth were achieved from 0.5 mm single-size perforation diameter MPP and its combination in multi-section perforation MPP.

Keywords

Impedance tube; Microperforated panel (MPP); Multi-section perforation size; Sound absorption coefficient (SAC)