

Acoustical impedance tube

The Mecanum's Impedance Tubes (MNS/Tube) are specifically designed to obtain reliable normal incidence measurements of the main acoustical indicators of a wide range of sound absorbing materials. The method follows the ASTM E1050 and ISO 10534-2 standards. It corrects for tube dissipation and ambient conditions (temperature, pressure, relative humidity).



Four acoustical indicators used to compare the acoustical performance of sound absorbing materials:

- α – Normal incidence sound absorption coefficient
- R – Normal incidence complex reflection coefficient
- Z – Normal incidence surface impedance
- TL – Normal incidence transmission loss (optional transmission tube)
- Z_c – Characteristic impedance of porous materials
- k – Wave number of porous materials

MNS/Tube has been a proven value to the world's leading materials suppliers to both the automotive and aircraft industry. It is used for:

- benchmark of sound absorbing materials
- quality control in the manufacturing process of materials
- R&D applications

Normal incidence absorption is used by Foam-X for the calculation of difficult to measure poroelastic material properties such as open porosity, static airflow resistivity, tortuosity, viscous and thermal characteristic lengths, and static thermal permeability.



MNS/Tube includes a medium impedance tube to cover the 100-4100 Hz frequency range, DAQ system, software Tube-X™, a verification sample to check the test procedure, and a user's manual.

The Tube-X™ software fully controls the calibration and the measurements. It graphs the different sound indicators and export them to an Excel sheet.

Small and large tubes are also available to cover the 500-6000 Hz and 50-16000 Hz frequency ranges, respectively [other dimensions are also available].

The DAQ system and Tube-X™ can also be used with other commercially available impedance tubes.



- TUBE : 100 x 12 x 12 cm³, 10 kg
- DAQ : 54 x 20 x 33 cm³, 5 kg
- Small tube diameter: 29.00 mm
- Medium tube diameter: 44.44 mm
- Large tube diameter: 100 mm

