

# TUBE

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## High Level Impedance & Transmission Tube

ISO 10534-2, ASTM E1050 and ASTM E2611

2, 3 or 4 Microphones Method



Mecanum's high level impedance and transmission tube is specially designed to measure the acoustic properties in transmission or absorption of materials or devices under high level excitation. This impedance tube operates up to 155 dB.

## MEASURING SYSTEM

### Test Bench

- Impedance tube for 2, 3 or 4 microphones methods
- High sound pressure level microphones
- High performance 150 W compression driver
- 24-bit acquisition system (DAQ) with embedded low distortion audio amplifier
- Flat square flange and large ergonomics handles for in-situ measurements
- Piston with integrated numeric thickness gage
- Ruggedized transportation case

Properties	2 Mics	3 & 4 Mics
Sound Absorption Coefficient	x	x
Reflection Coefficient	x	x
Surface Normalized Impedance	x	x
Sound Transmission Loss		x
Transfer Matrix Coefficient		x
Characteristics Impedance		x
Unwrapped Wavenumber		x
Eq. Fluid Dynamic Bulk Density & Modulus		x

### TUBE-X Software

- Fully controls the procedure (from calibration to measurement) with report generation
- Corrects errors due to weather conditions, internal tube dissipation, mounting rings, mounting grids and automatically controls the sound pressure level inside the tube
- Additional features: microphone acoustic center measurement module, comparison project and merging tools, averaging module, air cavity simulation tool, acoustic penetration depth tool

### OPTIONAL ACCESSORIES

- Customized engine silencer adapters
- Customized curved flange for aircraft engine liners
- Porous material slicers and circular cutters
- ENVIRO weather station

## TECHNICAL DATA

### Tube

- Nominal dimensions:
  - In-situ 2 mics: 350 (L) x 170 (W) x 190 (H) mm
  - 3 mics: 890 (L) x 170 (W) x 190 (H) cm
  - 4 mics: 1140 (L) x 170 (W) x 190 (H) cm
- Maximum sample length:
  - Absorption with 2 microphones: 250 mm
  - Transmission with 3 microphones: 220 mm
  - Transmission with 4 microphones: 125 mm
- Material: CNC machined aluminum, black anodized

### Instrumentation

- Power supply: 100-240 VAC 50/60 Hz 60 W
- Communication: USB 2.0 Type A
- Dimensions: 234 (W) x 223 (D) x 141 (H) mm
- Input: 4 channels 102.4 kHz / 24-bit channel
- Output: 1 channel 96 kHz / 24-bit channel
- Integrated 100 W class D audio amplifier
- IEPE ¼ " high sound pressure level microphones

### MEASURING RANGE

- Frequency range: 300 Hz to 6300 Hz
- White noise or sine sweep excitation up to 155 dB
- Hard wall measurement (zero absorption):
  - All ⅓ octave until 4 kHz. < 4 %
  - ⅓ octave 5 kHz and above < 10 %

### TYPICAL APPLICATIONS

- Aircraft engine liners
- Non linear meta-materials
- Engine silencer & air intake
- Non linear resistive screens and perforated plates

## WARRANTY & SUPPORT

All Mecanum characterization systems are covered by a one-year limited warranty and technical support. Valid only on manufacturing defects and does not cover damage due to abuse or improper use of the equipment.

Please note that the technical aspects of our equipment may be subject to change without notice