

Test Systems

# Impedance Tube Nor1527

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## Material Sound Transmission Loss and Acoustic Impedance Tube Systems

Nor1527 acoustic performance measurement system is an acoustic impedance, sound transmission loss and sound absorption coefficient measurement system operating in accordance with ASTM E-2611, ASTM E-1050, ISO 10534-2 standards. Measurement range is 50 Hz - 6400 Hz. Two different tube diameters are available (100 mm and 30 mm diameter) for low and high frequency measurements.



### Sound Absorption Coefficient

The sound absorption coefficient of acoustic materials can be measured in accordance with the ISO 10534-2 standard "Determination of sound absorption coefficient and impedance in impedance tubes - Part2: Transfer-function method". It is possible to measure between 50 - 1600 Hz or 200 - 6400 Hz depending on the tube configuration used. The measurements are carried out by generating a random acoustic excitation by the sound source and detecting the reflected sound components on the material.



### Sound Transmission Loss

In the sound transmission loss tube configuration with four microphones, the transmission loss of acoustic materials can be measured in accordance with the ASTM E2611 standard "Measurement of Normal Incidence Sound Transmission of Acoustical Materials Based on the Transfer Matrix". Measuring between 50 - 1600 Hz or 200 - 6400 Hz is possible depending on the tube configuration used. This measurement is made by generating a random acoustic excitation by the sound source and detecting the reflected sound power on the material.



## System features

**Compliance with ASTM E2611 (4-Pole Transfer Matrix Method), ASTM E1050 and ISO 10534-2 (Transfer Function Method)**

**High-frequency range, 50 - 6400 Hz (100 mm and 30 mm tubes)**

**State of art manufacturing**

**Industry-leading sensors and analyzer**

**High inner surface tolerance**

**Acoustic leakage-proof construction**

**One day free online training included**

## Software features

- Determination of sound barrier properties (sound transmission loss, characteristic impedance, characteristic wave number)
- Determination of sound absorbing properties (sound absorption coefficient, complex reflection coefficient, surface impedance)
- Determination of dynamic density and dynamic bulk modulus
- Determination of transfer matrix elements
- Random incidence absorption estimation models
- Tube attenuation removal algorithm for deficient absorptive materials
- Conical adapter correction for transmission loss measurements
- Determination of intrinsic properties with Johnson-Champoux-Allard-Lafarge (JCAL) material model. (Porosity, Flow Resistivity, Tortuosity, Viscous Characteristic Length, Thermal Characteristic Length, Static Thermal Permeability)
- Amplitude and phase calibration of the microphones
- Selectable frequency resolution and number of averages
- ASCII, MS Excel™ export
- Direct export to MSC Actran for poro-elastic materials definition



## System Components

<b>Analyser</b>	Nor1527/DAQ 102.4 kS/s, 100 dB, 0.8 Hz AC/DC Coupled, 4-Input/1-Output (Ni-USB-4431)
<b>Microphones</b>	GRAS measurement microphones Freq range: 10 Hz to 20 kHz Dyn range: 33 dB(A) to 142 dB Sensitivity: 9 mV/Pa
<b>Tubes</b>	LF-ABS $\varnothing$ 100 mm, 945 mm (L) LF-STL $\varnothing$ 100 mm, 1130 mm (L) HF-ABS $\varnothing$ 30mm, 875 mm (L) HF-STL $\varnothing$ 30 mm, 925 mm (L)
<b>Power Amplifier</b>	Built-in, 20W, high quality amplifier, to power the loudspeaker in the impedance tube
<b>Speaker</b>	Full Range - 4 ohm
<b>Calibrator (Optional)</b>	Nor1256 Sound Calibrator Sound pressure level: 94 dB or 114 dB Frequency: 250 Hz or 1 kHz ANSI: S1.40 IEC: 60942 class 1
<b>Cables</b>	Ultra low noise, BNC to 10-32 cables

## Included items

Demo melamin foam for training and system check

Transport case

Quality test report

Calibration certificate

User manual for installation and software



## Optional items

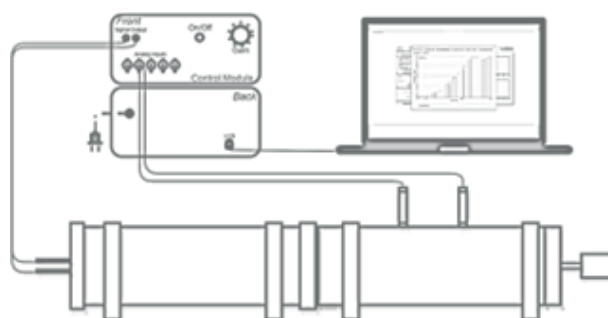
Nor1256 sound calibrator

Road absorption measurement option, in compliance  
with ISO 13472-2

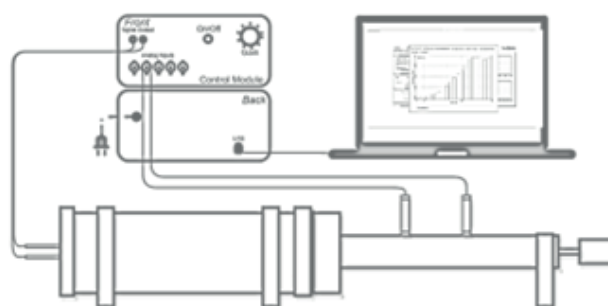


## Configurations

Product code	Description
<b>Low frequency range configurations (50-1600 Hz)</b>	
<b>Nor1527/ LF-SAC</b>	Single-tube Sound Absorption Coefficient Measurement System (Impedance Tube), 100 mm, 50 - 1600 Hz (2 microphones)
<b>Nor1527/ LF-STL</b>	Single-tube Sound Transmission Loss Measurement System, 100 mm, 50 - 1600 Hz (4 microphones)
<b>Nor1527/ LF-SAC/STL</b>	Single-tube Sound Absorption Coefficient + Sound Transmission Loss Measurement System, 100 mm, 50 - 1600 Hz (4 microphones)
<b>High frequency range configurations (200-6400 Hz)</b>	
<b>Nor1527/ HF-SAC</b>	Single-tube Sound Absorption Coefficient Measurement System (Impedance Tube), 30 mm, 200 - 6400 Hz (2 microphones)
<b>Nor1527/ HF-STL</b>	Single-tube Sound Transmission Loss Measurement System, 30 mm, 200 - 6400 Hz (4 microphones)
<b>Nor1527/ HF-SAC/STL</b>	Single-tube Sound Absorption Coefficient + Sound Transmission Loss Measurement System, 30 mm, 200 - 6400 Hz (4 microphones)
<b>Full Frequency Range Configurations (50 - 6400 Hz)</b>	
<b>Nor1527/ LF/HF-SAC</b>	Multi-tube Sound Absorption Coefficient Measurement System (Impedance Tube), 30 + 100 mm, 50 - 6400 Hz (2 microphones)
<b>Nor1527/ LF/HF-STL</b>	Multi-tube Sound Transmission Loss Measurement System, 30+100 mm, 50 - 6400 Hz (4 microphones)
<b>Nor1527/ LF/HF-SAC/STL</b>	Multi-tube Sound Absorption Coefficient + Sound Transmission Loss Measurement System, 30 + 100 mm, 50 - 6400 Hz (4 microphones) (recommended)



**Nor1527/LF-SAC**



**Nor1527/HF-SAC**




**Nor1527/LF-STL**




**Nor1527/HF-STL**



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