



ACOUSTICS IMPEDANCE TUBE



About Impedance Tube

HOLMARC's Impedance tube apparatus is designed to measure acoustic absorption, reflection and transmission loss of symmetric & non symmetric materials according to ASTM standards. The metallic design of the impedance tube with a piston support is dedicated to measure reflection, transmission & absorption coefficients of different solid materials. For measurement analysis, we have software controls, the instrumental design as well as operations are based on ASTM standards. Two microphone method for reflection coefficient analysis & four microphone method (For absorption & Transmission analysis) are used. 4-port USB Hub (USB3.0) is used for sound card function which is then connected to computer. The dedicated software is used to configure the speaker & microphones according to requirements.

Impedance tubes have a lot of applications in different industries such as automobile, musical instruments etc... Since the whole system is calibrated and operated according to ASTM standards you can obtain the required result in a single click on your PC

installed with HOLMARC's software. The scanned result can be exported as an excel file. The flange is available in centre of tube to fix the different materials according to ASTM dimensions. We have a designed control box to control the amplitude of sound signal transmitted through the tube.

Holmarc offers the complete set of Impedance Tube system, which includes: hollow tubes, microphones, sample holders, DAQ unit and measurement software as per international standards. The tube is designed using anodized aluminum to measure sound absorption coefficient and transmission loss as per test standards described in ISO 10534-2, ASTM E1050 & ASTM E2611 at normal incident, that is, 0°. The measurement is based on transfer function method which separates the incident and reflected energy from the measured transfer function, and then estimates the acoustic properties of the test sample. The properties measured with this test method are useful in basic research and product development of sound absorptive materials



Impedance tube is fitted with a 200mm sample holder to accommodate a variety of samples.

PRODUCT FEATURES

- Measurement is based on transfer-function method according to ISO10534-2 and ASTM E1050 international standards for absorption coefficient and ASTM E2611 for transmission loss.
- Built-in noise generator & power amplifier.
- Quick and simple to use.
- Two kind of tube to measure full range frequencies.
- Measure in 1/3 octave frequencies.
- Measure other normal incident material properties like reflection coefficient,
- impedance ratio, resistance ratio, reactance ratio, admittance ratio, conductance
- ratio, susceptance ratio, transmission coefficient, propagation wave number in
- material, characteristic impedance in material as per ASTM standards.
- Data measured on different tubes can be combined into full-frequency.
- Direct data export to excel sheet and print report

MODEL NO: HO-AE-ITA219



100Hz -1600 Hz
Frequency Range

100mm
Inner Diameter

100mm
Sample Holder

IMPEDANCE TUBE SMALL SIZE



The impedance type device features a compact size, operates within a frequency range of 500Hz to 6300Hz, and is equipped with a 200mm sample holder, all meticulously manufactured by Holmarc.

IMPEDANCE LARGE SIZE



The large-sized impedance type, crafted with precision by Holmarc, boasts a frequency range of 100Hz to 1600Hz and is fitted with a 200mm sample holder to accommodate a variety of samples.



TUBE WITH LOUD SPEAKER



Impedance Tube system, which includes: hollow tubes, microphones sample holders, DAQ unit and measurement software

SPECIFICATIONS

TUBE	LARGE	SMALL
Frequency Range	100Hz – 1600 HZ	500Hz – 6300HZ
Inner Diameter	100 mm	29mm
Sample Holder Inner diameter	100 mm	29 mm
Sample Holder Max length	200 mm	200 mm
Scanning Frequencies	1/3 Octaves	
Standard	ISO10534-2, ASTM E1050, ASTM E2611	
Value to be Measured	Sound Absorption Coefficient (α) and Transmission Loss (TL)	
Loud Speaker	3½" in diameter, 30 Watts, 4 Ohm	
Microphone	1/4" in diameter, -3dB at 1.5V sensitivity, 20 -16,000 Hz frequency response	
Measurement software	Holmarc Wave Analyzer 4C	



1. Power switch.
2. Indicator.
3. BNC connector.
4. Amplifier gain control.
5. Signal out..
6. Power switch.

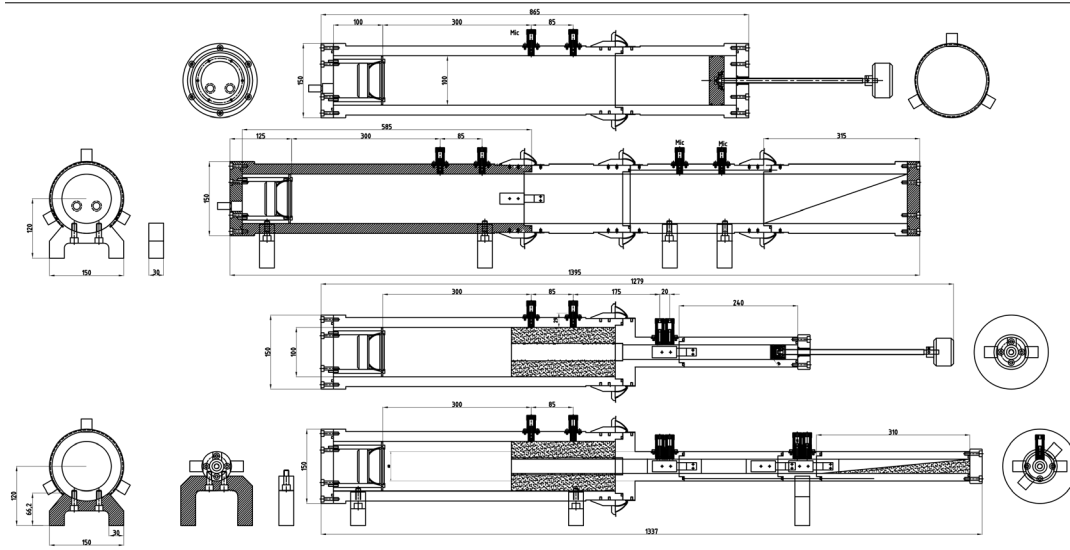


7. Indicator.
8. BNC connector.
9. Amplifier gain control.
10. Signal out..

COMPLETE SYSTEMS FOR ABSORPTION AND TRANSMISSION LOSS MEASUREMENTS

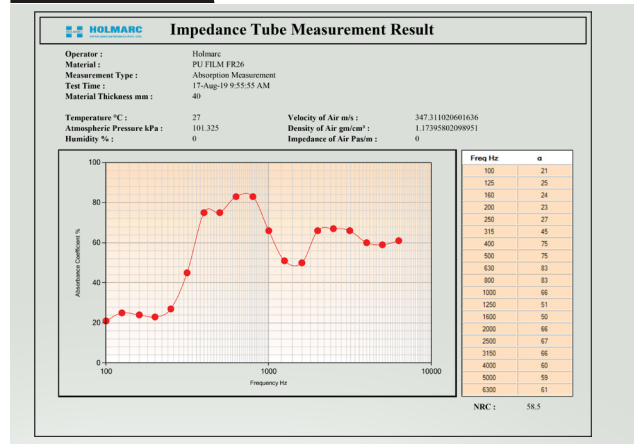


ASSEMBLY DRAWINGS

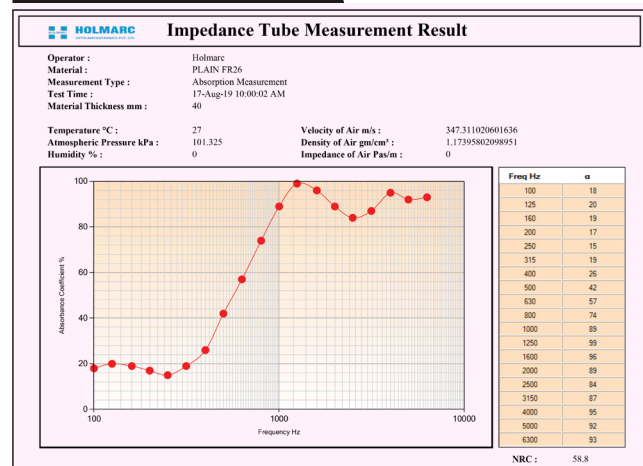


SOFTWARE

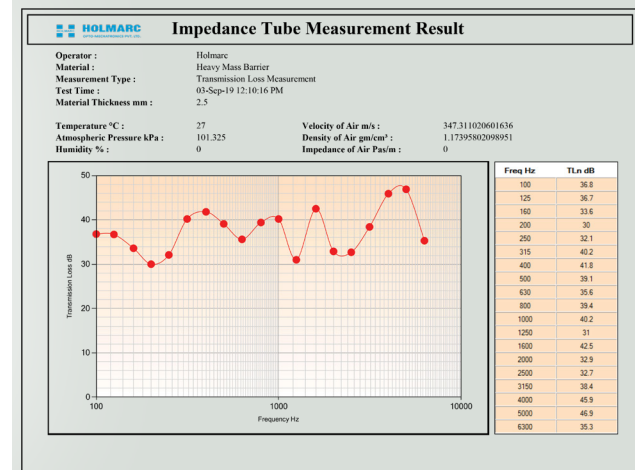
PU FILM



PLAIN SAMPLE



HEAVY MASS BARRIER



1. Tube with built in loud speaker.
2. Speaker connector.
3. Microphones.
4. 100 mm transmission loss measurement sample holder.
5. 100 mm anechoic tube.
6. 29 mm absorption measurement sample holder.
7. 29 mm connecting tube.
8. 29 mm transmission loss measurement sample holder.
9. 29 mm extension tube.
10. 29 mm anechoic tube.
11. 100 mm absorption measurement sample holder.
12. Supporting legs.
13. 100 mm extension tube.

Custom Impedance Tube

We can provide our ITA-219 Impedance tube setup with 1/4" LEMO Pressure Standard Microphone Set, GRAS 42AG Multifunction Sound Calibrator and a CNC sample cutting unit for sample preparation. It can be used to measure specific impedances, sound absorption coefficients (SACs), sound transmission losses (STLs) and acoustic properties (characteristic impedances, propagation wave numbers, effective densities, bulk moduli) of acoustic materials in normal incidence conditions.

GRAS 42AG Multifunction Sound Calibrator is a portable, battery operated sound source for calibration and check of microphones and sound level meters. It is designed for field use and comes with a protective casing. It conforms to the requirements in IEC 60942 for a class 1 sound

calibrator. It can produce a sinusoidal signal of 250 Hz or 1 kHz at 94 dB or 114 dB. For documentation purposes, 42AG provides display of the environmental conditions: ambient air pressure, temperature.

The sound is generated by a small loudspeaker integrated in the acoustic coupler. An internal reference microphone measures the level in the coupler and a feed back circuit automatically adjusts the level. Therefore, the calibration level is virtually independent of ambient conditions like temperature, atmospheric pressure and humidity within the specified range of operation.

GRAS 46BP-1 is typically used for sound pressure, high frequency,

and high level pressure measurements. It is suitable for general purpose acoustic measurements in couplers and at boundaries.

The microphone in the 46BP-1 is very versatile when connected to the RA0086 Transmitter Adapter for 1/4" Microphones. The 46BP-1 becomes a high impedance sound source when the RA0086 takes a calibration signal directly from the signal generator and makes the microphone behave like an electrostatic loudspeaker. When used for calibrating an acoustic coupler, this gives a frequency response that is as good as when the 46BP behaves like a microphone.

A front-vented version is available, 46BP-1-FV 1/4" LEMO Pressure Microphone Set, Front Vented

Regarding temperature range, see the Specifications. Should higher temperature limits be required, we recommend considering the GRAS probe microphones where the microphone and preamplifier can be isolated from the hot source.

PRODUCT FEATURES

- Measurement is based on transfer-function method according to ISO10534-2 and ASTM E1050 international standards for absorption coefficient and ASTM E2611 for transmission loss.
- Built-in noise generator & power amplifier.
- Quick and simple to use.
- Two kind of tube to measure full range frequencies.
- Measure in 1/3 octave frequencies.
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- material, characteristic impedance in material as per ASTM standards.
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MODEL NO: HO-SO-ITA219C3



Multifunction
Sound Calibrator



SPECIFICATIONS - HO-SO-ITA219C3

TUBE	LARGE	SMALL
Frequency Range	100Hz – 1600 HZ	500Hz – 6300HZ
Inner Diameter	100 mm	29mm
Sample Holder Inner diameter	100 mm	29 mm
Sample Holder Max length	200 mm	200 mm
Scanning Frequencies Standard	1/3 Octaves ISO10534-2, ASTM E1050, ASTM E2611	
Value to be Measured	Sound Absorption Coefficient (α) and Transmission Loss (TL)	
Loud Speaker	3½ "in diameter, 30 Watts, 4 Ohm	
Microphone	GRAS 46BP-1 1/4" LEMO Pressure Standard Microphone Set Freq range: 4 Hz to 70 kHz Dyn range: 39 dB(A) to 172 dB Sensitivity: 1.5 mV/Pa	
Measurement software	Holmarc Wave Analyzer 4C	

GRAS 46BP-1 Compatibility

To perform as specified, the GRAS 46BP-1 microphone set requires a power module or an analyzer input which can supply the preamplifier with power as well as 200 V polarization voltage for the microphone.

The microphone set is terminated with a 5-pin mini LEMO connector. Ready to use cable assemblies

with LEMO connectors of various types and lengths are available in standard as well as customized lengths.

The 46BP-1 is IEEE 1451.4 TEDS 27v. 1.0 compliant. If your measurement platform supports Transducer Electronic Data Sheets you will be able to read and write data like properties and calibration data.

GRAS 46BP-1 1/4



100Hz -1600 Hz
Frequency Range



100mm
Inner Diameter

100mm
Sample Holder

GRAS 42AG MULTIFUNCTION SOUND CALIBRATOR, CLASS 1

GRAS 42AG is designed to fulfil the need for a portable and versatile calibrator for field use. Also, it is designed to be the logical replacement or upgrade from existing calibrators. 42AG represents improved functionality and user friendliness. Its combination of portability, automatic level adjustment and two calibration frequencies and levels makes it a complete and self sufficient solution that can be used to perform a complete field-verification without the need for other instrumentation, e.g. for recording ambient calibration conditions. With two calibration frequencies, 250 Hz and 1 kHz it is well suited for calibration of microphones that normally are calibrated at 250 Hz as well as sound level meters which normally are calibrated at 1 kHz. 42AG can calibrate at two different levels, 94 dB and 114 dB.

SPECIFICATIONS

Frequency Hz	: 250 (251.19 ± 0.30 Hz) or 1 kHz (1000 ± 1 Hz)
Sound pressure level dB	: 94 (± 0.2 dB) or 114 (± 0.2 dB)
Temperature range, operation °C / °F	: ANSI standard S1.40 IEC standard 60942 class 1 -10 to +50/14 to 122
Noise generator	: Microcontroller based waveform generator
Frequency range	: 100 to 6300 Hz
Working mode	: Sweep mode
Audio amplifier	: Class D audio amplifier
Data acquisition system	
Number of Channels	: 4
Configuration	: Differential
Full Scale Range	: ±5V
Input impedance	: 100 kΩ
Absolute accuracy	: 0.25% of full scale range @ 25°C, excluding common mode error
Common mode rejection ratio	: 50 dB (dc - 60 Hz)
Channel-to-channel crosstalk rejection	: -80 dB



The GRAS 42AG Multifunction Sound Calibrator is a portable, battery-operated precision microphone calibrator. The calibrator can be used directly on 1" microphones. Adapters for calibrating 1/2" (factory mounted), 1/4" and 1/8" microphones are included.

IEC: 60942 class 1

94 dB or 114 dB | 250 Hz or 1 kHz | S1.40
Sound pressure level | Frequency | ANSI

GRAS Sound & Vibration

Note: This Product is Manufactured by G.R.A.S

BENCH TOP LABORATORY PELLET PRESS



- Compact benchtop machine for X-ray and IR sample pelletizing
- Simple, one-button operation and maintenance free
- Convenient wide space for die set positioning and removal
- Custom designed with adjustable pressure up to 200 kN max.
- Robust construction and solid steel housing
- Secure working chamber with removable safety windows

The HOP20E is the bench-top laboratory press for easier and more efficient preparation of pressed pellets. It produces perfect pellets at the press of a button. The sample material is filled into the press tool manually. The operator inserts the press tool into the machine and closes the safety input/output flap. The machine will not start until the flap is closed. By pushing the 'start' button, the piston moves out until it achieves its maximum pressure force of 200 kN and the motor stops. The hydraulic system keeps the pressure until the operator pushes the 'stop' button to let the piston move backwards.

GRAS 46BP-1 1/4" LEMO Pressure Standard Microphone Set

Design

The GRAS 46BP-1 is a high performance standard microphone set. In our clean-room environment the set is assembled and sealed with a label. However, the microphone set can be dismantled, if you wish to use the components separately.

Microphone

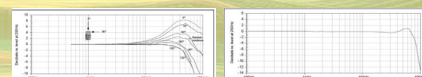
The microphone cartridge is the high-quality IEC 61094 WS3F standardized GRAS 40BP 1/4" Externally Polarized Pressure Microphone, designed for long-term reliability in multiple environments.

Preamplifier

The preamplifier is the GRAS 26AC-1 Preamplifier which is inclusive TEDS and based on our well known circuit board substrates. In the industry these are famous for their low self-noise, wide frequency and excellent slew rate performance

COMPLETE SYSTEMS FOR ABSORPTION AND TRANSMISSION LOSS MEASUREMENTS

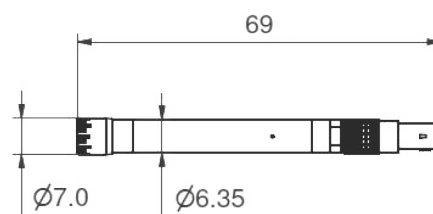
The 46BP is a 1/4" LEMO microphone set for pressure measurements.



4 Hz - 70 kHz
Frequency Range

39 dB(A) to 172 dB
Dynamic Range

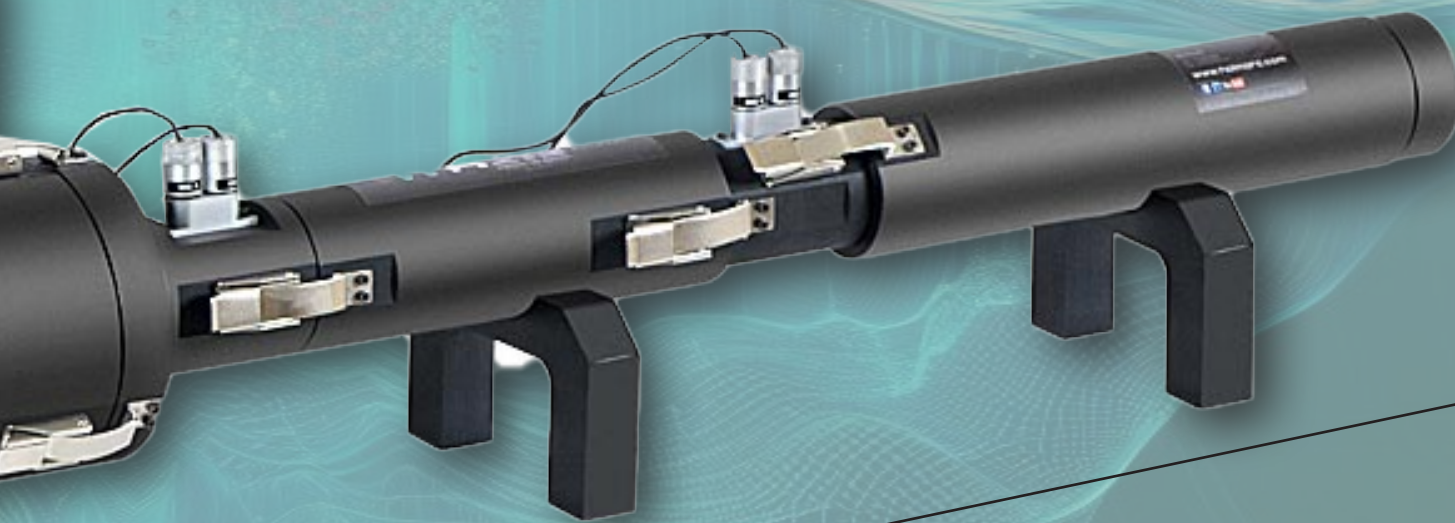
1.5 mV/Pa
Sensitivity



Polarization/Connection	200 V / Traditional
Frequency range	(±1 dB) Hz 10 to 25 k
Frequency range	(±2 dB) Hz 4 to 70 k
Dynamic range lower limit with GRAS preamplifier	dB(A) 39
Dynamic range upper limit with GRAS preamplifier @ +28 V / ±14 V	dB 169
Dynamic range upper limit with GRAS preamplifier @ +120 V / ±60 V	dB 172
power supply	dB 172
Set sensitivity @ 250 Hz (±3 dB)	mV/Pa 1.5
Set sensitivity @ 250 Hz (±3 dB)	dB re 1V/Pa -56.5
Output impedance	Ω 75
Power supply min. to max. (single/balanced)	V 28 to 120 / ± 14 to ± 60
DC-offset, min., single supply	V 0.5 x Vs - 1
DC-offset, max., single supply	0.5 x Vs + 4
DC-offset, balanced supply	V -1 to 4
Microphone venting	Rear
IEC 61094-4	Designation WS3P
Temperature range, operation	°C / °F -30 to 70 / -22 to 158
Temperature range, storage	°C / °F -40 to 85 / -40 to 185
Temperature coefficient	@250 Hz dB/°C / dB/°F -0.01 / -0.006
Static pressure coefficient	@250 Hz dB/kPa -0.008
Humidity range non condensing	% RH 0 to 90
Humidity coefficient	@250 Hz dB/% RH -0.0013
Influence of axial vibration	@1 m/s ² dB re 20 μPa 55
TEDS UTID (IEEE 1451.4)	27 v. 1.0
Connector type 5-pin	LEMO 00
CE/RoHS compliant/WEEE registered	Yes / Yes/Yes
Weight	g / oz 10 / 0.353

Note: This Product is Manufactured by G.R.A.S





1.395 Meter Length





Holmarc Opto-Mechatronics Ltd has been organized as a provider of engineering tools for scientific research. Our company is equipped to meet most challenging and demanding requirements of scientific community with our manufacturing and development capabilities in optics, mechanics, electronics and software. At Holmarc, experienced engineers, designers and technicians work hand in hand to deliver state of the art engineering solutions to our clients.

All of us at Holmarc stay tuned to absorb the changes in technology as fast as possible. We deliberately keep our technical skills as well as manufacturing infrastructure flexible and maintain a dynamic work culture throughout our operations.

We have distributors and collaborators in all parts of the world and are well equipped to serve world scientific community. We welcome queries irrespective of geographical and political boundaries.

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