01/02

BSWA Company Introduction

Established in 1998, BSWA Technology is becoming the preferred supplier for acoustical measurements. With headquarter located in Beijing, BSWA currently employs over 100 staffs with branch offices in Shanghai, Guangzhou, and Chengdu. BSWA's products are distributed in over 40 countries through our sales partners.

BSWA is fully committed to the Total Quality Management ensuring that every product meets strict standards in performance. BSWA continues to invest in new machine tools, new calibration equipment, and new control methods to further microphone and related equipment technology while reducing manufacturing costs. BSWA was awarded ISO9001 Certificate from TÜV in 2009.

The ***Automotive NVH Solutions Catalog*** reflects BSWA over 10 years experience in automotive NVH testing and measurements. Rich experiences make BSWA stand out in both manufacturing acoustic products and mapping out complete professional solutions for the customers.

This catalog focuses on the NVH testing products developed and manufactured by BSWA Technology. The products include microphones, material testing systems, artificial head, calibrators and cables.

BSWA manufactures a full range of acoustic measurement products. More information and other products can be found at:

www.bswa-tech.com

MPA Series Microphones

BSWA has been engaging in manufacturing microphones for over 12 years. BSWA's microphone production facility includes over 1200 m^2 of floor space and comprises test laboratories, environmental chambers, a full anechoic chamber, and a clean room. All microphones are hand built to and individually tested to meet BSWA's high standards in quality and performance.

MPA231

MPA231 is the 1/2” prepolarized free-field microphone complied with the IEC61672 standard for Class 1. Its measurement range runs from 17 dB to 136 dB. This model is widely used in the automotive NVH testing.

MPA231

MPA401

MPA401 is the 1/4” prepolarized free-field microphone complied with the IEC61672 standard for Class 1. Its requency response runs from 20Hz to 70k Hz. MPA401 can measure the sound press level up to 155 dB. The small size of MPA401 can reduce microphone’s effect on the sound field. Stability of sentivity and high sound pressure level make the MPA401 the best choice for NVH uses.

MPA401

SPECIFICATIONS

MEASUREMENT MICROPHONES				
Model	MPA231	MPA401	MKV201	MKV401
Microphones	MP231	MP401	MK201	MK401
Polarization Voltage	0 V	0 V	200 V	200 V
Preamplifiers	MA231	MA401	MV201	MV401
TEDS functions	Optional	Optional	Optional	Optional
Standards (IEC61672)	Class 1	Class 1	Class 1	Class 1
Optimized	Free Field	Free Field	Free Field	Free Field
Diameter	1/2”	1/4”	1/2”	1/4”
Frequency Response	20 Hz ~ 20k Hz	20 Hz ~ 70k Hz	4 Hz ~ 20k Hz	4 Hz ~ 70k Hz
Sensitivity	40 mV/Pa	5m V/Pa	40 mV/Pa	5 mV/Pa
Dynamic Range(3% Distortion Limit)	136 dB	155 dB	149 dB	165 dB
Inherent Noise	<17 dBA	<35 dBA	<16 dBA	<35 dBA
Output Impedance	110 ohms			
Operating Temperature Range	-30°C ~ 80°C	-20°C ~ 80°C	-10°C ~ 50°C	-10°C ~ 50°C
Operating Humidity Range	0 ~ 95% RH	0 ~ 98% RH	0 ~ 90% RH	0 ~ 90% RH
Input Connector	BNC	SMB	7-Pin LEMO	7-Pin LEMO
Power Supply	ICCP		200V	
Cable Length	0	0	2 m	2 m

ICCP = Integrated Constant Current Power

MKV Series Microphones

MKV201

MKV201 is 1/2" 200 V polarized free-field microphone, complied with the IEC61672 standard for Type I. It is widely used in the measurement requiring high precision or for the indoor measurement.

MKV401

MKV401 is 1/4" 200 V polarized free-field microphone with Class 1 precision, Its measurement range is up to 165 dB. MKV401 is widely used in the measurement for high sound pressure levels.

MKV series microphones have standard 7-pin LEMO outputs.


MKV201


MKV401

MPA416

MPA436

Array & Surface Micorphones

MPA416 / MPA436

MPA416/MPA436 are 1/4” prepolarized free-field measurement microphones. They are ideal choicse for array applications where a large number of microphones are required.

MPS426

MPS426 is a low-cost surface microphone for aerodynamic noise measurements. It is widely used in ground vehicle and aerospace to investigate the wind induced noise. It can be easily mounted on surfaces using double sided adhesive tape.

The MPS426 has ICCP preamplifier and can be connected to any ICCP input channel. It has five meter cable with SMB connector.

The MPS426 has a high sensitivity of 50mV/Pa and a flat frequency response between 20 Hz and 20 kHz.

The TEDS version of MPA416 and MPS426 is also available. It has a built-in TEDS chip written with such information as model, serial number, sensitivity, reference frequency, and etc.

SPECIFICATIONS

ARRAY & SURFACE MICROPHONES			
Model	MPA416	MPA436	MPS426
Optimized	Free Field	Free Field	Pressure
Open-circuit Sensitivity	50 mV/Pa	12.5 mV/Pa	-26 dB ± 2 dB
Inherent Noise	< 29 dBA	< 35 dBA	29 dBA
Dynamic Range	> 127 dB	> 130dB	127 dB
Frequency Response	20 Hz ~ 20k Hz	20 Hz ~ 20k Hz	20 Hz ~ 20k Hz
Standards	IEC 61672 Class 1	IEC 61672 Class 1	IEC 61672 Class 1
Power Supply	ICCP	ICCP	ICCP
Operating Temperature	-10℃ ~ 50℃	-10℃ ~ 50℃	-10℃ ~ 50℃
Diameter	1/4"	1/4"	60 mm
Calibration level	--	--	113.8 dB with CA 111 and adaptor
Connector	SMB	SMB	SMB

Sound Intensity Probe

SI512

Sound Intensity Method can determine the amplitude and direction of a sound inside a sound field and is widely used in the noise identification inside an automobile.

BSWA SI512 is a face-to-face sound intensity probe designed according to the IEC1043-1993 standard.

FEATURES

- ICCP powered
- Remote-control functions
- 1/3-octave centre frequency ranges: 63 Hz to 5 kHz

SI512’s remote-control functions can work with Mueller BBM PAK and BSWA VA-Lab system.

SPECIFICATIONS

SOUND INTENSITY PROBE SI512	
Standard	IEC 1043 Class 2
Frequency Range (1/3 Octave)	8.5 mm Spacer: 250 Hz ~ 5000 Hz 12 mm Spacer: 160 Hz ~ 5000 Hz 50 mm Spacer: 63 Hz ~ 1250 Hz
Weight	0.4 kg
Output Connectors	7-pin Lemo in the Probe
Cable to ICCP inputs	5 m cable with Lemo to 2 BNC connectors
Case Dimensions	400 x 200 x 70 mm
SOUND INTENSITY MICROPHONE PAIRS	
Microphones	Selected Type 1 MP231 for intensity microphone pair
Preamplifier	BSWA Type MA221 preamplifier
Diameter	1/2 inch
Response	Free Field
Combined Sensitivity	40 mV/Pa
Microphone Phase Response Difference	<0.3°, 45 Hz ~ 500 Hz <1°, 500 Hz ~ 2500 Hz <2°, 2500 Hz ~ 6000 Hz
Amplitude Response Difference (Ref 250 Hz)	< 0.5 dB ; 45 Hz ~ 6000 Hz
Dimensions	IEC61094-4 Type WS 2

Artificial Heads

BHead230/248

BHead230/248 is an artificial head for acoustic measurement and recording. The BHead230/248 has simple design concept, which is “TO PUT MICROPHONES IN THE EARS”. There is no fancy electronics or digital processing in the BHead230/248, just two microphones. It accurately reproduces all acoustically relevant parts of the human outer ear, allowing aurally accurate binaural recordings of sound events.

FEATURES

- Simple design and easy calibration
- Using two ICCP microphones, the signals can be directly to the analyzers and recorders
- Excellent phase matched microphones to ensure the binaural effects of hearing
- Large dynamic range from 25 dBA to 135 dBA

SPECIFICATIONS

ARTIFICIAL HEADS		
Model	BHead230	BHead248
Microphones Type	MP251	MP251
Sensitivity	-40 dB (10mV/Pa)	-40 dB (10mV/Pa)
Frequency Range	20 Hz ~ 20 kHz	20 Hz ~ 20 kHz
Power Requred	ICCP	48V phantom
Dynamic Range	25 ~ 135 dBA	25 ~ 135 dBA
Background Noise	<25 dBA	<25 dBA
Phase Match	± 0.5 ° up to 8000 Hz	± 0.5 ° up to 8000 Hz
Sen. Match	± 0.2 dB	± 0.2 dB
Crosstalk	- 80 dB	- 80 dB
Output	BNC	XLR
Tripod Thread	UNC 3/8”	UNC 3/8”
Weight	6.0 kg	6.0 kg

Analog Technology

BHead230/248 uses the analog technology with analog outputs. The output voltage signal can be used with any recording system, data analysis instruments or data acquisition cards.

Phase-matching is requested by the two microphones inside the artificial head. BSWA uses its sound intensity micrphone selecting technology on the artificial head micrphones so that the phase difference between the two microphones is within 1.5 degrees.

BSWA MC3122 Data Acquisition Hardware can be connected with the artificial head to make signal recording and playback.

The ear on the artificial head can be removed so that the micorphones inside the artificial head can be easily calibrated.

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Reverberation Room

R–Cabin

The sound absorption of the interior is important in overall sound package design of the vehicles. The measurements of the sound absorption are based on reverberation method and impedance method. BSWA R-Cabin is a 6.4 m^3 reverberation room specially designed for sound absorption testing of automotive interior material. It can be used for testing irregular and small material for the vehicles.

FEATURES

- Appropriate for measurement of sound absorption characteristics of small and irregular samples, such as car seat, roof panel, carpet and etc.
- The size of the tested sample can be up to 3 square meters
- Frequency range: 400~10000Hz

APPLICATIONS

- Designing and optimization of the inner-car decoration acoustic system.
- Testing of the sound absorption coefficients of the inner-car items.
- Quality Control of the tested items
- R&D of new materials and new items.

R-Cabin small reverberation chamber uses steel panes in its structure. The sound absorption quantity of the empty cabin is small to ensure the accuracy of the testing of the Sound Absorption Coefficients of the samples. R-Cabin has exceptional sound insulation characters so that the outer noises have no effects on the testing.

The bottom of R-Cabin is designed to be vibration-resistant. There are four wheels fixed to the cabin for easy movement. There are two omni-directional loudspeakers on the upper and base corners in the cabin individually as the sound sources. There are four microphones to make reverberation time measurements.

Sound absorption testing for the component

BSWA R–Cabin

Testing System

BSWA R-Cabin is equipped with a complete testing system. The pink-noise generator can drive 2 loudspeakers inside the cabin simultaneously. The system measures the signals from the four microphones installed inside the cabin. The reverberation time of the four channels can be calculated automatically. The whole operation is controlled by the computer for easy uses..

BSWA will provide the golden sample with the R-Cabin testing system, whose sound absorption is measured in a 200 m^3 reverberation room according to ISO354 standard. The customers can use the golden sample to verify the results obtained from the R-Cabin.

BSWA MC3642 and VA–Lab are used with the R–Cabin for measurements and reporting.

SPECIFICATIONS

SMALL REVERBERATION CHAMBER	
Parameter to be tested	Sound Absorption Coefficients, Reverberation Time
Testing Channel #	4
Noise Generator Channel #	2
Frequency Range	400 Hz ~ 10000 Hz
Max. Sample Size(m)	2.3 x 1.7
Cabin Size(m)	2.35 (Length) x 1.5 (Width) x 1.83(Height)
Door Size(m)	0.8 x 1.3
Weight(Kg)	800

Impedance Tubes

BSWA SW series Impedance Tubes can accurately measure sound absorption coefficients and impedance according to ISO10534-2. They also support the sound transmission loss measurements based on the Transfer Function Method. The Transfer Function Method separates the incident and reflected energy from the measured transfer function, and then estimates the acoustic properties of the tested sample installed in the tube.

The SW series Impedance Tubes are specially designed not only to work with the cut samples, but also for direct use in the field. The small size and durable aluminum construction make it easy to be transported and used for estimating the properties of walls, ceilings, installed building materials, road surfaces, different ground surfaces, interiors of vehicles, and etc.

BSWA offers the complete set of Impedance Tube system, which includes: the tubes, microphones; DAQ hardware and measurement software.

BSWA 1/4” microphones MPA416, which have excellent phase matches, are ideal for impedance applications. The microphones are directly connected to optional 2-channel MC3242 or 4-channel MC3642 data acquisition hardware. PA50 power amplifier is used to drive the loud speaker in the impedance tube. The BSWA VA-Lab software provides all measurement functions for sound absorption and transmission loss testing.

SW422

SW477

SPECIFICATIONS

IMPEDANCE TUBES						
Model	SW230	SW260	SW420	SW470	SW422	SW477
Value to be Measured	Sound Absorption Coefficient (α)				Sound Absorption Coefficient (α) and Transmission Loss(TL)	
Standard	ISO10534-2, 1998				Sound Absorption Standard: ISO10534-2, 1998; Transmission Loss(TL) Standard in Discussion	
Frequency Range (Hz)	125 ~ 3150	125 ~ 6300	63~ 1800	800 ~ 6300	63 ~ 1800	800 ~ 6300
Inner Diameter of Testing Tube	60 mm	30 & 60 mm	100 mm	30 mm	100 mm	30 mm
Loud speaker	4 “ in diameter, 20 Watts, 8 Ohm					
OPTIONAL ITEMS						
1/4” Microphone	MPA416					
Data Acquisition Card	MC3022+PA50 or MC3522				MC3242 / MC3642	
Power Amplifier	PA50					
Software	VA-Lab2 Basic + VA-Lab2 IMP-A				VA-Lab4 Basic + VA-Lab4 IMP-AT	

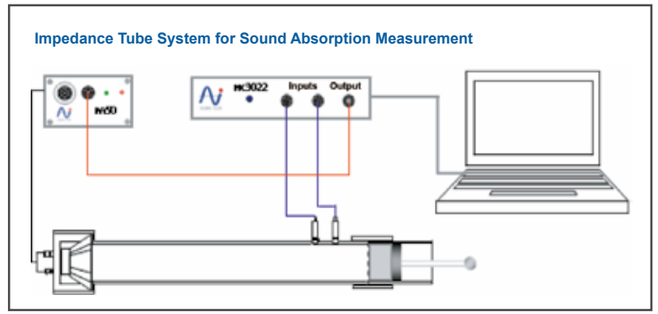
Material Testing System

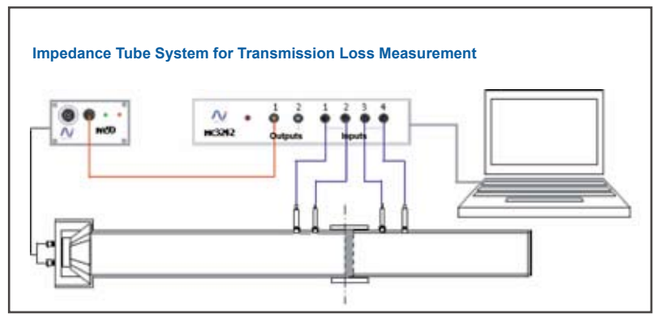
BSWA VA-Lab software has the Impedance Tube Module (VA-Lab IMP) which supports sound absorption and sound insulation measurement for BSWA SW series impedance tubes. The software works with BSWA MC3022, MC3522, MC3242 and MC3642 hardware for data acquisition and analysis.

The VA-Lab IMP supports two methods to measure the absorption coefficients of material:

- Method using Standing Wave Ratio (ISO10534-1)
- Transfer Function Method (ISO10534-2)

The VA-Lab IMP also supports four microphones method for sound transmission loss measurements





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Sound Calibrator/ Volume Source/Cables

Sound Calibrator

CA111 is small sound source for calibrating measurement microphones, sound level meters, and other sound measurement equipments. The calibrator can be used on 1/2-inch and 1/4-inch microphones with adaptor.

CA111 conforms to IEC 60942:2003 Class 1, ANSI S1.40-1984 and GB/T 15173-1994.

APPLICATIONS

- Calibration of measurement microphones, sound level meters, and other sound measurementequipments.
- Checking the linearity of equipments.

SPECIFICATIONS

SOUND CALIBRATORS	
Model	CA111
Standard	IEC60942:2003 Class 1, ANSI S1.40-1984
Sound Pressure Level	94.0 dB ±0.3 dB
Frequency	1000Hz ±0.5%
Microphone Diameter	According to IEC61094-4: 1/2" & 1/4"
Harmonic Distortion	<3% Stabilization Time: <10 s
Equivalent Free-field Level	-0.2 dB for 1/2" Microphones
Equivalent Random Incidence Level	+0.0 dB for 1/2", 1/4"
Reference Conditions	Ambient Temperature: 25°C (77°F) / Ambient Pressure: 101.3 kPa / Humidity: 55% RH / Effective Load Volume: 250 mm3
Environmental Conditions	Temperature: -10°C-50°C (14°F -122°F) Pressure: 65 kPa to 108 kPa Humidity: 10 to 90%RH (non-condensing)
Power Supply	Batteries: 1.5 V LR6 (AA battery) × 2 Lifetime: Typically 40 hours with alkaline batteries at 25°C (77°F)
Dimension	48*70*70mm
Weight	180 g, including batteries

Mid–Frequency Volume Source

VSS210 Volume Source is a mid-frequency volume source. It is ideal acoustical source for reciprocity measurements and TPA analysis. VSS210 uses a power speaker driver to deliver up to 125 dB over the frequency range from 200 to 10,000 Hz.

Two phase matched MPA416 microphones is installed at 2 cm apart in the outlet. The microphones provide the sound pressure and phase information for calculating the volume velocity radiated from the outlet.

MID-FREQUENCY VOLUME SOURCE VSS210	
Standards	NONE
Nominal Impedance	8 Ω
Power Handling	100 W continuous
Frequency Range	200 Hz ~ 10kHz
Sound Power Level	120 dB Pink Noise
Connector	Audio Connector
Loudspeaker Unit	Compassion Diver 100 W
Tube Diameter	30 mm
Tube Length	3 m
Weight	5 kg
Carrying Case Dimensions	420 x 420 x 320 mm

Cables

BSWA uses the high quality connectors for its cables. For example, BSWA uses 7-pin connectors made by LEMO in Switzerland, SMB connectors made by Radiall in France, BNC connectors made by Ampheral in Australia, UNF connectors made by Tyco in Japan and the shielded cables made by LTK. With the high quality material, BSWA assemblies the cables and tested for electrical and mechanical properties to ensure the high quality achieved. .

The length of the cable can be user-defined and can be up to 500 m. Each cable is marked with unique number, so that the measurement channel can be easily identified.

Each cable is tested of the electrical noise to ensure its quality.

CABLES				
Model	Connector 1	Connector 2	Applications	Photos
CBB	BNC	BNC	BNC cables with operating temperature at -20 ~ 80℃	
CBS	BNC	SMB	BNC to SMB cable	
CBSL	BNC	SMB90°	BNC to SMB 90° cable	
CUB	10-32UNF	BNC	Widely used for accelerometers	
CUBH	10-32UNF	BNC	Widely used for accelerometers at high temperature of 180℃	
CUU	10-32UNF	10-32UNF	Widely used for accelerometers	
CLL	Lemo Male	Lemo Female	LEMO cables, suitable for microphones