

Product Data – Acoustic Test Cabin

PRODUCT OFFER

Mecanum Acoustic Test Cabin (MATC) measures Sabine absorption coefficient and transmission loss of samples under diffuse field excitation quickly and accurately. MATC is designed to be very user friendly and allows the user to test a large number of samples in a very short period of time. With MATC, much smaller samples than in a full-size test chamber can be tested. MATC measures the following parameters in accordance with the specified standard:

	MATC absorption	MATC absorption & transmission
Diffuse field sound absorption coefficient	✓	✓
Estimated NRC	✓	✓
Estimated SAA	✓	✓
Diffuse field sound transmission loss (TL)		✓
Estimated STC		✓
Estimated Rw		✓
Inspired from ASTM C423 standard	✓	✓
Inspired from ISO 354 standard	✓	✓
Inspired from ISO 15186 standard		✓
Inspired from ISO 717 standard		✓
Inspired from ASTM E413 standard		✓

Standard Frequency Range

	Absorption	Transmission
Global frequency range (Hz)	315 to 10000	315 to 10000

Hardware Specification

Sound source

Maximum sound level in the cabin	110 dB re 20 µPa
Number of uncorrelated sources	4
Rated power input	60 W per source
Nominal impedance	8 Ohms

*The minimum sample surface that can be tested in absorption depends on the noise to signal ratio. If the tested material has a high sound absorption, smaller sample can be tested.

Cabine

Inside volume	5.95 m ³
Weight	1200 kg
Interior dimensions L x D x H	2.5 m x 1.4 m x 1.7 m
Exterior dimensions L x D x H	2.7 m x 1.7 m x 2.0 m
Door dimensions	1.3 m x 1.3 m
Sound insulation class	STC-45
Included parts	-4 Microphones -1 Antenna -4 Diffusers -1 Absorption verification sample -1 Transmission verification sample

Suggested sample dimensions

Absorption	
Suggested sample surface*	1 m ²
Sample thickness	n/a
Transmission	
Sample surface	610 mm x 610 mm
Sample thickness	Up to 100 mm

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DAQ

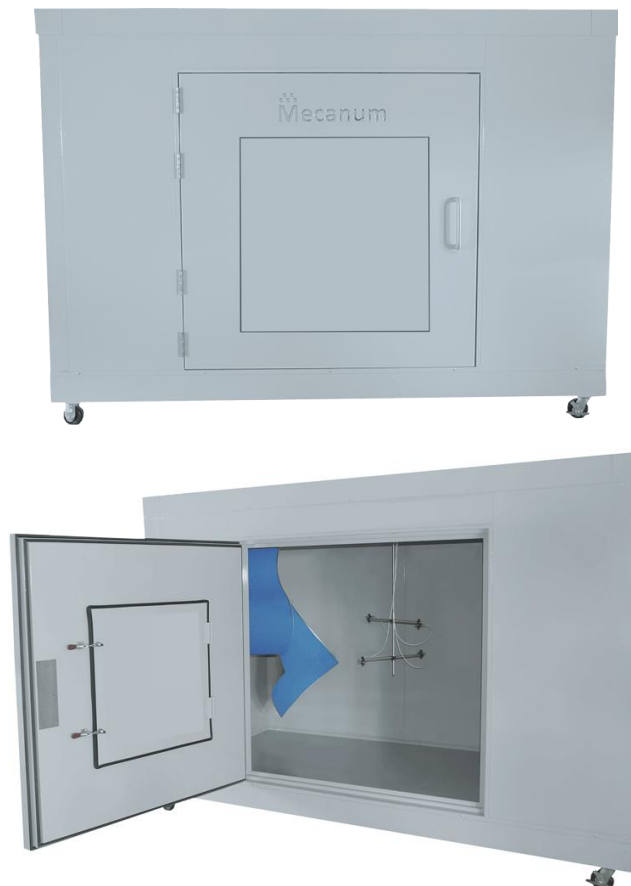
Acquisition card Brand	National Instrument
Number of input	8
Input sampling rate	51.2 kS/s/channel
Input resolution	24 bits
TEDs compatible	Yes
Input connection type	BNC
Number of output	4
Output update rate	100 kS/s
Output resolution	16 bits
Output connection type	BNC
Power amplifier type	Class D
Audio amplifier maximum power	4 x 60 W
Communication	USB 2.0 Type A
Temperature range	5 to + 40 °C
Power	100-240 VAC 50/60 Hz
Dimensions	(483 x 331 x 178) mm
Accessories (optional)	Mecanum's Weather Station ENVIRO

Microphones

Brand	PCB Piezotronic
Type	IEPE
Model	130F22
Nominal Mic. Diameter	¼"
Sensitivity	Rated as 45 mV/Pa
Inherent noise	29 dB re 20 µPa
Possibility of other brands or models on demand	

Sound intensity probe

Brand	GRAS
Type	IEPE
Model	50GI with mic. 40GK
Nominal Mic. Diameter	½"
Sensitivity	Rated as 12.5 mV/Pa
Inherent noise	27 dB(A) re 20 µPa
Possibility of other brands or models on demand	



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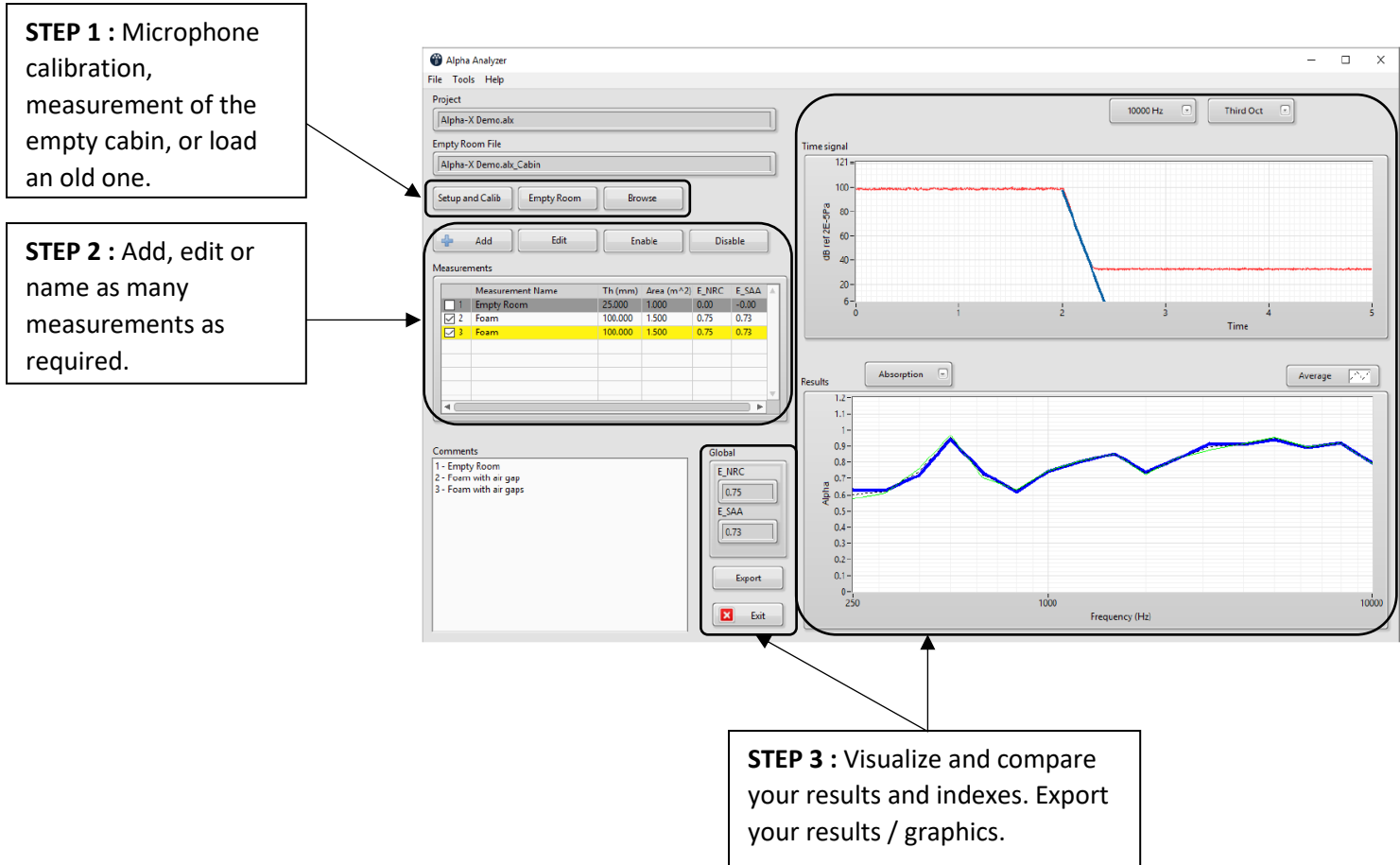
SOFTWARE DESCRIPTION: ALPHA-X

Alpha -X software fully controls the measurement procedure from the calibration to the post-processing. It follows the test procedure described in the ASTM C423 and ISO 354. Microphones calibration is facilitated by auto-detection of the sound calibrator signal. Sound pressure level, number of measurements and acquisition time are automatically adjusted according to the operator's specifications. Sabine sound absorption coefficient and decay rate are automatically computed after the measurement and displayed on the main window. All results are corrected with the atmospheric conditions measured by the Mecanum's weather station ENVIRO. Estimated NRC (E_NRC) and estimated SAA (E_SAA) are calculated following the method described in the ASTM C423 standard.

Measured Parameters

(1) Sabine sound absorption coefficient, (2) reverberation time RT20 / RT30 / RT60, (3) sound decay for the desired third octave band, (4) estimated NRC index, and (5) estimated SAA index.

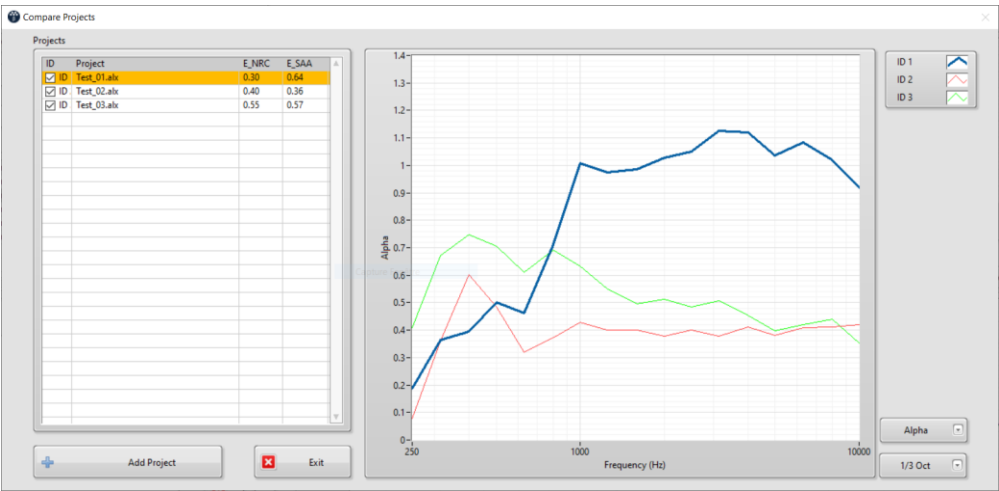
Measurement steps



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Additional features

- Compare project**
Easily load different project results (as many as desired) for comparison of Sabine sound absorption coefficients.



- Data export**
All measured data exported in *.txt file easily readable by Excel:
 - Estimated NRC and SAA for each specimen tested and their average.
 - All the measurement parameters (atmospheric conditions, dimensions of specimens tested)
 - Sabine sound absorption coefficient for each specimen tested and the average value, in octave and third octave.

Alpha-X specifications

Compatibilities	Windows 8, 8.1 and 10 32 or 64 bits
Result file type	.txt, .xlsx
Export graph files type	.bmp, .eps, .emf

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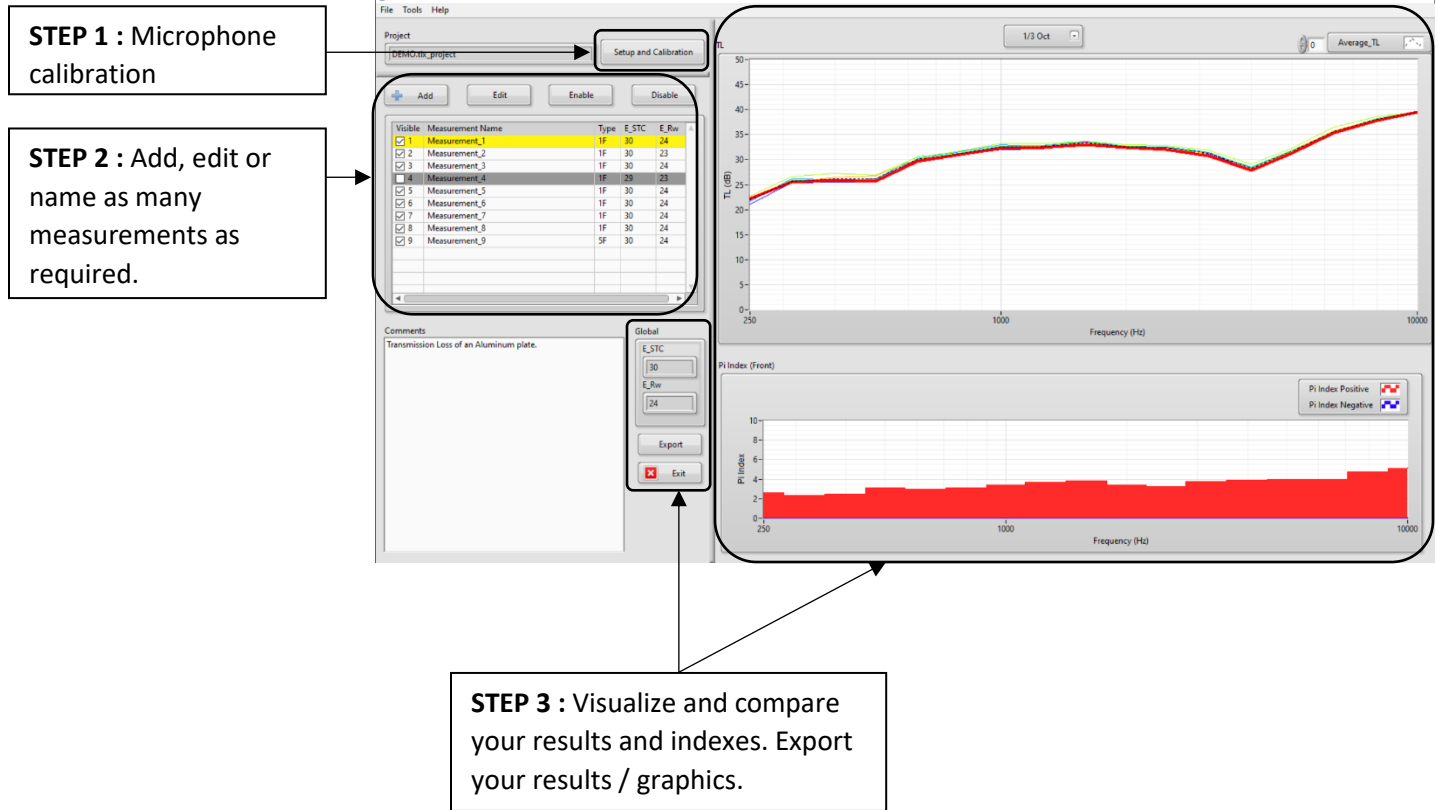
SOFTWARE DESCRIPTION: TL-X

TL-X software follows the method described in the ISO 15186 standard for the measurement of the sound transmission loss of structure by sound intensity method. The operator is guided from sensor calibration to the measurement. Like for Alpha-X, microphone calibrations is facilitated by auto-detection of the sound calibrator signal. Sound transmission loss is automatically computed after the measurement and displayed on the main window. PI-index is also displayed for the validation of the measurements. All results are corrected with the atmospheric conditions measured by the Mecanum's weather stations ENVIRO inside and outside the cabin. Estimated STC (E_STC) and estimated Rw (E_Rw) are calculated following the method described in the respective standards ASTM E413 and ISO 717-1. Possibility to measure the sound transmission loss over five faces around the element tested (5 faces mode).

Measured Parameters

(1) Sound transmission loss (2) PI-Index, (3) sound decay for the desired third octave band, (4) estimated STC index and (5) estimated Rw index.

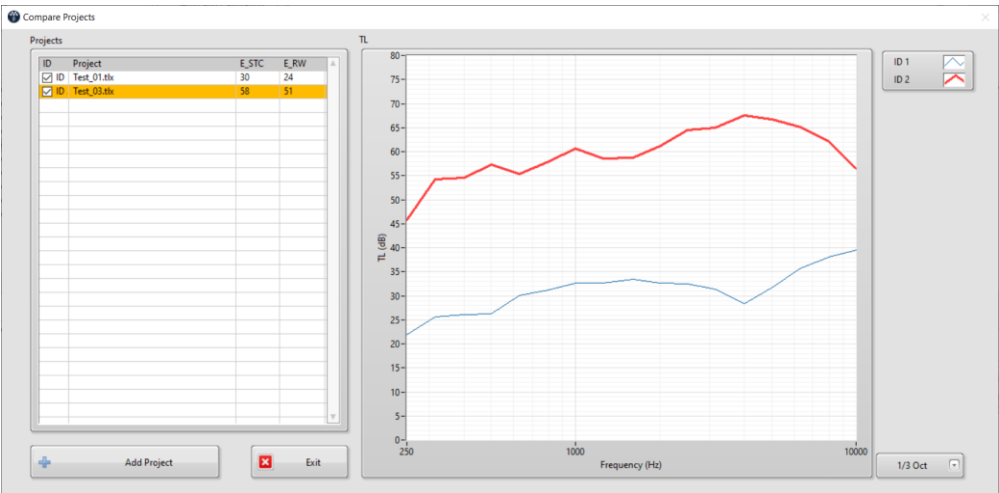
Measurement steps



Product Data – Acoustic Test Cabin

Additional features

- Compare project**
Easily load different project results (as many as desired) for comparison of sound transmission loss curves.



- Data export**
All measured data exported in *.txt file easily readable by Excel:
 - Estimated STC (E_STC) and estimated Rw (E_Rw) for each specimen tested and their average.
 - All the measurements parameters (atmospheric conditions, dimensions of specimens tested)
 - Sound transmission loss for each specimen tested and their average, in octave and third octave.

TL-X specifications

Compatibilities	Windows 8, 8.1 and 10 32 or 64 bits
Result file type	.txt, .xlsx
Export graph files type	.bmp, .eps, .emf

APPENDIX – VALIDATION CASE – SOUND TRANSMISSION LOSS

Comparison between Acoustic Test Cabin measurement (dark blue) and standard transmission loss measurement (light blue) performed in the transmission loss facility of Groupe d’Acoustique de l’Université de Sherbrooke (GAUS) or NOVA Simulation Software for a composite panel and an aluminum plate.

