

Product Data – SIGMA – Resistance meter

PRODUCT OFFER

The SIGMA resistance meter system measures the static airflow resistance, resistivity, and viscous permeability of a wide range of open cell porous materials. Every system includes: the main SIGMA unit, two sample holders (100- and 44.44-mm diameter), grids and rings to avoid peripheral leaks and support low mechanical properties material, one 44.44-mm resistive screen holder as well as a verification sample.

	SAR – Resistance meter
Static airflow resistivity (σ)	✓
Static airflow resistance (RPA)	✓
Static viscous permeability (k_0)	✓
Pressure drop	✓
ASTM C522-03 Standard	✓
ISO 9053 Standard	✓

Standard Measurement Range

	SAR – Resistance meter
Static airflow resistance (RPA)*	10 to 110 000 Pa.s/m
Static airflow resistivity (σ)*	400 to 4.6×10^6 Pa.s/m ²
Static viscous permeability (k_0)*	3.9×10^{-12} to 4.8×10^{-8} m ²

*With 100 mm diameter and 25.4 mm thick sample

Hardware Specification

Sample holder specification

Sample diameter* (mm)	44.44 & 100
Sample height (mm)	Up to 100

*custom diameter available on demand

Airflow control specification

Airflow control range (depending on sample holder size)	0.5 mm/s to 100 mm/s
Differential pressure transducer	0 to 25 Pa

Compressed air requirements

Operating pressure range	20 to 50 psig
Minimal operating flow	0.1 CFM
Airflow quality*	Clean and dry

*0.01 micron filter is required

Main SIGMA unit

Acquisition card brand	National Instrument
Air inlet connector	¼" O.D. push-to-connect connectors*
Communication	USB 2.0 Type A
Temperature range	+ 10° to + 40° C
Maximum relative humidity	100 %, non-condensing
Power	100-240 VAC 50/60 Hz 50W
Dimensions	(432 x 270 x 135) mm

*An adapter from ¼" O.D. to 6 mm O.D is provided.

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SOFTWARE DESCRIPTION

SIGMA-X software fully controls the measurement and calculates the main properties and statistics of the measured properties. By default, Airflow resistivity at 0.5 mm/s is the computed value. SIGMA system can measure other parameters at different speed values.

Measured Parameters

(1) Static airflow resistivity (σ), (2) Static airflow resistance (RPA), (3) Static viscous permeability (k_0)

Measurement steps

STEP 1 : Create a new project or open an existing one.

STEP 2 : Process verification with guided procedure.

STEP 3 : Add, edit or name as many measurements as required.

STEP 4 : Visualize and compare sample and global results. Export your graphics.

STEP 5 : Use Option button to display the desired parameter.

The screenshot displays the Sigma-X software interface. The main window includes a menu bar (File, Options, Tools, Help), a Project File field, a Verification Procedure section, a Measurements table, Global Stats, and Project/Sample Comment fields. The Measurements table lists three samples with their respective diameters, thicknesses, and values. The Global Stats section shows Mean and Std. Dev. values. The Project Comment and Sample Comment fields are also visible. The Display Options dialog box is open, showing the Display Parameter (Airflow Resistivity) and Display Velocity (At 0 mm/s, At 0.5 mm/s, Average measurement data) settings. The Sample Graph and Global Graph are also visible, showing Airflow Resistivity vs. Flow Velocity and Airflow Resistivity vs. Sample Number respectively.

ID	Name	Diameter (mm)	Thickness (mm)	Value	±
1	mel jaune 99mm	99.00	26.65	7450	148
2	mel jaune 99mm	99.00	26.65	7260	145
3	mel jaune 99mm	99.00	26.65	7320	146

Global Stats	Mean	Std. Dev.
	7343	97

Display Parameter: Airflow Resistivity (Pa.s/m²) at 0 mm/s

Project Comment:

Sample Comment: comment about sample 2

Display Options Dialog Box:

Display Parameter:

- Airflow Resistivity (ASTMC522 or ISO9053) [Selected]
- Airflow Resistance
- Airflow Permeability
- Pressure Drop

Display Velocity:

- At 0 mm/s (for perforated plate or screen)
- At 0.5 mm/s (ASTMC522 or ISO9053)
- Average measurement data

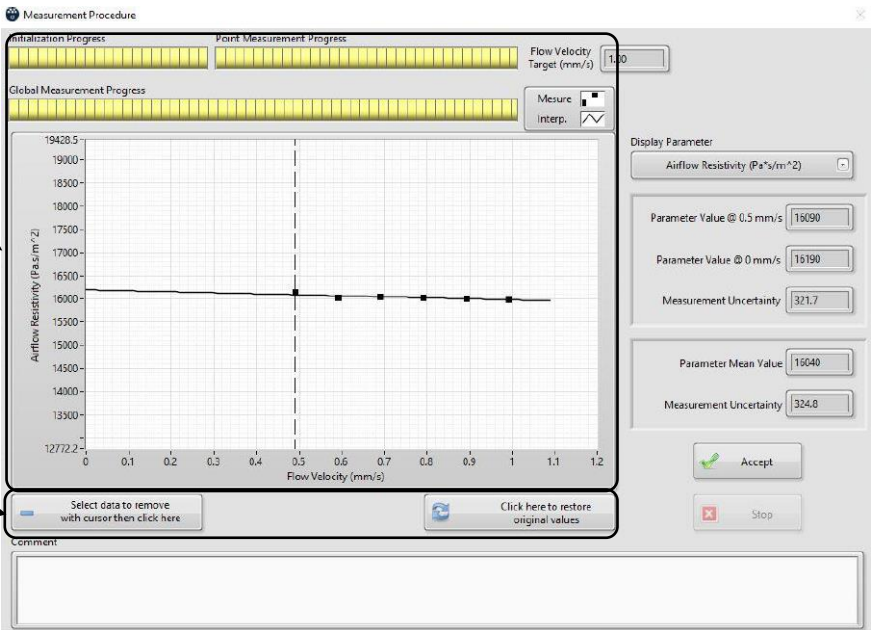
Buttons: OK, Cancel

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Measurement interface

STEP 1 : Follow real time measurement process.

STEP 2 : Remove or restore measured values.



Additional features

- Computation of penetration length of the acoustic wave in the material
- Obtain current atmospheric and flow conditions
- Automatic calculation of the global statistics
- Cleaning System Tools

SIGMA-X specifications

Compatibilities	Windows 8 and 10 32 or 64 bits
Result file type	.txt or .xlsx
Export graph file type	.txt or .xlsx

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RELATED ACCESSORIES AND OPTIONS

Circular cutter

Available diameters*	29, 44.44, 100 mm
Maximum sample thickness	75 mm
Material	Stainless steel

*custom diameter available on demand

Sample slicer

Available diameters	29, 44.44, 100 mm
Maximum sample thickness	100 mm
Also include	Acoustic material knife

Lab air compressor (including 0.01 micron filter)

Available voltage	110 or 220 Volts
Available frequency	50 or 60 Hz
Noise level	62 dB

SIGMA enclosure

Overall dimension	600 x 600 x 540 mm
Material	Steel

Custom sample holder - Mecanum can manufacture custom systems to meet your exact application requirements such as specific sample holder or specific measurement range.

Custom sample diameters (mm)	Up to 100 mm
Custom sample thickness (mm)	Up to 100 mm

Foam-X software

Based on the sound absorption coefficient measured in impedance tube (ASTM E1050, ISO 10534-2), Foam-X computes all the acoustic parameters (e.g. equivalent fluid or poroelastic Biot) you need to model a single or an equivalent acoustic material.

Nova software

Nova predicts sound absorption and transmission loss (and more) of single or multilayer materials. Simulation is based on the acoustic parameters you determined with Foam-X or direct characterisation apparatuses such as a airflow resistance meter (SIGMA), a porosity meter (PHI), a tortuosity meter (TOR), and a mechanical analyzer (QMA) or using directly the measured transfer matrix obtain using our transmission tube.



ANNEX 1 – SIGMA – RESISTANCE METER

