

Product Data – Porosity and density meter

PRODUCT OFFER

The porosity and density meter is a special pycnometer specifically designed to obtain reliable measurements of the open porosity and true bulk density of open cell porous materials. Mecanum porosity meter does not follow a specific standard but it is based on very rigorous and published scientific research. Each porosity meter includes a main unit, an analytical balance with a calibration mass, a test enclosure and a verification sample.

Porosity and Density Meter	
Open porosity (ϕ)	✓
Bulk density (ρ)	✓
Based on the Pressure/mass method [1]	✓

[1] Salissou and Panneton: Pressure/mass method to measure open porosity of porous solids, J. Appl. Phys. 101 (2007)

Standard Measurement Range

Porosity and Density Meter	
Open porosity (ϕ)*	0 % to 99.9 %
Bulk density (ρ)	0.1 kg/m ³ and above

*accuracy can vary in function of the porosity, the sample volume and the type of gas used for the test. See full scientific article for detail: Salissou and Panneton: Pressure/mass method to measure open porosity of porous solids, J. Appl. Phys. 101 (2007)

Hardware Specification

Pressured gas source (not provided)

Recommended gas type	Argon*
Recommended pressure	690 kPa (590 kPa relative)
Maximum pressure	724 kPa (624 kPa relative)
Connection type	¼" O.D. push-to-connect connectors**

*Dry & clean compressed air can also be used but reduce the equipment accuracy.

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

Sample Specifications

Inside diameter of the test chamber (Max. sample diameter)	111 mm
Inside Height of the test chamber (Max. sample thickness)	120 mm
Max. sample weight	2000 g
Shapes required	Any kind*

*Any sample shape that fits in the test chamber can be tested, however the precision on the sample dimensions greatly influences the measurement accuracy.

Analytical balance

Brand	Sartorius
Maximum capacity	4200 g
Readability	0,010 g
Calibration mass* (Class 1)	2 kg

* Provided with gloves for manipulation

Main PHI unit

Acquisition card Brand	National Instrument
Max pressure gas inlet	724 kPa (624 kPa relative)
Communication	USB 2.0 Type A
Temperature range (Celsius)	+ 15° to + 35° C
Power	100-240 Vac 50/60 Hz
Dimensions	(432 x 368 x 134) mm

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SOFTWARE DESCRIPTION

PHI-X software fully controls and guides the experimenter all along the characterization process and calculates the statistics of the measured open porosity and true bulk density. The result is based on the published pressure/mass isothermal method, where the mass of the test sample is measured at different pressures.

Measured Parameters

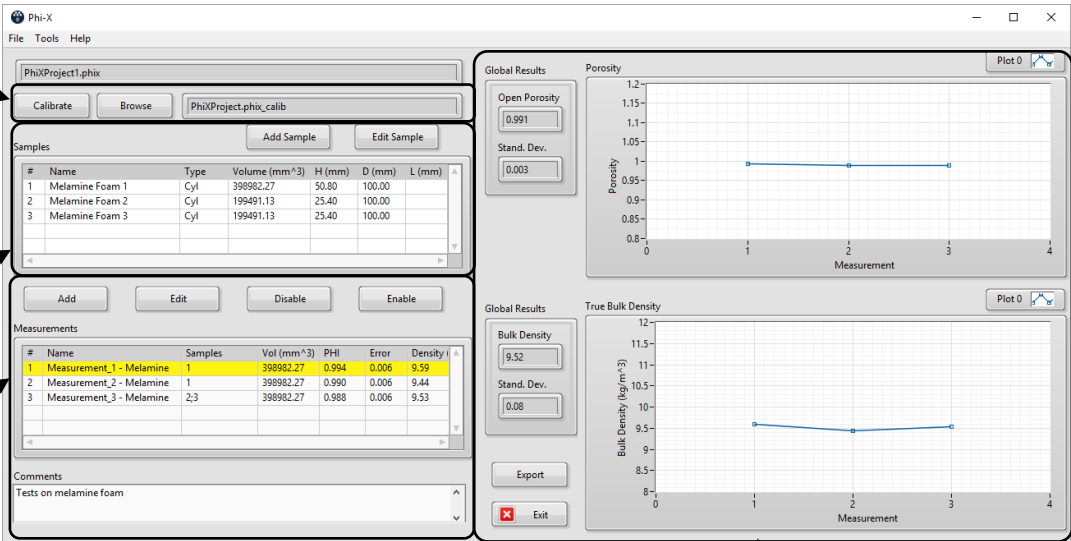
(1) Open Porosity with standard deviation and uncertainty, (2) True bulk density with standard deviation and uncertainty

Measurement steps

STEP 1 : Calibrate your Phi-X unit using “Calibrate” or retrieve previous calibration using “Browse” button.

STEP 2 : Add, edit or name as many samples as required.

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

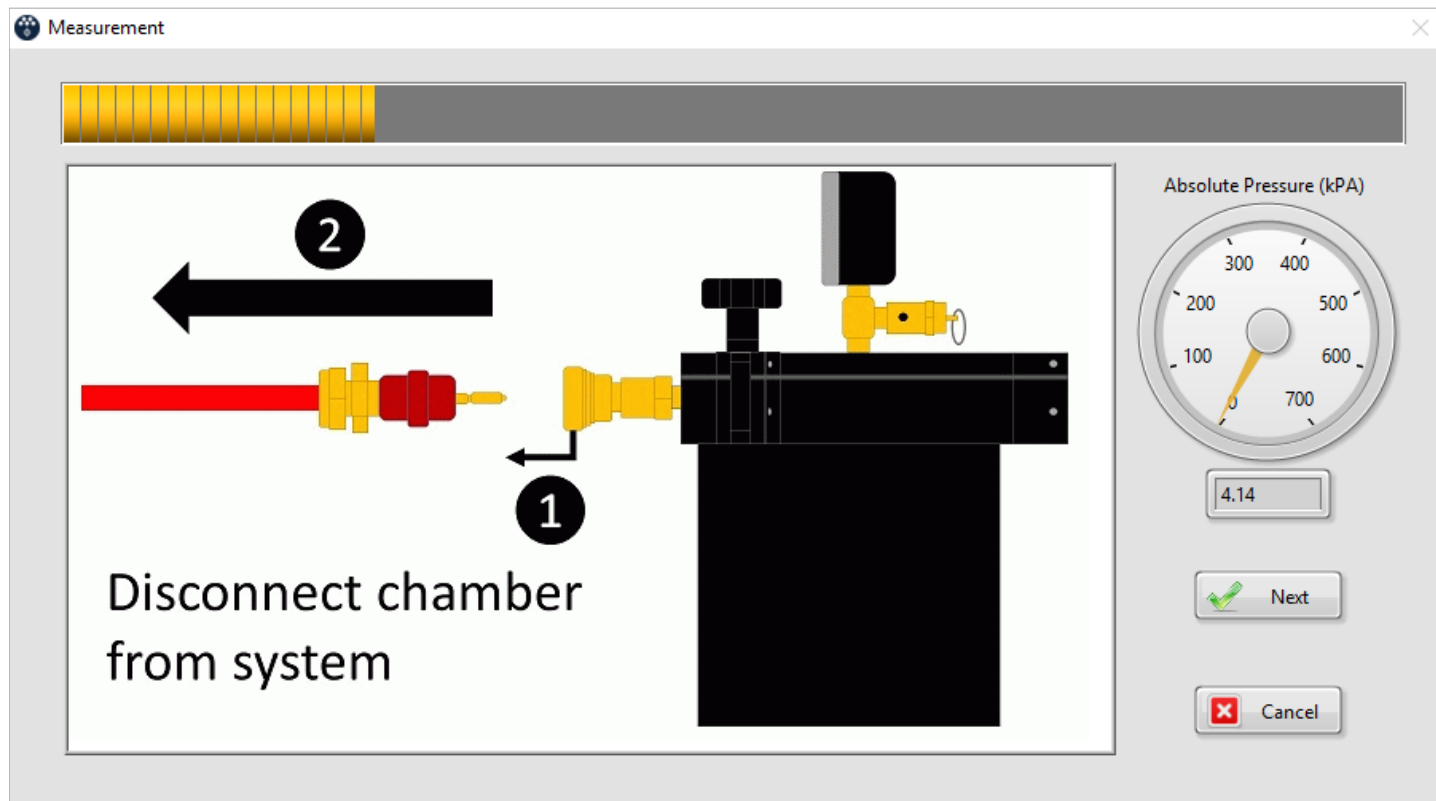


STEP 4 : Visualize and compare your results. Export your graphics or generate a report.

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Measurement interface

PHI-X is a user-friendly software with automated acquisition method. The measurement steps are properly described, and an audible signal is played for each step to help the user doing the experiment properly every time making this experiment easily repeatable.



Additional features

- Automatic calculation of the global statistics
- Adjust measurement uncertainties on lengths
- Set the language of schemes in the measurement procedure
- Choose between 2 gases for measurement

PHI-X specifications

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

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RELATED ACCESSORIES AND OPTIONS

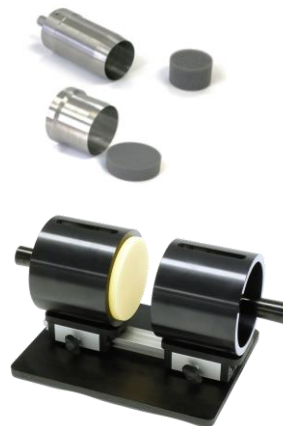
Circular cutter

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

*custom diameter available on demand

Sample slicer

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



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 – POROSITY AND DENSITY

