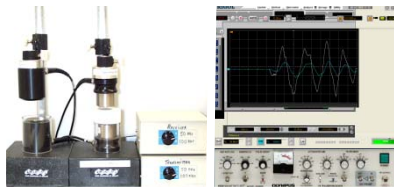


# Ultrasound Tortuosity meter

The system is specifically designed to obtain a reliable measurement of the tortuosity on a wide range of porous materials typically used in noise control.



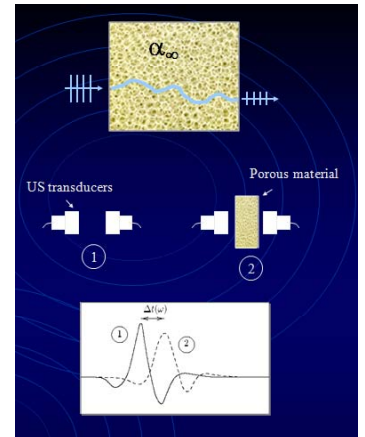
### $\alpha_{\infty}$ - tortuosity

The tortuosity, or identically the structure factor, is a geometrical measurement of the deviation of the actual path followed by an acoustical wave from a direct path.



### $\Delta_{\infty}$ - characteristic parameter

The characteristic parameter is linked to the viscous and thermal characteristic lengths. If one of the characteristic lengths is known, or their ratio, both characteristic lengths are determined from the measured characteristic parameter.



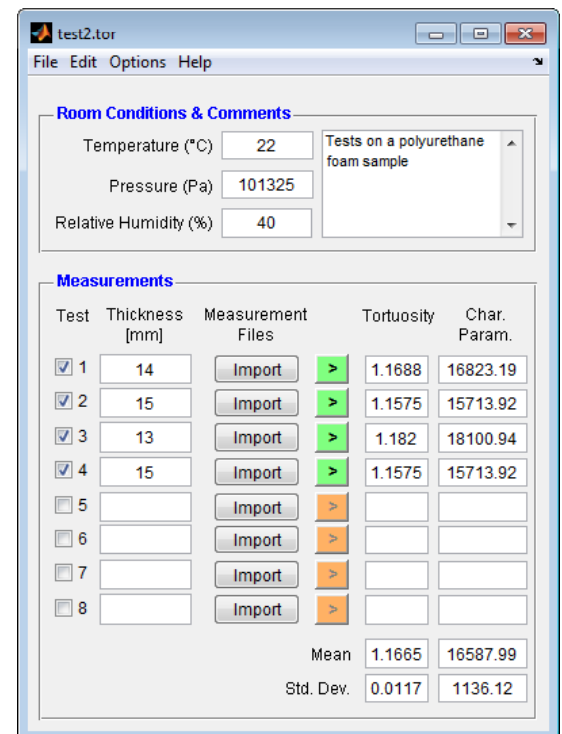
The tortuosity and characteristic parameter are measured at ultrasound frequencies by comparing the travel time of an ultrasound pulse in the material to the travel time of the pulse without the material (i.e. in the air). The delay between the two travel times is used to determine both the tortuosity and characteristic parameter of the material when viscous forces are negligible (i.e. at infinite frequency).

The system has been a proven value to the world's leading materials suppliers to both the automotive and aircraft industry. It is used for:

- quality control in the manufacturing process of materials
- research, development, and innovation
- feeding acoustical prediction software

The system includes two pairs of ultrasound transducers (50 and 100 kHz), one high voltage pulser/receiver system, one specimen holder, one acquisition system, and the Tor-X™ software.

The Tor-X™ software assists the experimenter during the measurement and calculates the statistics on the tortuosity and characteristic parameter.



Room Conditions & Comments

Temperature (°C) 22 Tests on a polyurethane foam sample  
 Pressure (Pa) 101325  
 Relative Humidity (%) 40

Measurements

Test	Thickness [mm]	Measurement Files	Tortuosity	Char. Param.
<input checked="" type="checkbox"/> 1	14	Import	1.1688	16823.19
<input checked="" type="checkbox"/> 2	15	Import	1.1575	15713.92
<input checked="" type="checkbox"/> 3	13	Import	1.182	18100.94
<input checked="" type="checkbox"/> 4	15	Import	1.1575	15713.92
<input type="checkbox"/> 5		Import		
<input type="checkbox"/> 6		Import		
<input type="checkbox"/> 7		Import		
<input type="checkbox"/> 8		Import		
Mean			1.1665	16587.99
Std. Dev.			0.0117	1136.12