microPro™

A near-surface *micro profilometer* shear stress sensor

The microPro™ shear stress sensor measures the wall shear using a near-wall traversing 1-D miniLDV. It is designed to automatically obtain the mean velocities at a number of points within the log region and possibly within the linear region of laminar or turbulent boundary layer. The velocity data are then used to obtain the best estimate for velocity gradient at the wall. Knowing the coefficient of viscosity, the wall shear stress is then calculated. MSE's microPro shear stress sensor requires no alignment or calibration by the user.

ADVANTAGES OF THE MICROPRO:

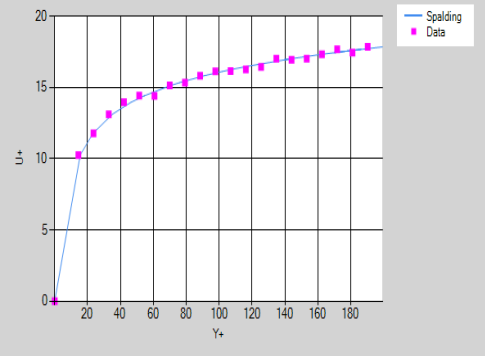
- Works as well for any transparent medium, including air and water.
- Self-contained
- No alignment needed
- Calibration done at the factory
- Battery operated option
- Waterproof and temperature resistant housing option

APPLICATIONS INCLUDE:

- Wall shear stress measurements
- Drag reduction
- Turbulence mixing
- Marine full-scale and model-scale vessel performance measurements
- Flow quality diagnostics
- Micro channels
- Wind, water, and oil tunnels and channels
- Boundary layer studies

The microPro, the size of a small flashlight, is self contained and permanently aligned; no calibration required by the user. The probe contains a miniLDV, micro translation stage, and receiving optics. ***MSE will provide custom attachment hardware designed for your flow facility****. Below is an example of an attachment for circular pipes.*

The processing software automatically finds to location of the window, collects near wall boundary layer mean velocity profile, curve fit the data with Spalding, Musker or a profile of your choice to calculate the wall shear, as shown below.



MEASUREMENT SPECIFICATIONS	
Shear stress range	0.7 to 6500 Pa (water) 0.015 to 140 Pa (air) Other ranges please specify
Repeatability	97%
Accuracy	97% typical

PROBE VOLUME	
PV dimensions (*x* by *y* by *z*)	15 x 30 x 80 μm
Standoff distances (air / water)	Up to 15 mm

PROBE SPECIFICATIONS	
Probe weight	500g
Dimensions	40 x 60 x 150 mm

LASER SPECIFICATIONS	
Laser power	110 mW
Wavelength	658 nm
Laser type	Class IIIb

OPERATING PARAMETERS	
Temperature	0 to 55°C
Pressure	Up to 3 bar
PC requirements	Laptop or PC

OPTIONAL FEATURES
High pressure sensor (please specify maximum pressure)
Submerged probe

POWER SUPPLY
12 VDC Universal

U.S. Patent No. 6,654,102

MEASUREMENT SCIENCE ENTERPRISE, INC

123 W. Bellevue Dr., Suite 1
Pasadena, CA 91105
USA

Info@MeasurementSci.com
Phone: +1 (626) 577 0566
Fax: +1 (626) 577 0565