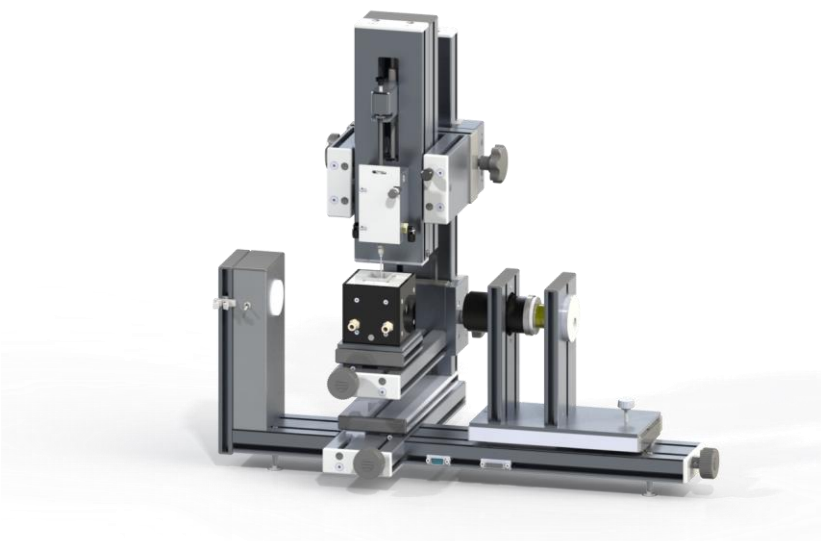
TRACKER™
Pressure sensor



TRACKER™ PRESSURE SENSOR

The Laplace pressure is the pressure difference between the inside (P_{inside}) and the outside ($P_{outside}$) of a curved surface that forms the boundary between a gas region and a liquid region. The pressure difference is caused by the surface tension of the interface between liquid and gas.

The Laplace pressure (ΔP) is determined from the Yong-Laplace given as

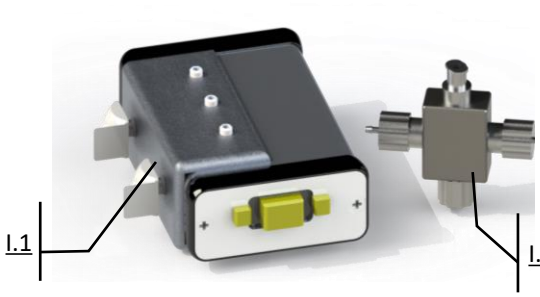
$$\Delta P = P_{inside} - Pou_{tside} = (\frac{1}{R_1} + \frac{1}{R_2})$$

where R_1 and R_2 are the principaly radii of curvature and γ is the surface tension.

TRACKER™ Pressure sensor

Tracker™ Pressure sensor can measure Laplace pressure inside the bubble. The bubble pressure of gas-liquid systems is measured in real time and saved by Tracker™ software while surface tension is measured.

The option is composed of the sensor itself and a luer lock crossed manifold that is connected to the syringe that makes the bubble.



Pressure sensor	I.1	Pressure sensor
	I.2	Luer lock crossed manifold

The pressure measurement is set up in the Tracker™ software and parameters can be displayed :

- P_{inside} (in Pa) is the pressure inside the bubble
- Apex Tension (mN/m) is the surface tension calculated by the pressure measurement.

Tracker™ software measures the pressure inside the bubble with the pressure sensor and the surface tension and the height of the bubble by image analysis. With those three data the software can determine the hydrostatic pressure inside the bubble.

The outcomes displayed are (Fig1):

- one surface tension (mN/m) calculated by image analysis of the shape of the bubble.
- one Apex tension (mN/m) given by measurement of pressure (P_{inside}) and height of the bubble

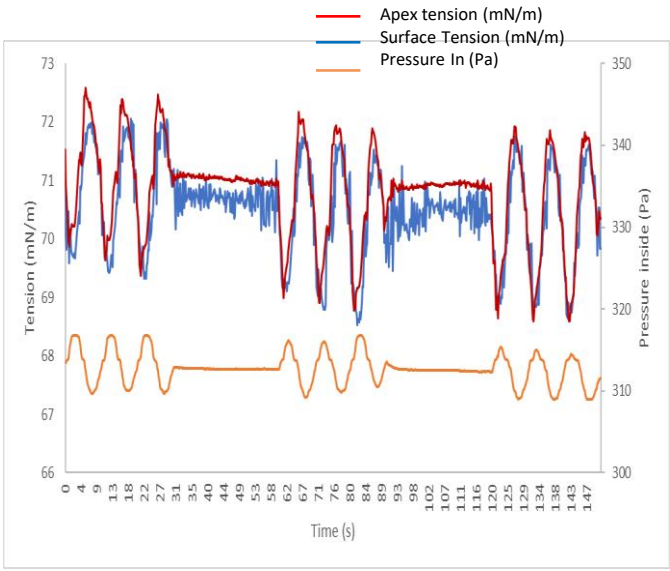


Fig1: Example of measurement with pressure sensor

When the two surface tension measurements are the same, it means that the interface is Laplacian.

When the shape of the bubble becomes not Laplacian, the two measurements should be different. It indicates the presence of structured membrane on the surface.

Therefore, the pressure sensor is a good tool to characterize that a membrane has formed at the surface and that the interface is no more “liquid”.

Combined with the piezoelectric cell, the Pressure sensor is also used to measure surface tension at High frequency oscillations.

Technical specifications	
Compatibility	TRKS, TRKH, TRKCMC
System	For Liquid/gas systems only

REFERENCES	
Interfacial Rheology with Pressure sensor	Sandrine le Tirilly; Corentin Tregouet; Mathilde Reyssat; Stephane Bone; Cedric Geffroy; Gerald G. Fuller; Nadege Pantoustier; Patrick Perrin; and Cecile Monteux, Interfacial rheology of hydrogen-bonded polymer multilayers assembled at liquid interfaces. Influence of anchoring energy and hydrophobic interactions. Langmuir **2016, 32, 24, 6089–6096**
	Armando Maestro; Emmanuelle Rio; Wiebke Drenckhan; Dominique Langevin;and Anniina Salonen, Foams stabilised by mixtures of nanoparticles and oppositely charged surfactants: relationship between bubble shrinkage and foam coarsening. Soft Matter, **2014, 10, 6975**