

MultiTool[®] - a pH-sensor system suitable for HPHT oil & gas applications

From studies carried out over several years, we have recorded shortcomings in the data collection from well testing both in the exploration and the production phases. It is often only when fields have come to the production phase that the problems are seen. With this tool, pH can continuously be monitored in oil/water process lines. The pH has a central role in the evaluation of scale and corrosion.

The MultiTool measurement probe system contains instruments for the measurement of pH. A platinum temperature element is integrated in the sensor-system for measurement of well temperature. pH is temperature dependent and accurate temperature measurement is therefore very important.

Future development will also provide measurements of Cl⁻, H₂S and other ions by use of the same technology.

Features:

The MultiTool measurement concept can also be used downhole for logging in exploration or production wells or for permanent installation in future smart wells, subsea on templates or topside in process systems.

One of the main advantages of this measurement technique, is the possibility of doing measurements directly in multiphase flow of oil and water. Reliable pH measurements in water/oil mixtures with down to 1-2% water have been accomplished.

Benefits:

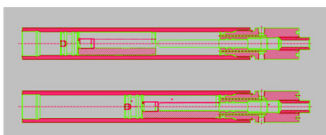
The value to users (oil companies) lies in the areas of:

- Better well control and supervision
- Better control of problems with deposit formation and corrosion
- Optimisation of chemical well treatment
- Increased well production time
- Reduction in the need for well "Work Over"
- Economical savings due to less need for onshore analysis

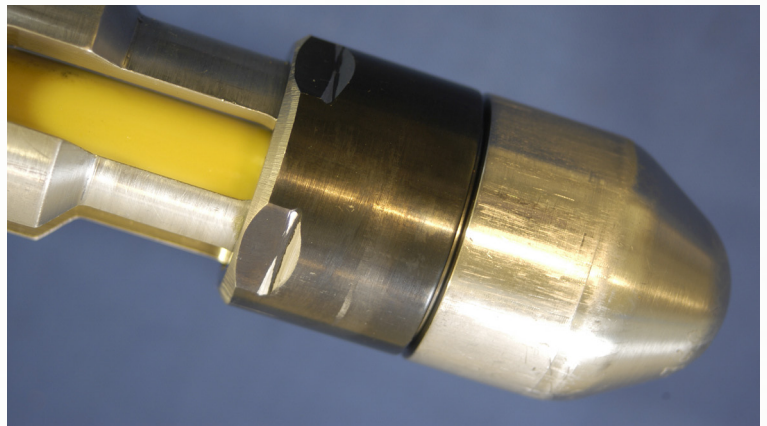
High Pressure Laboratory pH-measurements



- pH range: 3-11
- Pressure (max): 0-650 barg
- Temperature (max): 150 °C
- Sample volume: 350 ccm
- Sample re-usable



Laboratory setup



Technical Specifications:

Maximum working pressure	1.000 barg
Working temperature	0 – 180°C
Measurement range	3-11 pH
Usable range	1-12 pH
Accuracy	± 0.05 pH
Resolution	0.01 pH
Water-cut required	>1-2 %
Temperature range (built-in sensor)	0-180°C

Applications:

By use of the MultiTool pH-sensor in combination with computer simulations, it is possible to establish a better understanding of deposits, scale, corrosion, rheology, asphaltenes, well chemistry, wax and composition.

The measurement probe is capable of being used in all wells, downhole, subsea or topside. The demands on the probe and its properties are determined by several conditions, such as corrosion, potential for formation of calcium deposits, emulsion formation, asphaltene deposition and how many of these critical parameters can be controlled.

This measurements probe can be used either:

- Downhole
- Subsea
- Topside
- Laboratory