Wax Appearance Temperature

Interface FLUIDICS

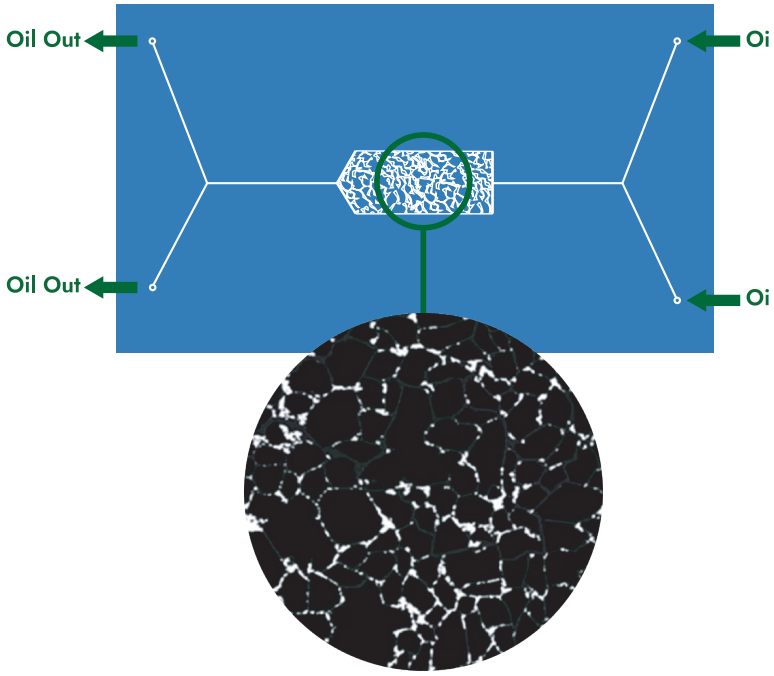
Interface Fluidics is a technology company providing energy industry clients insights into the interactions and properties of reservoir fluids to help them improve their financial performance and ensure the responsible development of their oil and gas assets.

Overview

The SaphireLab Platform uses Microfluidic chips that are used to visualize and quantify wax appearance conditions and coverage. The platform can operate at up to 1000bar/15000psi and 200C°/400F°.

Technology

- Interface's WAT method is built on our in-house microfluidic technology.
- When looked under cross-polar light, wax crystals appear brighter than the background.
- Coupled with cross-polar microscopy, this microfluidic method allows WAT measurements at high pressure.



Advantages

- High Sensitivity
- Live oil compatible
- Sample Quantity: < 0.1ml per datapoint

Wax and asphaltene management.

Predict, prevent, and remidate wax damage.

More data, more quickly to make a faster decision.

Find the right chemistry for your application.

InterfaceFluidics.com | Info@InterfaceFluidics.com | 403.816.4315

Methodology

1. The microfluidic analogue is mounted in a custom manifold connected to the fluid handling system.
2. The manifold temperature is raised to the starting temperature and the analogue is vacuumed to remove air from the system.
3. Several pore volumes of pre-heated oil are injected into the analogue, which is at a controlled pressure.
4. The temperature of the analogue is dropped as desired, at a cooling rate of 1°C/min. Once the temperature approaches WAT, the cooling rate is lowered to 0.2°C/min.
5. The test ends when the wax crystals start to appear prominently on the analogue.

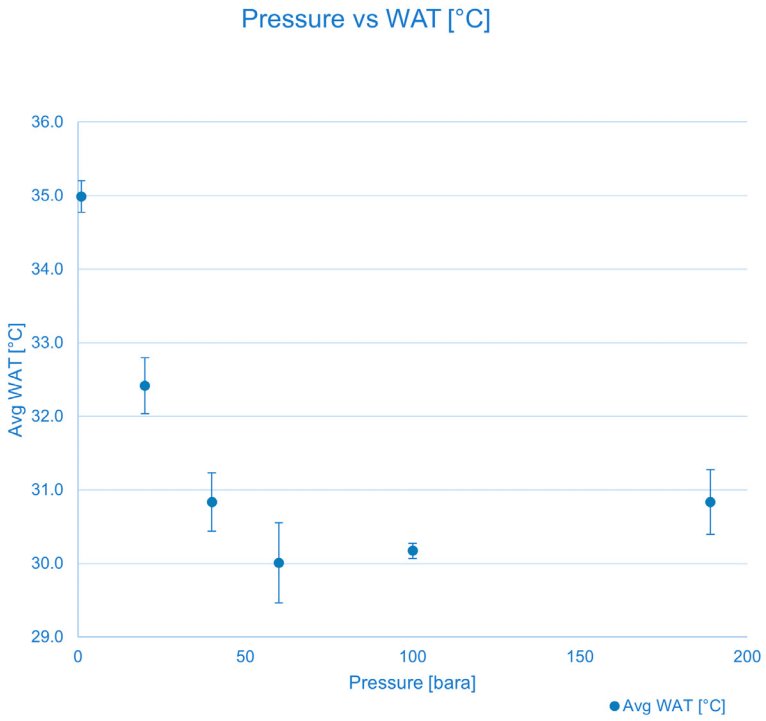


Figure 1: WAT changes as gas is liberated

Deliverables

- Wax appearance temperature.
- Time-lapsed, high-resolution cross-polar microscopy images of wax crystal growth in-situ.
- Wax Inhibitor performance.

Results

One live oil was tested to verify the accuracy of WAT determination using the microfluidic method. The microfluidic WAT data obtained in this work is in good agreement with the benchmark data, within deviation of 5.4%.

Pressure [bara]	WAT [°C] (microfluidics)			Std Dev	Avg WAT [°C] (microfluidics)	WAT [°C] (benchmark)	Deviation from benchmark (%)*
	Run#1	Run#2	Run#3				
189	31.0	31.3	30.2	0.4	30.8	NA	NA
100	30.3	30.1	30.1	0.1	30.2	NA	NA
60	30.8	29.7	29.5	0.5	30.0	NA	NA
40	31.3	30.8	30.4	0.4	30.8	NA	NA
20	32.8	32.6	31.9	0.4	32.4	NA	NA
1	35.2	34.7	35.0	0.2	35.0	37.0	5.4

$$* Deviation = \frac{|WAT_{benchmark} - WAT_{microfluidics}|}{WAT_{benchmark}} \times 100$$

Table 1: Results from WAT validation.