Deposition of organic compounds, which exist in petroleum crude and heavy oil, can cause a number of severe problems. The Flow Loop by F5 Technologie is the tool to solve these problems. The instrument offers a variety of test routines dealing with paraffin deposition and flow assurance:

- Pipeline simulation / restart / yield strength
- Wax deposition and wax inhibitor testing
- Wax appearance temperature (WAT)
- Flow improver testing and rheological tests

The test pipelines are exchangeable for highest flexibility in simulating real pipelines regarding temperature profile, pressure and shear rate. They have a defined inner roughness, which is highly important to assure reproducible test results.

The new, zero-slip pump system provides full flow rate across the complete viscosity and counter pressure range. Extremely low flow rates are possible for pipeline restart / yield strength tests.

All data is stored and exported in an Excel readable format. Test programs are stored and can be reloaded at any time.

**Applications:**

- Wax inhibitor effectivity testing
- Pipeline simulation
- Yield stress and pipeline restart
- Wax appearance temperature (WAT)

**Options/Accessories:**

- Full automation with automated cleaning procedure
- Test pipelines with several pressure sensors for pressure profiles / creep test
- High pressure and live crude oil injection
Technical Data:

**Differential pressure range** 5, 10 or 20 bar (72.5, 145 or 290 psi)
accuracy: 0.5, 1 or 2 mbar (7.25, 14.5 or 29 mpsi)

**Absolute pressure range** 60 bar (870 psi), 100 bar (1,450 psi), more on request
HP version with **live crude oil** inlet: 200 bar (3,000 psi)

**Temperature range** of sample: ambient to +80 °C
of test loop: -30 °C to +90 °C (depending on cooling/heating devices)

**Display** PC for data curve visualisation and touch screen on wax flow loop for
most relevant data (current values)

<table>
<thead>
<tr>
<th>Pump System</th>
<th>Standard</th>
<th><strong>NEW:</strong> Zero-Slip Pump System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td>2 .. 90 ml/min</td>
<td>0.02 .. 100 ml/min</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>100 bar max</td>
<td>100 bar max</td>
</tr>
<tr>
<td>System pressure</td>
<td>200 bar max</td>
<td>200 bar max</td>
</tr>
<tr>
<td>Pipeline restart</td>
<td>API Gravity &lt; 20</td>
<td>all API Gravities</td>
</tr>
<tr>
<td></td>
<td>1 .. 2000 mPas</td>
<td></td>
</tr>
</tbody>
</table>

*Wax Deposition Test*

Deposit builds up, pressure raises until
deposit is sheared off.

**Oil sample 1:**
- WAT 38°C
- PP < -18°C
- viscosity 2 mPas @ 60 °C

**Oil sample 2:**
- WAT 39°C
- PP < -18°C
- viscosity 5 mPas @ 60 °C

**Test Setup:**
- sample temperature: 60 °C
- cooling (bath) temperature: 15°C
- flow rate: 20 ml/min
- test pipeline: length 40 ft, inner diameter 2.8 mm

*Pump for high and low-viscous oils.*
Heated pump head, pulsation free flow, no slip.

*Bright touch-screen display*

*High pressure sample cells*