

Wax Flow Loop with Pipeline Restart Test Capability & Bypass for Rheological Tests (Dead Crude)

Deposition of complex and heavy organic compounds in crude and heavy oil can cause a number of severe problems up to pipeline blocking. This apparatus provides the ability to develop and test inhibiting chemicals.

The apparatus offers a variety of testing procedures:

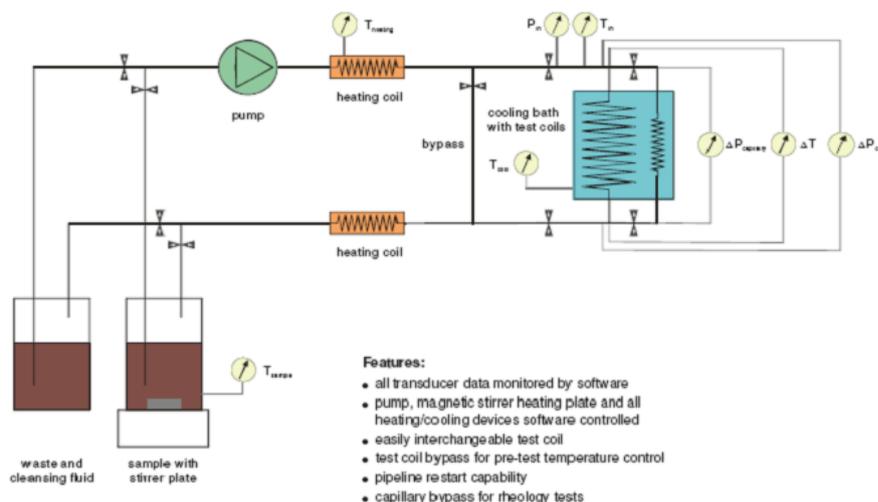
- Pipeline blocking simulation with exchangeable test pipelines
- Yield strength (yield point) tests
- Flow improver / deposition inhibitor testing

Overview

The Wax Flow Loop consists of a sample container which is placed on a magnetic stirrer plate for pre-heating. The sample is pumped out of this container by an HPLC pump into an electrically heated coil which provides a constant inlet temperature to the test coil. The test coil is cooled in a water bath which is placed at the side of the apparatus for easy access. For wax precipitation and deposition tests a 1/8" test coil of 2m length is normally used whereas for pipeline restart a 8mm test coil of 20 to 30m length is recommended but the coils are interchangeable. After leaving the test coil, the sample enters a second heating coil and flows back into the sample container or to waste. This provides the ability to circulate the sample and to loop cleaning fluid after a test. There are valves located at the loops inlet and outlet to change between circulating and non-circulating modes. Additional valves allow for the test coil to be isolated and changed out. There is a bypass to the test coil for use during pre-heating of the sample before the test starts, using the bypass avoids pre-precipitation of wax during the time the test coil is cooled down to set temperature.

Parallel to the test coil a small capillary is installed as a bypass for use in rheological tests of the sample. All pressures and temperatures, including differential are monitored.

The apparatus is controlled by PC based software for the pump, stirrer and heating / cooling equipment and operation of the test. Valves are manually operated.



UK Office

PMAC House
Greenhole Park
Greenhole Place
Bridge of Don
Aberdeen UK
AB23 8EU

Phone: +44 (0)1224 703032
Fax: +44 (0)1224 821660
E-mail: sales@pmacsystems.com

Singapore Office

#01-01, 19 Layang Way
Changi Logistics Centre
Singapore
508724

Phone: +65 6214 9029
E-mail:
asia.pacific@pmacsystems.com

PMAC Systems

Flow Assurance
Specialists

Products and
Services for
Corrosion &
Erosion Integrity
and Monitoring

The software has the following basic modes:

Rheology Mode—The sample is pumped through the capillary. This can be done at increasing/decreasing flow rates or temperature ramps. Another feature is the constant flow/constant capillary differential pressure test. The capillary differential pressure is monitored while the flow rate is kept constant or the flow rate is controlled to keep the capillary differential pressure constant.

Wax Flow Loop Mode—The sample is circulated in the system and is pre-heated to a set temperature while the cooling bath is cooling to its set temperature with the bypass opened. The differential pressure and differential temperature are monitored and the test ends after:

- A) a set differential temperature is reached
- B) A set differential pressure is reached (constant flow rate mode) or a set flow rate limit is under-run (constant coil differential pressure mode)
- C) A set time period is up

Pipeline Restart Mode—The cooling bath is cooling to its set temperature. The sample is heated above WAT and is circulating in the system or a short period of time with the bypass opened. The bypass is closed and the pump stopped, after a set time period the pump restarts and the differential pressure measured. If the differential pressure is still below a set value, the pump stops again and the process is repeated until the differential pressure exceeds the set limit, The pump restarts with very low but increasing volume flow. The pressures are monitored and indicate the restart. The constant flow rate/constant differential pressure feature can also be used in this mode.

Combined Mode

Free mode—The operator sets the valves, volume flow and temperatures arbitrarily. Only safety limits (pressure, temperature) are controlled by the software.

Cleaning Mode

The especially designed high-accurate pump system provides an absolutely pulsation-free flow, with maximum pressure starting at zero flow rate, so realistic shear and flow regimes inside the test coil are possible..

The exchangeable test coils are available in a variety of diameters and lengths for your requirements.

The system can be supplied with fully automated and electrically actuated valves and a third vessel for cleansing fluid and thus automation of the cleansing cycle on completion of a test.

Options are available for Flow Rate, Temperature ranges, Pressure Range and Stirrer. Please contact us with your requirements.

Temperature Range (Sample)	Ambient to 80°C
Temperature Range (test Loop)	30 °C to +90 °C
Flow Rate	0.01 to 80 ml/min
Absolute pressure range	725psi
Variable speed stirrer	100 to 1000 rpm

UK Office

PMAC House
Greenhole Park
Greenhole Place
Bridge of Don
Aberdeen UK
AB23 8EU

Phone: +44 (0)1224 703032

Fax: +44 (0)1224 821660

E-mail: sales@pmacsystems.com

Singapore Office

#01-01, 19 Layang Way
Changi Logistics Centre
Singapore
508724

Phone: +65 6214 9029

E-mail:

asia.pacific@pmacsystems.com

