PMAC Coaxial Shearing Deposition Apparatus

The PMAC Systems Coaxial Shearing Wax Deposition Apparatus was developed in conjunction with Alan Smith, to perform the Coaxial Cold Finger Test. The unit provides a method for quantifying the predicted amount of wax that will be deposited on the internal wall of a pipe at a predetermined temperature and flow regime. Wax is the amalgam of normal paraffin's, resins, gums and liquid oil, which deposits on the cold surface.

The wax can be collected and the nature of the crystal structure observed and compositional analysis undertaken. The data generated can be used to predict the amounts of wax that will be recovered from the pipeline during pigging operations and the frequency required to maintain a clearway.

Coaxial Wax Deposition Apparatus.
The procedure is used to evaluate the efficiency of wax dispersant chemicals. Comparative tests can be performed with or without the presence of inhibitors. Shear conditions are simulated and the deposition rate is related to specific pipeline conditions.

Equipment Description.
The **Coaxial Shearing Wax Deposition Apparatus** is a laboratory test unit comprising a Control Unit, Coaxial Cell, Heater Unit and a Cooling Unit. The cooler is a Glycol bath providing cooling medium for the Cold Finger test with sufficient heat transfer to maintain an adequately low temperature.

The Coaxial Shearing Cell consists of a stainless steel cylinder cooled from the inside by pumping cold liquid from the glycol bath. An outer heating jacket on the oil container maintains the bulk oil temperature. The shear is applied to the surface of the Cold Finger by rotating the outer cylinder at a controlled rate to simulate a rate of shear effected by flowing liquid in the pipeline.
The Wax Deposition Profile is determined for the crude oil where the bulk oil temperature is controlled at a temperature representative of the oil in the pipeline, and the inner core of the coaxial cell is controlled at a temperature which, is representative of the minimum wall temperature of the pipeline measured at a specific reference point.

Elevated Pressure Coaxial Cell.
A high pressure, high temperature (HP/HT) Coaxial Cell was developed to provide a Wax Deposition Profile at above atmospheric pressure. The current specification is 1000 psig but other specifications may be available.

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