Achieve Accurate Viscosity Measurements with Small Sample Size for Deepwater Drilling

RESULTS

- Provides accurate viscosity measurement up to 30,000 psi with the VISCOlab PVT special option
- Minimal sample size needed – 6ml

APPLICATION

Accurate Viscosity Measurements for Deepwater Drilling at Extremely High Pressures

CHALLENGE

When tapping a new offshore well, companies initially need to know the quality of the well, such as how much oil, water, gas, brine, etc. exists within it. High quality viscosity data is critical for key reservoir characteristics such as hydrocarbon volume, production/ injection rates, and recovery potential. This information allows operations to know what it will take to get the crude out of the well, e.g., determining pump and pipe sizes and get it into transport vessels or onto land based operations. They also are able to determine the quality of the oil find (percent of oil, brine, water etc.) and what they can sell once it is pumped out and refined.

Typical offshore rigs drill to 10,000 – 15,000 foot depths. However, with increased demand, offshore operations are drilling at deeper and deeper depths, which then increase the pressure the well is under. For instance, in the Gulf of Mexico off the US and Mexico coasts, new wells are being dug at 25,000 – 35,000 foot depths which have pressures in the range of 25,000 – 30,000 psi. Now offshore companies are faced with the challenge of extracting crude oil at extreme depths and very high pressures. Since it is very expensive to capture sample fluids from these wells, only small volumes of oil are extracted for evaluation. Samples often include corrosive fluids and are under high pressures which affect fluid and gas behavior. Since many tests need to be performed on the samples captured, the smallest volume necessary to measure the viscosity is very important since once a sample is tested that sample volume cannot be used for other testing. Therefore, offshore operations need to be able to accurately measure the viscosity of the oil at high pressure with a very small amount of sample.

SOLUTION

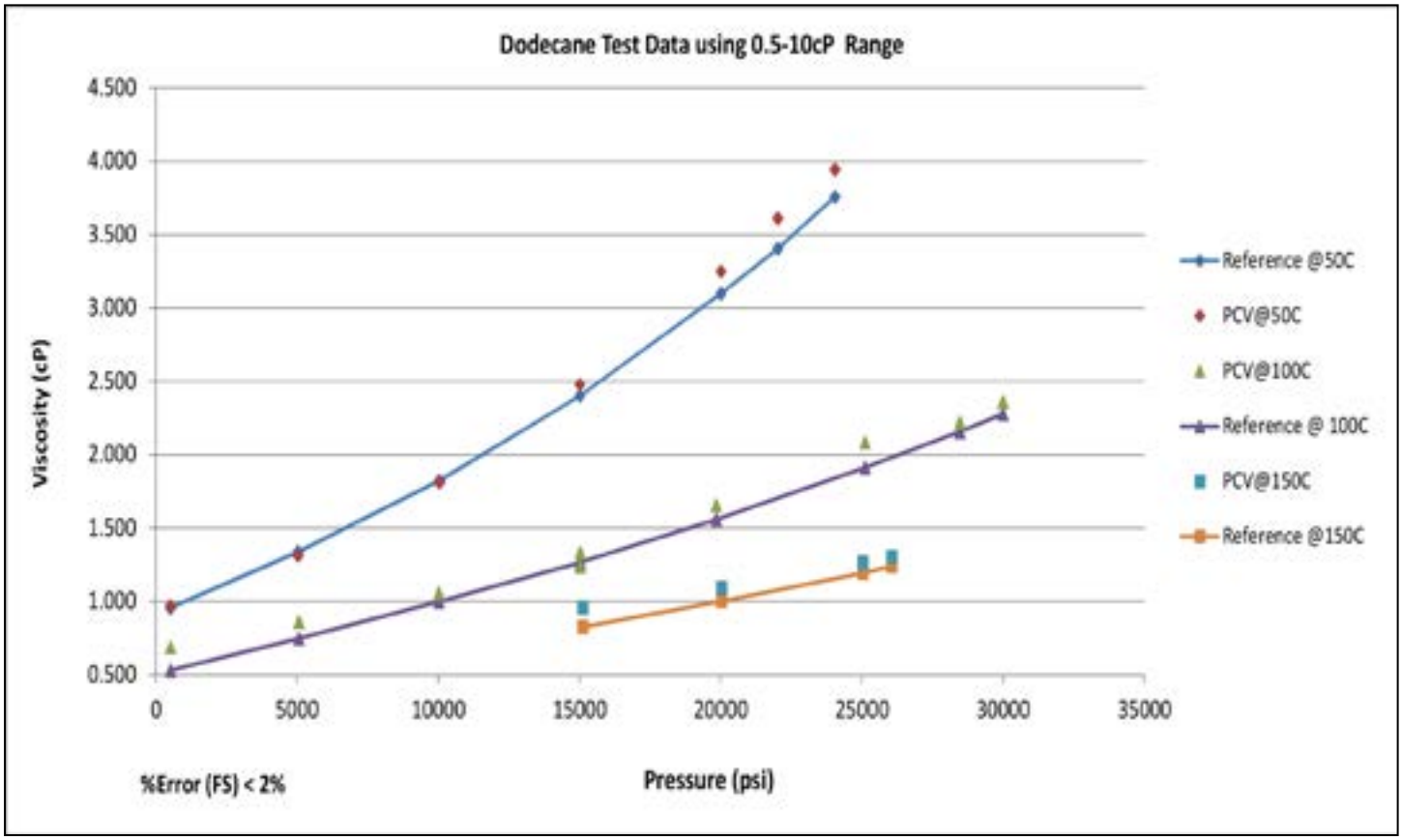
The VISCOlab PVT has an embedded SPL443 sensor to provide accurate viscosity measurements for gas and crude oil at high pressures, up to 30,000 psi as a special option. It also provides statistical certainty that ensures sample conditions are stable, accurate, and repeatable through standard deviation calculation and temperature change monitoring. In addition to high accuracy and small sample usage, the VISCOlab PVT is extremely easy to use since sample handling occurs direct from the pressure vessel or via pressure generator making it much simpler than the labor-intensive processes

PAC Corporate Headquarters
8824 Fallbrook Drive
Houston, TX 77064
United States
Telephone: 281.940.1803
pacsales@paclp.com

PAC

required by other high-pressure viscometers. With the addition of higher rated valves, tubing and materials, the VISCOlab PVT lend itself to these high pressures and caustic environments and only requires 6ml of sample.

Test measurements from the VISCOlab PVT with the 30,000 psi option showed good correlation to NIST reference viscosity values with errors under 2%. Measurements were performed with dodecane under high pressure and temperature conditions, up to 150°C and 30,000psi.



(note: NIST published values for dodecane exist to 6000psi;the rest of the data is extrapolated).

The VISCOlab PVT has been the gold standard in high pressure viscosity measurements for more than 10 year. With the option for higher pressure measurements, it reaffirms our continued commitment to solving our customer's priority issues and providing best-in-class technology. For more information about the VISCOlab PVT, visit us online at http://www.paclp.com/Lab_Instruments/VISCOlab%20PVT:%20High%20Pressure%20Viscometer.

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