

WAT-70Xi

Crude Oil Analyzer

for wax appearance temperature/cloud point and wax disappearance temperature

from Phase Technology

Speed & Precision Benefits for Upstream & Midstream

- **DETECTION OF BOTH WAT AND WDT**
Two critical tests for understanding crude oil behavior; also determines rate of wax deposition & melting.
- **FASTER THAN ANY OTHER TEST METHOD**
Results in just 20-40 minutes, compared to average test times of several hours for other methods.
- **TESTS OPAQUE SAMPLES**
Enhanced optical configuration "sees" through dark samples.
- **SELF-CLEANING**
Automatic solvent flush after each test run.
- **NO MANUAL SET UP**
Simply inject sample directly into analyzer and begin test run.
- **SUPERIOR PRECISION**
Repeatability of 1.0° C.
- **GREATER SENSITIVITY**
Controlled, automatic test method ensures no subjectivity in reported results.
- **INFORMATIVE, REAL-TIME TEST RESULTS**
Complete phase diagram (loop) clearly illustrates WAT, relative amount of wax formation and WDT.
- **INTUITIVE, EASY-TO-USE INTERFACE**
Full-color, touch-sensitive, 15" high resolution screen and one-touch, preset "favorites"

Wax Appearance Test (WAT) and Wax Disappearance Test (WDT)

A Breakthrough in Crude Oil Testing

With a long, notable history as the world leader in developing test methods for cold flow properties detection, Phase Technology has now extended its capability to include a critical measurement for crude oil: Wax Appearance Temperature (WAT).

Also known as cloud point, wax appearance temperature is the temperature at which a crude oil sample first precipitates solid wax as it is being cooled under prescribed test conditions.

Similarly, Wax Disappearance Temperature (WDT) is the temperature at which the last wax solids are melted into liquid during a warming cycle.

An End to Subjective, Tedious Testing

Until now, trying to determine crude oil WAT or cloud point was an imprecise, tedious, and subjective process. Various manual methods have been tried, but all are difficult and time-consuming, yielding results with unacceptably wide error margins.

Phase Technology's new WAT-70Xi analyzer revolutionizes the upstream and midstream oil industries with the world's first and only totally automatic process to measure WAT and WDT of crudes. Based upon ASTM D5773, our proprietary optical light scattering technique detects phase changes with extreme sensitivity and accuracy.



Timely Test Results; No Set Up or Cleaning

This important scientific breakthrough means that even the darkest, most opaque samples can now be easily tested, with 1.0°C precision. Just load the sample, and the analyzer does the rest, with tests completed in just 20-40 minutes. There's no time-consuming manual set-up needed, and cleaning is done automatically after each test.



Trusted 70Xi Analyzer Design

The new WAT analyzer is built on the 70Xi series platform, with time-saving, productivity features included.

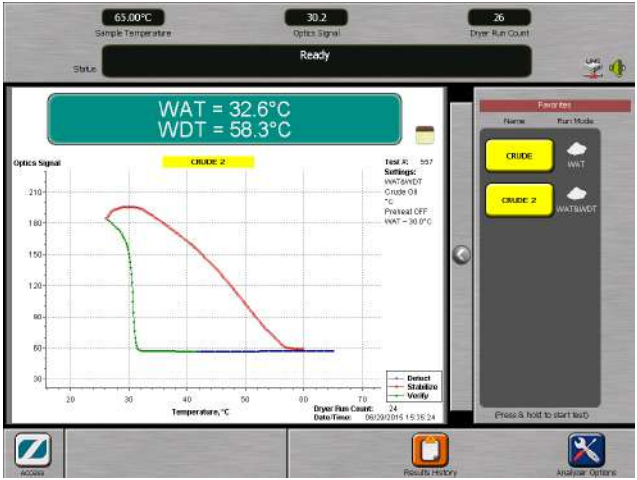


11168 Hammersmith Gate Richmond, B.C. Canada V7A 5H8 604.241.9568
www.phase-technology.com

WAT-70Xi-Crude Oil Analyzer

| | | |
|---|---|--|
| TEST METHOD | ASTM D5773 (IP 446) ASTM D2500 (IP 219/ISO 3015) equivalent | |
| STATED PRECISION | Repeatability 1.0 °C | |
| SAMPLE TEMPERATURE RANGE | -20 °C to 65 °C | |
| SYSTEM CLEANING | Automatic flush cycle; external solvent tank | |
| TEST DURATION | 20 to 40 minutes | |
| REQUIRED OPERATOR TIME | 15 seconds | |
| SAMPLE SIZE | 3.0 mL required | |
| DETECTION METHOD | Patented Diffusive Light Scattering (DLS) technology | |
| COOLING SYSTEM | Integrated Peltier device cooling system | |
| DISPLAY | Full-color, touch-sensitive, 15" high resolution LCD touch screen | |
| OUTPUTS | (3) USB A ports for optional peripherals: flash drive, label printer, barcode scanner, keyboard, mouse; (1) USB B port (3) RS-232 serial ports for optional peripherals & networking: external computer, Phase Technology LTB diagnostic software; (1) dedicated Service port; (1) 10/100Base-T Ethernet (RJ45) port for networking: LIMS, local area network (LAN) | |
| TEMPERATURE MEASUREMENT | °C or °F (User selectable) | |
| ALERTS | Buzzer for alarms warnings and prompts (User selectable) | |
| INTERNAL MEMORY | Storage up to 5000 test runs | |
| AMBIENT OPERATING ROOM TEMPERATURE | 10 to 30 °C (50 to 86 °F) Extremes not recommended | |
| DIMENSIONS (W x D x H) | Unit | Length x Width x Height 21.5 x 13.25 x 17.5 inches 54.6 x 33.7 x 44.5 cm |
| | Boxed | 29 x 23 x 19 inches 74 x 58 x 48 cm |
| WEIGHT | Unit | 53 lbs / 24 kg |
| | Boxed | 62 lbs / 28 kg |
| UTILITY REQUIREMENTS | Electrical | 90 – 260 VAC, 47 – 63 Hz 350 watts |
| | External Cooler Bath | NONE |

ANALYZER SCREENSHOT



Applications

Wax appearance temperature (WAT) and wax disappearance temperature (WDT) can help predict the occurrence of wax deposition in crude oils, and are therefore useful for upstream and midstream petroleum companies.

In oilfield applications, WAT or WDT can assist in determining optimum levels of wax crystal modifiers and/or wax deposition inhibitors. WAT is also an indicator of potential crude incompatibility and a monitor of evolving crude quality. Crude oils from the same region may have quite different characteristics, with disparate rates of wax deposition and dissolution. Changes of location, extraction depth, evolution of time, or even methods of production and blending can all be verified by WAT.

For transport of crude oil via pipeline, railway or tanker, as well as for oil storage, wax crystals may restrict flow or create a total blockage. WAT and WDT can help define acceptable operability limits and prevent the downtime and expense associated with cleaning. WAT is a useful tool for the accurate prediction of wax deposition in pipelines and storage vessels, resulting in great potential savings. The design and development of subseas and land pipeline systems and implementation of wax remediation options benefit from analysis of WAT data.