

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).

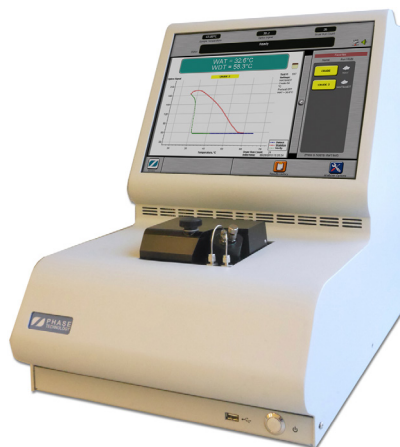
Also known as cloud point, wax appearance temperature is the temperature at which a crude oil sample first precipitates solid wax as it is being cooled under prescribed test conditions.

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.

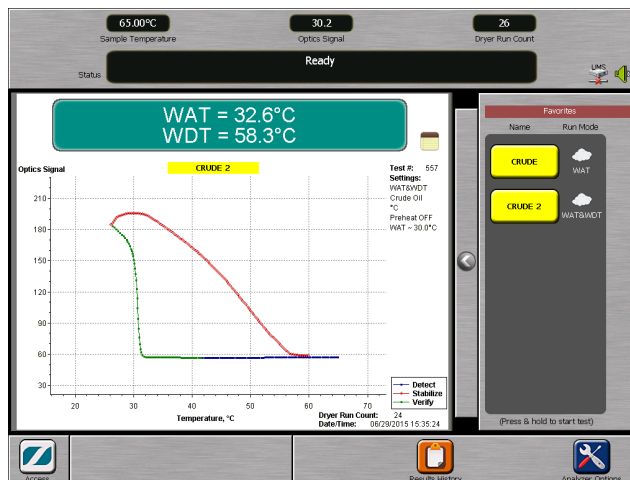


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WAT-70Xi-Crude Oil Analyzer

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.