

WAT-70Xi Marine Fuel Oil Analyzer

for wax appearance temperature/cloud point

from Phase Technology



Speed & Precision Benefits for the Maritime Industry

- **MARINE FUEL COMPATIBLE**
Reliable testing of VLSFO and residual black oils
- **DETECTION OF BOTH WAT AND WDT**
Two critical tests for understanding marine fuel 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 Marine Fuel 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 marine fuel oil, including VLSFO and residual black oils: Wax Appearance Temperature (WAT).

Also known as cloud point, wax appearance temperature is the temperature at which a marine fuel 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 marine fuel 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 marine fuel oil testing with the world's first and only totally automatic process to measure WAT and WDT of marine fuels. 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 Marine Fuel Oil Analyzer

TEST METHOD	ASTM D5773 (IP 446) ASTM D2500 (IP 219/ISO 3015) equivalent	
STATED PRECISION	Repeatability 1.0 °C	
SAMPLE TEMPERATURE RANGE	-30 °C to 75 °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

Application

The International Marine Organization's (IMO) 2020 regulations limit the sulfur content in fuel oil used on ships operating outside designated emission control areas. The limit has been reduced from 3.50% m/m to 0.50% m/m worldwide to comply with the International Convention for the Prevention of Pollution from ships (known as the MARPOL Convention).

These new regulations have resulted in a wider range of marine fuel formulations, and with that, new concerns about storage, operability and managing risk. Some 0.50% m/m fuels show a tendency to be more paraffinic, or waxier in nature.

Among the marine fuels now being used, VLSFO (Very Low Sulphur Fuel Oil) has emerged as a primary contender for maritime usage. This new fuel is blended from residual and distillate components with distinctly different cold flow characteristics. Stability and compatibility are key considerations. Since VLSFO has a higher potential to be paraffinic, wax can precipitate from the fuel onboard ship due to temperature-related issues, causing serious operational problems.

Previous to the introduction of VLSFOs, conventional wisdom was that maintaining bunker fuel at 10°C warmer than pour point was sufficient, since there was no reliable way to test for wax appearance temperature (cloud point) due to the fuel's opacity. Now however, Phase Technology has developed an automatic wax appearance temperature test which is accurate and highly repeatable.

New research shows that the wax appearance temperature of VLSFO can be significantly warmer (> 30°C) than its pour point, disproving the previous conventional wisdom. The higher paraffinic content of VLSFO makes fuel storage, handling and transfer problematic. Therefore, wax appearance temperature is now the most definitive cold-flow property that should be tested to prevent wax precipitation.