

# DREW XP VISCOSITY METER



## DESCRIPTION

The DREW XP VISCOSITY METER is used for onboard testing and analysis to accurately determine the viscosity of residual fuel oil and lube oil. The self-contained test kit includes a thermostatically controlled heating unit, viscosity test balls, test beaker, test strainer, cleaning rod, spare seals and fuses, power cable, and an easy-to-use manual. Test results are available in minutes.

The VISCOMAR™ VISCOSITY TEST is available separately for onboard testing of distillate fuel oil, as well residual fuel oil and lube oil. The VISCOMAR test kit includes the CALCUMAR™ control unit, which stores measured viscosity values, along with temperature and density values, and automates calculations used for efficient fuel heating, handling and blending. (Refer to the VISCOMAR VISCOSITY TEST product data sheet for technical details and ordering information about that test kit.)

Viscosity, which measures resistance to flow, is a key parameter of fuel oil quality used to grade residual fuels. Onboard testing for viscosity during bunkering allows immediate confirmation of the grade of fuel delivered. Correct fuel temperature adjustments for transfers between tanks, and for maintaining optimum combustion efficiency in diesel engines, depend on access to accurate viscosity values, which Drew Marine's onboard viscosity tests provide at bunkering or while underway. Fuel oil viscosity in combination with density values is also used to calculate the ignition quality of fuel oil.

## FUEL OIL VISCOSITY

Because viscosity changes with temperature — decreasing as oil temperature increases — viscosity should always be stated in terms of the specific units of measurement used and the temperature at which it was determined or converted. Timely access to accurate viscosity values for fuel oil contributes to:

### ■ Obtaining full monetary value from purchased bunkers

Record-high prices for residual fuel oils underscore the importance of getting what you pay for. It is common practice to order fuel based on its viscosity. Therefore, viscosity values measured by onboard testing can help protect against misrepresentations or fuel alterations by unscrupulous operators, as well as routine documentation errors. In all cases, viscosity testing that shows significant differences versus the bunker delivery note should trigger submittal of samples to an accredited shore-based laboratory for confirmation and bunker claim processing, if warranted.



### ■ Maximizing operating and combustion efficiency

- Fuel oil viscosity is important for determining the amount of heat that must be applied in order to achieve the correct viscosity for transferring fuel, e.g., from storage tanks to settling tanks. For example, the viscosity needed for effective fuel oil transfer is lower for moving fuel through longer suction lines from storage tanks to fuel transfer pumps.
- Viscosity is used to calculate correct injection temperatures for proper fuel atomization to maintain optimum combustion efficiency. When viscosity is too high, injected fuel droplets are too large for diesel engines and boilers to burn completely, which also produces smoke and exhaust system deposits. Precise heating of heavy fuel oil is required to ensure viscosity meets engine and boiler manufacturers' specifications.
- When centrifuging residual fuel oil, accurate measurement of viscosity enables shipboard engineers to properly adjust purifier pre-heater operation for removing water, sediment and catalyst fines.
- Determined by combining viscosity with density values, the Calculated Carbon Aromaticity Index (CCA) of heavy fuel oil provides an indication of fuel ignition quality and combustion delay, for corrective measures as needed.



Contact your Drew Marine representative for more information

## LUBE OIL VISCOSITY

Changes in lube oil viscosity over time can point to oxidation or contamination by fuel oil, which may reduce the effectiveness of the lube oil in preventing metal-to-metal contact. Onboard testing of lube oil viscosity provides best value for:

- Confirming product received versus stated product viscosity.
- Establishing the viscosity of new lube oils as benchmarks.
- Monitoring lube oil condition both at scheduled intervals and to investigate symptoms of possible degradation or other problems.
- Determining, in combination with other lube oil parameters, requirements for additive packages or lube oil replacement.

Whenever testing shows significant differences between lube oil viscosity and reference values, the used lube oil sample should be forwarded to an accredited shore-based laboratory for viscosity confirmation and guidance regarding corrective measures.

## HYDRAULIC OIL VISCOSITY

Essential in identifying the grade and viscosity index of hydraulic oil, viscosity is the most important characteristic of hydraulic fluid. At operating temperatures, viscosity must be high enough so that the hydraulic fluid does not leak through seals or junctions, and low enough to ensure flow and maintain system efficiency and lubrication.

Onboard testing enables operators to effectively and accurately measure changes in viscosity for monitoring its condition and conformance to specification requirements and operating parameters. Whenever testing shows significant differences between hydraulic oil viscosity and reference values, a sample should be forwarded to an accredited shore-based laboratory for viscosity confirmation and guidance regarding corrective measures.

## TECHNICAL SPECIFICATIONS AND OPERATING FEATURES

- The DREW XP VISCOSITY METER has a broad measurement range of 20 to 810 mm<sup>2</sup>/s (cSt) heated at 50°C for heavy fuel oil, and 20 to 810 mm<sup>2</sup>/s (cSt) unheated and corrected to 40°C for lube oils.

- Viscosity measurement is based on the falling-ball principle using a steel ball precisely calibrated for the ranges provided. A flux-field microchip measuring technique is used to achieve laboratory-quality accuracy with reproducibility of ±3% or ±2 mm<sup>2</sup>/s.
- Built-in calculator improves the accuracy of viscosity index measurement. Incorporating density values (manual input), it also facilitates CCAI calculation.
- Step-by-step testing procedures are easy to follow. Simple prompts shown on the LCD screen of the DREW XP VISCOSITY METER guide operators through the testing process.
- Results are provided in 20 minutes or less.

## BENEFITS AT A GLANCE

- Provides timely data to confirm the viscosity of fuel when bunkered and the viscosity of lube oil on delivery.
- Prompts shore-based laboratory follow-up for confirmation and claim processing.
- Assists operators in determining correct heat for efficient fuel-transfer viscosity; and optimizing purifier pre-heater operation for removing water, sediment and catalyst fines.
- Facilitates calculations of correct injection temperatures and (in combination with density) CCAI values for maintaining optimum fuel-combustion efficiency.



## CLEANUP

The use of harsh chemicals for cleaning test kit instruments and accessories is not advisable. Use only approved cleaning agents (e.g. Drew Marine's TEST KIT CLEANER — PCN 1AB2738) to clean test kit components, and wipe clean using a dry rag. Dispose of the used rag as used oil.

## TEST PROCEDURES

Refer to the Viscosity section of the DREW XP FUEL & LUBE OIL TEST CABINET Operating Manual for step-by-step operating procedures and precautions.



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## CONTENTS AND ORDERING INFORMATION

The DREW XP VISCOSITY METER is standard as part of the DREW XP FUEL & LUBE OIL TEST CABINET (PCN 1AB2757).

### REORDERS

- DREW XP VISCOSITY METER (PCN 1AB2765)

#### Spares and Replacements

DESCRIPTION	PCN
Viscosity Meter Unit	On Request
Power Cable, 2M, EU	1AB2800
Test Beaker, 100 ML, 40 CT.	1AB2803
Cleaning Rod	1AB2736
DREW XP-VIS Balls, Seals, & Fuses	1AB2748
DREW XP-VIS Power Supply	1AB2835
DREW XP-VIS Strainer	1AB2750



Contact your Drew Marine representative for more information

Drew Marine maintains Safety Data Sheets on all of its products. These documents contain health and safety information for the development of appropriate product handling procedures to protect your employees. Safety Data Sheets should be read and understood by all of your supervisory personnel and employees before using Drew Marine products.



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