

CRUDE OIL TESTING EQUIPMENT



Crude Oil Testing Equipment

Crude oil is one of the most complex and variable natural materials handled by the global energy industry. Its physical and chemical properties — water content, API gravity, sulfur levels, salt content, sediment, carbon residue, calorific value, and detailed elemental and compositional analysis — vary significantly between production fields, blend streams, and delivery batches. Accurate, comprehensive crude oil testing is essential at every point in the value chain: wellhead, gathering system, pipeline terminal, export loading point, refinery intake, and process unit feed.

Torontech's crude oil testing equipment portfolio provides a complete, standards-compliant solution for all critical crude oil quality parameters. With 21 dedicated instruments covering flash point, water and sediment determination, sulfur analysis, API gravity, salt content, compositional analysis, and advanced elemental testing by ICP, Torontech enables petroleum laboratories to perform the full range of crude oil characterization tests from a single, specialized equipment supplier.

APPLICATIONS

Crude oil testing equipment supports every stage of the petroleum supply chain, from the wellhead to the refinery gate, where accurate characterization protects both value and equipment.

Exploration and Production

Characterize crude at the wellhead to assess quality and value early, and to plan handling and transport.

Custody Transfer and Trading

Confirm density, water content, and sulfur at the point of sale, where small differences in quality affect price and contract compliance.

Refinery Acceptance and Blending

Verify incoming crude against specification and guide blending decisions that keep refinery units running within design limits.

Pipeline and Terminal Operations

Monitor water, sediment, and flow properties to protect pipelines, tanks, and pumps from corrosion and deposits.

Application

Torontech's crude oil testing instruments support quality assurance, process control, and commercial operations across the entire crude oil industry:

- Custody transfer and terminal operations: API gravity, water content, BS&W (basic sediment and water), and salt content testing are mandatory at all crude oil custody transfer points to determine net quantity and commercial value.
- Refinery feedstock evaluation: Comprehensive crude oil assay testing (API gravity, sulfur, water, carbon residue, distillation, paraffin/resin/asphaltene content) is performed on incoming crude batches to optimize refinery processing plans.

- Pipeline quality monitoring: Continuous monitoring of water content, sediment, API gravity, and salt content ensures pipeline integrity and delivery specification compliance.
- Upstream production facilities: Flash point and basic quality testing at production sites for initial crude oil characterization and safe handling verification.
- Crude oil blending: API gravity, sulfur, and viscosity testing of blend components and finished blend streams to achieve target commercial specifications.
- Equipment protection: Salt, sediment, and water content testing protects refinery desalters, heat exchangers, and distillation columns from fouling and corrosion caused by crude oil contaminants.
- Calorific value determination: Gross calorific value (ASTM D5865) by automatic calorimeter for crude oil energy content assessment and fiscal metering support.

FEATURES

1. Full-Property Coverage

The equipment range covers the core crude parameters, including density and API gravity, distillation, sulfur, water and sediment, viscosity, and pour point.

2. Standards-Based Testing

Instruments operate to recognized ASTM and ISO methods, such as ASTM D4052 for density and ASTM D2892 for distillation, so results are accepted across the industry.

3. Density and API Gravity

Digital density meters determine API gravity quickly, the first indicator of whether a crude is light or heavy.

4. Distillation Analysis

Distillation systems separate the crude into boiling-range fractions to predict product yields.

5. Sulfur and Contaminant Measurement

Sulfur analyzers and water-content testers identify properties that affect processing, corrosion, and emissions.

6. Reliable, Repeatable Results

Controlled test conditions and calibrated instruments deliver consistent data for trading, custody transfer, and refinery operation.

Why Choose Torontech's Series for Your Crude Oil Testing?

Torontech's crude oil testing equipment portfolio is designed around the specific, demanding requirements of crude oil analysis:

- **End-to-End Crude Oil Coverage:** From wellhead flash point safety testing to refinery ICP trace metal analysis, Torontech's 21-instrument crude oil range addresses every test parameter in the crude oil characterization workflow.
- **Water Content Dual-Method Capability:** Torontech offers both distillation-based water determination (TT-4006A, ASTM D4006) and Karl Fischer titration (TT-6304 coulometric, TT-203 volumetric), enabling laboratories to apply the most appropriate water content method for each crude oil type and concentration range.
- **Comprehensive Sulfur Analysis:** Three sulfur analysis technologies — quartz tube (TT-1551), lamp method (TT-1266), and micro coulometric titration (TT-4929) — cover the range of sulfur measurement methods required for crude oil chlorine and sulfur species analysis.
- **Paraffin, Resin, and Asphaltene Analysis:** Torontech's specialized TT-6560 apparatus for paraffin, resins, and asphaltenes content in crude oil addresses a critical compositional analysis requirement that is unique to crude oil evaluation and not available from most instrument suppliers.
- **ICP for Trace Metals:** The TT-5708 ICP system for crude oils and residual fuels is specifically configured for the challenging crude oil matrix, delivering accurate vanadium, nickel, iron, and sodium trace metal data essential for refinery catalyst protection and corrosion management.

THEORY & METHOD

Crude oil testing characterizes a crude before it is refined, because the value of a crude and the way a refinery processes it depend on a set of measured physical and chemical properties. A laboratory runs several standardized tests, each measuring a different property.

Key Properties and How They Are Measured

Density and API gravity, measured to ASTM D1298 or D4052, indicate whether a crude is light or heavy. A distillation test, such as ASTM D2892, separates the crude into fractions by boiling range, which predicts the yield of products like gasoline and diesel. Sulfur content, measured by ASTM D4294, shows whether the crude is sweet or sour and affects processing and emissions.

Contaminants and Flow Behavior

Water and sediment tests, such as ASTM D4928 and D473, reveal contamination that can corrode equipment, while viscosity and pour point describe how the crude flows and pumps at different temperatures. Together these measurements build a complete profile of the crude, which guides pricing, blending, and refinery operation.

TECHNICAL SPECIFICATIONS

How to Choose: Crude Oil Instrument Comparison

Use the comparison table below to identify the Torontech instruments relevant to your crude oil testing requirements:

Instrument	Model	Standard
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Manual Cleveland Open Cup Flash Point Tester	TT-92	ASTM D92
Automatic Cleveland Open Cup Flash Point Tester	TT-92Z	ASTM D92
Vacuum Distillation Apparatus	TT-1160	ASTM D1160
Water in Crude Oil Apparatus (Distillation)	TT-4006A	ASTM D4006
Coulometric Karl-Fischer Titration Tester	TT-6304	ASTM D6304
Volumetric Karl Fischer Moisture Titrator	TT-203	ASTM D1533
Semi Automatic Kinematic Viscosity Apparatus	TT-445BZ	ASTM D445
Quartz Tube Sulfur Apparatus	TT-1551	ASTM D1551
Sulfur Lamp Method Unit	TT-1266	ASTM D1266
Sulfur and Chlorine Micro Coulometric Titrator	TT-4929	ASTM D4929
Density Test by API Hydrometer	TT-1298	ASTM D1298
Ramsbottom Carbon Residue Apparatus	TT-524	ASTM D524
Smoke Point Apparatus for Kerosene	TT-1322	ASTM D1322
Ash Content for Petroleum Product	TT-482	ASTM D482
Sediment Extraction in Crude Oil and Fuel Oil	TT-473	ASTM D473
Total Sediment in Residual Fuels	TT-4870	ASTM D4870
Oil Test Centrifuge	TT-1796	ASTM D1796
Automatic Calorimeter	TT-5865	ASTM D5865
Salt Content of Crude Oil Tester	TT-3230	ASTM D3230
ICP for Crude Oils and Residual Fuels	TT-5708	ASTM D5708

Paraffin, Resins and Asphaltenes in Crude Oil	TT-6560	IP 143
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✓ = Primary use ● = Secondary/applicable — = Not primary



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