



SPECTROSCOPY & ADVANCED ANALYTICAL INSTRUMENTS

Spectroscopy & Advanced Analytical Instruments

Advanced spectroscopic analytical instruments provide the most powerful elemental analysis capability available for petroleum products, lubricants, and related materials. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES), Rotating Disc Electrode Optical Emission Spectrometry (RDE-OES), Atomic Absorption Spectrometry (AAS), and Ultraviolet-Visible (UV-VIS) spectrophotometry collectively enable the detection and quantification of trace metals, wear elements, contaminants, and characteristic chemical species at concentrations ranging from percent levels down to sub-ppm detection limits.

Torontech's spectroscopy and advanced analytical instrument portfolio covers the full range of optical spectrometry techniques required in modern petroleum analysis laboratories — including multiple ICP configurations for different product matrices, RDE-OES for used oil wear metal analysis, AAS for lead in gasoline, and UV-VIS spectrometry for characterization of petroleum product absorbance properties.

APPLICATIONS

Application

Torontech's spectroscopy instruments address elemental and molecular analysis requirements across a comprehensive range of petroleum product applications:

- Unused lubricant oil analysis: ICP-OES quantification of additive elements (zinc, phosphorus, calcium, magnesium, barium) in fresh lubricant formulations for quality control and additive package verification per ASTM D4951 and D5185.

- Used oil analysis: ICP-OES and RDE-OES wear metal analysis (iron, copper, lead, chromium, aluminum) in used engine and gear oils for equipment condition monitoring and predictive maintenance programs per ASTM D5185 and D6595.
- Crude oil trace metals: ICP analysis of vanadium, nickel, iron, and sodium in crude oils and residual fuels per ASTM D5708 and D5863, critical for refinery catalyst protection and corrosion management.
- Biodiesel catalyst metal residues: ICP for B100 biodiesel quantifies sodium, potassium, calcium, and magnesium catalyst and process residues per EN 14538 and ASTM D6751.
- Middle distillate fuel contamination: ICP analysis of trace metals in diesel, jet fuel, and heating oil for specification compliance and contamination source identification.
- Lead in gasoline: AAS determination of lead content in gasoline per ASTM D3237, essential for leaded fuel monitoring and regulatory compliance in markets with transition programs.
- RDE-OES used oil analysis: Rotating disc electrode optical emission spectrometry provides fast, direct elemental analysis of used lubricating oils without the digestion and dilution steps required by ICP.
- UV-VIS spectrophotometry: Measurement of light absorption characteristics for petroleum product color analysis, aromatic content determination, and chemical species quantification.

FEATURES

Why Choose Torontech's Series for Your Spectroscopy & Advanced Analytical Needs?

Torontech's spectroscopy portfolio provides the broadest application-specific ICP and OES coverage available for petroleum laboratories:

- Matrix-Specific ICP Configurations: Torontech offers five dedicated ICP systems optimized for the specific digestion, dilution, and calibration requirements of different petroleum matrices (unused lube, used lube, crude/residual, biodiesel, middle distillates) — eliminating the compromises required when a single generic ICP must address multiple complex petroleum sample types.

- RDE-OES Specialty: Torontech's RDE-OES rotating disc electrode optical emission spectrometer provides the rapid direct-read elemental analysis methodology preferred for high-volume used oil analysis programs in fleet maintenance and industrial tribology monitoring.
- Complete Spectrometry Coverage: ICP-OES, RDE-OES, AAS, and UV-VIS spectrometry under one supplier — simplifying procurement, training, and technical support for laboratories requiring multiple spectroscopic analytical techniques.
- Standards Alignment: All Torontech spectroscopy instruments are configured for compliance with the relevant ASTM, EN, ISO, and IP standards for each application.
- Dedicated Technical Support: Torontech provides application-specific method development support, calibration standard guidance, and instrument training for each spectroscopy platform.



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