



TORONTECH

# THERMAL OXIDATION / HIGH-TEMPERATURE PERFORMANCE TESTING



# Thermal Oxidation / High-Temperature Performance Testing

When fuels are subjected to high-temperature surfaces — such as heat exchangers, fuel nozzles, or combustion chamber walls — they can undergo thermal oxidation: a rapid, heat-driven decomposition that deposits carbonaceous residues, degrades fuel quality, and critically reduces system reliability. High-temperature performance testing measures a fuel's resistance to this kind of thermal degradation under carefully controlled, standardized conditions that replicate the extreme thermal environment found inside modern aircraft engines, gas turbines, and high-performance combustion systems.

The Jet Fuel Thermal Oxidation Stability (JFTOT) test is the definitive industry standard for assessing the high-temperature performance of aviation turbine fuels. Governed by ASTM D3241, the JFTOT method evaluates a fuel's tendency to form solid deposits on a heated metal tube at temperatures from 260 °C to 355 °C — simulating conditions in aircraft fuel systems where thermal oxidation is a direct safety concern. Torontech's JFTOT instrument is engineered to deliver exact compliance with ASTM D3241, providing laboratories with the precision and reliability that aviation fuel qualification demands.

## APPLICATIONS

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### Applications

Thermal oxidation and high-temperature performance testing is critical in the following sectors:

- Aviation turbine fuel qualification: Every batch of Jet A, Jet A-1, and JP-8 fuel must pass the JFTOT (ASTM D3241) before acceptance for use in commercial and military aircraft.
- Aviation fuel blending & refinery QC: Thermal oxidation stability data guides blending decisions and confirms that finished jet fuel meets specification before shipment.
- Third-party inspection & certification: Independent inspection agencies use JFTOT data to certify aviation fuel deliveries to airports, airlines, and military operators.

- Gas turbine fuels: Industrial gas turbine operators use high-temperature performance testing to evaluate alternative and synthetic fuels for suitability in stationary power generation.
- Fuel additive development: Antioxidants and thermal stability improvers for jet fuel are screened and optimized using JFTOT-based test protocols.
- Alternative & sustainable aviation fuel (SAF) qualification: SAF and synthetic paraffinic kerosene (SPK) blends require rigorous thermal oxidation assessment before regulatory approval.
- Research institutions: Universities and aerospace research centers use JFTOT data to understand fuel thermal degradation mechanisms and develop next-generation aviation fuels.

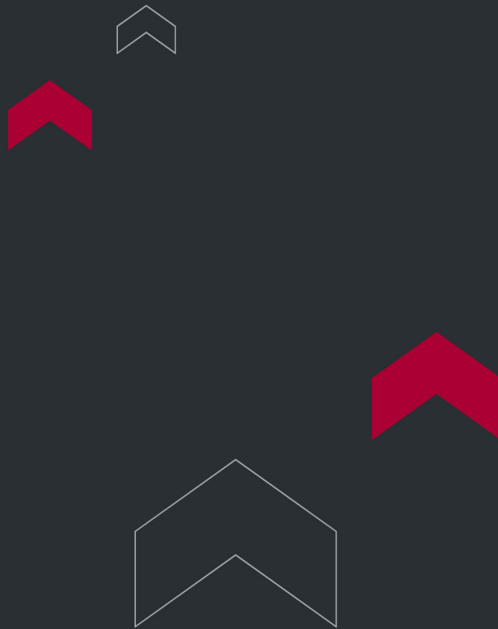
## FEATURES

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### Why Choose Torontech JFTOT Series for Your Aviation Fuel Testing?

Torontech's Jet Fuel Thermal Oxidation Stability Tester is the benchmark choice for aviation fuel laboratories:

- Full ASTM D3241 compliance: Every parameter — tube temperature, fuel flow rate, differential pressure measurement, and deposit rating procedure — is implemented to the exact specification of ASTM D3241 and IP 323.
- Precise thermal control: A high-stability heater maintains the critical test tube at the target temperature  $\pm 0.5$  °C throughout the entire 150-minute test, eliminating temperature-induced variability.
- Automated differential pressure monitoring: The instrument continuously logs pressure drop across the filter downstream of the heated tube, providing an objective measure of deposit severity alongside the visual tube rating.
- Digital tube rating integration: Compatible with quantitative deposit analyzer systems for objective, operator-independent deposit assessment, reducing inter-laboratory variability.
- Aviation-grade reliability: Designed for 24/7 laboratory environments with robust pump systems, high-quality wetted materials, and comprehensive self-diagnostic alerts.
- Compact laboratory footprint: Optimized bench-top design accommodates the instrument in standard petrochemical laboratory spaces without dedicated infrastructure.



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