TORONTECH

AVIATION FUEL TESTING EQUIPMENT

Aviation Fuel Testing Equipment

Aviation turbine fuel — Jet A, Jet A-1, JP-8, and aviation gasoline (AVGAS 100LL) — is one of the most tightly specified petroleum products in the world. The consequences of off-specification aviation fuel range from accelerated engine component wear and fuel system contamination to, in the most serious cases, in-flight engine flameout or structural failure. Every batch of aviation fuel must therefore be certified against a comprehensive set of physical, chemical, and safety properties before it is accepted at a fuel farm, loaded onto a refueling vehicle, or introduced into an aircraft fuel system.

Torontech's Aviation Fuel Testing Equipment portfolio covers the full spectrum of mandatory and recommended test parameters defined in DEF STAN 91-091 (Jet A-1), ASTM D1655, MIL-DTL-83133 (JP-8), and ASTM D910 (AVGAS). From flash point and freezing point to thermal oxidation stability (JFTOT), lubricity, water separation, electrical conductivity, and particulate contamination — Torontech provides a single-source, standards-compliant instrument ecosystem for aviation fuel quality assurance laboratories worldwide.

APPLICATIONS

Applications

Aviation fuel testing is mandatory at multiple points in the supply chain:

- Petroleum refineries: Confirming that each batch of jet fuel meets the full specification before shipment to fuel distribution terminals or airports.
- Aviation fuel terminals and depots: Receipt inspection of incoming Jet A-1 deliveries, including flash point, freezing point, density, and conductivity testing before tank acceptance.
- Airport into-plane operations: Pre-delivery checks including appearance, density, conductivity, and particulate contamination testing immediately before refueling aircraft.
- Military aviation: JP-8 qualification and surveillance testing at military fuel facilities in accordance with MIL-DTL-83133 and NATO STANAG 3747.
- Sustainable Aviation Fuel (SAF) qualification: Thermal oxidation stability (JFTOT), aromatic content, and freeze point testing of SAF and blended synthetic paraffinic kerosene (SPK).
- Third-party inspection agencies: Cargo inspection and quality certification of aviation fuel shipments — by sea, pipeline, or rail — for airlines, operators, and government bodies.
- Airline and airport quality assurance teams: Independent quality surveillance of fuel supplied by third-party into-plane providers.
- Research and formulation laboratories: New fuel development, additive screening, and alternative aviation fuel qualification requiring the complete ASTM D1655 or DEF STAN 91-091 test suite.

FEATURES

1. Full-Specification Coverage
The instrument range covers the mandatory tests defined in DEF STAN 91-091 (Jet A-1), ASTM D1655, MIL-DTL-83133 (JP-8), and ASTM D910 (AVGAS), giving a laboratory a single-source path to certification.

2. Flash Point Testing
Closed-cup flash point analyzers determine the lowest temperature at which fuel vapor ignites, a core safety property tested under ASTM D93 and D3828.

3. Freezing Point Determination
Automated freezing point instruments confirm cold-weather operability against limits such as -47 C for Jet A-1, in line with ASTM D2386 and D5972.

4. Thermal Oxidation Stability (JFTOT)
A JFTOT analyzer rates deposit formation under heat to ASTM D3241, which predicts how the fuel behaves in hot sections of the engine.

5. Conductivity and Lubricity
Conductivity meters check electrical conductivity for safe static dissipation (ASTM D2624), while lubricity testers measure wear protection (ASTM D5001).

6. Water Separation and Particulate Contamination
Separometer and contamination instruments confirm the fuel is clean, dry, and free of particulates before it reaches an aircraft.

Why Choose Torontech Aviation Fuel Testing Series for Your Laboratory?

- Complete DEF STAN 91-091 and ASTM D1655 coverage: Torontech's aviation fuel testing portfolio addresses every mandatory test parameter in the world's two primary jet fuel specifications — from flash point and freeze point to JFTOT high-temperature performance, MSEP water separation, lubricity, sulfur species, particulate contamination, and trace metals — from a single supplier.
- Aviation-grade precision and reliability: Aircraft safety depends on fuel quality. Torontech instruments are engineered to the precision levels demanded by aviation standards, with repeatability and reproducibility performance validated to ASTM, IP, and ISO requirements.
- JFTOT expertise: The Toron™ JFTOT Jet Fuel Thermal Oxidation Stability Tester is a cornerstone of aviation fuel qualification. Torontech's instrument delivers exact ASTM D3241 compliance, precise temperature control to ±0.5 °C, and integrated differential pressure monitoring — all critical for accurate thermal oxidation stability assessment of both

conventional jet fuel and SAF blends.

- Freezing point to lubricity — specialized aviation parameters covered: Torontech's automatic aviation fuel freezing point apparatus and BOCLE lubricity evaluator address two of the most safety-critical aviation-specific parameters, often unavailable in general-purpose petroleum testing portfolios.
- Scalable automation: Manual, semi-automatic, and fully automatic configurations are available for every key parameter, allowing laboratories to match instrument capability to sample throughput and budget.
- SAF-ready: All relevant Torontech instruments are validated or compatible with SAF and SAF/conventional fuel blends, positioning your laboratory to support the aviation industry's transition to sustainable fuel.
- ISO/IEC 17025 support: Torontech provides instrument qualification documentation, calibration traceability, and application support to assist aviation fuel laboratories in achieving and maintaining accreditation.
- Global aviation supply chain presence: Torontech instruments are in service at refineries, terminals, and airport quality laboratories across Asia, the Middle East, Europe, and the Americas — trusted wherever aviation fuel quality matters.

THEORY & METHOD

Aviation fuel is one of the most tightly specified petroleum products because off-specification fuel can damage engines or cause in-flight failure. Several core tests work together to confirm a batch is safe to use, and each measures a different property.

Flash Point: A Safety Measure

The flash point is the lowest temperature at which the fuel gives off enough vapor to ignite. A closed-cup tester heats a fuel sample and applies a small flame until the vapor flashes. A correct flash point confirms the fuel can be stored and handled safely.

Freezing Point: Cold-Weather Operability

At the altitudes aircraft fly, fuel reaches very low temperatures. The freezing point test cools the fuel until wax crystals form, then records the temperature at which the last crystal disappears on warming. A low freezing point confirms the fuel will keep flowing in flight.

Thermal Oxidation Stability: Deposit Control

In a jet engine, fuel passes over hot surfaces before combustion. The JFTOT test pumps fuel across a heated tube for about 2.5 hours, then measures the deposits on the tube and the pressure drop across a filter. Low deposits confirm the fuel resists breaking down under heat, which protects fuel-system components from clogging.

TECHNICAL SPECIFICATIONS

How to Choose — Aviation Fuel Testing Equipment Comparison

The table below maps each instrument to its test method, parameter, automation level, and applicable fuel grade:

Product	Test Method	Parameter Tested	Automation	Fuel Grade
Manual Pensky-Martens Closed-Cup Flash Point Tester TT-93	ASTM D93 / IP 34	Flash Point	Manual	Jet A/A-1, JP-8
Pensky-Martens Closed Cup Flash Point Tester — Auto ToronCCFPT™	ASTM D93 / IP 34	Flash Point	Full Auto	Jet A/A-1
Automatic Pensky-Martens Closed Cup Flash Point Tester TT-93Z	ASTM D93 / IP 34	Flash Point	Auto	Jet A/A-1, JP-8
Abel Closed Cup Flash Point Tester TT-170	IP 170 / EN ISO 13736	Flash Point (Low FP)	Auto	Aviation Gasoline
Double Tubes Distillation Apparatus TT-86A	ASTM D86 / IP 123	Distillation Characteristics	Semi	Jet A/A-1, AVGAS
Coulometric Karl-Fischer Titration Tester TT-6304	ASTM D6304	Water Content	Auto	Jet A/A-1
Automatic Distillation Apparatus TT-86Z	ASTM D86 / IP 123	Distillation Characteristics	Full Auto	Jet A/A-1, AVGAS

Product	Test Method	Parameter Tested	Automation	Fuel Grade
Volumetric Karl Fischer Moisture Titrator TT-203	ASTM D1744 / ISO 10337	Water Content	Auto	Jet A/A-1
Jet Fuel Thermal Oxidation Stability Tester Toron™ JFTOT	ASTM D3241 / IP 323	Thermal Oxidation Stability	Full Auto	Jet A/A-1, JP-8, SAF
Automatic Aviation Fuel Freezing Point Apparatus TT-2386Z	ASTM D2386 / IP 16	Freezing Point	Full Auto	Jet A/A-1, JP-8
Low Temperature Kinematic Viscosity Tester TT-445L	ASTM D445 / ISO 3104	Kinematic Viscosity (Low T)	Auto	Jet A/A-1
X-ray Fluorescence Sulfur Content Apparatus TT-4294	ASTM D4294 / IP 336	Total Sulfur	Full Auto	Jet A/A-1, AVGAS
Mercaptan Sulfur Content (Potentiometric Titration) TT-3227	ASTM D3227 / IP 342	Mercaptan Sulfur	Auto	Jet A/A-1, JP-8
Density Test by API Hydrometer TT-1298	ASTM D1298 / IP 160	Density / API Gravity	Manual	Jet A/A-1, AVGAS
Saybolt Chromometer TT-156	ASTM D156 / IP 17	Saybolt Color	Manual	Jet A/A-1
Micro Carbon Residue Apparatus TT-4530	ASTM D4530 / ISO 10370	Carbon Residue	Auto	Jet A/A-1
Fluorescent Indicator Absorption Apparatus TT-1319	ASTM D1319 / IP 156	Aromatic/Olefin/Saturate	Manual	Jet A/A-1, AVGAS
Solid Particulate Pollutant Tester for Jet Fuel TT-2276	ASTM D2276 / IP 423	Particulate Contamination	Manual	Jet A/A-1
Automatic Reid Vapor Pressure Bath TT-323Z	ASTM D323 / IP 69	Vapor Pressure (RVP)	Full Auto	AVGAS
Ball-on-Cylinder Lubricity Evaluator (BOCLE) TT-5001 ASTM D5001	ASTM D5001	Lubricity (WSSD)	Auto	Jet A/A-1
Micro Separometer for Aviation Fuel TT-3948	ASTM D3948	Water Separation (MSEP)	Auto	Jet A/A-1
Apparatus for Hydrogen Sulfide in Fuel Oils TT-7621	ASTM D7621	H_2S Content	Auto	Jet A/A-1, JP-8
Digital Conductivity Meter TT-2624	ASTM D2624	Electrical Conductivity	Auto	Jet A/A-1
Colorimeter for Petroleum Products TT-1500	ASTM D1500 / ISO 2049	ASTM Color	Auto	Jet A/A-1

Product	Test Method	Parameter Tested	Automation	Fuel Grade
ICP for Middle Distillate Fuels TT-7111	ASTM D7111	Trace Metals (ICP-OES)	Full Auto	Jet A/A-1
UV-VIS Spectrometer TT-1840	ASTM E169 / IP 391	UV Absorbance	Auto	Jet A/A-1
Particulate Contaminant In Aviation Fuel By Line Sampling Analyzer TT-2276	ASTM D2276 / IP 564	Particulate (Line Sample)	Auto	Jet A/A-1

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