



ICP FOR MIDDLE DISTILLATE FUELS

ICP for Middle Distillate Fuels TT-7111

ICP for Middle Distillate Fuels TT-7111 utilizes inductively coupled plasma atomic emission spectrometry (ICP-AES) to analyze selected elements in middle distillate fuels.

The test's concentration range typically spans from 0.1 to 2.0 mg/kg. While the test may be used for concentrations beyond this range, the precision statements may not be applicable. Middle distillate fuels analyzed in this method consist of all distillation fractions within the boiling range of 150 to 390°C. This includes, but is not limited to, diesel fuels and aviation turbine fuels.

APPLICATIONS

The primary application of this instrument is to analyze selected elements in middle distillate fuels using inductively coupled plasma atomic emission spectrometry (ICP-AES).

It is specifically used for:

- Analyzing middle distillate fuels, defined as all distillation fractions within the boiling range of 150°C to 390°C.
- Testing fuels including, but not limited to, diesel fuels and aviation turbine fuels.
- Measuring element concentrations that typically range from 0.1 to 2.0 mg/kg.

FEATURES

Instrument advantage

- Over 70 elements can be tested.
- Simultaneous testing of multiple elements, allowing all elements to be tested at once with a single sample injection.
- Fast analysis speed, with approximately 5 elements tested per minute, and the fastest test speed reaching up to 10 elements per minute.
- Low detection limit, with most elements detectable at ppb levels.
- Wide linear range, spanning up to 5-6 orders of magnitude, enabling testing of high and low content simultaneously without altering the standard curve.
- Minimal chemical interference leads to more accurate test results.

Performance characteristics

Safe and Reliable Solid-State RF Power Supply

The instrument utilizes a radio frequency power supply that is both safe and reliable. With its compact size, high output efficiency, and stable power output, it incorporates various safety protection functions including water circuit, air circuit, and overload protection. These features significantly enhance the instrument's safety and reduce the likelihood of failures.

High Degree of Automation

Featuring exceptional automation, the instrument operates primarily through software control. Apart from the power switch, all operations are software-driven. Intelligent software provides real-time feedback and prompts for various operations, ensuring efficient and error-free operation.

Automatic Ignition

The software enables fully automatic one-key ignition, with all parameter settings automatically adjusted. Utilizing advanced automatic matching technology, the ignition success rate is high, and operation is simplified.

High-Precision Airflow Control System

The instrument uses a high-precision mass flow controller (MFC) to regulate plasma gas, auxiliary gas, and carrier gas. The flow rate is continuously adjustable, ensuring highly accurate output airflow and precise test data.

TECHNICAL SPECIFICATIONS

High Frequency Generator	
Working Frequency	27.12MHz
Stability	± 0.05%
Output power	800W ~ 1600W
Output power Stability	≤0.2%
Scanning spectrometer	
Light path	Czerny turner
Focal length	1000mm
Raster specification	Ion-etched holographic grating, engraved line density 3600L / mm or 2400L / mm; scribed area (80 × 110) mm
Line dispersion reciprocal	0.26nm/m
Resolution	≤0.008nm(3600 wire grating)
Main Unit Parameters	
Scanning wavelength range	195nm~ 500nm (3600L/mm wire grating)
Repeatability	RSD≤1.5%

Stability	RSD≤2.0%
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Sample measurable element evaluation

Now for the detection of middle distillate fuel, the application R&D center has evaluated the details as shown in Table 2:

Table 2. Middle distillate fuel sample solutions

Samples	Tested elements	Instrument	Sample processing (for reference only)	Standard
Middle Distillate Fuels	Shown ASTM D7111 table 1	TT-7111 ICP	Weigh 0.5g of the sample into a microwave digestion tank, then add 6ml of nitric acid and 2ml of hydrogen peroxide. Preheat the mixture on a 150°C electric hot plate for approximately 10 minutes. Once heated, allow it to cool before loading it into the microwave digestion system to run the program. After completion, cool the solution to room temperature and adjust the volume to 50ml for testing.	ASTM D7111-2015



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