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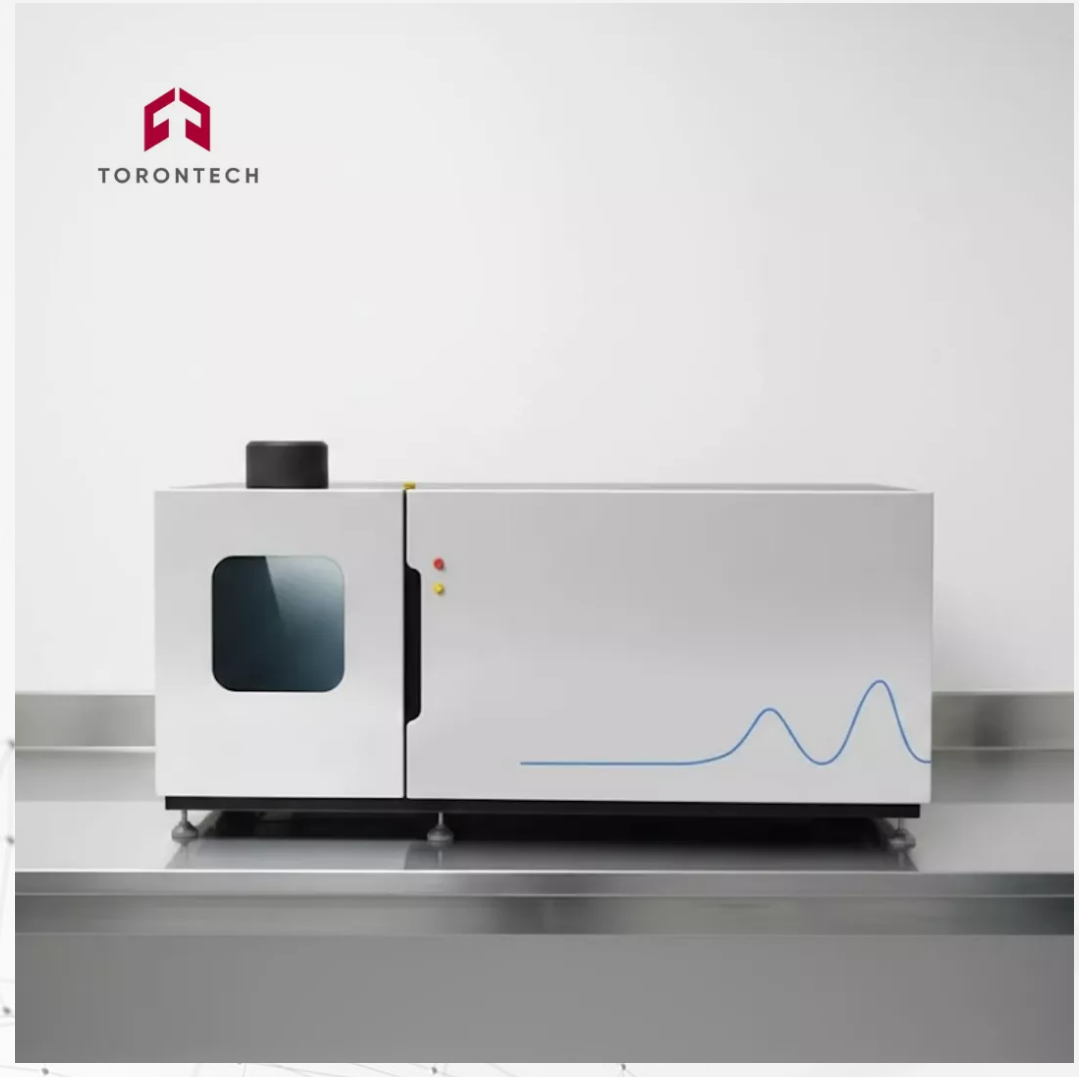

ICP FOR USED LUBE OILS

ICP for used Lube Oils TT-5185

ICP for Used Lube Oils TT-5185 plays a crucial role in daily work and production processes where certain components require special protection.

Regular monitoring of wear particle accumulation on these components is essential. This often involves analyzing metal elements in oil, which accurately determines the failure cycle of machine components based on metal component composition and accumulation rate in the oil. Additionally, it's necessary to monitor foreign contamination components in lubricating oil, such as metal elements introduced by dust and dirt. Assessing the content of wear metal in the lubricant provides accurate insights into equipment operating status and performance. The presence of metals in the oil indicates the severity of parts wear, crucial for equipment maintenance and performance evaluation. Monitoring methods for trace metal determination in lubricating oils as wear components are particularly significant.

APPLICATIONS

The primary application of the ICP for Used Lube Oils TT-5185 is the elemental analysis of in-service (used) lubricating oils. It measures the concentration of wear metals (e.g., iron, copper, lead) and contaminants (e.g., silicon from dust, calcium from coolant). This data is essential for predictive maintenance programs, as it provides an accurate insight into the health of an engine or machine, allowing operators to detect abnormal wear and schedule repairs before a catastrophic failure occurs.

Key Industries

- **Automotive and Heavy Equipment (Fleet Maintenance):** This is a critical tool for large fleets (trucking, construction, mining). Regular oil analysis is used to monitor engine and transmission health, extend drain intervals, and prevent catastrophic failures in the field.
- **Power Generation:** Power plants rely on this analysis to monitor the condition of lubricating oils in their turbines and large reciprocating engines. Detecting abnormal wear early is essential for ensuring reliability and avoiding costly,

unplanned outages.

- **Aerospace and Aviation:** This industry has the most stringent maintenance requirements. ICP analysis of engine and hydraulic oils is a standard procedure to monitor the health of critical components, ensuring the highest levels of safety and reliability.

FEATURES

- MCU-controlled with a large LCD color touch screen, allowing for programmed heating as per ASTM D93 requirements.
- Automatic ignition and flash point judgment, with ignition possible via electric or gas supply.
- Comes with an automatic ignition wire for gas ignition.
- Utilizes a stepper motor for sample stirring, ensuring stable, precise, and adjustable speeds, fully compliant with ASTM D93 A, B, and C procedures.
- Features a quick detection function, enabling the setting of heating rates as per requirements, facilitating swift judgment of the expected flash point for unknown oil samples.
- Automatic lifting and lowering function for easy operation.
- Equipped with a temperature correction function that automatically adjusts for atmospheric pressure.
- Can establish the highest detection temperature and ignition times, automatically halting heating upon reaching the set values.
- Optional nitrogen distinguisher available.
- Automatically disconnects gas supply in case of power outage.
- Capable of real-time atmosphere pressure detection.

TECHNICAL SPECIFICATIONS

High Frequency Generator	
Working Frequency	27.12MHz

Stability	□ 0.05□
Output power	800W □ 1600W
Stability	≤0.05□
Matching Method	Automatic
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) ≤0.015nm(2400 wire grating)
Main Unit Parameters	
Scanning wavelength range	195nm□ 500nm□ 3600L/mm wire grating) 195nm□ 800nm□ 2400L/mm wire grating)
Repeatability	RSD≤1.5□
Stability	RSD≤2.0□

Test Part

Abrasion Elements in Lube Oils

1.1 Equipment

1.1.1 CONOSTAN Dedicated Diluent for ICP

1.1.2 Pipette, 0-5ml

1.1.3 Electronic balance, 0.0001g

1.2 Working Condition Requirements

High-frequency generator: 27.12MHz, 0.7mm quartz torch with center channel, high-frequency power 1200W, plasma gas flow 15L/min, auxiliary gas flow 0.99L/min, carrier gas flow 0.35L/min, oxygen flow rate 50ml/min. The temperature of the atomizing chamber is -20°C, and the peristaltic pump operates at a speed of 3ml/min.

1.3 Test Method

After the apparatus is automatically ignited and parameters are set according to the working conditions, the diluent is drawn directly into the mist chamber via the nebulizer and enters the plasma. Once the apparatus stabilizes, the blank solution, standard solution, and diluted sample solution are measured simultaneously. The content of each element in the final sample can be directly determined. The linear relationship of the elements is determined using the experimental method. Simultaneously, the blank solution is measured ten times for each element. The standard deviation of the measured value is divided by the slope of the curve to obtain the method detection limit. As shown in the table below, the fitting coefficient of the elemental working curve exceeds 0.999, indicating a good linear relationship within the linear range of the working curve. Optimized working parameters of the apparatus improve the accuracy of the test results for the elements.

Applicable Standard: ASTM D5185 Standard Test Method for Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

Conclusion

The ICP method directly determines 16 wear elements in lubricating oil. Compared to relative digestion methods, it offers higher accuracy and better reproducibility. KN-5185 demonstrates characteristics of low cost, fast speed, and high accuracy. The determination of 16 types of wear elements in lubricating oil adequately fulfills the requirements of the petrochemical industry.

Test Report Comparasion			
Sample Name	Diesel Engine Oil		
Receiving Date	JAN,2ND,2020	Test Period	JAN,8TH,2020
Description	Viscous Oil Sample		
Test Requirement			
Test component	Ca, Mg, P, Zn		
Reference			
Standard	ASTM D5185	Standard Sample	S-21 Mixed Sample
Humidity	≤70%	Temperature	25℃
Test Process			
Weigh a certain amount of sample into a 100ml volumetric flask, add the internal standard solution, dilute to the mark with blank oil, shake well, and wait for measurement			

TT-5185 ICP			Perkin Elmer Optima 3300 ICP-OES		
Test Item	Unit	Result	Test Item	Unit	Result
Ca	mg/kg	4179.1	Ca	mg/kg	4225.7
Mg		22.06	Mg		21.501
P		1064.3	P		1026.2
Zn		1133.1	Zn		1133.1

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