

FLAME FURNACE ATOMIC ABSORPTION SPECTROPHOTOMETER



Flame Furnace Atomic Absorption Spectrophotometer TT-AAS

Flame Furnace Atomic Absorption Spectrophotometer TT-AAS adheres to the ASTM D4628 Standard Test Method for Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oils by Atomic Absorption Spectrometry.

During fuel combustion, metals within the fuels can create corrosive low melting compounds that pose a threat to metal components. Additionally, trace metals found in petroleum can hinder catalysts during processing. These test methods offer a quantitative means of determining the concentrations of vanadium, nickel, iron, and sodium. Consequently, they serve as valuable tools in assessing the quality and value of both crude oil and residual oil.

APPLICATIONS

The primary application of the Flame Furnace Atomic Absorption Spectrophotometer TT-AAS is to determine the concentration of specific metals in various petroleum products. This includes two key functions:

- **Additive Measurement (ASTM D4628):** Measuring the concentration of metallic additives like Barium, Calcium, Magnesium, and Zinc in new lubricating oils to ensure they are correctly formulated.
- **Contaminant Measurement:** Quantifying harmful metallic contaminants like Vanadium, Nickel, Iron, and Sodium in crude oils and residual fuels to assess quality and prevent operational issues like corrosion and catalyst poisoning.

Key Industries

- **Lubricant Manufacturing:** This is a fundamental quality control tool for lubricant blenders. They use it to verify that the correct amounts of metallic additives (e.g., detergents, anti-wear agents) are present in their finished products, which is critical for performance.

- **Petroleum Refining:** Refineries rely on this instrument to test incoming crude oil and residual fuels for metallic contaminants like nickel and vanadium. These metals can severely poison expensive catalysts in refining units, making this a vital analysis for protecting assets and maintaining efficiency.
- **Additive Manufacturing:** Chemical companies that produce the metallic additive packages used in lubricants utilize this technology for their own quality control, ensuring the concentration of metals in their products is precise before they are sold to lubricant blenders.

FEATURES

- High-precision automatic optical system.
- Polymer spray chamber made of materials resistant to corrosion from acids and alkalis.
- Titanium burner with options for 50mm and 100mm burners.
- Automatic analysis capabilities, including safety ignition, extinguishing, and switching.
- The structure is reliable with a low fault rate, ensuring sensitivity and reproducibility of the flame method.
- The light source system features six-lamp automatic conversion, allowing for the direct use of high-performance hollow cathode lamps, enhancing flame analysis sensitivity.
- It also includes automatic adjustment of power supply parameters and beam position, as well as automatic wavelength scanning and peak searching.

TECHNICAL SPECIFICATIONS

Mainframe

1. Light Source: ≤ 3 lamps automatic turret with automatic alignment.
2. Power Supply: 110/220V (+5% ~ -10%), 60/50Hz; 5000VA.

3. Lamp Current: pulsed power supply.
4. Optical System: large 1800 lines/mm grating ruling, full closed optical system.
5. Wavelength Range: 190nm-900nm, with automatic peak finding and key optical optimization function.
6. Wavelength Accuracy: $\leq 0.15\text{nm}$.
7. Wavelength Repeatability: $\pm 0.1\text{nm}$.
8. Spectral Bandwidth: 0.1nm, 0.2nm, 0.4nm, 1.0nm, 2.0nm (5 steps with automatic changeover).
9. Baseline Stability: $\leq \pm 0.002\text{A}/30\text{ min}$ (Static), $\leq \pm 0.005\text{A}/30\text{min}$ (Dynamic).
10. Absorbance Range: 0-4A.

Flame Analytical System

1. Detector: photomultiplier tube.
2. Burner Head: full titanium combustion head, with options for 50mm or 100mm general combustion heads.
3. Atomization Chamber: polymer explosion-proof spray chamber.
4. Nebulizer: efficient glass atomizer, can be customized as well.
5. Ignition Type: microcomputer control with automatic ignition.
6. Gas Control: automatic gas control system.
7. Detection Limits (Cu): $0.002\mu\text{g/mL}$.
8. Precision: Relative Standard Deviation (RSD) $\leq 0.5\%$.



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