

# Atomic Absorption Method Guide

## Mg in lubricating oils

### Key Words

- Lubricating Oils
- Mineral Oils
- Magnesium
- Flame
- Atomic Absorption

### Principle

The sample is dissolved in white spirit, and magnesium is determined by flame atomic absorption spectrometry using an air-acetylene flame.

### Reagents

**White spirit (BS:245)** (Spectrosol grade or equivalent)

**Magnesium master standard (500mg/L, oil-soluble organometallic standard solution or equivalent)**

**Magnesium sub-stock standard (50.0mg/L)**

Transfer 10.0g of the master standard to 100mL volumetric flask, dilute to volume with white spirit.

### Working standards

Weigh 0, 0.05, 0.2 and 0.5g of the magnesium sub-stock standard into a series of 100mL volumetric flasks and dilute to volume with white spirit. The working standards will contain 0, 0.025, 0.1 and 0.25mg/L of magnesium.

### Sample Preparation

Weigh up to 10.000g of oil into a 100mL volumetric flask and dilute to volume with white spirit. Ensure the sample is fully dissolved. For higher concentrations, dissolve a smaller quantity of oil prepared in the same way.

### Instrument Parameters

The screenshot shows two panels of the instrument software interface. The top panel is titled 'Mg oil (Mg)' and contains the following settings: Measurement Mode: Absorption; Number of Resamples: 3; Fast Resamples: checked; Measurement Time: 4.0 s; Wavelength: 285.2 nm; Lamp Current: 75%; Bandpass: 0.5 nm; Optimize Spectrometer Parameters: unchecked; Signal: Continuous; Transient Peak Measurement: Measure From: 0.00 s, To: 1.00 s; High Resolution: unchecked; Background Correction: D2 Quadline; Flier Rejection: Use Flier Rejection: unchecked, Rejection Limit: 35%; RSD Test: Use Test: unchecked, If RSD greater than: 0%, AND signal greater than: 0.1 Abs, Then: Flag and Continue. The bottom panel is also titled 'Mg oil (Mg)' and contains: Flame Type: Air-Acetylene; Fuel Flow: 0.8 L/min; Optimize Fuel Flow: unchecked; Auxiliary Oxidant: checked; Burner Stabilisation Time: 0 min; Nebuliser Uptake Time: 4 s; Burner Height: 7.0 mm; Optimize Burner Height: checked.

Figure 1 Instrument parameters

### Results

Sample	Used gear oil
Magnesium found (% m/m)	0.0059
Independent analysis (% m/m)	0.0059

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*The method of sample treatment described in this publication should be performed only by a competent chemist or technician trained in the use of safe techniques in analytical chemistry. Users should acquaint themselves with particular hazards which may be incurred when toxic materials are being analysed and handled in the instruments, and the instrument must be used in accordance with the operating and safety instructions given in the Operators manual.*

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