

The Thermo Scientific SC 4000 provides precise measurement of oil and lubricants on metallic substrates. This hand-held device provides reliable, accurate oil readings without time consuming sampling and destructive laboratory tests.

Thermo Scientific SC 4000

Portable Oil Film and Lubricant Measurement System



The Thermo Scientific SC 4000 measures the thickness of oil or organic films on metal surfaces. The technology used is extremely flexible and applicable to many aspects of flat sheet processing.

Measurement Physics

Thickness measurement of oil and other organic lubricant films on metal surfaces relies on analyzing the infrared reflectance of the surface using several specific mid-infrared wavelengths and polarization states.

Absorption of IR radiation by hydrocarbon (CH) compounds (the basic components of oil) is used in determining the film thickness. The main opto-electronic components are housed in a hermetically-sealed multi-channel detector package. This assures the exacting stability and durability required for reliable operation in an industrial environment. The measurement method is applicable

for oil film thickness from a few milligrams up to 5 grams per meter squared.

The user can create custom system calibrations by using the Calibration Tool software and samples with known coating thickness. The software makes the calibration process fast and easy.

The SC 4000 is provided with a patented reference plate containing stable, permanent sample films. This reference plate provides a fast method for on-site instrument performance verification.

Since each oil film/substrate combination may produce its own sensor response, the plate acts as a stable, permanent reference to confirm the calibration of the unit for every sample measured. The plate is assigned a serial number, and its film characteristics are maintained at our manufacturing facility. It is an essential component of the system.



Applications

- Lubrication
- Corrosion protection oil films
- Dry lubricants or other organic coatings

Specifications

The SC 4000 is a hand-held lubricant thickness measurement instrument for applications where portability is needed. Such applications include:

- Oil film thickness measurement of the outgoing/incoming material
- Laboratory measurements
- Oil film thickness control in automotive pressing shops
- Lubricant thickness measurement in steel or aluminum rolling mills

The instrument is easy to use. Place it on the metal surface, pull the trigger and the amount of oil is shown immediately on the display. The individual readings and measurement data statistics can be viewed on the LCD display. They are additionally stored in the system memory together with user and calibration information.

The SC 4000 utility software that accompanies the SC 4000 unit can be installed on a Windows®-based desktop PC. The hand-held unit is connected through a standard serial link to the PC for data transfer.

The SC 4000 utility software includes the following functions:

- A step-by-step procedure for calibration of new oil film/substrate combinations.
- A report generator to print out graphical statistics of recent measurements.
- Storage of previous calibrations and measurements.

The SC 4000 is available in two versions:

- Thermo Scientific SC 4000 GS for electro-galvanized, galvanized or pickled steel and other matte substrates.
- Thermo Scientific SC 4000 AT for all other measurements and especially for very thin oil coatings on shiny substrates like aluminum.



Oil Film Measurement with the SC 4000

Thermo Scientific SC 4000 AT and SC 4000 GS

| General Specifications | SC 4000 AT | SC 4000 GS |
|-------------------------------|--|--|
| Coating to be Measured | Corrosion protection or lubrication oils, dry lubricants, firm organic coatings | |
| Measuring Principle | Multi-channel infrared-absorption spectroscopy | |
| Recommended Application Areas | Glossy, well-reflecting metal surfaces like tin plate, aluminum, glossy cold rolled steel, hot dip galvanized, etc.; oil amounts greater than 10 mg/m ² | Matte/rough, weakly-reflecting metal surfaces like electro-galvanized steel, galvanized, pickled, etc.; glossy, reflecting surfaces like cold rolled steel, hot dip galvanized and aluminum with oil amounts greater than 0.1 g/m ² |
| Measuring Ranges | Range A: 0.1 to 5 g/m ² Range B: 10 to 1,000 mg/m ² Range C: 10 to 200 mg/m ² | Range A: 0.1 to 5 g/m ² Range B: 100 to 1,000 mg/m ² |
| Source | Halogen lamp with intensity modulator and polarizer | Halogen lamp with intensity modulator and polarizer |
| Detector | Multi-wavelength receiver module | Multi-wavelength receiver module |
| Measurement Area | 1.5 cm ² (0.23 in ²) | 1.5 cm ² (0.23 in ²) |
| Optional Measurement Units | mg/m ² , g/m ² and mg/ft ² | mg/m ² , g/m ² and mg/ft ² |
| Dimensions | 23 cm (9.05 in) x 24 cm (9.45 in) x 11 cm (4.33 in) | 23 cm (9.05 in) x 24 cm (9.45 in) x 11 cm (4.33 in) |
| Weight | 2.8 kg (6.2 lb) | 2.8 kg (6.2 lb) |
| Operating Time | More than 1,000 readings with full battery charging | More than 1,000 readings with full battery charging |
| Memory Capacity | 98,000 readings, 50 calibrations | 98,000 readings, 50 calibrations |
| Data Interface | Standard RS-232-C serial channel | Standard RS-232-C serial channel |

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