

ET10

HANDHELD THERMAL EMISSOMETER

The SOC410 Series handheld reflectometers and emissometers are a product of collaboration between U.S. Naval Air Systems Command and Surface Optics Corporation, with vital input from the Naval Research Lab (NRL) and National Institute of Standards and Technology (NIST).

The ET10 answers the long standing need for the measurement of emissivity as an entry parameter for infrared cameras involved in measurements of temperature.

The ET10's lightweight, counter-balanced, pistol-grip design allows single-handed carry and use. Simply hold the ET10 sampling port against the surface to be tested and press the trigger to take the measurement. The ET10 measures total reflectance at 20 degrees angle of incidence in-band for 3-5 and 8-12 microns. View results immediately on the touch screen display. Measurements can be taken on curved surfaces without special jigs or fixtures.



KEY BENEFITS

- Capture valuable reflectance and emissivity characteristics with a portable, lab quality instrument you can take anywhere.
- Access data measurement results in the field from the user friendly, color touchscreen interface.
- Easy calibration process ensures your measurement session produces good data.
- A 90 second warm-up time and 10 second measurement cycle for no wasted time.
- Measures reflectance in the infrared spectral range from 3-5 and 8-12 microns.
- Emissivity can be measured for various materials; metals, dielectrics, or other.

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HOW IT WORKS

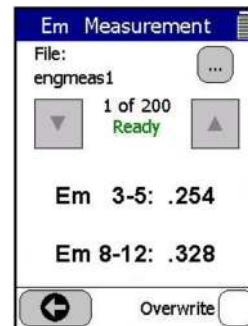
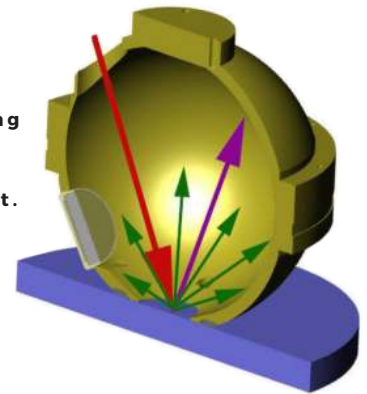
The basic structure in a measurement head is: an internal source, a modified integrating sphere, and detectors. The reflectance measurement is made by collimating the source beam onto the target, the energy is reflected back into the sphere, and eventually detected or dissipated.

The integrating sphere captures the reflected light from the target material, integrating reflections in all directions. Wavelength-filtered detectors measure the total light reflected in each wavelength band and converts it to an analog electrical signal.

The ET10 electronics processes the detector signals for initial amplification (fixed), filtering, offset adjustment, secondary amplification (variable), and analog to digital conversion. The digitized signals are read by the onboard processor, stored in memory, and then used to determine the target sample reflectance at 20 degrees incident angle for the two wavelength bands.

Schematic of the integrating sphere in contact with a sample.

Red arrow - illuminating beam; purple arrow - reflected beam; green arrows - scattered light.



Results are displayed on the liquid crystal display touchscreen, and stored on a SecureDigital (SD) card.

COMPONENTS



CALIBRATION

An easy calibration process is required before each measurement session. The software GUI will walk the user through the process. Calibration is performed using a Specular Gold Calibration Coupon with known reflectance values.



SPECIFICATIONS

MEASURED DATA

Measured Parameter	Directional hemispherical reflectance (DHR)
Method	Integrated total reflectance in a band for a given angle of incidence
Measured Value	Absolute reflectance (0-1)
Calculated Value	Directional thermal emissivity at 20°
Wavelength Bands (microns)	3-5, 8-12
Angle of Incidence	20° from normal incidence

PERFORMANCE

Accuracy	+/- .03
Measurement Time	7 sec
Surface Curvature	Any surface; convex 6" radius; concave 12" radius
Warm Up Time	90 seconds

POWER

Run Time	2 hours on one battery. Battery easily replaced with continuous operation after battery replacement
Power Source	Rechargeable battery (standard environmentally friendly NiMH)
Battery Recharge Time	1 hour
IR Source	Kanthal filament operated at about 1,000°C



ENVIRONMENT

Storage	-25 to 70°C
Operating	0 to 40°C

INTERFACE

Operator Interface	LCD graphics screen, 1/4 VGA, touch screen, software buttons; trigger switch in handle
Inspection Applications	Pass/fail can be incorporated, user set values
Diagnostics	On screen status and signals monitor. Signal values stored with data. Raw data collection and display.

DIMENSIONS

Weight	4.7 lbs
Form Factor/Size	H 11.54", L 9.04", W 3.27"

DATA

Format	Data files can be opened and post processed with Excel or a text processor
Storage	Removable SanDisk(SD) card

