



George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

EM50-OWI-020
April 27, 2005

ORGANIZATIONAL WORK INSTRUCTION

EM50

OPERATION OF PORTABLE INFRARED REFLECTOMETER

Revision E

APPROVING
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TITLE

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EM50

4/27/2005

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VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Marshall Space Flight Center Organizational Work Instruction		
OPR		
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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		08-07-97	Baselined OWI
Revision	A	05-23-99	Updated for reorganization
Revision	B	02-22-00	Changed QMS Documents to directives
Revision	C	07-06-00	Updated for records management
Revision	D	09-01-04	Updated per HQ Rules Review Action
Revision	E	04-27-05	Changes made due to reorganization

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OPERATION OF PORTABLE INFRARED REFLECTOMETER

1. SCOPE

1.1 Scope.

This document establishes the organizational work instruction for the AZ Technology Total Emittance Measurement Portable (TEMP) model 2000 portable infrared reflectometer.

1.2 Purpose.

The purpose of this document is to outline the steps necessary for measurement of a material's infrared emittance using the AZ Technology TEMP 2000 infrared reflectometer.

1.3 Applicability.

This document applies to the infrared reflectometer used by EM50. This work instruction is not a substitute for formal training in TEMP 2000 operation. Untrained personnel should not attempt to use this document to operate the TEMP 2000 unless supervised by trained, experienced personnel.

2. APPLICABLE DOCUMENTS

	TEMP 2000 Operations Manual
MPD 1280.1	Marshall Management Manual
EM50-OWI-002	Document and Data Control
MPG 8730.5	Control of Inspecting, Measuring, and Test Equipment
EM50-OWI-003	Control of Records
ASTM E408-71	Total Normal Emittance of Surfaces Using Inspection-Meter Techniques

3. DEFINITIONS

Warning - Warnings are used when failure to observe instructions or precautions could result in injury to personnel.

Caution - Cautions are used when failure to observe instructions could result in damage to equipment.

Note - Information to help clarify multi-person procedures or simultaneous multiple operations.

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4. INSTRUCTIONS

Work performed and data generated within EM50 that affects the quality of products as specified in the scope of MPD 1280.1 shall be documented and controlled per EM50-OWI-002.

- 4.1 Connect cable between measurement head and readout unit/power supply.
- 4.2 Connect power cable to readout unit and plug into single phase 110VAC outlet.
- 4.3 Flip power switch and wait 5-10 minutes for warm-up.
- 4.4 Check that the TEMP is operating in the Relative Mode instead of Absolute Mode.
- 4.5 Place measurement head so that it is facing up, and place the calibration chip over the aperture. Take readings on both black and gold sides. Compare the readings to the standard values; if the readings are not within 0.001 of the calibration values, re-calibrate the machine. (See TEMP 2000 Operating Manual, section 3.2.2.)
- 4.6 For emittance measurements, toggle emittance/reflectance switch. The symbol "ε" should replace "ρ" on the readout.
- 4.7 Place measurement head so that the aperture is on the surface to be measured. Orientation is irrelevant as long as stray light and vibration are minimized.

Caution - Do not attempt to measure a sample smaller than the measurement head aperture (approx. 0.25 in. dia.)

- 4.8 Wait until readings have stabilized (minimum of 3 readings), then record in the appropriate lab notebook the sample material, sample number, and the measured infrared emittance.
- 4.9 Repeat steps 4.7 and 4.8 as necessary. Check calibration (step 4.5) periodically.

5. NOTES

In respect to MPG 8730.5, calibration of the TEMP infrared reflectometer shall be on an as-needed basis using the calibration chip provided by the manufacturer, AZ Technology.

6. SAFETY PRECAUTIONS AND WARNING NOTES

None.

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7. APPENDICES, DATA, REPORTS, AND FORMS

When qualifying a material for spacecraft use, a data sheet shall be filled out with infrared emittance for each sample. General practice is to make three emittance measurements on the same sample then use the average rounded off to two digits. This data sheet shall be presented to quality personnel for stamping. MSFC Quality may choose whether or not to be present for the sample characterization.

8. RECORDS

Records will be retained in accordance with EM50-OWI-003. Copies are to be maintained on file in EM50 for a period not less than two years.

9. TOOLS, EQUIPMENT, AND MATERIALS

Calibration chip provided with TEMP 2000 by manufacturer.

10. PERSONNEL TRAINING AND CERTIFICATION

The leader of the Environmental Effects Group shall be responsible for ensuring that all personnel using the TEMP 2000 are trained. Training is generally accomplished as on-the-job training by experienced personnel or a manufacturer's representative. Records of personnel training shall be kept in the group office.

11. FLOW DIAGRAM