



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

EM50-OWI-019  
April 27, 2005

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# ORGANIZATIONAL WORK INSTRUCTION

## EM50

### OPERATION OF PORTABLE SPECTROREFLECTOMETERS

### Revision E

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4/27/2005

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VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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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	QMS documents changed 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 SPECTROREFLECTOMETERS

### 1. SCOPE

#### 1.1 Scope.

This document establishes the organizational work instruction for the Laboratory Portable Spectroreflectometer (LPSR) and the non-flight Space Portable Spectroreflectometer (SPSR).

#### 1.2 Purpose.

The purpose of this document is to outline the steps necessary for measurement of a material's solar absorptance using the Laboratory Portable Spectroreflectometer (LPSR) and the non-flight version of the Space Portable Spectroreflectometer (SPSR).

#### 1.3 Applicability.

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

### 2. APPLICABLE DOCUMENTS

MPD 1280.1	Marshall Management Manual
EM50-OWI-002	Document and Data Control
MPG 8730.5	Control of Inspection, Measuring, and Test Equipment
EM50-OWI-003	Control of Records LPSR Operating Manual

### 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 with 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.

The spectroreflectometers may be operated either through direct computer control or stand-alone mode with data dump to a computer later.

##### 4.1 Stand Alone Mode of Operation

- 4.1.1 Connect power cable between reflectometer unit and power supply. Plug power supply into single phase 110VAC outlet.
- 4.1.2 Flip power switch and wait for warm-up. (Note: for SPSR, do not turn on lamp switch. This is a feature for EVA use and is not needed in the laboratory.)
- 4.1.3 Place reflectometer unit so that the sphere aperture is on surface to be measured. Orientation is irrelevant as long as stray light is minimized.

Caution - Do not attempt to measure a sample smaller than the sphere aperture (approx. 0.55 in. dia.)

- 4.1.4 Toggle switch for "Measurement Menu".
- 4.1.5 Toggle switch for "Start Measurement". Spectroreflectometer will take approximately two minutes to complete a measurement.
- 4.1.6 Record in the appropriate lab notebook the sample material, sample number, the run number (year, month, day, hour, minute), and the measured solar absorptance.
- 4.1.7 Repeat steps 4.1.3 through 4.1.6 as necessary. The spectroreflectometers may only hold data from 40 measurements before a data dump to disk is needed.
- 4.1.8 To retrieve stored data from the spectroreflectometer, follow steps in Section 4.3.

##### 4.2 Direct Computer Control

- 4.2.1 Connect data cable between reflectometer unit and controlling computer.
- 4.2.2 Connect power cable between reflectometer unit and power supply. Plug power supply into single phase 110VAC outlet.
- 4.2.3 Start-up computer and type "host" at the prompt.
- 4.2.4 When menu appears, flip spectroreflectometer power switch and wait for warm-up. (Note: for SPSR, do not turn on lamp switch. This is a feature for EVA use and is not needed in the laboratory.)

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- 4.2.5 Hit "1" for computer to assume control of spectroreflectometer and wait for downloading of calibration data.
- 4.2.6 Place reflectometer unit so that the sphere aperture is on surface to be measured. Orientation is irrelevant as long as stray light is minimized. With small samples, reflectometer unit may be inverted, and sample placed on the aperture.

Caution - Do not attempt to measure a sample smaller than the sphere aperture (approx. 0.55 in. dia.)

- 4.2.7 Toggle switch for "Measurement Menu".
- 4.2.8 Toggle switch for "Start Measurement". Spectroreflectometer will take approximately two minutes to complete a measurement.
- 4.2.9 Record in the appropriate lab notebook the sample material, sample number, the run number (year, month, day, hour, minute), and the measured solar absorptance.
- 4.2.10 Repeat steps 4.2.6 through 4.1.9 as necessary. The spectroreflectometers may only hold data from 40 measurements before a data dump to disk is needed.

#### 4.3 Data Storage

- 4.3.1 Toggle switch for "Measurement Menu".
- 4.3.2 Toggle switch for "Store Data to Disk".
- 4.3.3 Select personal database for data to be stored in.
- 4.3.4 When prompted, type in a sample description to be stored with the data. Solar absorptance and run number are automatically stored in the LPSR/SPSR database.
- 4.3.5 Follow prompts for copying data to the C: drive, and write down in the appropriate lab notebook the name of the data file.

#### 5. NOTES

In respect to MPG 8730.5, calibration of the LPSR and the non-flight SPSR units shall be on an as-needed basis by the manufacturer, AZ Technology.

#### 6. SAFETY PRECAUTIONS AND WARNING NOTES

None.

#### 7. APPENDICES, DATA, REPORTS, AND FORMS

When qualifying a material for spacecraft use, a data sheet shall be filled out with solar absorptance for each sample. This data sheet shall be presented to quality personnel for stamping.

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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 of not less than two years.

#### 9. TOOLS, EQUIPMENT, AND MATERIALS

None.

#### 10. PERSONNEL TRAINING AND CERTIFICATION

The leader of the Environmental Effects Group shall be responsible for ensuring that all personnel using the LPSR or SPSR 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