

410-Vis

Visible/NIR Hand-Held Reflectometer

Field Reflectance Measurements



FEATURES

- Measures total, diffuse and specular reflectance
- Measures reflectance between 400-1100nm in four discrete bands
- Battery operated
- Fast and portable
- Tool-like feel and operation

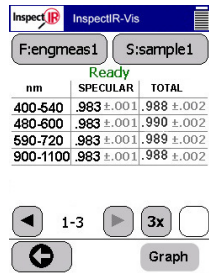
BENEFITS

- Solar Absorptance predictions
- No alignment problems
- Measures reflectance of large objects
- Works in the field

The **410-Vis** measures absolute reflectance for large objects or objects in the field

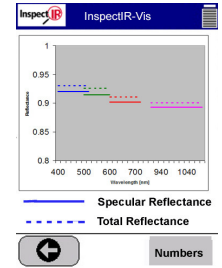
Operation

The **410-Vis** measures the diffuse portion of the total reflectance at 20° using the fully automated specular diffuse port plug. The port plug is lifted away from the sphere allowing the 20° specular beam to escape, leaving the diffuse portion of the total reflectance left to measure. The specular beam portion is obtained by subtracting the diffuse reflectance from the total reflectance. For maximum accuracy it is calibrated with a specular calibration coupon and with a diffuse calibration coupon.



nm	SPECULAR	TOTAL
400-540	.983 ±.001	.988 ±.002
480-600	.983 ±.001	.990 ±.002
590-720	.983 ±.001	.989 ±.002
900-1100	.983 ±.001	.988 ±.002

Numerical Data Display



Graphical Data Display

The **410-Vis** is controlled by soft keys on the PDA computer screen. To perform measurements just press the device against the surface to be tested pull the trigger. The data is recorded and can be displayed in a graphical or numerical form. The data can also be annotated with sample names or measurement point identifications.

Specifications

MEASURED PARAMETER

Directional Hemispherical Reflectance

METHOD

Integrated Total Reflectance in a band for 20° angle of incidence

MEASURED VALUE

Total reflectance, Diffuse Reflectance, and Specular Reflectance at 20° (8 measurements simultaneously)

WAVELENGTH BANDS

Four bands: 400-540, 480-600, 590-720 & 900-1100nm

ANGLE OF INCIDENCE

20° from normal incidence

SURFACE CURVATURE

Any surface; convex 6" radius; concave 12" radius

BEAM SPOT SIZE

0.250" diameter at 20°

BEAM ANGLE

3° half cone angle

MEASUREMENT TIME

10 sec./measurement, user controlled (7bands)

WARM UP TIME

90 seconds

RUN TIME

Two hours on one battery. Battery easily replaced, with continuous operation after battery replacement.

POWER SOURCE

Rechargeable batter (standard environmentally friendly NiMH)

RECHARGE TIME

1 hour

WEIGHT

4.7 lbs. with battery

VIS-NIR SOURCE

Tungsten filament, temperature controlled by user

FORM FACTOR/SIZE

Hand held, balanced at the trigger, approx. the size of a power drill (H 11.54", L 9.04", W 3.72")

MODULARITY

Modular construction, interchangeable measurement heads

OPERATOR INTERFACE

LCD graphics screen, ¼ VGA, touch screen, software buttons; trigger switch in the handle.

DIAGNOSTICS

On **screen** status and signals monitor. Signal values stored with data. Raw data collection and display.

INTERNAL DATA STORAGE & TRANSFER

265MB removable CompactFlash™ card
 No data on PDA after power down

DATA FORMAT

Standard spreadsheet; data files can be opened & post processed with Excel or a text processor.

ENVIRONMENTAL

Storage: -25 to 70°C;

Operating 0 to 40°C, non-condensing

410-VIS:

- Portable & accurate
- Based on a modified integrating sphere
- Measures total reflectance at 4 sub-bands (400 to 1100 nm spectral band)
- Signal intensity normalized against an internal standard
- Total diffuse & specular reflectance reported for the data at 20° incidence
- 8 data points produced during each acquisition cycle
- Powerful control, measurement & data processing functions executed via PDA screen
- Uses:
 - Inspection of mirrors & diffuse materials
 - Inspection of telescope mirrors

