

Solar Reference Cells

NIST Traceable calibration



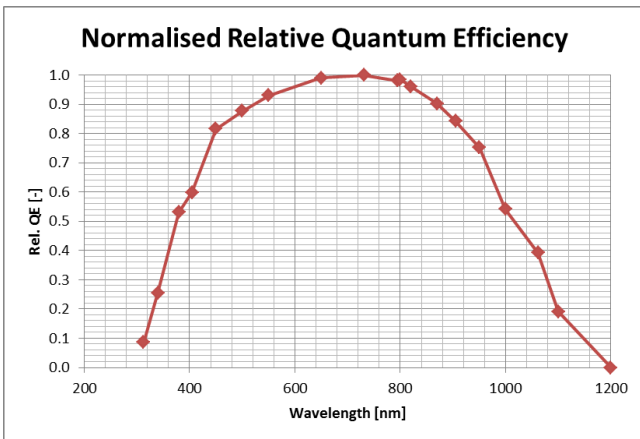
Abet Technologies Model 15150 Reference Cell

WPVS Compatible 62x62 mm Mount

The full featured Abet 15150 series of reference cells comply with the WPVS standard dimensions to allow easy intercomparison of different devices. Standard cells ship with a fused silica window. 15150-KG5 models ships with a KG5 window. Other filter options available – please consult with Abet. The calibration uncertainty for the KG-5 filtered cells is +/-5%.

Spectral Calibration option

A Relative Spectral Calibration option is available for all the 15150 Reference Cell models to assist in Spectral Mismatch determination and correction.



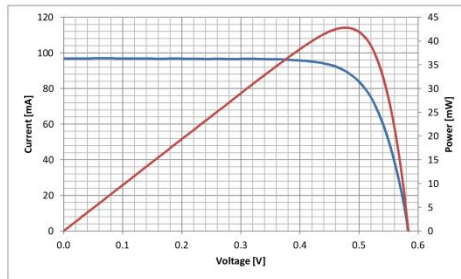
Relative Spectral Calibration plot from an Option 15154 report

Specifications for Model 15150

Solar Cell	Mono-crystalline silicon
Solar Cell Area	4 cm ²
Window	Fused silica
Calibration Conditions	1000 Wm ⁻² , AM1.5G, 25°C
Irradiance Level Range	900 to 1000 Wm ⁻²
Spectral Sensitivity	320 - 1100 nm
Parameters Reported	I _{sc} , V _{oc} , I _{mpp} , V _{mpp} , Fill Factor and Efficiency
Uncertainty in I _{sc}	+/- 3%
Temperature Sensor	3 wire connected Pt100
Cable Lengths	2 x 1.5 meter

ABET TECHNOLOGIES, INC.
158 Old Gate Lane
Milford, Connecticut 06460

Device Code:	RR-109-0	Irradiance:	1000 W/m ²
Date:	10-Mar-11 2:06 PM	Spectrum:	AM1.5G
Reference:	PVM199	Temperature:	24.4 °C
Area:	4 cm ²	Corrected to STC:	Yes



I _{sc}	96.8 mA	J _{sc}	24.2 mA/cm ²
V _{oc}	584 mV	I _{mpp}	89.8 mA
FF	75.7 %	V _{mpp}	476 mV
Eta	10.7 %		

Source: Abet Technologies Solar Simulator
Load: Keithley 2400
Temperature: PTE00
Software: ReRa Tracer
Contact calibration lab for error analysis

Approved:
E. Haverkamp

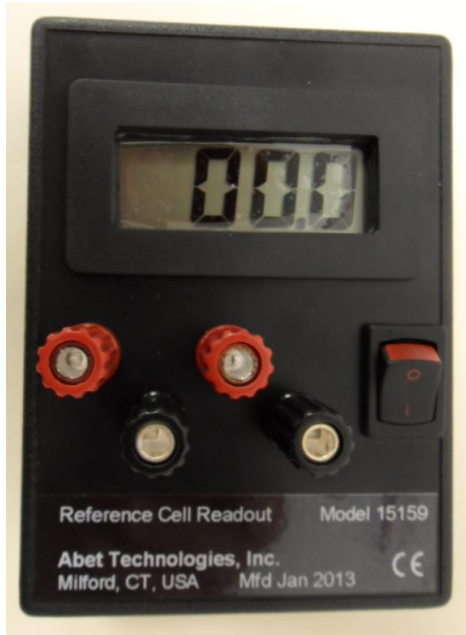
Sample calibration report for a Model 15150 Solar Reference Cell

Using the solar reference cell

Model 15150 reference cells can be utilized using the PV-IV curve tracer electronics. They can also be used in a standalone mode using a low input impedance current meter like Abet Technologies Model 15159 Calibrated Readout. Four wires are attached to the sensor to make 4-point measurements possible. These wires are terminated with banana connectors (two red and two black). The Pt100 temperature sensor is connected by means of 3 wires. Any 3-wire capable Pt100 readout device can be used to measure the temperature.

Calibrated Readout

Model 15159 Calibrated Readout can be calibrated for a particular Model 15150 reference cell to display 100.0 when the cell is exposed to one AM 1.5G sun irradiance. It can also be shipped calibrated to offer 1 Ohm input impedance and be then usable with a number of different cells, displaying their calibrated I_{sc} at one sun irradiance conditions.



Abet Technologies Model 15159 Calibrated Readout

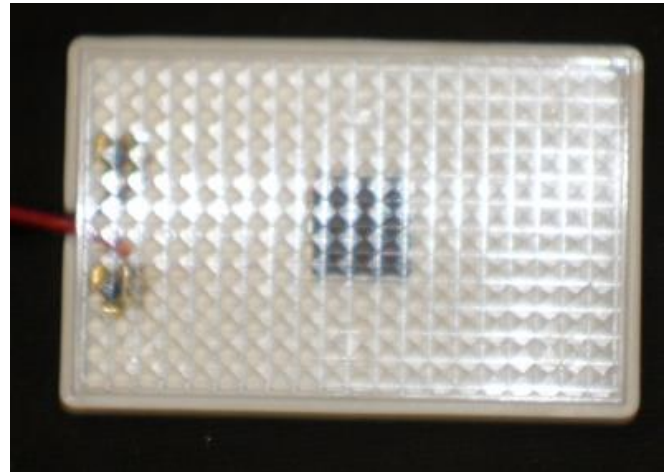
Reference cells for QE measurements

Quantum efficiency metrology requires spectrally characterized reference cells. Abet 10 mm diameter AB2152 Si and Ge cells come with NIST traceable calibration data.



Abet Technologies Model AB2152-1 Si reference cell

Low Cost Reference Cell



Abet Technologies Model 15151 Reference Cell

Model 15151 reference cells offer an entry level means for calibrated solar cell metrology. Each 10x10 mm cell comes calibrated to deliver 100 mV output at one AM 1.5G sun which can be easily read with any voltmeter. Calibration accuracy is 6% at the time of shipment. Enclosure size is 55x36x7 mm. Model 15151-KG5 cells add a KG5 window to more closely match spectral response of amorphous Silicon and Dye Sensitized Cells. Calibration accuracy is 8% at the time of shipment.

Relative responsivity data option is not available for the 15151 family of cells.

Ordering Information

15150	Reference Cell, 20x20 mm, WPVS compatible
15150-KG5	Reference Cell, 20x20 mm, WPVS compatible, KG5 filter window
15154	Spectral Response Calibration Option for 15150 reference cells, NIST traceable
15159	Calibrated reference cell readout
15151	Low cost reference cell, 10x10 mm
15151-KG5	Low cost reference cell, 10x10 mm, KG5 filter
AB2152-1	Si reference cell, 280-1100 nm NIST traceable calibration
AB2152-2	Ge reference cell, 700-1800 nm NIST traceable calibration

Abet Technologies regularly continues to upgrade our products, therefore all specifications are subject to change without notice.

2015 Product updates

Please ask us about the smaller size Si, and the new GaAs and multijunction calibrated cells.