



721 W 1800 N
Logan, UT 84321

Certificate of Calibration

Reference Pyranometer [V_R]:

Manufacturer: Kipp & Zonen
Model: CMP 10
Serial Number: 140713
Responsivity [R_R]: 9.351 $\mu\text{V}/\text{Wm}^{-2}$

Test Pyranometer [V_T]:

Manufacturer: Kipp & Zonen
Model: EXAMPLE
Serial Number: EXAMPLE
Responsivity [R_T]: 9.647 $\mu\text{V}/\text{Wm}^{-2}$

Initial Position:

$V_{R1U} = 4.630 \text{ mV}$	$V_{T1U} = 4.350 \text{ mV}$
$V_{R1S} = -0.010 \text{ mV}$	$V_{T1S} = 0.000 \text{ mV}$
$V_{R1} = 4.640 \text{ mV}$	$V_{T1} = 4.350 \text{ mV}$

Transposed Position:

$V_{R2U} = 4.210 \text{ mV}$	$V_{T2U} = 4.790 \text{ mV}$
$V_{R2S} = 0.000 \text{ mV}$	$V_{T2S} = 0.010 \text{ mV}$
$V_{R2} = 4.210 \text{ mV}$	$V_{T2} = 4.780 \text{ mV}$

Calibration Stability:

$$(0.995) < \frac{V_{R1} V_{T1}}{V_{R2} V_{T2}} < (1.005) \qquad 1.003 \text{ Pass}$$

Test Pyranometer Responsivity:

$$R_T = \frac{V_{R1} + V_{T1}}{V_{R2} + V_{T2}} R_R \qquad 9.647 \mu\text{V}/\text{Wm}^{-2}$$

Calibration Factor:

103.662 Wm^{-2}/mV

Calibration Procedure		
<p>Calibration is based on a side-by-side comparison under high intensity metal halide lamps using an ISO-classified reference pyranometer of the same type, and is in accordance with ISO 9847 type IIc. The ISO-classified reference pyranometer is recalibrated on an annual schedule under clear sky conditions in Logan, Utah using the mean of at least (2) ISO-9060 Spectrally Flat Class A reference pyranometers, and is in accordance with ISO 9847 type Ia. Each of the four Class A reference pyranometers are recalibrated on an alternating year schedule (two instruments per year) at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. NREL reference standards are calibrated to the World Radiometric Reference (WRR) in Davos, Switzerland.</p>		
Traceability		
Reference Instrument	Serial Number	ISO 9060 Classification
EKO Instruments MS80*	S16088044	Spectrally Flat Class A
Kipp & Zonen CM11	060089	Spectrally Flat Class A
Kipp & Zonen CMP11	101625	Spectrally Flat Class A
Hukseflux SR20	2497	Spectrally Flat Class A
Kipp & Zonen CMP10	140713	Spectrally Flat Class A

Technical Manager: *Jacob Birgham*

Date : 13-Jan-2020

Please keep this document for your records