



721 West 1800 North
Logan, UT 84321

Certificate of Calibration Apogee Instruments Pyranometer Model SP-100/200/400 Series

Serial Number : EXAMPLE
Calibration Date : Jul-2017
Recommended Recalibration Date : Jul-2019
Calibration Uncertainty : $\pm 5\%$
Measurement Repeatability : $< 1\%$
Non-stability (Long-term Drift) : $< 2\%$ per year

Calibration Procedure

Calibration is based on a side-by-side comparison under high intensity discharge metal halide lamps using the mean of (4) Apogee transfer standard pyranometers. Apogee transfer standards are calibrated to the mean of at least (2) ISO-classified reference pyranometers under sunlight (clear sky conditions) in Logan, Utah. Each of the four ISO-classified 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.

Traceability

Instrument (Serial #)	ISO Classification	Calibration Date	Calibration Due Date
EKO Instruments MS80 (S16088044)*	Secondary Standard	5-Jun-2017	6-Jun-2019
Kipp & Zonen CM11 (060089)	Secondary Standard	13-Jul-2016	14-Jul-2018
Kipp & Zonen CMP11 (101625)	Secondary Standard	13-Jul-2016	14-Jul-2018
Hukseflux SR20 (2497)	Secondary Standard	18-Jun-2017	19-Jun-2019
Apogee SP-110 (32783)	Photodiode Transfer Standard	15-Jul-2017	15-Jul-2018
Apogee SP-110 (32784)	Photodiode Transfer Standard	15-Jul-2017	15-Jul-2018
Apogee SP-110 (32785)	Photodiode Transfer Standard	15-Jul-2017	15-Jul-2018
Apogee SP-110 (32786)	Photodiode Transfer Standard	15-Jul-2017	15-Jul-2018

*MS80 purchased new in 2017. Initial calibration conducted by EKO Instruments with traceability to the outdoor World Radiometric Reference.

Technical Manager :

Jacob Bingham

Date : 21-Jul-2017

Please keep this document for your records