Broadband Outdoor Radiometer Calibration
Longwave

BORCAL-LW
2015-01

Calibration Facility

Southern Great Plains

Latitude: 36.605°N
Longitude: 97.488°W
Elevation: 317.0 meters AMSL
Time Zone: -6.0

Calibration date
02/09/2015 to 03/04/2015

Report Date
March 4, 2015

NOTICE

Broadband Outdoor Radiometer Calibration Report

Table of contents

Introduction

This report compiles the calibration results from a Broadband Outdoor Radiometer Calibration (BORCAL). The work was accomplished at the Radiometer Calibration Facility shown on the front of this report. The calibration results reported here are traceable to the World Infrared Standard Group (WISG).

This report includes these sections:

- Control Instruments - a group of instruments included in each BORCAL event that provides a measure of process consistency.
- Results Summary - a table of all instruments included in this report summarizing their calibration results and uncertainty.
- Instrument Details - the calibration certificates and application notes for each instrument.
- Environmental and Sky Conditions - meteorological conditions and reference irradiance during the calibration event.

Control Instrument History

Figure 1. Eppley PIR Control Instrument History (K0 Coefficient)

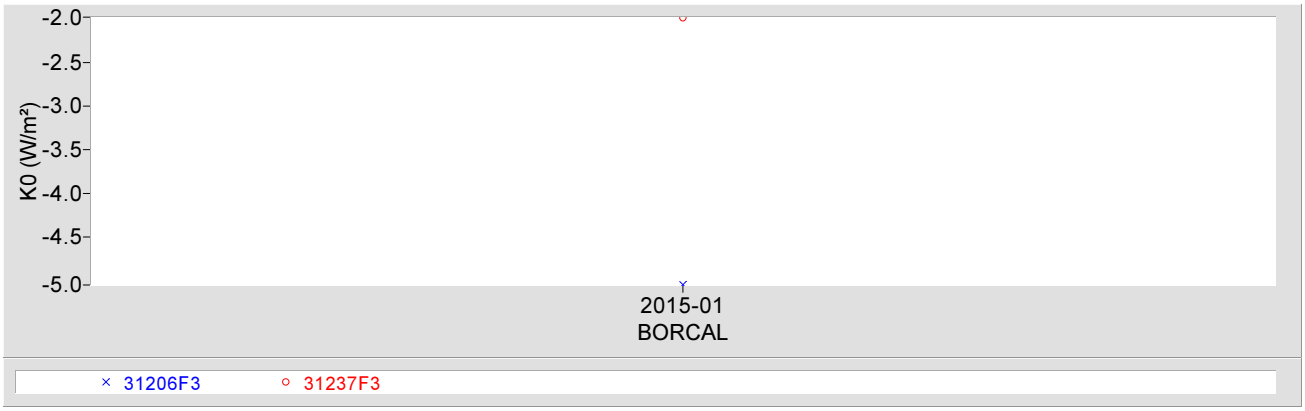


Figure 2. Eppley PIR Control Instrument History (K1 Coefficient)

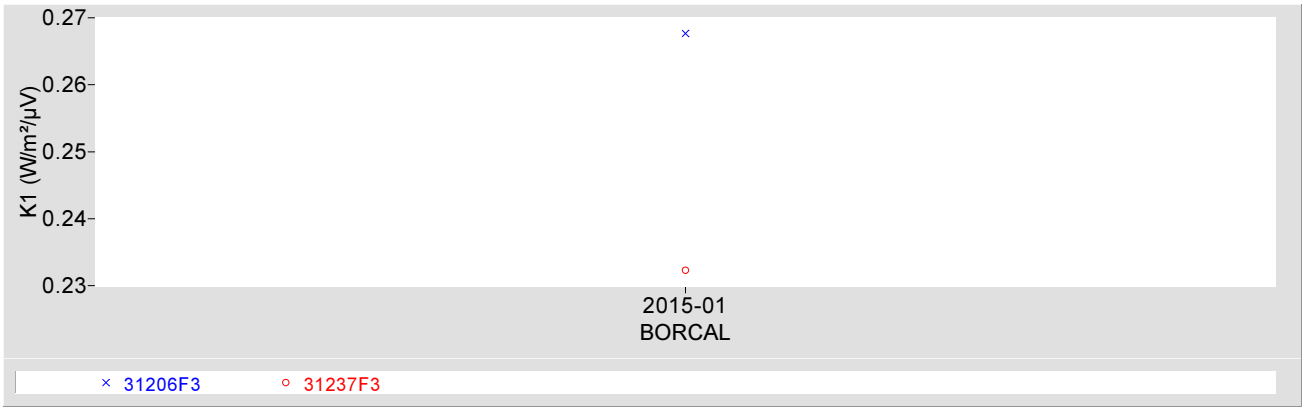


Figure 3. Eppley PIR Control Instrument History (K2 Coefficient)

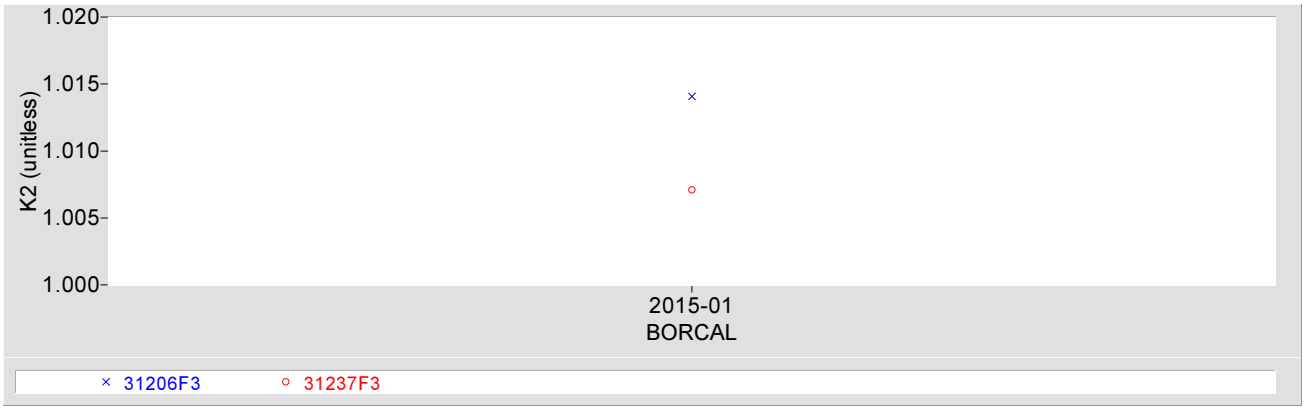
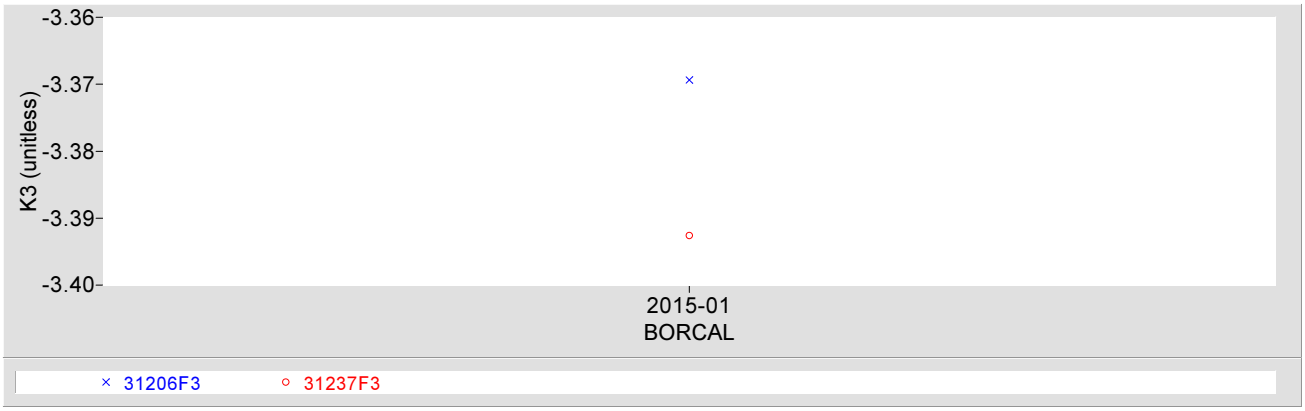


Figure 4. Eppley PIR Control Instrument History (K3 Coefficient)



Results Summary

Table 1. Results Summary

Instrument	Customer	K0 (W/m²)	K1 (W/m²/µV)	K2	K3	Kr * (K/µV)	U95 (W/m²)	Page
31206F3	Calibration System	-5.0471	0.26768	1.0141	-3.3694	7.044e-4	±1.69	A1-2
31237F3	Calibration System	-1.9892	0.23228	1.0071	-3.3926	7.044e-4	±1.69	A1-5
32309F3	Reda-NREL	-7.0418	0.20916	1.0194	-3.0895	7.044e-4	±1.69	A1-8
36362F3	Reda-NREL	-0.62447	0.32378	1.0127	-5.4039	7.044e-4	±1.76	A1-11

Note: Environmental Conditions for BORCAL starts on page A1-14.

* Kr used to derive K0,K1,K2, and K3

Appendix 1
Instrument Details

Calibration Certificates: 3 pages for each radiometer (4 including Environmental Conditions)

Environmental Conditions for BORCAL: Last Page of a Calibration Certificate. Note: This appears only once, at the end of Appendix 1.

Southern Great Plains Radiometer Calibration Facility

National Renewable Energy Laboratory

Metrology Laboratory

Calibration Certificate

Test Instrument:	Downwelling Pyrgeometer	**Manufacturer:**	Eppley
Model:	PIR	**Serial Number:**	31206F3
Calibration Date:	3/4/2015	**Due Date:**	3/4/2017
Customer:	Calibration System	**Environmental Conditions:**	see page 4
Test Dates:	2/9-17, 2/25-28, 3/1-4		

This certifies that the above product was calibrated in compliance with procedure listed below. Measurement uncertainties at the time of calibration are consistent with the Guide to the Expression of Uncertainty in Measurement (GUM) using Reda et al., 2008. All nominal values are traceable to the World Infrared Standard Group (WISG).

No statement of compliance with specifications is made or implied on this certificate. However, the estimated uncertainties are the uncertainties of the calibration process; users must add other uncertainties that are relevant to their measuring system, environmental and sky conditions, outdoor set-up, and site location.

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Table 1. Traceability

Measurement Type	Instrument	Calibration Date	Calibration Due Date
Data Acquisition	NREL Data Acquisition System Model RAP-DAQ, S/N 2014-1302	01/30/2015	01/30/2016
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 30557F3	01/26/2015	01/26/2020
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 31197F3	01/26/2015	01/26/2020

‡ Through the World Infrared Standard Group (WISG)

Number of pages of certificate: 4

Calibration Procedure: SGP BORCAL-LW Calibration Procedure

Setup: Radiometers are calibrated outdoors, using the atmosphere as the source. Pyranometers and pyrgeometers are installed for horizontal measurements, with their signal connectors oriented north, if their design permits.

Calibrated by: Afshín M. Andreas and Craig Webb

_____ _____

Michael Dooraghi, Technical Manager Date

For questions or comments, please contact the technical manager at:
Mike.Dooraghi@nrel.gov; 303-384-6329; 15013 Denver West Parkway, Golden, CO 80401, USA

Calibration Results

31206F3 Eppley PIR

The incoming irradiance (Win) of the test instrument during calibration is calculated using this Measurement Equation:

$$Win = K0 + K1*V + K2*Wr + K3*(Wd - Wr) \quad [1]$$

where,

K0,K1,K2,K3 = calibration coefficeints,
V = thermopile output voltage (μV),
$Wd = \sigma * Td^4$ = dome irradiance (W/m²),
where, *Td* = dome temperature (K),

$Wr = \sigma * Tr^4$ = receiver irradiance (W/m²),
where, σ = 5.6704e-8 W·m-2·K-4,
$Tr = Tc + Kr * V$ = receiver temperature (K),
Tc = case temperature (K),
Kr = efficiency coefficient (K/μV).

Figure 1. Residuals for calc. vs ref. irradiance using K0<>0 Coefficients

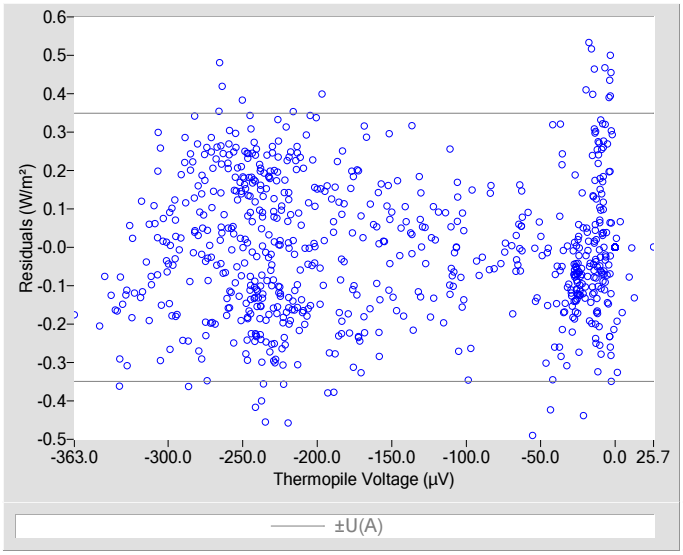


Figure 2. Residuals for calc. vs ref. irradiance using K0=0 Coefficients

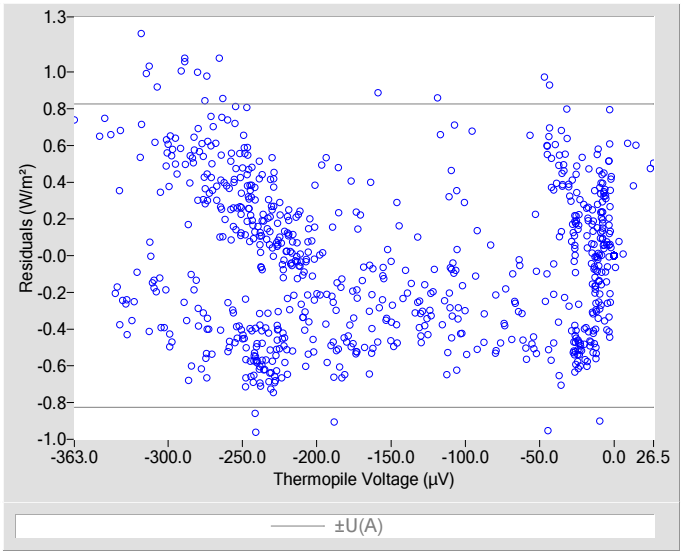


Table 2. Calibration Coefficients for K0<>0

K0	-5.0471
K1	0.26768
K2	1.0141
K3	-3.3694
Kr used to derive coefficients	0.00070440

Table 3. Calibration Coefficients for K0=0

K0	0
K1	0.26685
K2	0.99743
K3	-3.3932
Kr used to derive coefficients	0.00070440

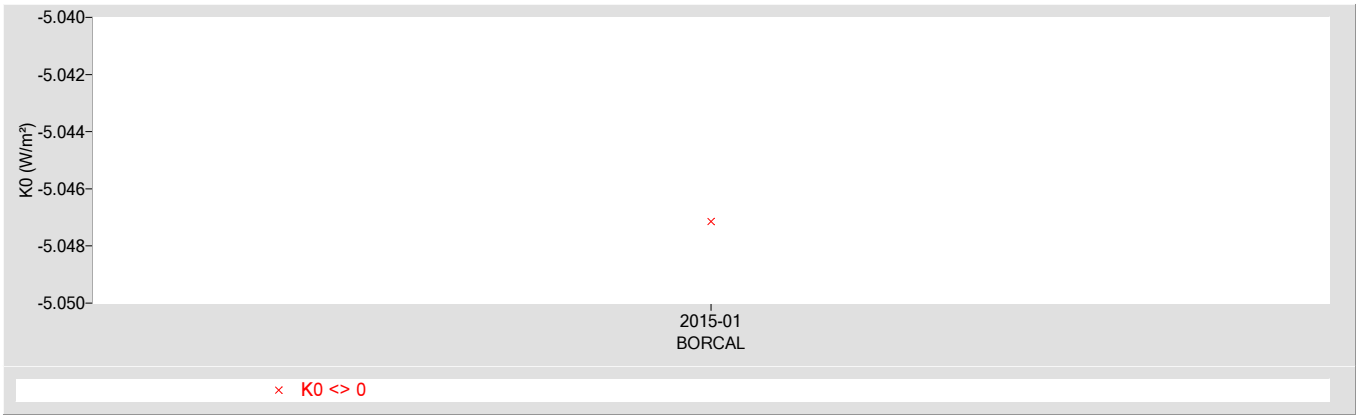
Table 4. Uncertainty using K0<>0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.18
Combined Standard Uncertainty, u(c) (W/m²)	±0.86
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.69

Table 5. Uncertainty using K0=0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.42
Combined Standard Uncertainty, u(c) (W/m²)	±0.94
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.85

Figure 3. History of instrument (K0 Coefficient)



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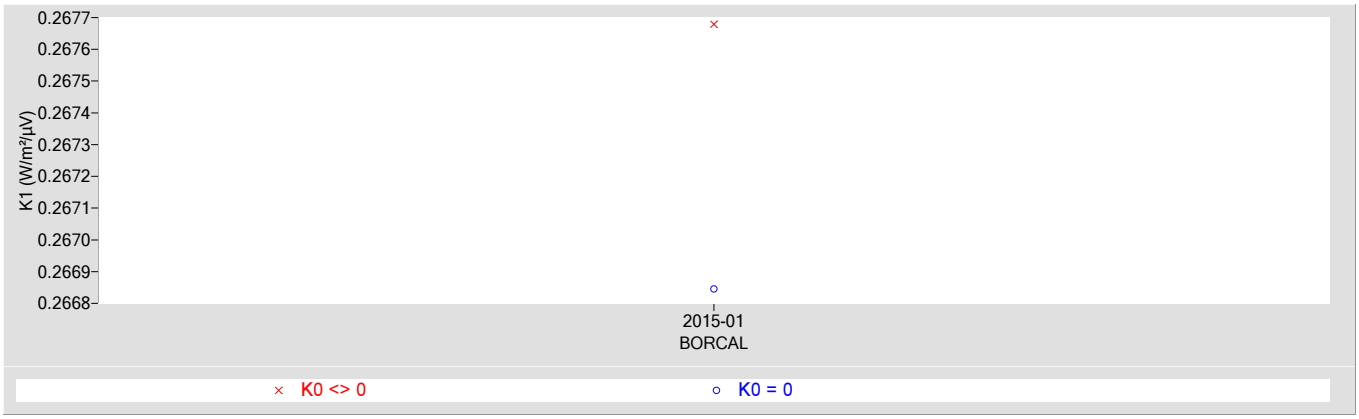


Figure 5. History of instrument (K2 Coefficient)

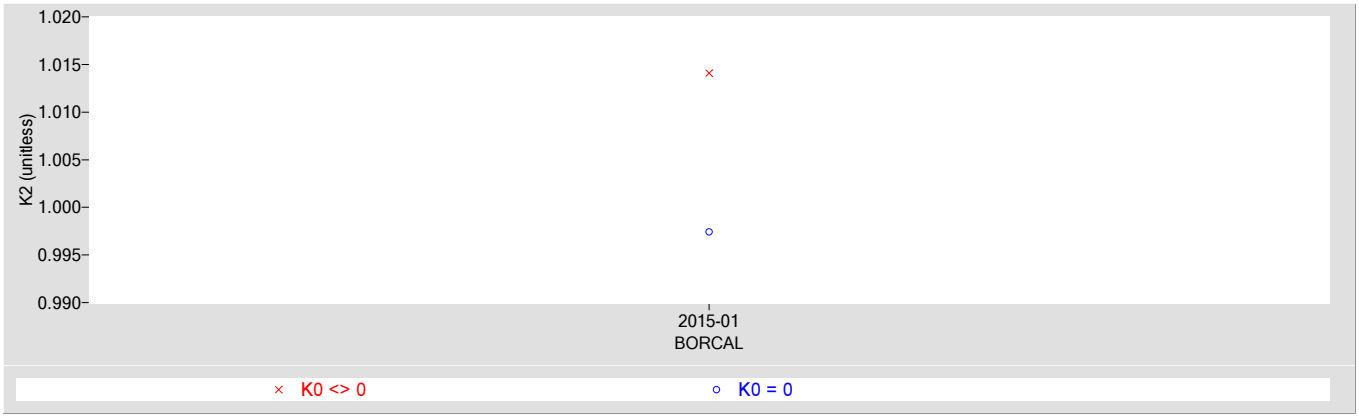
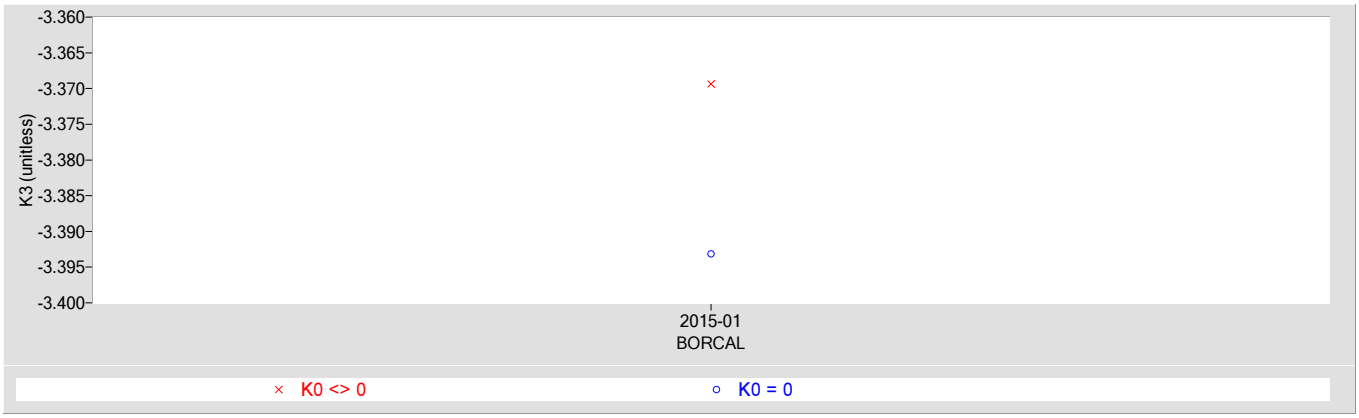


Figure 6. History of instrument (K3 Coefficient)



References:

[1] Reda, I.; Stoffel, T. (2010). Pyrgeometer Calibration for DOE-Atmospheric System Research Program using NREL Method (Presentation). 9 pp.; NREL Report No. PR-3B0-47756; http://www.nrel.gov/docs/fy10osti/47756.pdf.

Southern Great Plains Radiometer Calibration Facility

National Renewable Energy Laboratory

Metrology Laboratory

Calibration Certificate

Test Instrument:	Downwelling Pyrgeometer	**Manufacturer:**	Eppley
Model:	PIR	**Serial Number:**	31237F3
Calibration Date:	3/4/2015	**Due Date:**	3/4/2017
Customer:	Calibration System	**Environmental Conditions:**	see page 4
Test Dates:	2/9-17, 2/25-28, 3/1-4		

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Measurement Type	Instrument	Calibration Date	Calibration Due Date
Data Acquisition	NREL Data Acquisition System Model RAP-DAQ, S/N 2014-1302	01/30/2015	01/30/2016
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 30557F3	01/26/2015	01/26/2020
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 31197F3	01/26/2015	01/26/2020

‡ Through the World Infrared Standard Group (WISG)

Number of pages of certificate: 4

Calibration Procedure: SGP BORCAL-LW Calibration Procedure

Setup: Radiometers are calibrated outdoors, using the atmosphere as the source. Pyranometers and pyrgeometers are installed for horizontal measurements, with their signal connectors oriented north, if their design permits.

Calibrated by: Afshín M. Andreas and Craig Webb

_____ _____

Michael Dooraghi, Technical Manager Date

For questions or comments, please contact the technical manager at:
Mike.Dooraghi@nrel.gov; 303-384-6329; 15013 Denver West Parkway, Golden, CO 80401, USA

Calibration Results

31237F3 Eppley PIR

The incoming irradiance (Win) of the test instrument during calibration is calculated using this Measurement Equation:

$$Win = K0 + K1*V + K2*Wr + K3*(Wd - Wr) \quad [1]$$

where,

K0,K1,K2,K3 = calibration coefficeints,
V = thermopile output voltage (μV),
$Wd = \sigma * Td\text{^}4$ = dome irradiance (W/m²),
where, *Td* = dome temperature (K),

$Wr = \sigma * Tr\text{^}4$ = receiver irradiance (W/m²),
where, σ = 5.6704e-8 W·m-2·K-4,
$Tr = Tc + Kr * V$ = receiver temperature (K),
Tc = case temperature (K),
Kr = efficiency coefficient (K/μV).

Figure 1. Residuals for calc. vs ref. irradiance using K0<>0 Coefficients

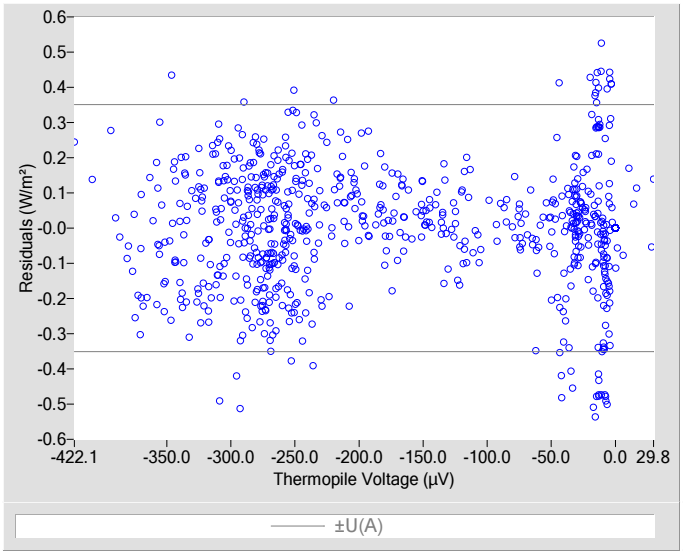


Figure 2. Residuals for calc. vs ref. irradiance using K0=0 Coefficients

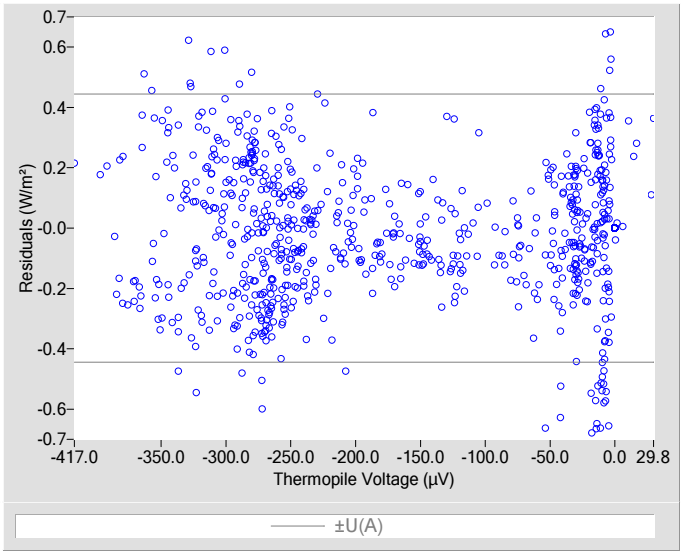


Table 2. Calibration Coefficients for K0<>0

K0	-1.9892
K1	0.23228
K2	1.0071
K3	-3.3926
Kr used to derive coefficients	0.00070440

Table 3. Calibration Coefficients for K0=0

K0	0
K1	0.23169
K2	1.0006
K3	-3.7204
Kr used to derive coefficients	0.00070440

Table 4. Uncertainty using K0<>0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.18
Combined Standard Uncertainty, u(c) (W/m²)	±0.86
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.69

Table 5. Uncertainty using K0=0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.23
Combined Standard Uncertainty, u(c) (W/m²)	±0.87
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.71

Figure 3. History of instrument (K0 Coefficient)

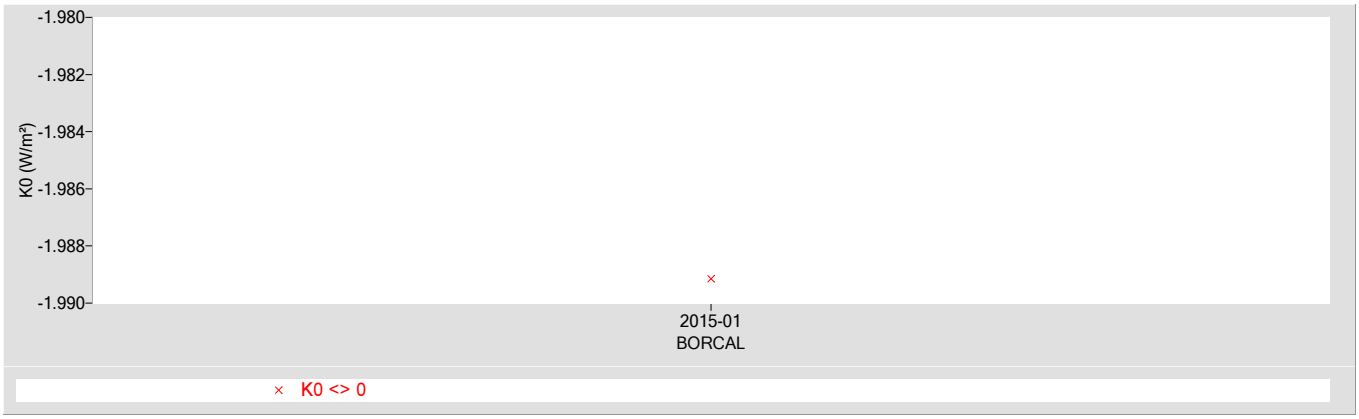


Figure 4. History of instrument (K1 Coefficient)

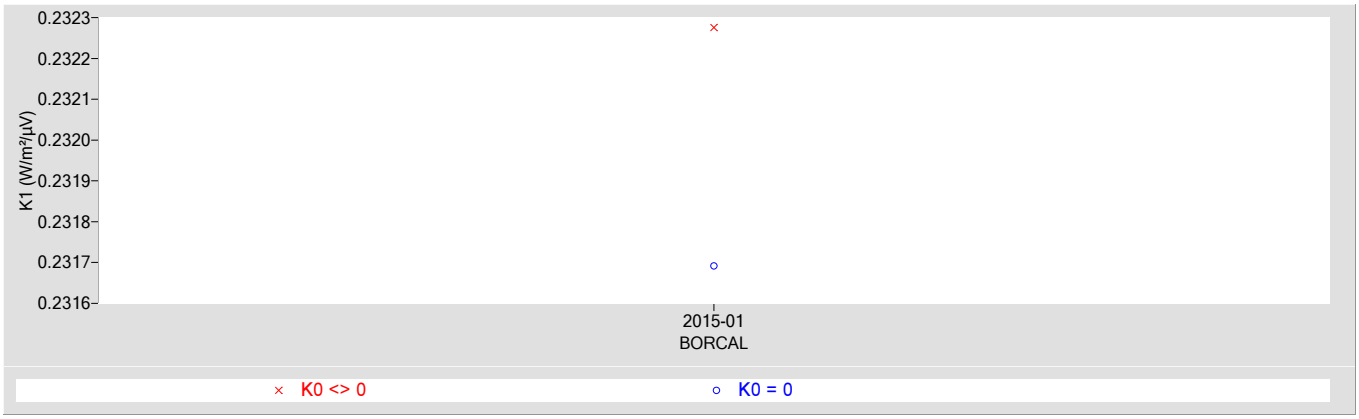


Figure 5. History of instrument (K2 Coefficient)

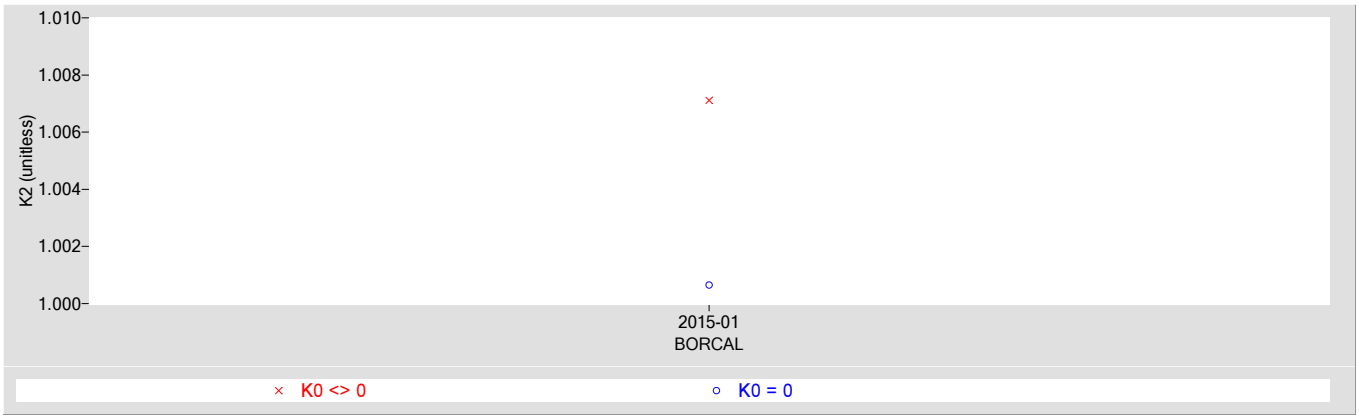
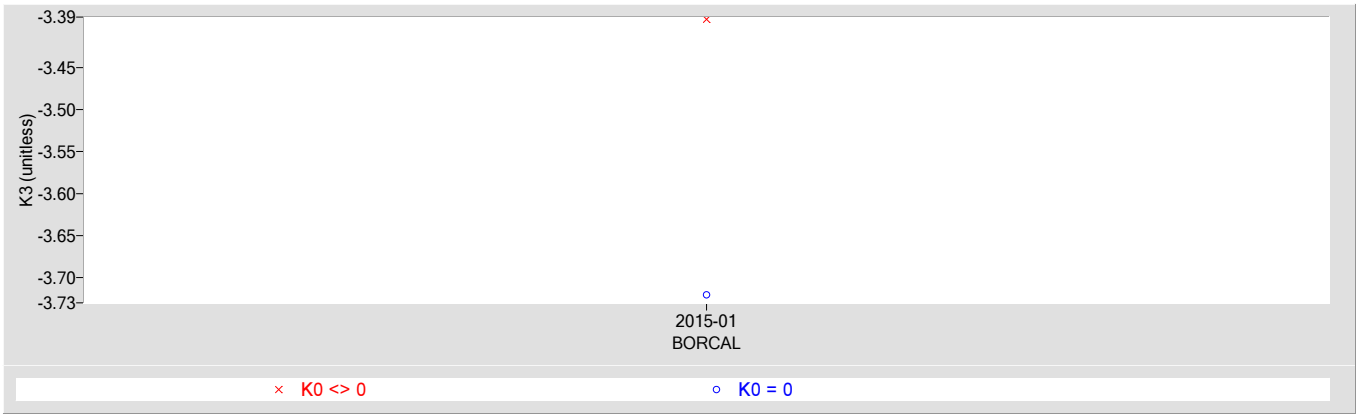


Figure 6. History of instrument (K3 Coefficient)



References:

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Southern Great Plains Radiometer Calibration Facility

National Renewable Energy Laboratory

Metrology Laboratory

Calibration Certificate

Test Instrument:	Downwelling Pyrgeometer	**Manufacturer:**	Eppley
Model:	PIR	**Serial Number:**	32309F3
Calibration Date:	3/4/2015	**Due Date:**	3/4/2017
Customer:	Reda-NREL	**Environmental Conditions:**	see page 4
Test Dates:	2/9-17, 2/25-28, 3/1-4		

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Measurement Type	Instrument	Calibration Date	Calibration Due Date
Data Acquisition	NREL Data Acquisition System Model RAP-DAQ, S/N 2014-1302	01/30/2015	01/30/2016
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 30557F3	01/26/2015	01/26/2020
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 31197F3	01/26/2015	01/26/2020

‡ Through the World Infrared Standard Group (WISG)

Number of pages of certificate: 4

Calibration Procedure: SGP BORCAL-LW Calibration Procedure

Setup: Radiometers are calibrated outdoors, using the atmosphere as the source. Pyranometers and pyrgeometers are installed for horizontal measurements, with their signal connectors oriented north, if their design permits.

Calibrated by: Afshín M. Andreas and Craig Webb

_____ _____

Michael Dooraghi, Technical Manager Date

For questions or comments, please contact the technical manager at:
Mike.Dooraghi@nrel.gov; 303-384-6329; 15013 Denver West Parkway, Golden, CO 80401, USA

Calibration Results

32309F3 Eppley PIR

The incoming irradiance (Win) of the test instrument during calibration is calculated using this Measurement Equation:

$$Win = K0 + K1*V + K2*Wr + K3*(Wd - Wr) \quad [1]$$

where,

K0,K1,K2,K3 = calibration coefficeints,
V = thermopile output voltage (μV),
$Wd = \sigma * Td^4$ = dome irradiance (W/m²),
where, *Td* = dome temperature (K),

$Wr = \sigma * Tr^4$ = receiver irradiance (W/m²),
where, σ = 5.6704e-8 W·m-2·K-4,
$Tr = Tc + Kr * V$ = receiver temperature (K),
Tc = case temperature (K),
Kr = efficiency coefficient (K/μV).

Figure 1. Residuals for calc. vs ref. irradiance using K0<>0 Coefficients

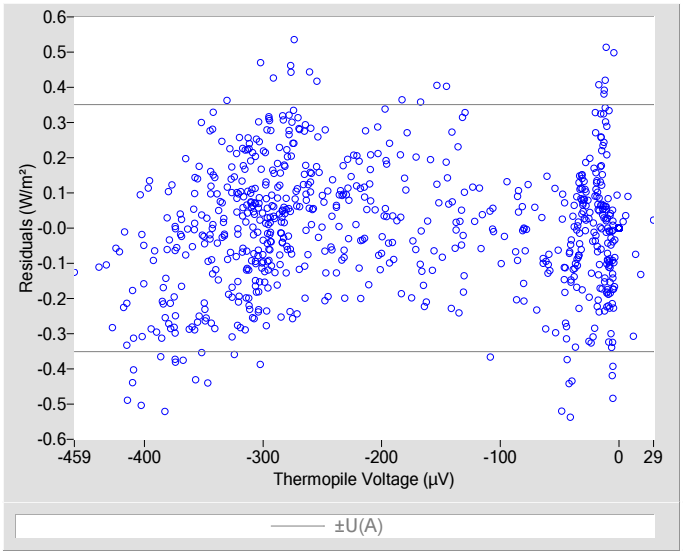


Figure 2. Residuals for calc. vs ref. irradiance using K0=0 Coefficients

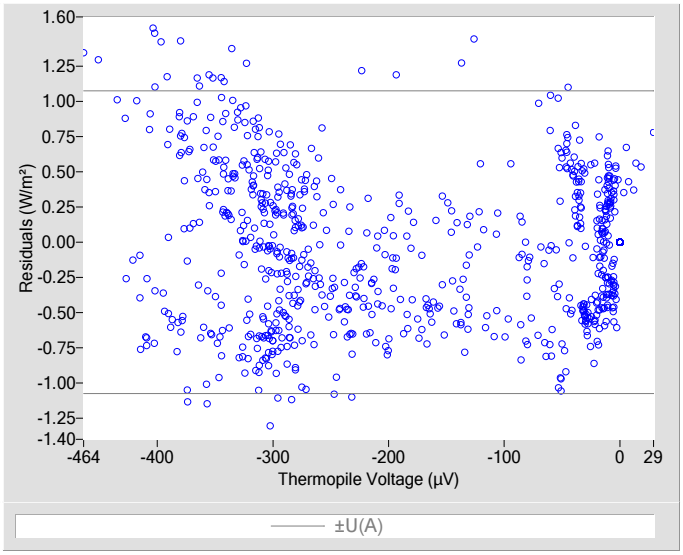


Table 2. Calibration Coefficients for K0<>0

K0	-7.0418
K1	0.20916
K2	1.0194
K3	-3.0895
Kr used to derive coefficients	0.00070440

Table 3. Calibration Coefficients for K0=0

K0	0
K1	0.20880
K2	0.99647
K3	-2.6289
Kr used to derive coefficients	0.00070440

Table 4. Uncertainty using K0<>0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.18
Combined Standard Uncertainty, u(c) (W/m²)	±0.86
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.69

Table 5. Uncertainty using K0=0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.55
Combined Standard Uncertainty, u(c) (W/m²)	±1.01
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.97

Figure 3. History of instrument (K0 Coefficient)

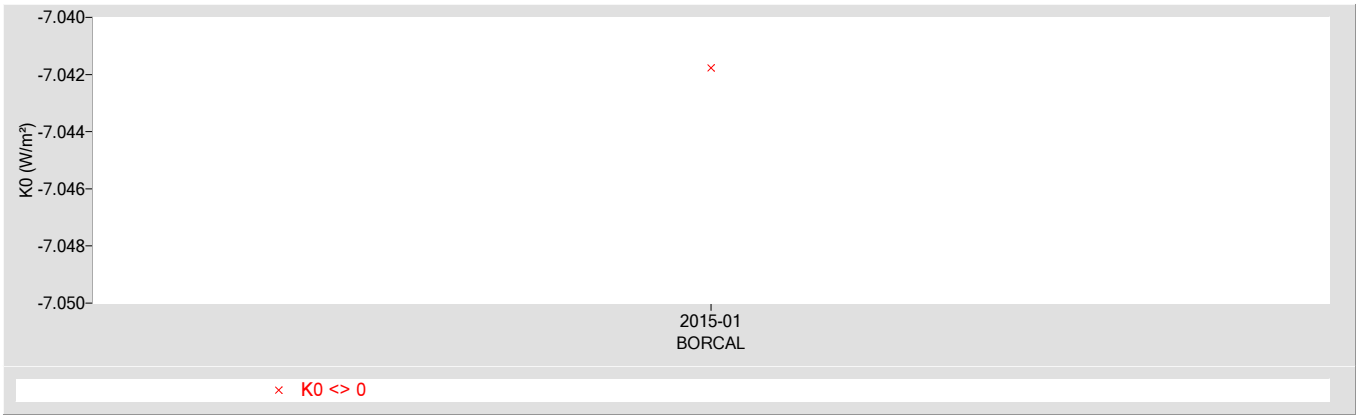


Figure 4. History of instrument (K1 Coefficient)

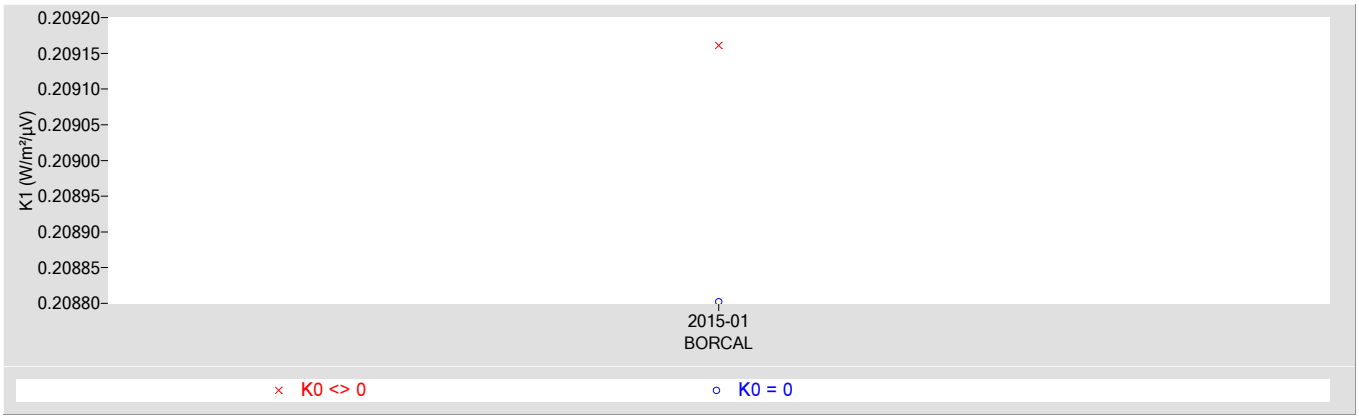


Figure 5. History of instrument (K2 Coefficient)

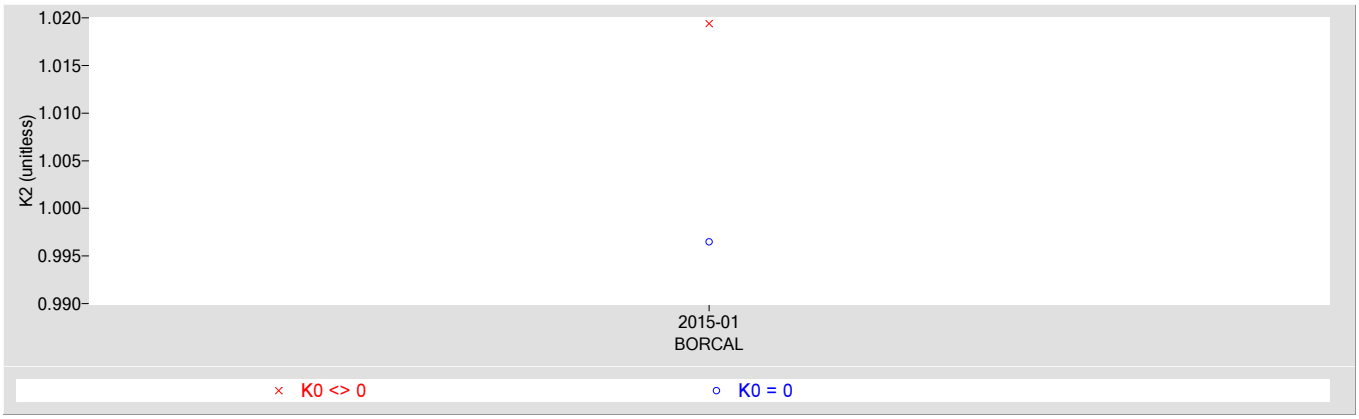
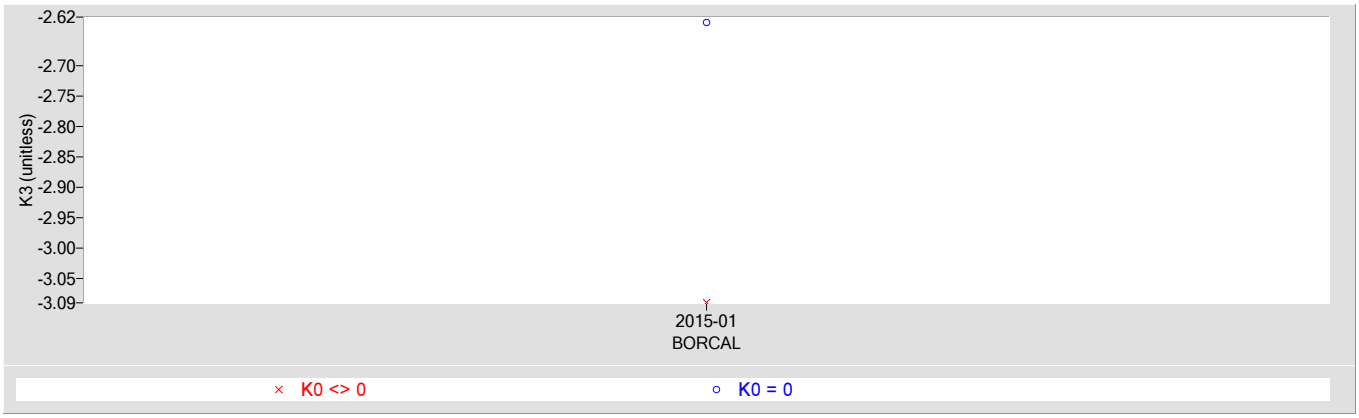


Figure 6. History of instrument (K3 Coefficient)



References:

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Southern Great Plains Radiometer Calibration Facility

National Renewable Energy Laboratory

Metrology Laboratory

Calibration Certificate

Test Instrument:	Downwelling Pyrgeometer	**Manufacturer:**	Eppley
Model:	PIR	**Serial Number:**	36362F3
Calibration Date:	3/4/2015	**Due Date:**	3/4/2017
Customer:	Reda-NREL	**Environmental Conditions:**	see page 4
Test Dates:	2/9-17, 2/25-28, 3/1-4		

This certifies that the above product was calibrated in compliance with procedure listed below. Measurement uncertainties at the time of calibration are consistent with the Guide to the Expression of Uncertainty in Measurement (GUM) using Reda et al., 2008. All nominal values are traceable to the World Infrared Standard Group (WISG).

No statement of compliance with specifications is made or implied on this certificate. However, the estimated uncertainties are the uncertainties of the calibration process; users must add other uncertainties that are relevant to their measuring system, environmental and sky conditions, outdoor set-up, and site location.

This certificate applies only to the item identified above and shall not be reproduced other that in full, without specific written approval from the calibration facility. Certificate without signature is not valid.

Table 1. Traceability

Measurement Type	Instrument	Calibration Date	Calibration Due Date
Data Acquisition	NREL Data Acquisition System Model RAP-DAQ, S/N 2014-1302	01/30/2015	01/30/2016
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 30557F3	01/26/2015	01/26/2020
Infrared Irradiance ‡	Eppley Downwelling Pyrgeometer Model PIR, S/N 31197F3	01/26/2015	01/26/2020

‡ Through the World Infrared Standard Group (WISG)

Number of pages of certificate: 4

Calibration Procedure: SGP BORCAL-LW Calibration Procedure

Setup: Radiometers are calibrated outdoors, using the atmosphere as the source. Pyranometers and pyrgeometers are installed for horizontal measurements, with their signal connectors oriented north, if their design permits.

Calibrated by: Afshín M. Andreas and Craig Webb

_____ _____

Michael Dooraghi, Technical Manager Date

For questions or comments, please contact the technical manager at:
Mike.Dooraghi@nrel.gov; 303-384-6329; 15013 Denver West Parkway, Golden, CO 80401, USA

Calibration Results

36362F3 Eppley PIR

The incoming irradiance (Win) of the test instrument during calibration is calculated using this Measurement Equation:

$$Win = K0 + K1*V + K2*Wr + K3*(Wd - Wr) \quad [1]$$

where,

K0,K1,K2,K3 = calibration coefficeints,
V = thermopile output voltage (μV),
$Wd = \sigma * Td^4$ = dome irradiance (W/m²),
where, *Td* = dome temperature (K),

$Wr = \sigma * Tr^4$ = receiver irradiance (W/m²),
where, σ = 5.6704e-8 W·m-2·K-4,
$Tr = Tc + Kr * V$ = receiver temperature (K),
Tc = case temperature (K),
Kr = efficiency coefficient (K/μV).

Figure 1. Residuals for calc. vs ref. irradiance using K0<>0 Coefficients

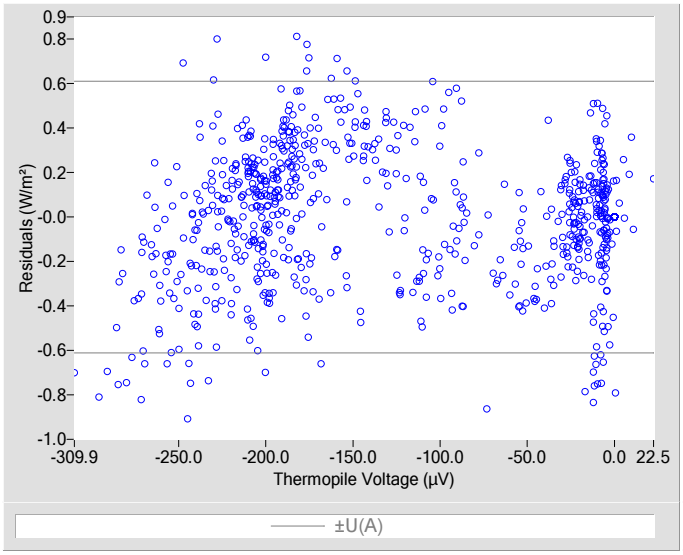


Figure 2. Residuals for calc. vs ref. irradiance using K0=0 Coefficients

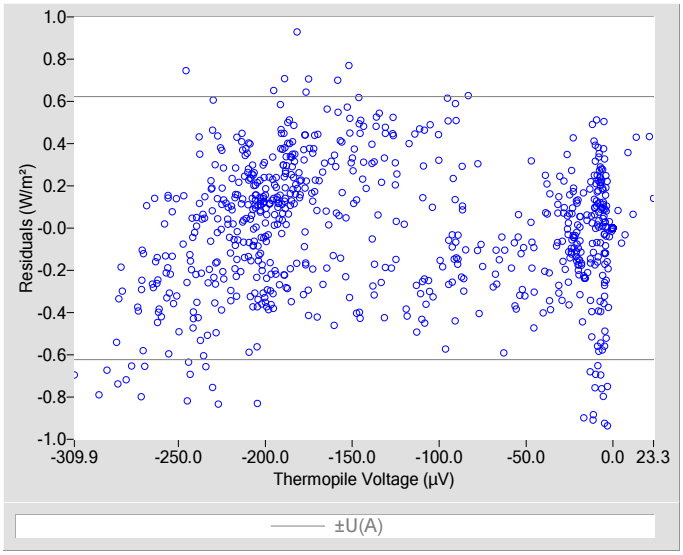


Table 2. Calibration Coefficients for K0<>0

K0	-0.62447
K1	0.32378
K2	1.0127
K3	-5.4039
Kr used to derive coefficients	0.00070440

Table 3. Calibration Coefficients for K0=0

K0	0
K1	0.32394
K2	1.0110
K3	-5.6386
Kr used to derive coefficients	0.00070440

Table 4. Uncertainty using K0<>0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.31
Combined Standard Uncertainty, u(c) (W/m²)	±0.90
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.76

Table 5. Uncertainty using K0=0 Coefficients

Type-B Standard Uncertainty, u(B) (W/m²)	±0.84
Type-A Standard Uncertainty, u(A) (W/m²)	±0.32
Combined Standard Uncertainty, u(c) (W/m²)	±0.90
Effective degrees of freedom, DF(c)	+Inf
Coverage factor, k	1.96
Expanded Uncertainty, U95 (W/m²)	±1.76

Figure 3. History of instrument (K0 Coefficient)

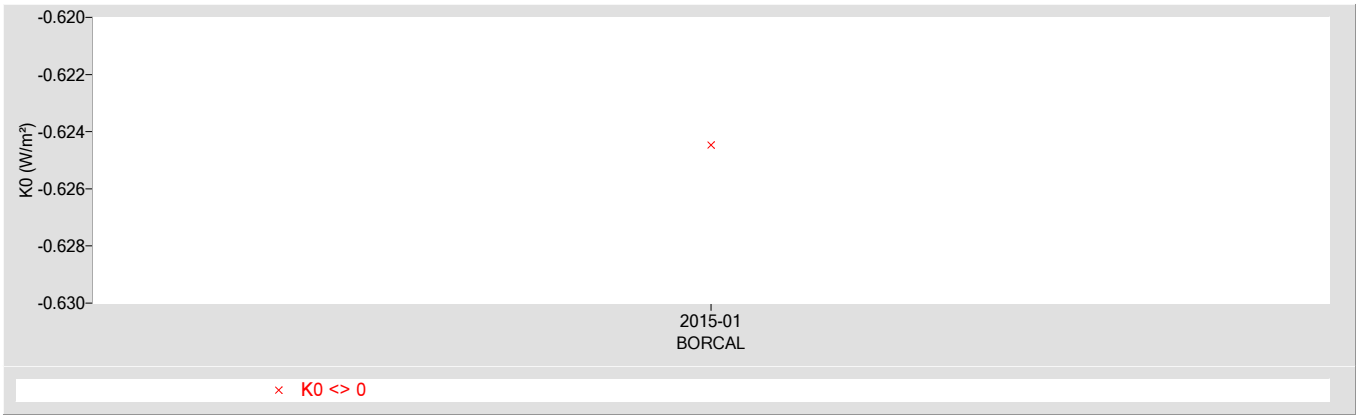


Figure 4. History of instrument (K1 Coefficient)

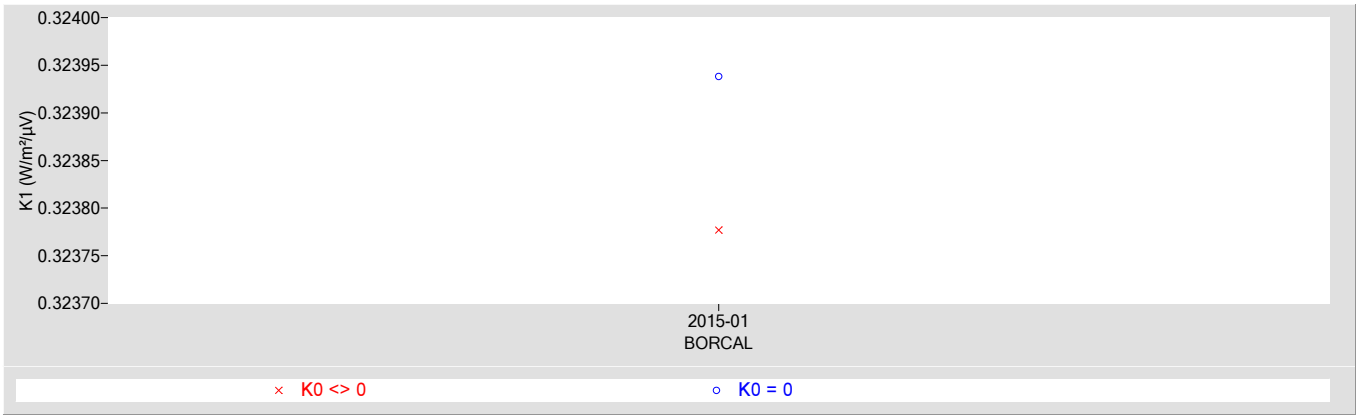


Figure 5. History of instrument (K2 Coefficient)

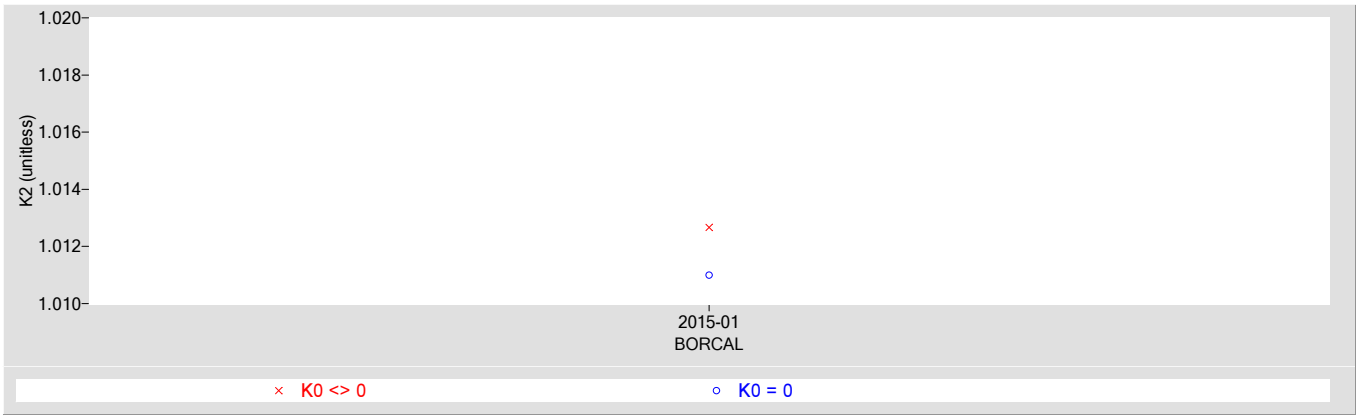
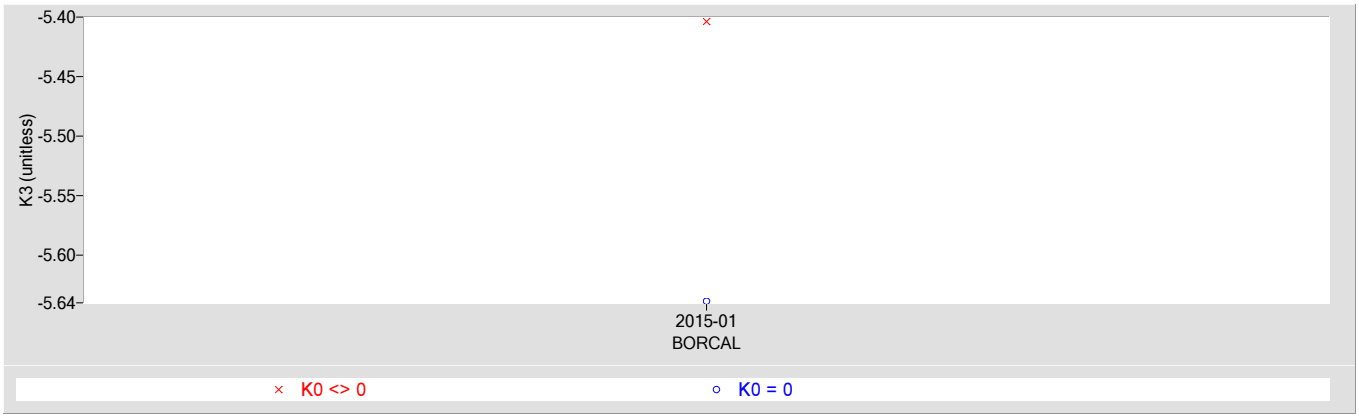


Figure 6. History of instrument (K3 Coefficient)



References:

[1] Reda, I.; Stoffel, T. (2010). Pyrgeometer Calibration for DOE-Atmospheric System Research Program using NREL Method (Presentation). 9 pp.; NREL Report No. PR-3B0-47756; http://www.nrel.gov/docs/fy10osti/47756.pdf.

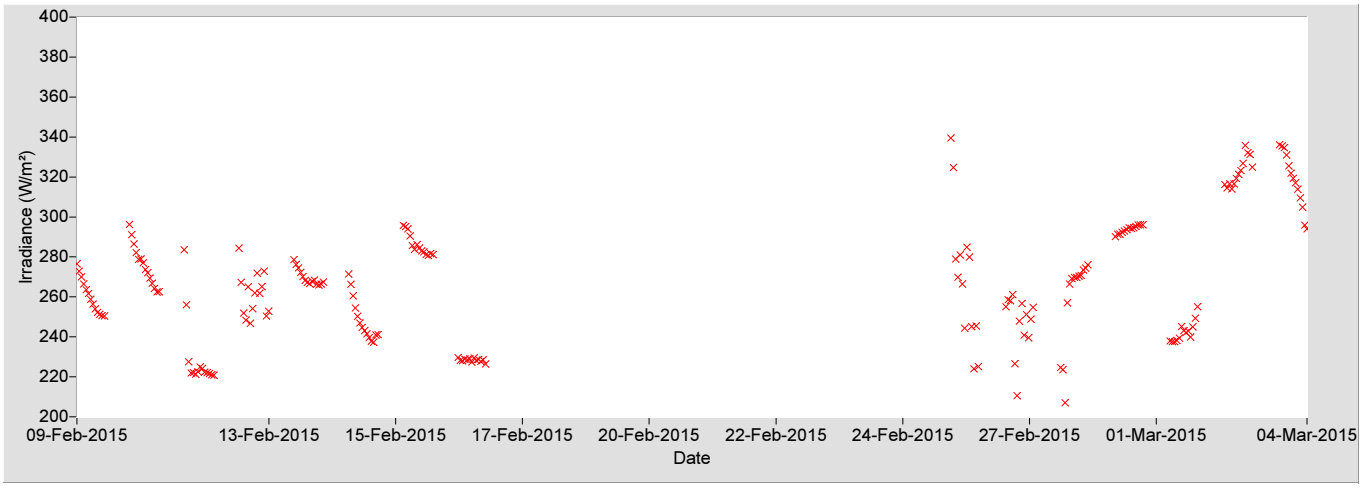
Environmental and Sky Conditions for BORCAL-LW 2015-01

Calibration Facility: Southern Great Plains

Latitude: 36.605°N Longitude: 97.488°W Elevation: 317.0 meters AMSL Time Zone: -6.0

Reference Irradiance (hourly averages):

Figure 6. Reference Irradiance



Meteorological Observations (hourly averages):

Figure 7. Temperature

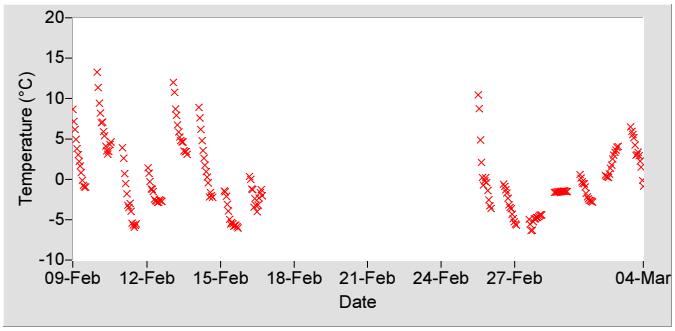


Figure 8. Humidity

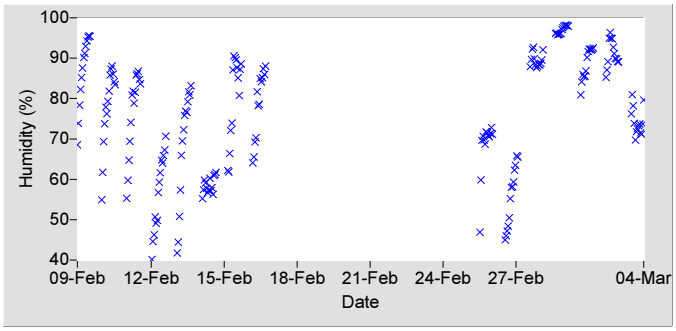


Figure 9. Pressure

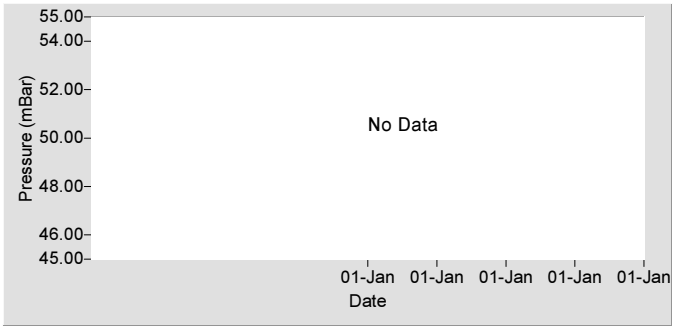


Figure 10. Estimated Precipitable Water Vapor (PWV)

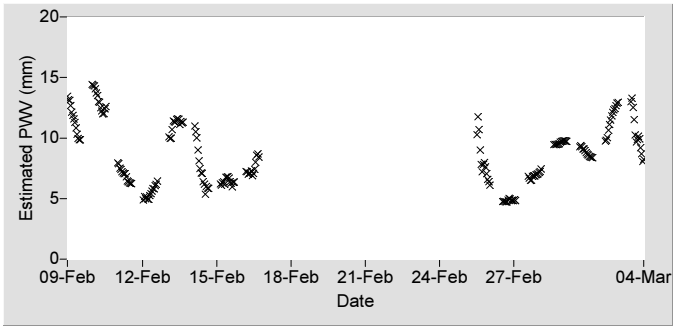


Table 6. Meteorological Observations

Observations	Mean	Min	Max
Temperature (°C)	0.06	-6.66	13.60
Humidity (%)	76.55	37.47	98.33
Pressure (mBar)	N/A	N/A	N/A
Est. Precipitable Water Vapor (mm)	8.7	4.2	14.5

For other information about the calibration facility visit: http://www.arm.gov/docs/sites/sgp/sgp.html

Appendix 2
BORCAL Notes

Instrument, Configuration, and Session Notes for the BORCAL

BORCAL Notes

Facility: Southern Great Plains
Comments:
Avg. Station Pressure and Temperature is for Tulsa, OK, which is used for the Solar Position Algorithm (SPA).

Appendix 3
Session Configuration Audit Report

Latest Session Configuration Audit Report for the BORCAL

BORCAL/LW 2015-01 Session Configuration Audit Report

LOCATION

Facility	Facility Abbrev.	Contact	Latitude	Longitude	Elevation (m)	Avg press (mbr)	Avg temp (C)	Time zone	ISO
Southern Great Plains	SGP	Craig Webb	36.605	-97.488	317.0	992.0	15.0	-6.0	

SYSTEM

% Error Thresholds

TP(x) / TP(x-1)	5.0

Delta Thresholds

Ref Pyg Stability	2.0
Temp(x) - Temp(x-1)	5.0
Hum(x) - Hum(x-1)	10.0
Bar(x) - Bar(x-1)	5.0
Thrm(x) - Temp(x)	10.0

Analysis Rejection

Threshold 1 (Blue)	1.000
Threshold 2 (Green)	2.000
Threshold 3 (Brown)	3.000
No. of Std. Dev.	3

Clock

Reset Interval (m)	0
Warning Threshold (s)	0
Delta UT1	-0.300

Misc

Scan Rate (s)	300
Uncert. Dec. Precision	2

Auto Mode Zenith Angle

Afternoon Startup	94
Morning Shutdown	94

Solar Position Algorithm

Delta T (s)	67.484
Atmos. Refraction (deg)	0.5667

METEOROLOGICAL INSTRUMENTS

Channel	Junction Box	Cable	Location
Temperature: E0710026T Vaisala HMP155 T			
37		red	T8-1
Scale 100	Offset -40		
Humidity: E0710026H Vaisala HMP155 H			
38		blue	T8-1
Scale 100	Offset 0		
Pressure: None			
Scale 0	Offset 0		

GPS TIME RECIEVER

GPS: None

Type	Port	Baud	Parity	Stop bits	Data bits
	0	0	0	0	0

DATALOGGER

	Logger/Relay	DMM
Unit 0	2014-1302 NREL RAP-DAQ	SG42000596 Agilent 34420A
Unit 0	None	None
Unit 0	None	None
Unit 0	None	None

	Unit 0	Unit 0	Unit 0	Unit 0
Cal Date	01/30/2015			
Cal Due Date	01/30/2016			
System Offsets: Volts DC (µV)	5.30	0.00	0.00	0.00
2-Wire Res. (mOhms)	2100.00	0.00	0.00	0.00
4-Wire Res. (mOhms)	0.00	0.00	0.00	0.00

Communications

	Unit	Type	Addr.	Board	Parity	Stop	Data
DMM	0	GPIB	1	0	0	0	0
Relay	0	GPIB	4	1	0	0	0
	-1		0	0	0	0	0
	-1		0	0	0	0	0
	-1		0	0	0	0	0
	-1		0	0	0	0	0
	-1		0	0	0	0	0
	-1		0	0	0	0	0

BORCAL/LW 2015-01 Session Configuration Audit Report

PYRGEOMETER REFERENCE INSTRUMENTS

Cal Date	Cal Due Date	Calibration Coefficients K0	K1	K2	K3	Kr	Uncert. (W/m^2)	Channel	Junction Box	Cable	Location	Active
Pyrgeometer 1: 30557F3 Eppley PIR												
01/26/2015	01/26/2020	-8.34767	0.21477	1.02659	-3.27118	7.04400E-4	1.67	5		2	T5-2	☑
Pyrgeometer 1: Case Thermistor								4		2		
Pyrgeometer 1: Dome Thermistor								6		2		
Pyrgeometer 2: 31197F3 Eppley PIR												
01/26/2015	01/26/2020	-0.28910	0.23782	1.00487	-2.88000	7.04400E-4	1.21	17		2	T6-2	☑
Pyrgeometer 2: Case Thermistor								16		2		
Pyrgeometer 2: Dome Thermistor								18		2		

BORCAL/LW 2015-01 Session Configuration Audit Report

INSTRUMENTS

Serial Number	Customer	Mfg RS	Ch	Box	Cable	Act	ISO	AIM	Stickr	Vent	Use	Kr	Location	Due
31206F3 ‡	Calibration System	3.5000	1		1	Yes	No	Yes	K0=0	No	PYG	7.044e-4	T5-1	24
	(Case 10K Temperature)		0		1									
	(Dome 10K Temperature)		2		1									
31237F3 ‡	Calibration System	3.9100	13		1	Yes	No	Yes	K0=0	No	PYG	7.044e-4	T6-1	24
	(Case 10K Temperature)		12		1									
	(Dome 10K Temperature)		14											
32309F3	Reda-NREL	4.2600	9		3	Yes	No	Yes	K0<>0	No	PYG	7.044e-4	T5-3	24
	(Case 10K Temperature)		8		3									
	(Dome 10K Temperature)		10											
36362F3	Reda-NREL	3.0300	21		3	Yes	No	Yes	K0<>0	No	PYG	7.044e-4	T6-3	24
	(Case 10K Temperature)		20		3									
	(Dome 10K Temperature)		22		3									

‡ Control Instrument