

Applications

- Satellite Sun Loading Testing
- Photochemistry
- Material Characterization, Degradation Testing
- Photovoltaic Testing
- Accelerated Age Testing
- Thermal Energy Storage System Testing (Molten Salts)

Features

- Range of working distances and target sizes
- Each unit includes a power supply, xenon short arc lamp and AM filter (if specified)
- Homogenizing optics provide uniform irradiance distribution

Pictured: BigSun-S-COL



BigSun Solar Simulators

BigSun Solar Simulator

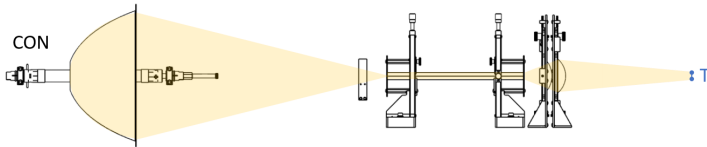
CONFIGURATION

The BigSun series of solar simulators and light sources can be configured to give precedence to certain specifications of interest, in accordance with your requirements. Some features are related, and maximizing one specification may reduce another. Four main series maximize certain features.

CON: Concentrated

Intended to maximize power (many Suns' irradiance) on a small target. Commonly used for testing thermal storage technology, solar concentrator systems, etc.

- Usually less stringent spatial non-uniformity is possible.
- Not usually collimated, typically focused beam by design.

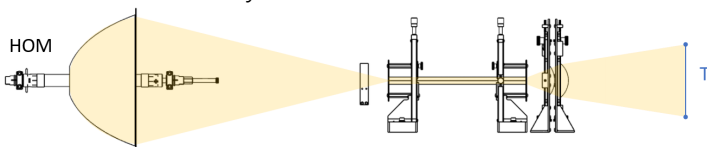


Target Size: ↓ Collimation: ↓ Irradiance: ↑ Homogeneity: ↓

HOM: Homogenized

Homogeneity interacts with many other specifications. Maximizing homogeneity often means reducing other specifications, so a balance is usually struck to achieve the best combination. Best possible spatial non-uniformity usually affects:

- Collimation: better collimation means poorer spatial non-uniformity.
- Irradiance: higher irradiance can be achieved by reducing the number and length of homogenizing optics, reducing losses, but this leads to poorer spatial non-uniformity.

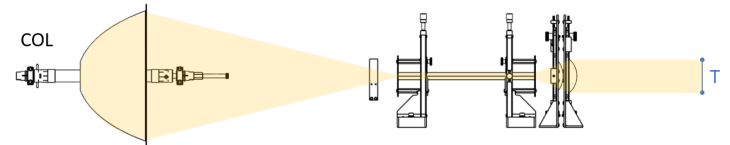


Target Size: ~ Collimation: ~ Irradiance: ~ Homogeneity: ↑

COL: Collimated

Intended to minimize collimation angle (as small as 0.35° half angle) on a target. Commonly used for testing space or upper atmosphere traversing devices, etc.

- Usually less stringent spatial non-uniformity is possible.
- Usually 1 Sun (AM1.5G or AM0) irradiance (1000 to 1367 W/m²), though higher irradiance is available.

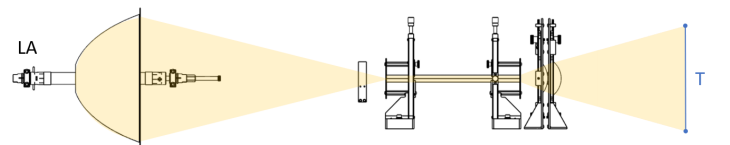


Target Size: ↓ Collimation: ↑ Irradiance: ↓ Homogeneity: ↓

LA: Large Area

Intended to maximize area covered by illumination at a given irradiance. Commonly used for light-soaking, materials-testing, or photocatalytic applications, etc.

- Usually less stringent spatial non-uniformity is possible, particularly affected at corners and edges.
- Efficiency is usually maximized to allow greatest irradiance over greatest possible target size, with smallest possible lamp.
- Lowest cost option per unit area.



Target Size: ↑ Collimation: ↓ Irradiance: ~ Homogeneity: ↓

BigSun Solar Simulator

SPECIFICATIONS

The BigSun series of solar simulators and light sources includes a selection of complementary options for convenience. Additional options are readily available. Please contact our sales team for more information.

Model	BigSun-S-COL	BigSun-M-COL	BigSun-L-COL	BigSun-L-HOM	BigSun-L-LA	BigSun-L-CON
Spectral Match ⁴	AM 1.5G Class A AM0 Class A ⁸					
Spatial Non-Uniformity	B	B	C	A	C	C
Temporal Instability	A					
Standard for Classification	ASTM E927-19					
Target Size (mm)	100 (diameter)	150 (diameter)	300 (diameter)	300 (diameter)	500×500	200×200
Target Shape	Hexagonal				Square	
Working Distance	1-3m ⁵				0.2-1.0m ⁵	0.1-0.5m ⁵
Maximum Irradiance ²	1.0 Suns (AM0) 1.2 Suns (AM1.5G) 1.5 Suns (Unfiltered)					8 suns (AM0) 10 suns (AM1.5G) 15 suns (Unfiltered)
Sun Type	AM1.5G, AM0, Unfiltered					
Collimation Half Angle ³	<0.5	<0.9	<0.9	<8	<20	N/A
Lamp Power (W)	1600	2500	6500			
Lamp Type	Xenon short arc					
Illumination Direction	Horizontal ⁷					
Dimensions (L x W x H) (mm)	2500 × 500 × 600 ⁶			3000 × 1000 × 1500 ⁶		
Weight (kg)	140 ⁶			200 ⁶		
Power Supply Model	611-1.6k	621-2.5k	631-6.5k-480-B ⁴			
Power Requirements	220-240VAC, 50/60 Hz, 2500 VA	220-240VAC, 50/60 Hz, 4400 VA	380-480VAC, 50/60 Hz, 7000 VA (380-480 V p-p, 3p+E)			

1. Depending upon chosen upgrades, classification may be reduced or additional cost may apply.

2. Sun level evaluated according to ASTM E927-19

3. 90% of irradiance within the angle

4. 631-6.5k-220-B, 220-240VAC power supply available at extra cost

5. User configurable, other specs may change depending on selected working distance.

6. Approximation, dimensions and weight vary depending on chosen configuration and upgrades.

7. Vertical available at extra cost, may reduce specifications

8. Class A from 350-1100 nm, Class C from 1100-1400 nm.

BigSun Solar Simulator

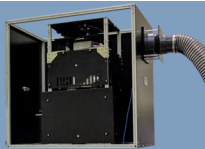
OVERVIEW

Sciencetech's BigSun line has been developed from previous successful custom solutions. The core of the BigSun line is a high powered xenon short arc lamp paired with a homogenizing optics system. The result is uniform irradiance over a range of target areas at user selectable working distances. The power of the BigSun lies in its many standard and custom options, all of which have been implemented with success in the past.

Lamp Housing

Options:

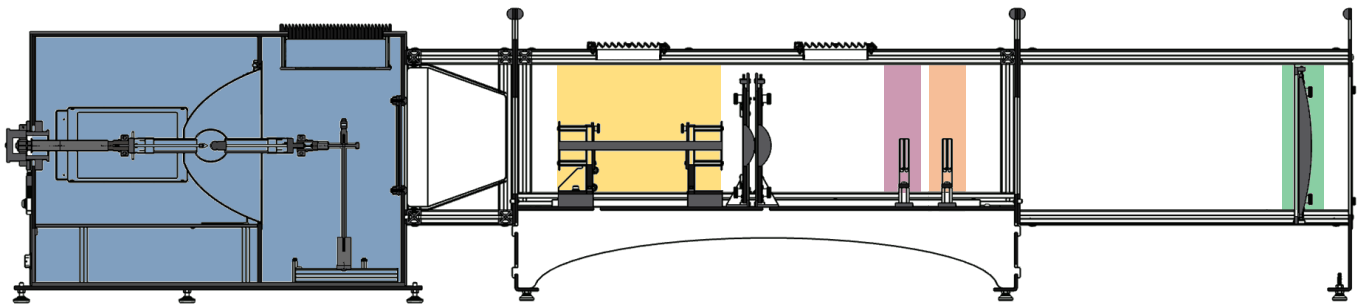
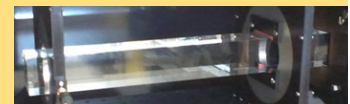
- Standard Housing
- HEPA Filtering
- Cleanroom or Environmental Chamber Safe Housing



Homogenization Optics

Options:

- Hex-shaped light pipe for homogenization (for round targets, best homogeneity)
- Square light pipe for homogenization (for square targets, irradiance decreases at corners)



Spectral Filtering

Options:

- AM1.5G
- AM0
- Unfiltered xenon arc lamp
- Specialty UV matches:
 - USFDA
 - COLIPA
 - MIL-STD-810G
- IR-removing water filters
- Custom filtering



Attenuation Options

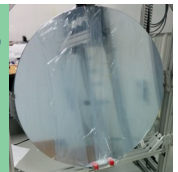
Options:

- Variable Attenuation
- Discrete Irradiance Filters
- No attenuation

Collimating Optics

Options:

- Collimation as low as 0.35° half angle
- Non-collimated, expanding beam
- Non-collimated, focused beam, for focused or concentrated applications



BigSun Solar Simulator

COLLIMATED CLASSIFICATION

The BigSun series' COL models prioritize the best possible collimation (the smallest collimation angle). Some models have been afforded multiple configurations, to allow easy alternating between more collimated and more uniform configurations.

BigSun-S-COL, BigSun-M-COL, and BigSun-L-COL

BigSun-S-COL Collimation = 0.5° half angle

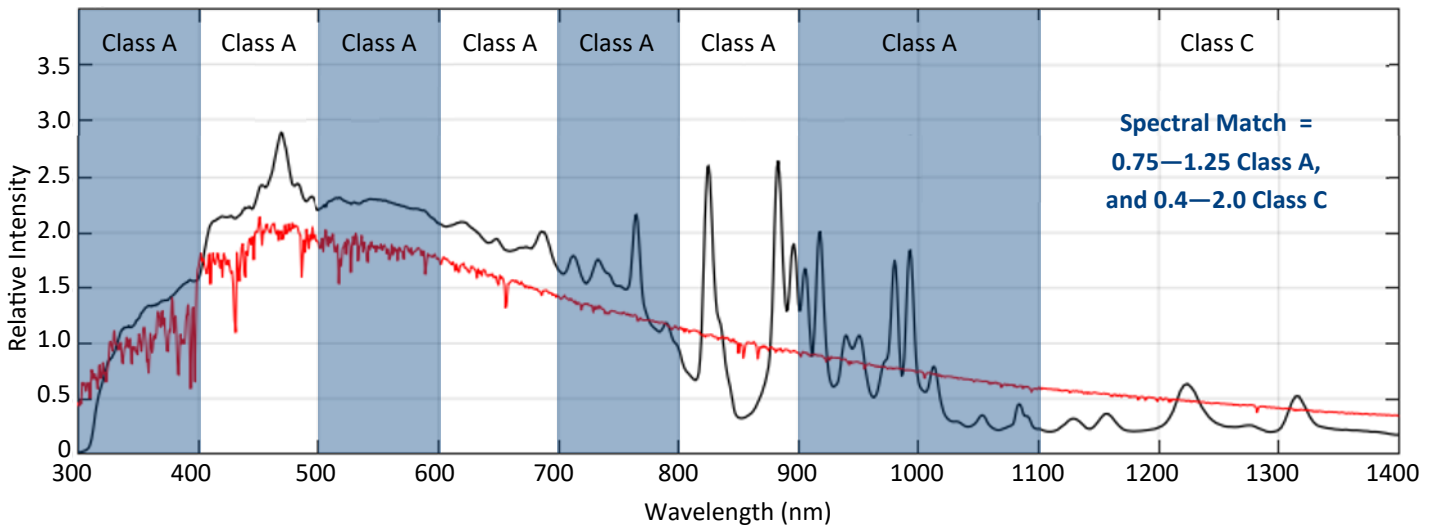
BigSun-M-COL Collimation = 0.9° half angle

BigSun-L-COL Collimation = 0.9° half angle

Collimation

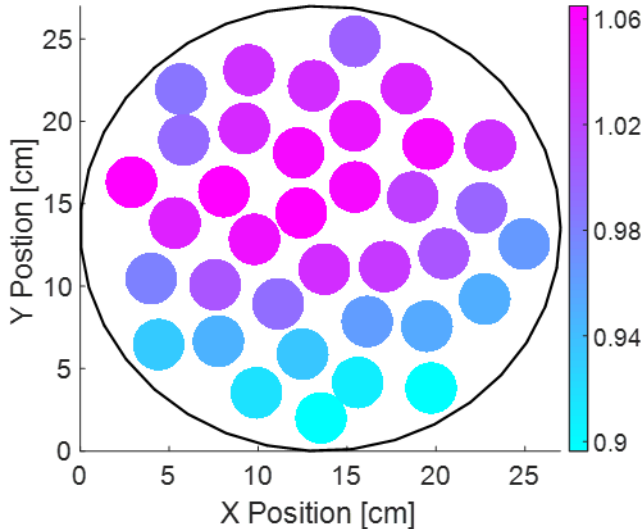
Spectral Match

Typical AM0 Spectral Match BigSun COL-series (from BigSun-S-COL)

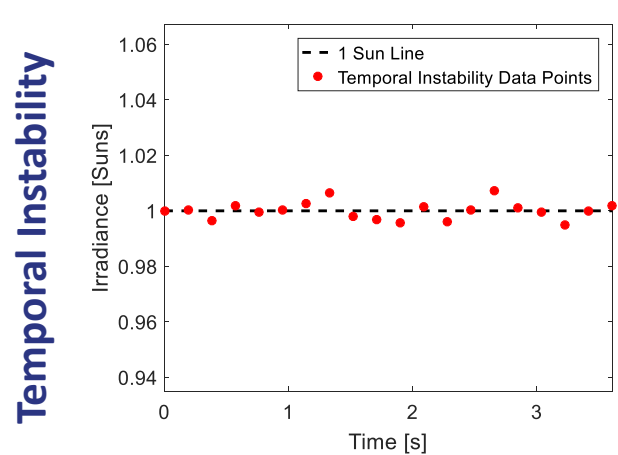


Spatial Non-Uniformity

Typical Non-Uniformity Plot - BigSun-L-COL



Typical Temporal Instability Plot—BigSun



Temporal Instability = < 2.0% = Class A

BigSun-S-COL: Spatial Non-uniformity < 5.0% = Class B

BigSun-M-COL: Spatial Non-uniformity < 5.0% = Class B

BigSun-L-COL: Spatial Non-uniformity < 10.0% = Class C



BigSun Solar Simulator

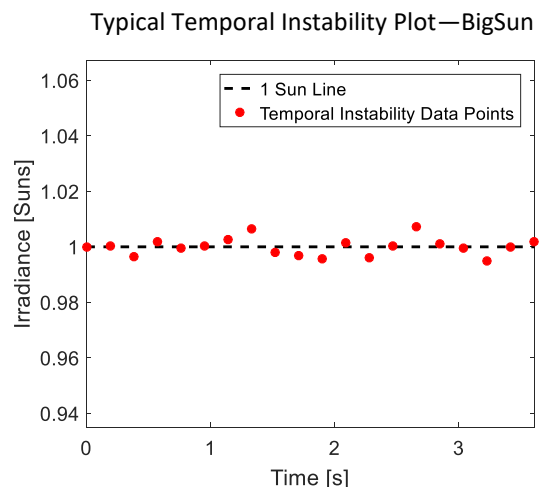
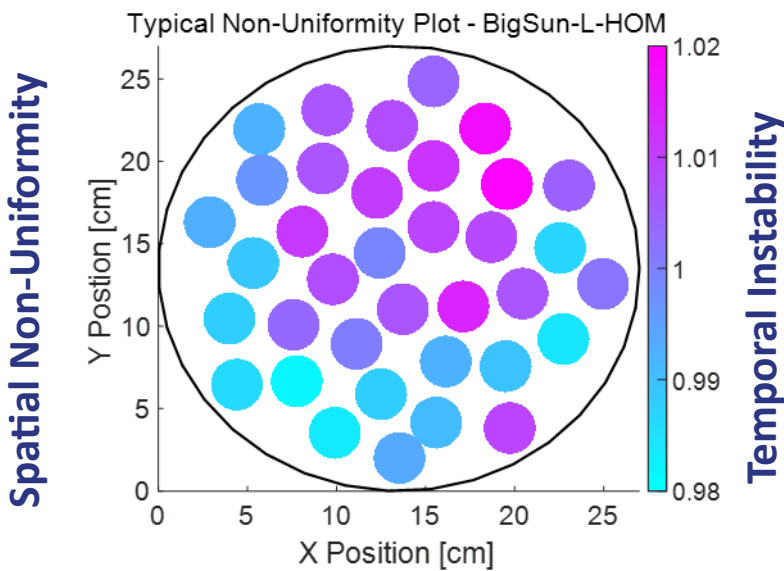
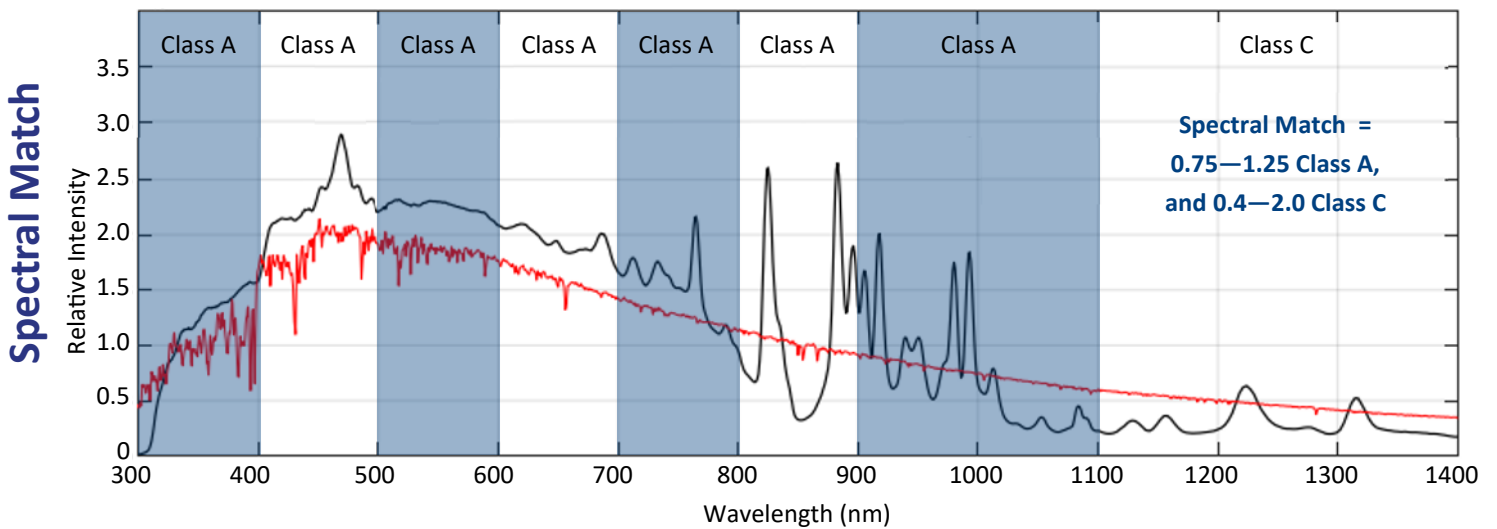
HOMOGENIZED CLASSIFICATION

The BigSun series' COL models prioritize the best possible collimation (the smallest collimation angle). Some models have been afforded multiple configurations, to allow easy alternating between more collimated and more uniform configurations.

BigSun-L-HOM

Collimation Collimation Angle = $<8^\circ$ half angle

Typical AM0 Spectral Match BigSun HOM-series



Spatial Non-uniformity $< 2.0\%$ = Class A

Temporal Instability = $< 2.0\%$ = Class A

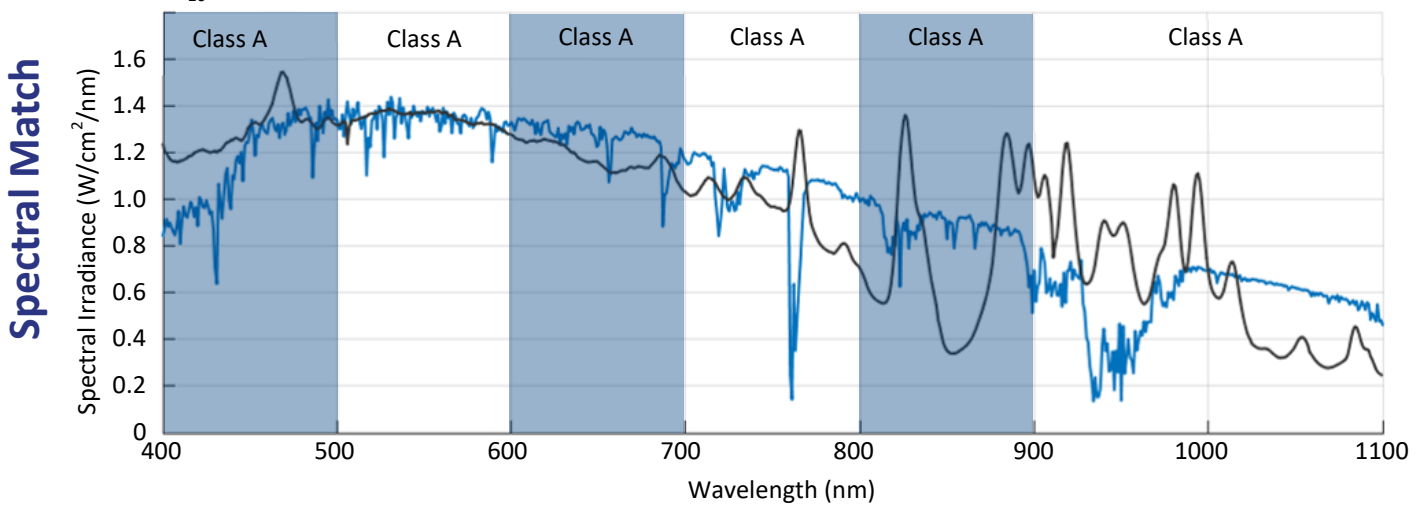
BigSun Solar Simulator

CONCENTRATED CLASSIFICATION

The BigSun series' CON models prioritize the highest possible irradiance over the target (usually a small area). For these applications, spatial non-uniformity is usually a secondary concern, and systems are usually not required or designed to be collimated.

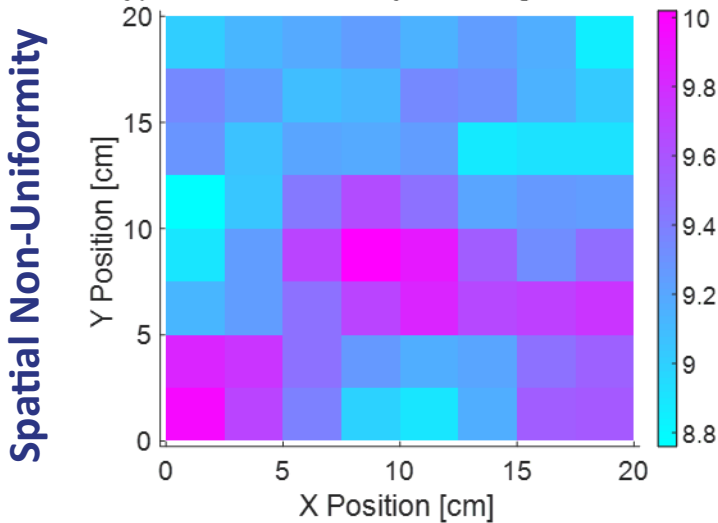
BigSun-L-CON

Typical AM1.5G Spectral Match BigSun CON-series



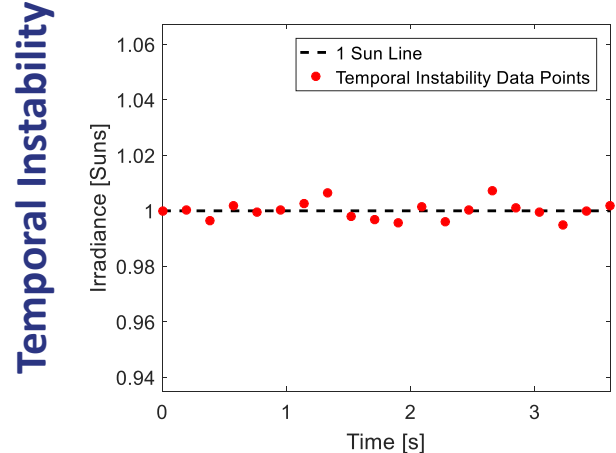
Spectral Match = 0.75—1.25 = Class A

Typical Non-Uniformity Plot - BigSun-L-CON



Spatial Non-uniformity < 10% = Class C

Typical Temporal Instability Plot—BigSun



Temporal Instability = <2.0% = Class A

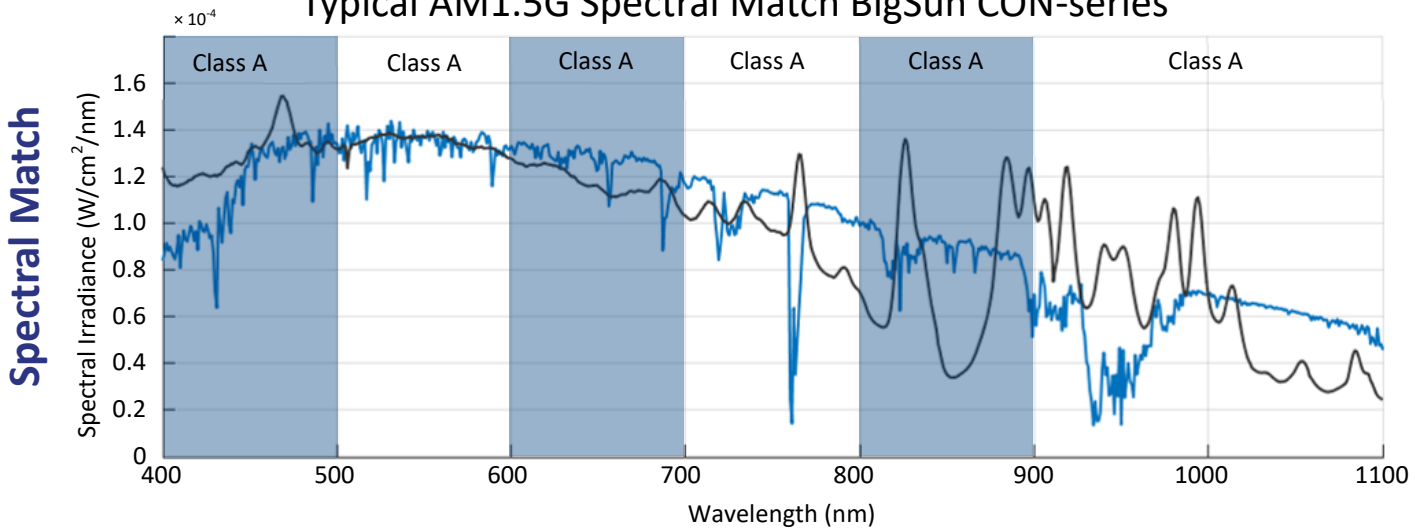
BigSun Solar Simulator

LARGE AREA CLASSIFICATION

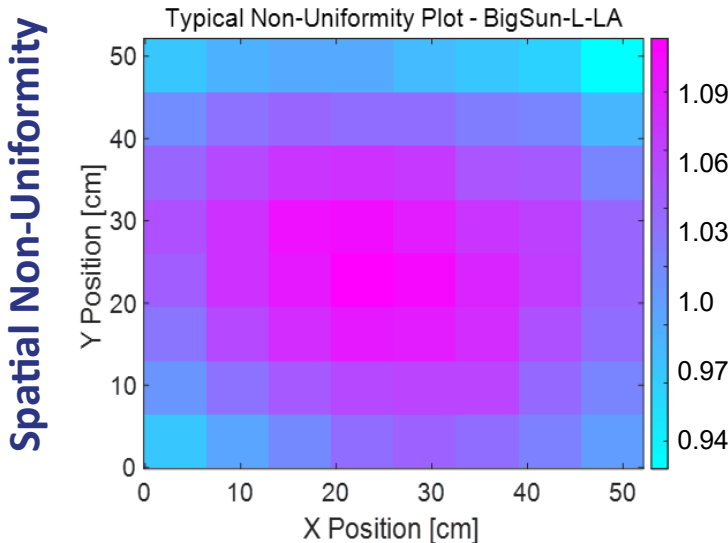
The BigSun series' LA models prioritize the largest area that can be illuminated at 1 Sun irradiance. For these applications, spatial non-uniformity is usually a secondary concern, and collimation is not prioritized, to maximize efficiency. Spectral filtering can be applied, or omitted to provide the most efficient, cost-effective area coverage. The BigSun-L-LA standard model omits spectral filtering.

BigSun-L-LA

Typical AM1.5G Spectral Match BigSun CON-series

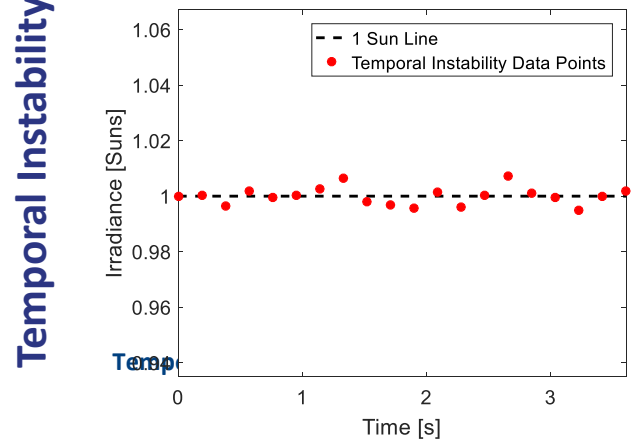


Spectral Match = 0.75—1.25 = Class A



Spatial Non-uniformity < 10% = Class C

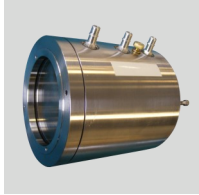
Typical Temporal Instability Plot—BigSun



Temporal Instability = <2.0% = Class A

BigSun Solar Simulator

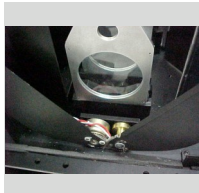
ACCESSORIES

**(WF-AL-3Q) Optical Liquid Filter****100-8066**

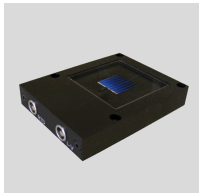
Optical liquid filter (e.g. for water filter, for removing IR). Fused quartz windows transmit 270 to 2500 nm wavelengths; aluminum housing is best for superior heat transfer but is not corrosion-resistant.

**(HPF-series) High-Power Filters****640-####**

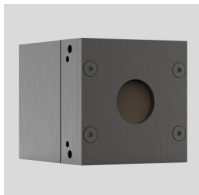
HPF-series filters offer longpass, bandpass, and band-blocking filters for high-power applications. They can endure high heat without being damaged.

**(SH-HP) High Power Shutter****167-9010**

Automated shutter for controlled light exposure.

**(SOL-REF-Q) Solar Reference Cell, Calibrated****125-9060**

Calibrated reference cell for 1 Sun applications. Certificate includes I_{SC} , I_{MAX} , V_{OC} , V_{MAX} , P_{MAX} , Spectral correction, fill factor, area, and efficiency.

**(BBT-30) Broadband Thermopile Detector****585-0001**

Broadband thermopile detector for 30 mW to 30W, suitable for irradiance of < 25 Suns. Requires readout accessory or software.

**(BBT-3000) Broadband Thermopile Detector****585-0004**

Broadband thermopile detector up to 4kW, suitable for irradiance of > 25 Suns. Requires readout accessory or software.

**(UNO-1) Handheld Monitor for Thermopile****585-0176**

Reads BBT-series thermopile detectors.

BigSun Solar Simulator

ORDERING INFORMATION

Model	SKU	Description
BigSun-S-COL	167-9001	Collimated Light Pipe Solar Simulator, 100 mm diameter
BigSun-M-COL	167-9002	Collimated Light Pipe Solar Simulator, 150 mm diameter
BigSun-L-COL	167-9003	Collimated Light Pipe Solar Simulator, 300 mm diameter
BigSun-L-HOM	167-9004	Homogenized Light Pipe Solar Simulator, 300 mm diameter
BigSun-L-LA	167-9005	Large Area Light Pipe Solar Simulator, 500 × 500 mm
BigSun-L-CON	167-9006	Concentrated Light Pipe Solar Simulator, 200 × 200 mm
WF-AL-3Q	100-8066	Optical Liquid Filter
160-REC	160-REC	Water Recirculating Cooler 900W Capacity
HPF-series	640-####	High-Power Filters
SH-HP	167-9010	High Power Shutter
SOL-REF-Q	125-9060	Solar Reference Cell, Calibrated
BBT-30	585-0001	Broadband Thermopile Detector , 30 mW - 30W
BBT-3000	585-0004	Broadband Thermopile Detector, up to 4kW
UNO-1	585-0176	Handheld Monitor for Thermopile