SCIENCETECH
Making Light Work Better Since 1985

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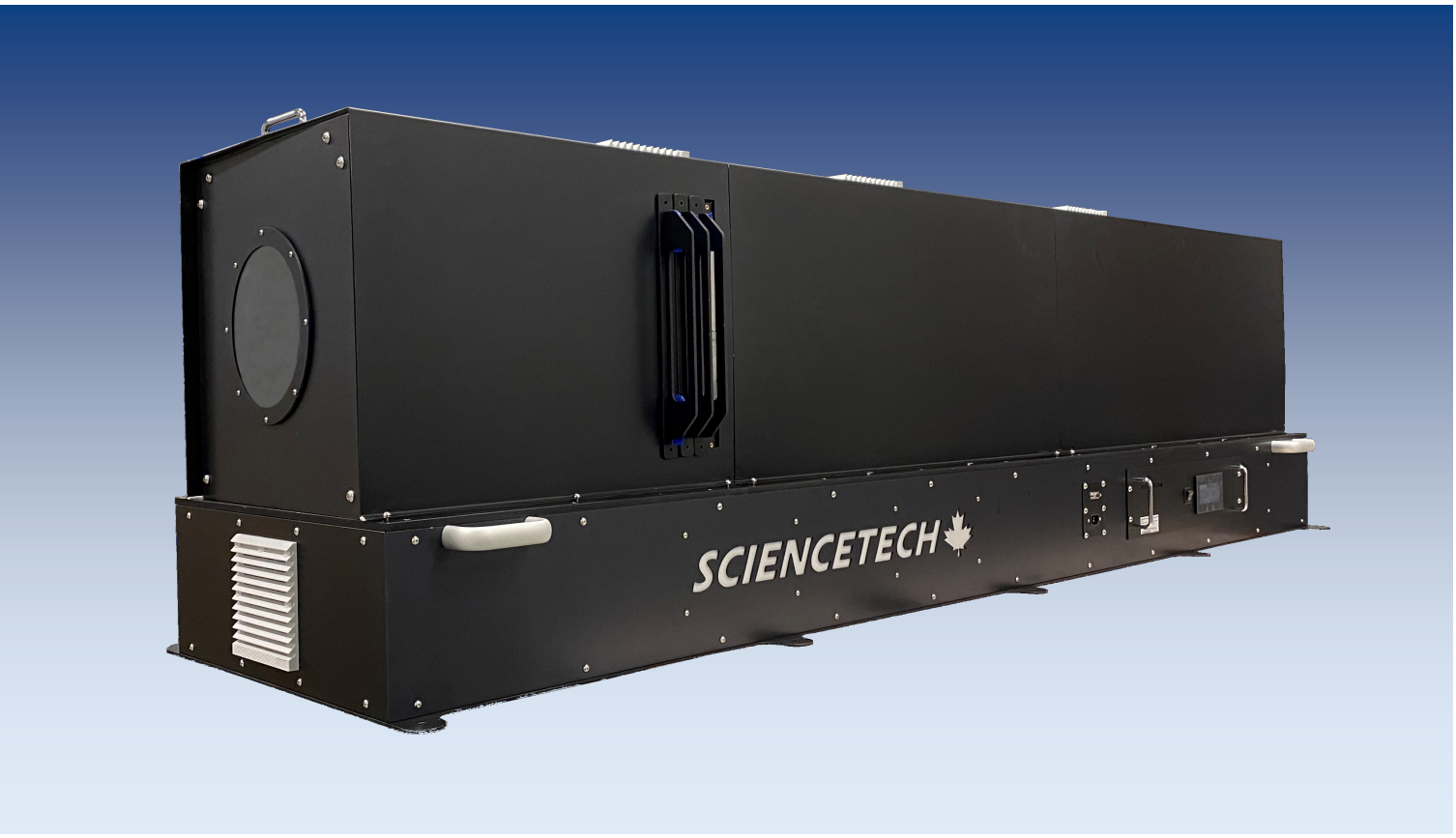


Applications

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

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: SLP-100-COL

MADE IN CANADA
FABRIQUÉ AU CANADA

Solar Light Pipe Solar Simulators

SLP Series

TDB-22.40 January 2025 v1.5

Light Pipe Solar Simulator

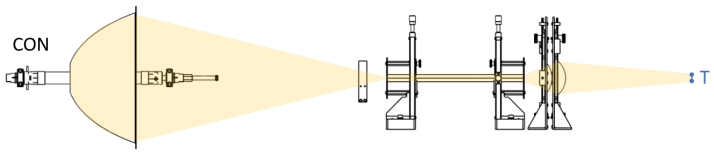
CONFIGURATION

The SLP series of solar simulators 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 distinctions maximize certain features.

HF: High Flux

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.

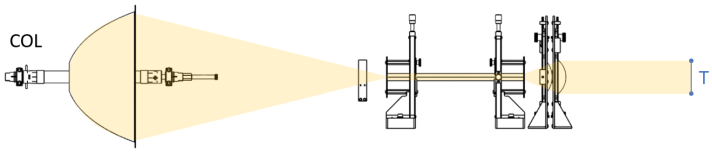


Target Size: ↓ Collimation: ↓ **Irradiance: ↑** Homogeneity: ↓

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/m^2), though higher irradiance is available.

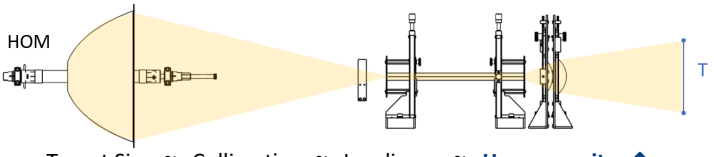


Target Size: ↓ **Collimation: ↑** Irradiance: ↓ Homogeneity: ↓

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.

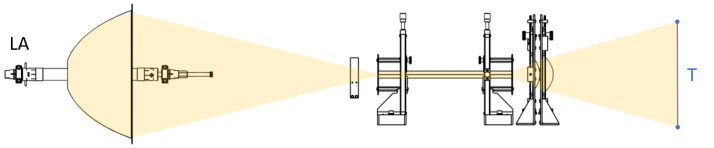


Target Size: ~ Collimation: ~ Irradiance: ~ **Homogeneity: ↑**

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: ↓

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Light Pipe Solar Simulator

SPECIFICATIONS

The SLP 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	SLP-100-COL	SLP-150-COL	SLP-320-COL	SLP-320-HOM	SLP-500-LA	SLP-200-HF
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)	320 (diameter)	320 (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.

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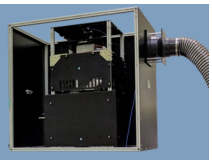
Light Pipe Solar Simulator

OVERVIEW

Sciencetech's SLP line has been developed from previous successful custom solutions. The core of the SLP 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 SLP designs lies in their many standard and custom options, all of which have been implemented with success in the past.

Lamp Housing



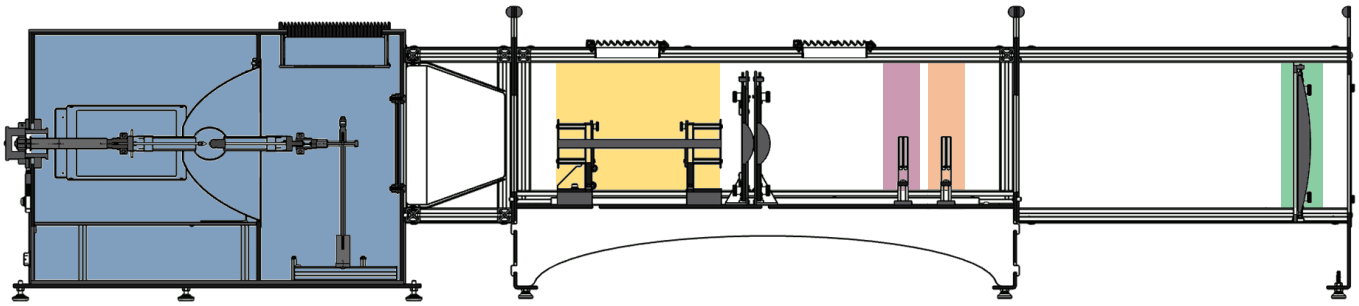
Options:

- 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:

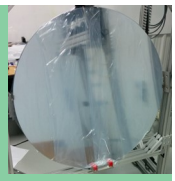
- AM1.5G
- AM0
- Unfiltered xenon arc lamp
- Specialty UV matches:
  - USFDA
  - COLIPA
  - MIL-STD-810G
- IR-removing water filters
- Custom filtering

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

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Light Pipe Solar Simulator

COLLIMATED CLASSIFICATION

The SLP 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.

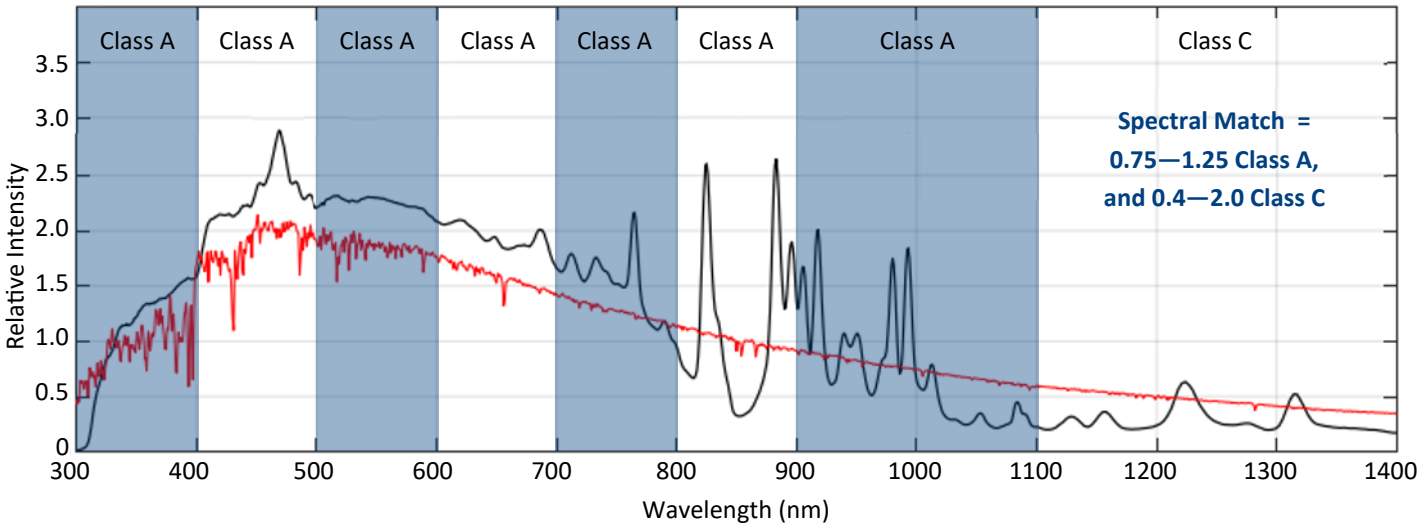
Collimation

SLP-100-COL, SLP-150-COL, and SLP-320-COL

SLP-100-COL Collimation = 0.5° half angle
SLP-150-COL Collimation = 0.9° half angle
SLP-320-COL Collimation = 0.9° half angle

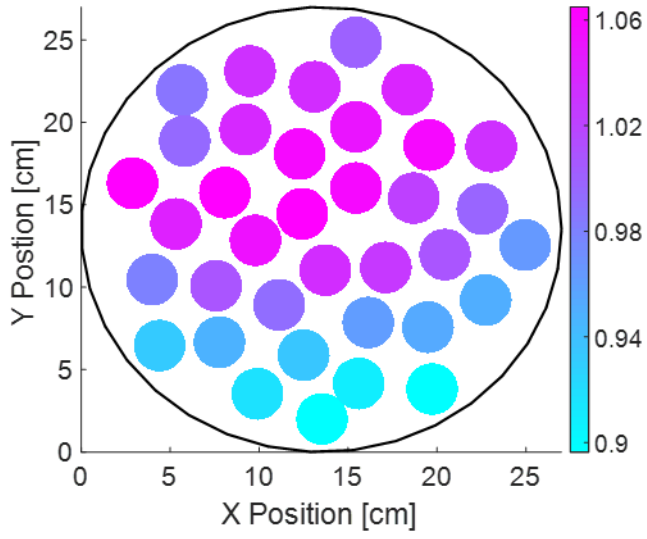
Spectral Match

Typical AM0 Spectral Match SLP COL-series (from SLP-100-COL)



Spatial Non-Uniformity

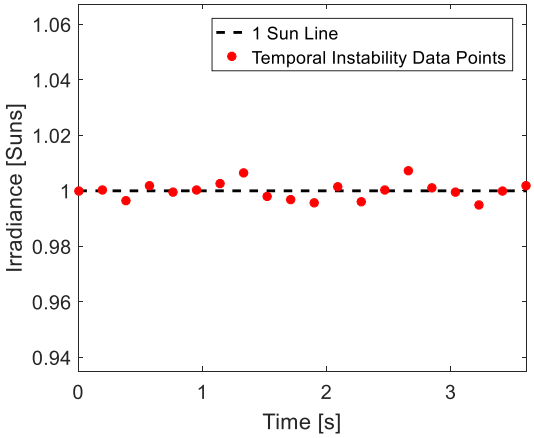
Typical Non-Uniformity Plot - SLP-320-COL



SLP-100-COL: Spatial Non-uniformity < 5.0% = Class B
SLP-150-COL: Spatial Non-uniformity < 5.0% = Class B
SLP-320-COL: Spatial Non-uniformity < 10.0% = Class C

Temporal Instability

Typical Temporal Instability Plot—SLP



Temporal Instability = < 2.0% = Class A

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Light Pipe Solar Simulator

HOMOGENIZED CLASSIFICATION

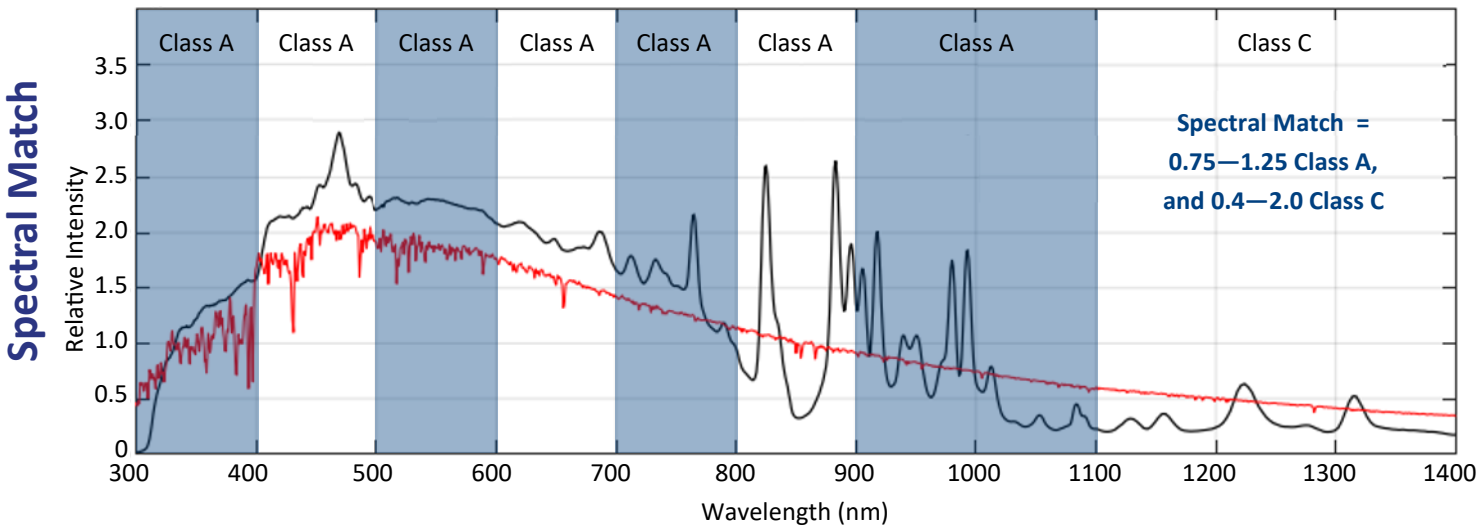
The SLP series' HOM models prioritize the best possible homogeneity (the lowest possible variation between highest and lowest points of irradiance in the measured target area).

SLP-320-HOM

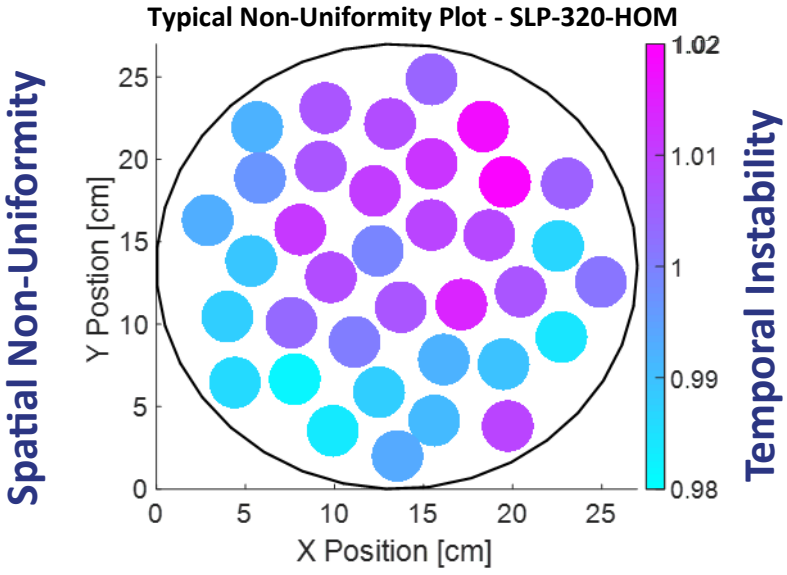
Collimation

Collimation Angle = <8° half angle

Typical AM0 Spectral Match SLP HOM-series

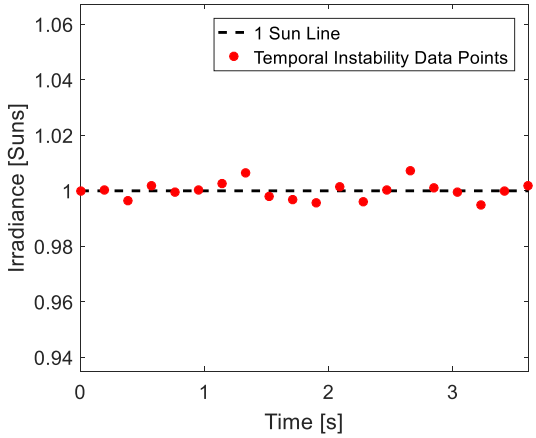


Typical Non-Uniformity Plot - SLP-320-HOM



Spatial Non-uniformity < 2.0% = Class A

Typical Temporal Instability Plot—SLP



Temporal Instability = < 2.0% = Class A

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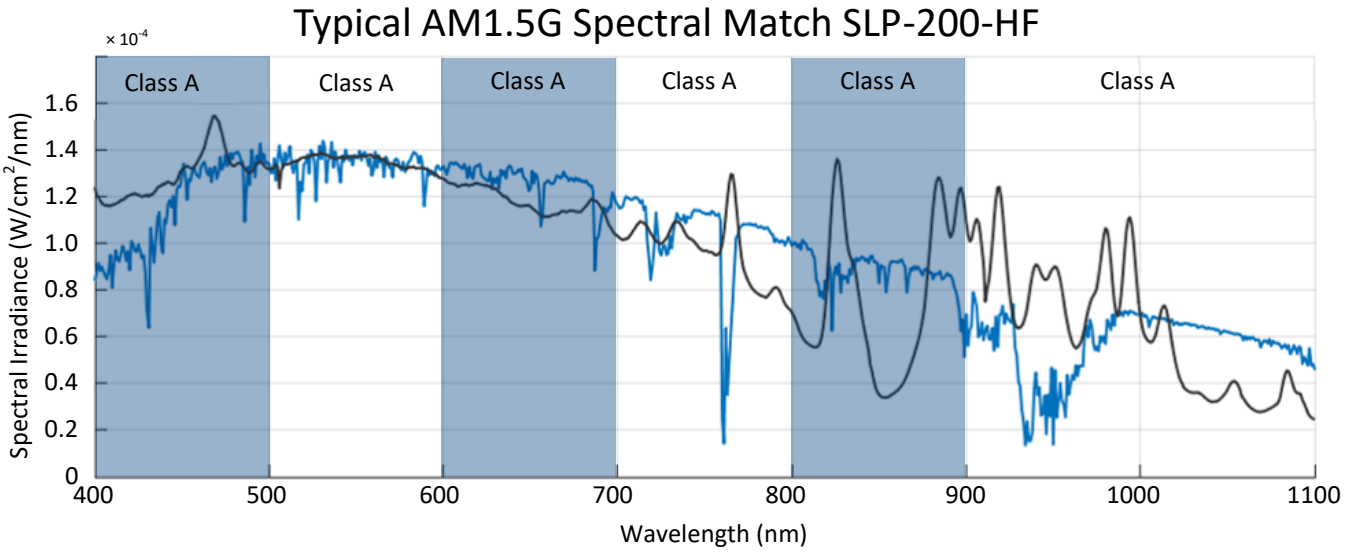
Light Pipe Solar Simulator

HIGH FLUX CLASSIFICATION

The SLP series' HF 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.

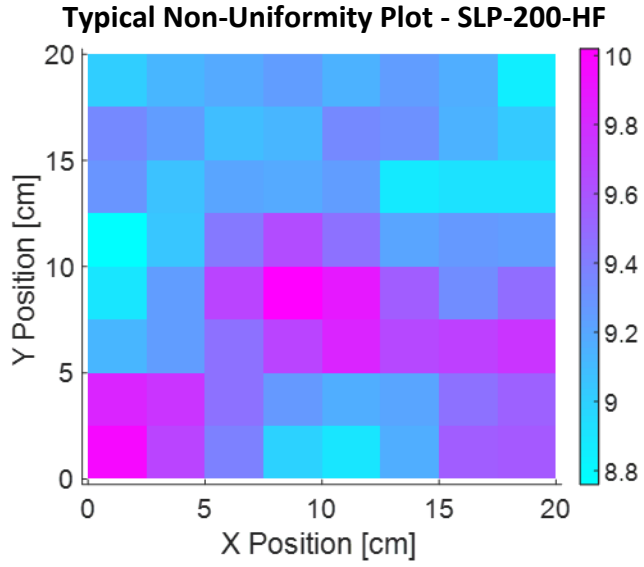
SLP-200-HF

Spectral Match



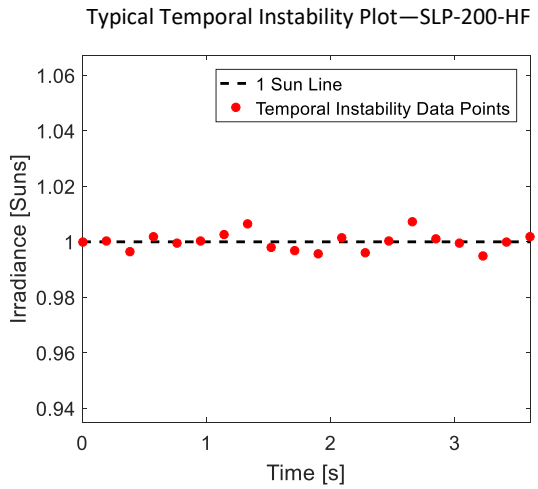
Spectral Match = 0.75—1.25 = Class A

Spatial Non-Uniformity



Spatial Non-uniformity < 10% = Class C

Temporal Instability



Temporal Instability = <2.0% = Class A

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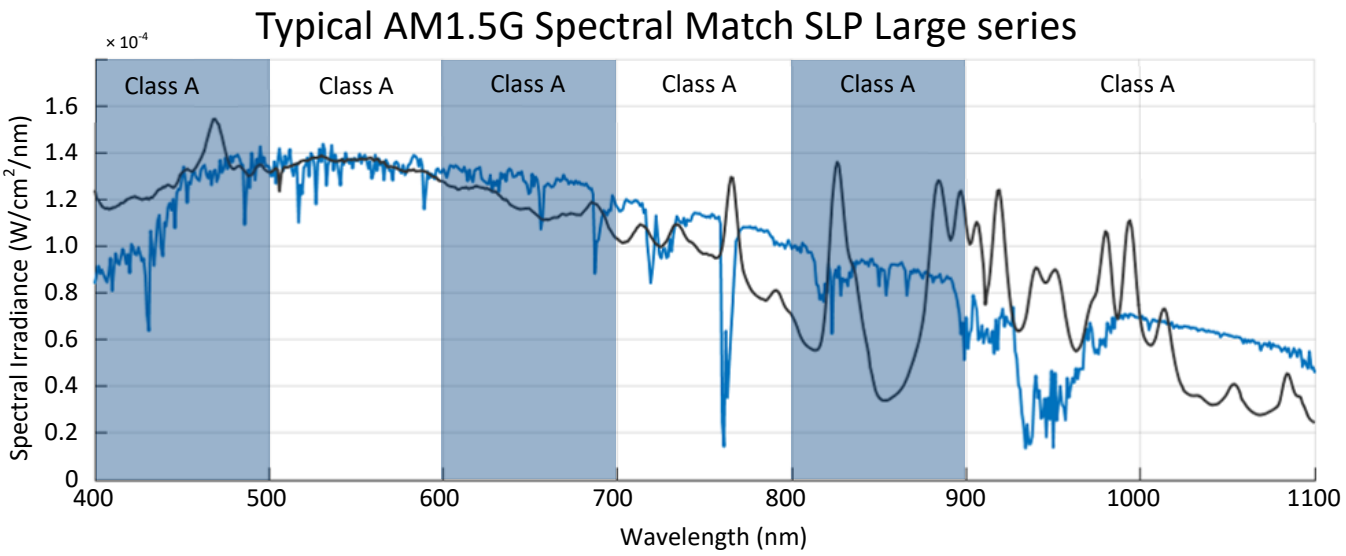
LARGE AREA CLASSIFICATION

The SLP 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 SLP-500-LA standard model omits spectral filtering.

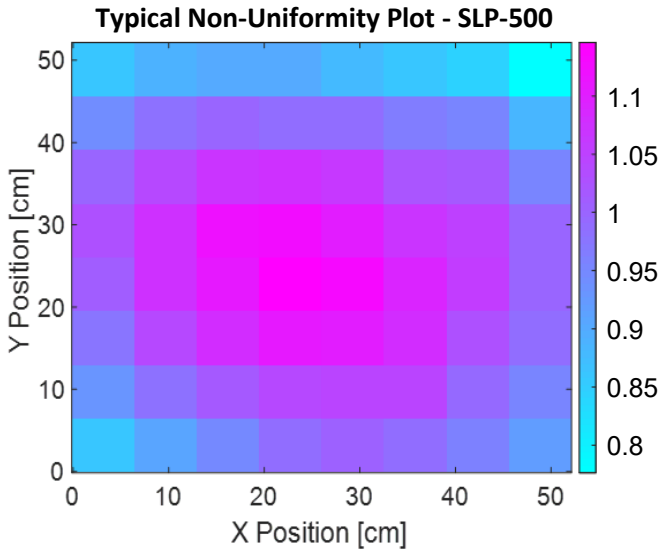
SLP-500-LA

Spectral Match



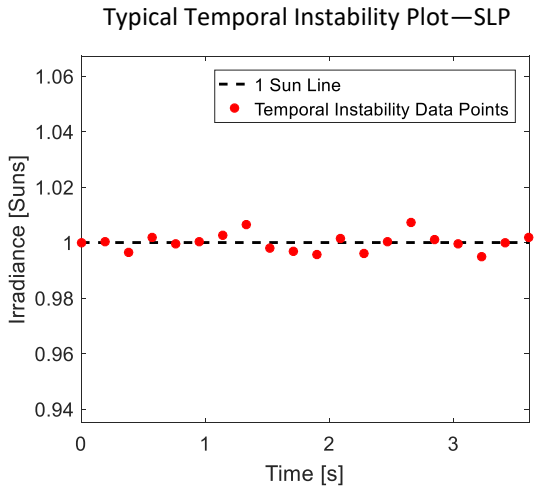
Spectral Match = 0.75—1.25 = Class A

Spatial Non-Uniformity



Spatial Non-uniformity < 10% = Class C

Temporal Instability



Temporal Instability = <2.0% = Class A

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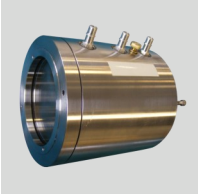
Light Pipe Solar Simulator

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; aluminum housing is best for superior heat transfer.

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

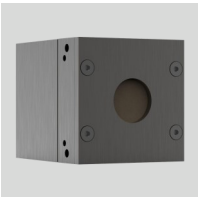
HPF-series filters offer longpass, bandpass, and band-blocking filters for high-power applications. They can endure high heat without being damaged.

(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

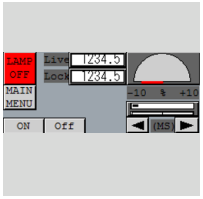
Broadband thermopile detector for 30 mW to 30W, suitable for irradiance of < 25 Suns. Requires readout accessory or software.

(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.



(FS-02-N-631) Light Intensity Stabilizer 115-9032

Improves the lamp stability over long times of >1s. Does not improve inherent arc lamp stability over time periods <1s.

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Light Pipe Solar Simulator

ORDERING INFORMATION

Model	SKU	Description
SLP-100-COL	167-9001	Collimated Light Pipe Solar Simulator, 100 mm diameter
SLP-150-COL	167-9002	Collimated Light Pipe Solar Simulator, 150 mm diameter
SLP-320-COL	167-9003	Collimated Light Pipe Solar Simulator, 300 mm diameter
SLP-320-HOM	167-9004	Homogenized Light Pipe Solar Simulator, 300 mm diameter
SLP-500-LA	167-9005	Large Area Light Pipe Solar Simulator, 500 × 500 mm
SLP-200-HF	167-9006	High Flux Light Pipe Solar Simulator, 200 × 200 mm, 10 Suns
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
FS-02-N-631	115-9032	Light intensity stabilizer for 631-series power supplies.
FS-02-N-621	115-9031	Light intensity stabilizer for 621-series power supplies.
FS-02-N-611	115-9027	Light intensity stabilizer for 611-series power supplies.

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