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SC-225 LED Spot-Curing System

Control up to Four LED Heads Independently for Greater Curing Flexibility

- One controller controls up to four LED heads
- Available in three wavelengths -
- 365, 385, & 405 nm
- Variable mode allows each LED head to be programmed independently
- Interchangeable/replaceable focusing lenses in 3-, 5-, and 8-mm diameters
- Efficient LED-head temperature management eliminates need for PPE
- PLC interface with 4-channel mode

The SC-225 is the next step in high-performance LED spot curing units. This small, versatile unit offers high intensity, long die life, and great PLC functionality. The system is comprised of a controller with an easy-to-use control interface and up to four LED heads.

The SC-225 is designed for flexible operation, using LEDs installed directly at the end of the head for precision light delivery. The small diameter LED heads can be mounted very close to the piece being cured, covering hard-to-reach portions of complex geometries or providing 360° cures, and providing maximum intensity via the short working distance (focused at 5 mm). With 4 independently operable channels, multiple LED heads can be combined to cover complex parts. Alternately, wavelengths can be mixed to get the best curing properties.

Curing cycles can be activated by screen, foot pedal or PLC interface, allowing the unit to be easily incorporated into automated systems. LED heads are available in 365, 385, and 405 nm and can be used with 3-, 5-, or 8-mm diameter focusing lenses. LED heads and focusing lenses can be used in any combination and can be controlled through the system's constant or variable mode.

In variable mode or through the 4-channel PLC interface, each LED head (up to four) can operate independently of the others. Each can be programmed in 1% increments for specific duty cycles, creating curing profiles with many advantages in a manufacturing or R&D setting. Variable mode gives users maximum curing flexibility and control over their process. Recipe storage for up to 20 programs.

System Features & Benefits

Features	Benefits
Use one controller with up to four LED heads	• Provides maximum application flexibility
LED heads available in 365, 385, or 405 nm wavelengths	• Compatible with a variety of UV and visible light-curable materials • Wavelengths can be mixed to product optimal cure • Units can be custom configured to your curing requirements
Variable mode allows each LED head to be programmed independently	• Individual exposure times and intensity settings available in 1% increments for each LED head allows for maximum curing flexibility • Timer mode from 0.1 to 999 seconds
Interchangeable/Replaceable focusing lenses in 3-, 5-, and 8-mm diameters	• Allows tailoring of the unit to your curing requirements
Instant on-off	• No warm-up period • More energy efficient
Highly flexible interconnect cables with quick connect for LED heads	• Can be subjected to frequent movement, with small bend radius • Flexible cables are more resilient and pliable than typical lightguides • Can be daisy chained up to 10 meters for separated work stations • Easy to handle and switch LED heads
Efficient LED-head temperature management	• Maximized continuous operation without overheating • Comfortable hand-held operating temperature; no PPE required • Temperature monitoring assures maximum LED life
PLC interface with 4-channel mode	• Easily incorporated into automated systems
Enhanced full touch screen HMI	• Easy to use, navigate and program • Recipe storage for up to 20 programs

Heat Control

For applications with heat-sensitive components, or exo-thermal chemistry properties, interruptions in the exposure duration can reduce the materials' and substrates thermal rise during the cure process. This isn't a concern with the SC-225 because each LED head can be programmed to a precise curing energy exposure profile to reduce the risk of substrate damage.

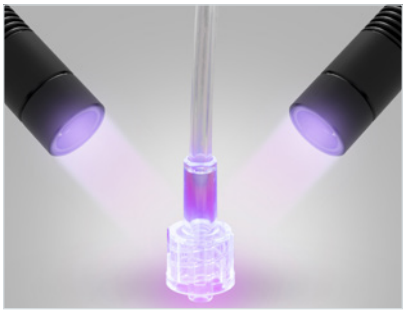
Depth of Cure vs. Surface Cure

Utilizing the multiple narrow bands available for the SC-225 the perfect combination of outputs can orchestrate the perfect cure. The approach of alternating between depth of cure and surface cure LED heads can aid in the reduction of surface tack otherwise found on single wavelength LED products.

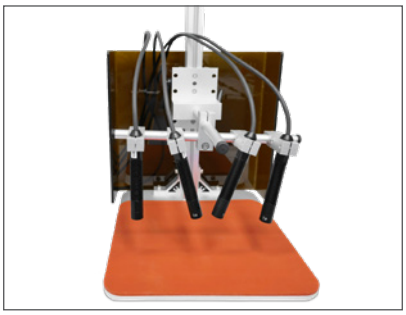
Fluorescing for Inspection

If all four LED heads are not used during parts production, a 365 nm LED head could be set to operate as a low-intensity lamp to fluoresce some Hanarey products. This aids in QC inspections, resulting in higher quality finished products.

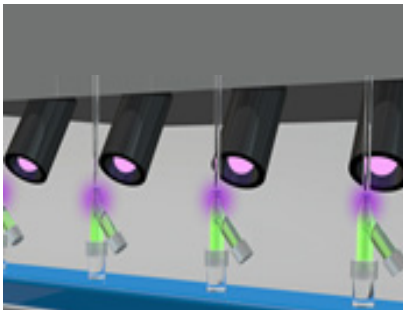
Using the SC-225



Capitalize on the small diameter and length of the SC-225 LED heads, as well as the short, 5-mm focus distance, to get multiple LED heads around a single point.



Use by hand or fixtured. The heat removing design allows hand use with no PPE. The quick connects allow for easy switching of LED heads to change wavelengths in R&D applications.



Use the 4 independently operable channels to mix wavelengths, curing times, and intensities to achieve an optimal cure. Or cure multiple pieces at one time.

LED Light-Curing Technology

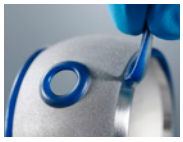
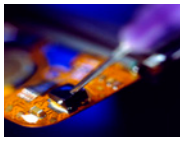
LED spot-curing systems generate curing energy using high-intensity LEDs instead of conventional metal-halide or mercury-arc lamps. The relatively narrow frequency band of energy emitted by LEDs results in cooler substrate temperatures compared to traditional conventional arc lamp systems, making them ideal for curing thermally sensitive materials. Hanarey LED-curing systems offer many energy and cost-saving benefits, such as no warm-up period, lower energy consumption, no bulbs to change, and more consistent frequency and intensity output for better process control.

Key Advantages of LED Light-Curing Technology

- High electrical efficiency and instant on/off capability for lower operational costs
- Long service life that eliminates bulb replacement and reduces maintenance costs
- Narrow wavelength spectral emissions that minimize substrate thermal rise
- Compact unit footprint that reduces workspace requirements and cost of the system
- Consistent frequency and intensity output for better process control
- "Green" attributes that eliminate mercury and ozone safety risks and disposal handling costs

Compatible Materials & Applications

The SC-225 is ideally suited for a number of applications in the medical, consumer electronics, automotive, aerospace and defense, optical, and appliance industries. The chart below displays some of the materials commonly used in those industries and where the SC-225 can be considered as a curing system.

Materials			
Adhesives		✓	Medical device (catheter, needles, tube set, facemask) assembly; glass bonding (stemware, furniture, etc.); automotive headlamp assemblies; camera module assemblies; appliance assembly; speaker assembly; optical display bonding
Conformal Coatings		✓	Printed circuit board protection in aerospace avionics, automobiles, appliances, and consumer electronics; camera module assembly; electric vehicle battery management systems
Potting Compounds		✓	Tamper proofing; potting electrical connectors, switches, and sensors; cable potting; medical potting*
Maskants		✓	Surface protection for turbine blades and rotorcraft components during processing; protection for surfaces during metal finishing processes; protection of orthopaedic parts during processing; protection of PCB components for consumer electronics, automotive electronics, avionics, and medical electronics; protection for surfaces during metal finishing processes*
Encapsulants		✓	Chip encapsulation on PCBs used in automobiles, plane and helicopter control panels, consumer electronics, appliance, and medical diagnostic equipment*
Ruggedization Materials			Flex circuit reinforcement; wire tacking; ball grid array (BGA) ruggedization; Video graphics arrays (VGA) ruggedization; shock absorption; underfill alternative*

✓ SC-225 compatible with this material

* Materials cured with SC-225 to be evaluated in customer application to their performance requirements.

System Specifications

Property	Specification		
Output Frequency	365 nm	385 nm	405 nm
Intensity Output*	16.9 W/cm^2	22.9 W/cm^2	22.0 W/cm^2
Power Supply Input	100-240 V ~2 A, 50/60 Hz		
LED Timer	0.1 to 999 seconds		
LED Activation	Footswitch, front panel, or PLC		
Cooling	Natural convection		
Dimensions	Controller: 3.7" x 5.5" x 5.8" [93.5 mm x 137.4 mm x 147.5 mm] (W x H x D) LED Head: Φ0.6" x 2.6" [15.4 mm x 66 mm] (Diameter x L)		
Weight	Controller: 2.2 lbs. [1 kg] / Head: 4.6 oz [130 g]		
Unit Warranty	1 year from purchase date		
Operating Environment	5-40°C [41-104°F], 0-80% relative humidity, non-condensing		

* Measured with 3-mm lens using an ACCU-CAL™ 50-LED Radiometer, in spot mode using the SC-225 Integrated Optic Adapter

Figure 1. SC-225 Dimensions

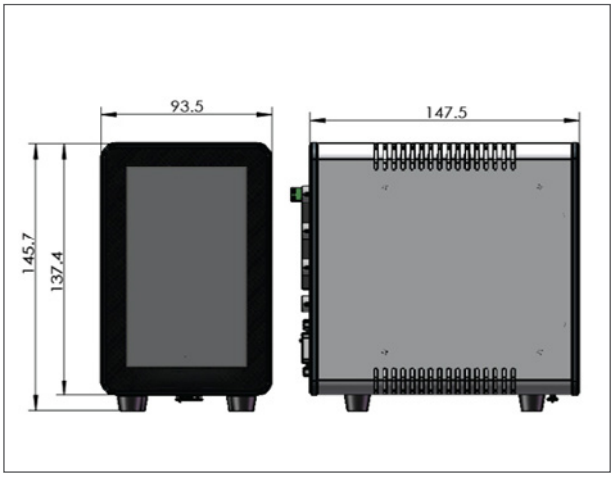
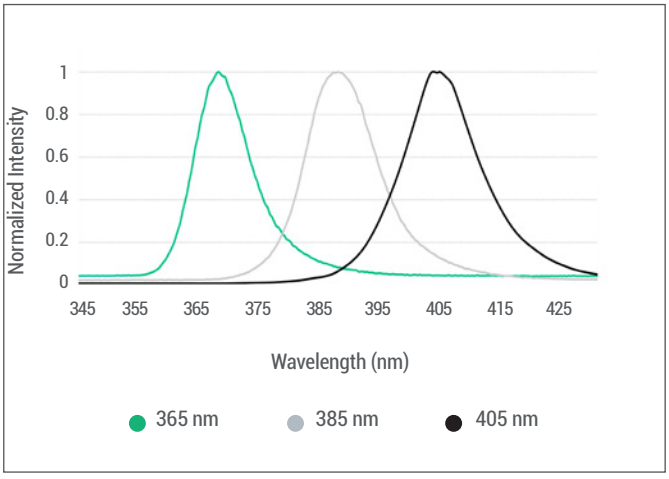
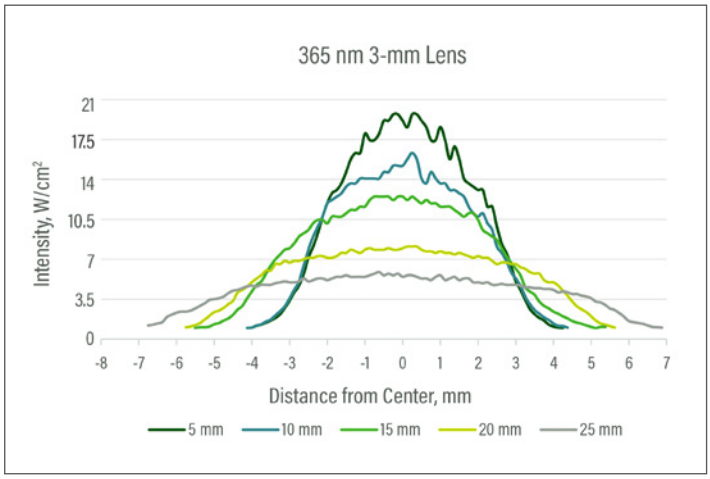


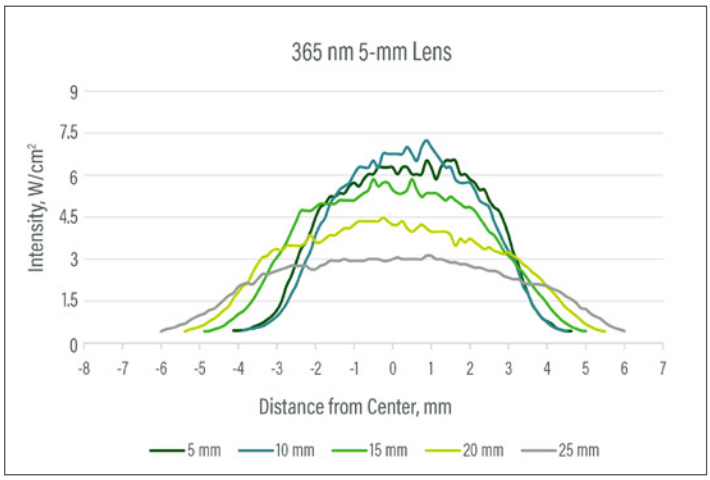
Figure 2. SC-225 Spectral Output Chart

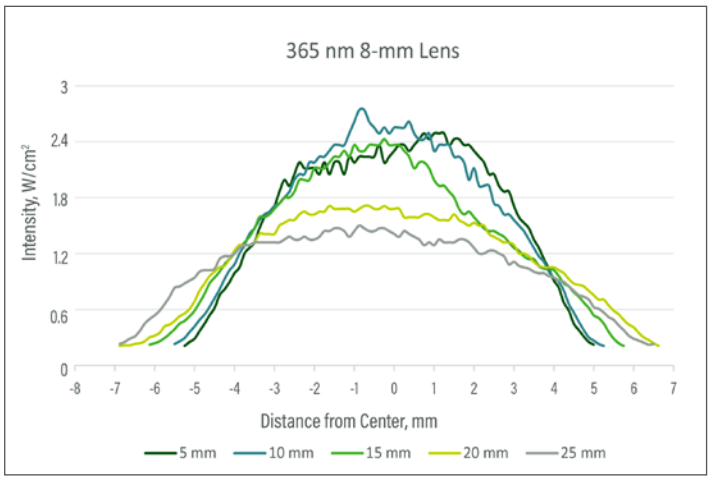


System Intensity

Figure 3. 365 nm LED Head - Intensity* at Various Working Distances

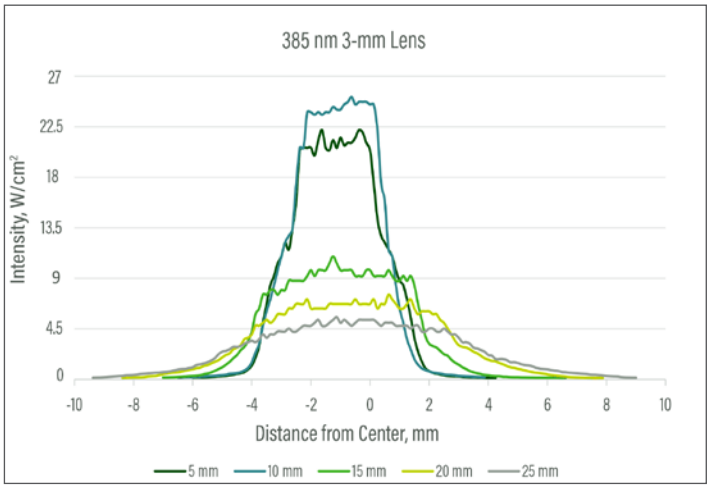


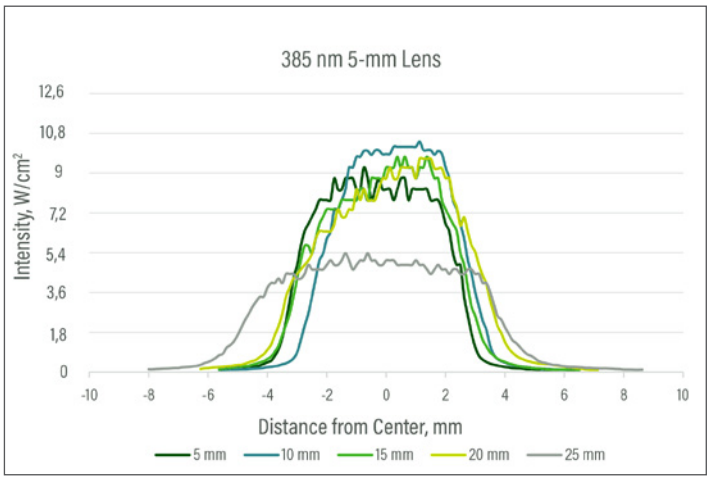


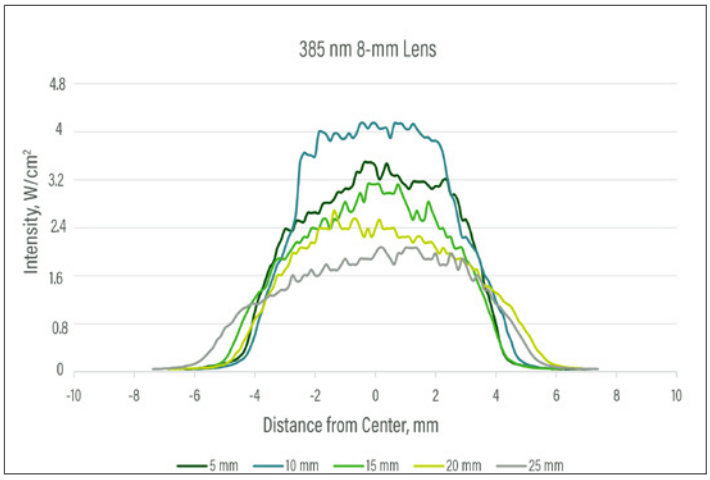


Note: Curing area data taken using Fuji UV Light Distribution Mapping System and normalized to ACCU-CAL™ 50 LED Radiometer.

Figure 4. 385 nm LED Head - Intensity* at Various Working Distances

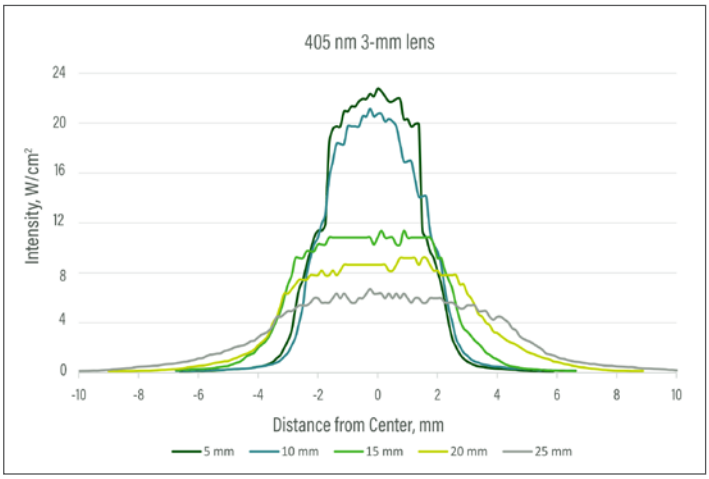


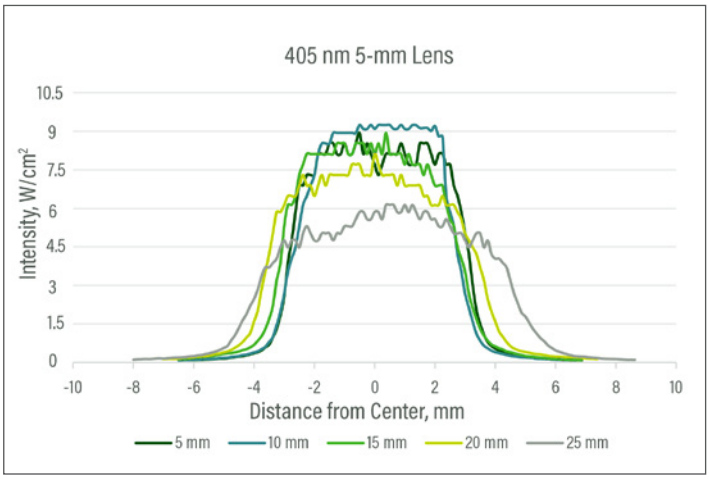


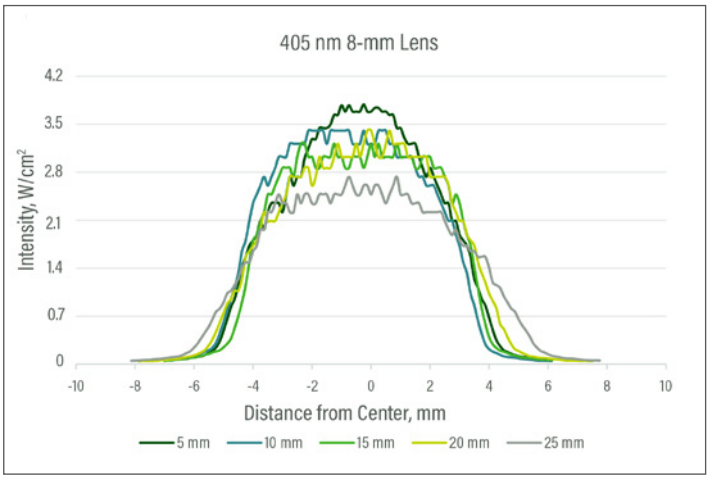


Note: Curing area data taken using Fuji UV Light Distribution Mapping System and normalized to ACCU-CAL™ 50 LED Radiometer.

Figure 5. 405 nm LED Head - Intensity* at Various Working Distances







Note: Curing area data taken using Fuji UV Light Distribution Mapping System and normalized to ACCU-CAL™ 50 LED Radiometer.

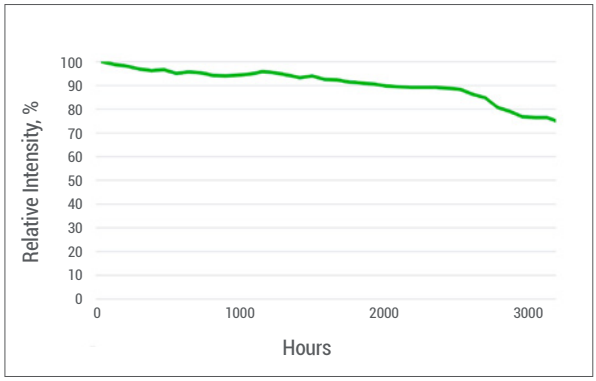
Degradation/Life Testing

Unlike broad-spectrum lamps, LED curing systems do not have bulbs that require regular replacement. Instead, LED curing systems operate with high-intensity LEDs. The instant on/off functioning of LEDs greatly increases the life of these LED systems. Long-term life testing of SC-225 systems was conducted for 3,000 continuous hours at 100% intensity. As noted in the graphs below, LED degradation was found to be very low for all wavelengths and intensities. Contact Hanarey Application Engineering for additional details on setting up an LED curing process for maximum throughput and LED die life.

365 nm Emitters

- 100% Intensity resulted in a 8% degradation per 1,000 hours

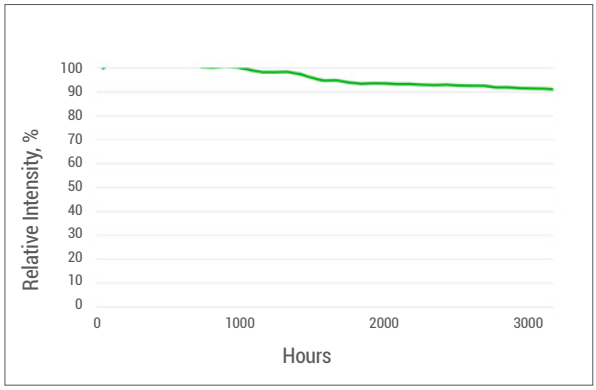
Figure 6. LED Degradation Testing - 365 nm



385 nm Emitters

- 100% Intensity resulted in a 3% degradation per 1,000 hours

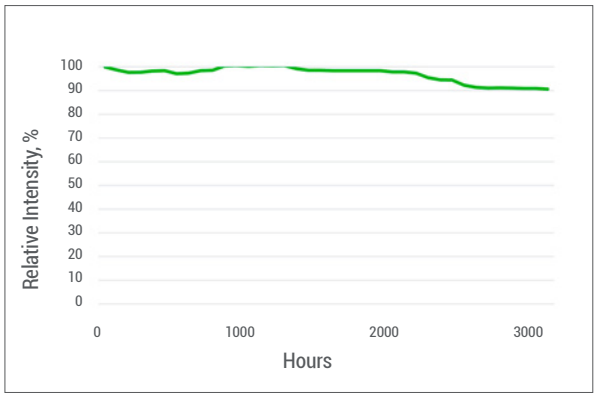
Figure 7. LED Degradation Testing - 385 nm



405 nm Emitters

- 100% Intensity resulted in a 3.1% degradation per 1,000 hours

Figure 8. LED Degradation Testing - 405 nm



Note: Testing conducted at 70oF +/-3°F and 30% +/-10% Relative Humidity

Ordering Information

A complete SC-225 system features a controller and up to four LED heads/lenses. Each LED head must have a lens in order to operate properly. Components are sold separately.

Units are warrantied against defects in material and workmanship for one year from date of purchase.

Part Numbers - Main System Components	
Controller	86623 Controller Kit
LED Head (1 M)	86607 365 nm 86608 385 nm 86609 405 nm
Focusing Lens Only	81205 3-mm Lens 81206 5-mm Lens 81207 8-mm Lens

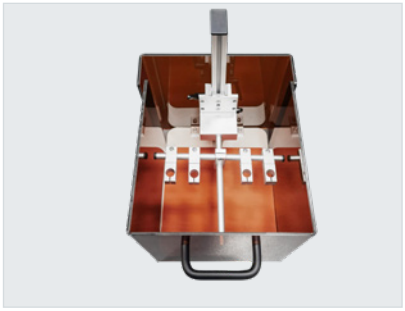
Controller

LED Heads

Focusing Lenses
Available in 3, 5, and 8 mm

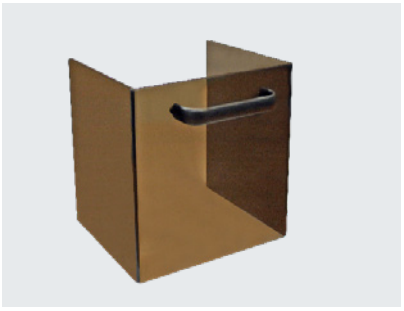
Spare Parts & Accessories

Spare Parts & Accessories	
AC Power Adapter and Power Cords	84103 AC Power Adapter 84104 China Power Cord
Connection Cable Extensions	84125 1.0 M Extension 84127 2.0 M Extension
Stands	88821 SC-225 Mounting Clamp Kit (including 81016) 88822 Mounting Clamp Extend Rod Kit 81016 3-Sided Acrylic Shield
Footswitch	84124 Footswitch
Angle Adapters	81209 90° Angle Adapter for LED Head



SC-225 Mounting Clamp Kit

Integrated Optic Adapter
Specially designed for use with ACCU-CAL 50-LED Radiometer to test the SC-225



3-Sided Acrylic Shield

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