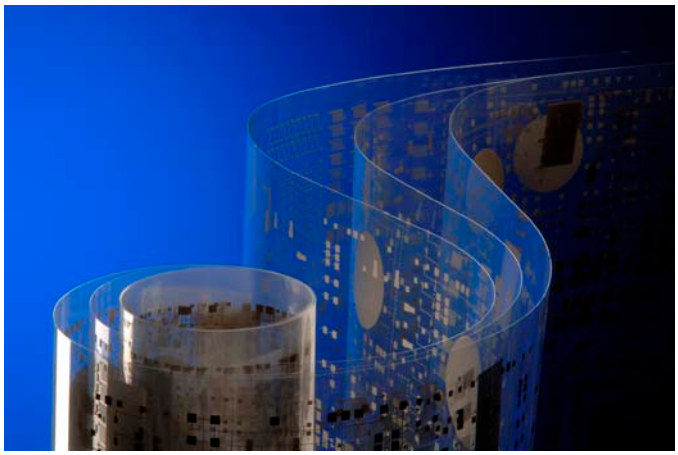
SINTERON 500
Photonic Curing R&D Systems

Researchers working with functional nano materials in the field of Printed Electronics have a new resource available. The benchtop SINTERON 500 systems from Xenon Corp. offer high peak energy, pulsed light technology to quickly heat and fuse conductive metallic ink flakes and nano inks at room temperature without significantly heating the substrate or adjacent thermally sensitive components. By controlling the pulse energy, various experiments are easily performed on flexible substrates.



The heart of Xenon's sintering systems is a high energy, air cooled pulsed lamp designed for reliable, repeatable testing of a range of conductive nanomaterials such as silver and copper. The high intensity pulsed xenon lamp provides a broadband UV/Visible spectrum, from 240 to 1000 nm. The energy to the flashlamp is user controlled by adjusting the flashlamp voltage. The flexibility of the SINTERON 500 exposure area, pulse energies and lamp spectra, offers the user the ability to match the sintering needs of a range of nanoparticle inks and flakes on low cost heat sensitive substrates such as PET and paper.

Features

- Adjustable exposure intensity: 290-830 Joules
- Exposure area options
  - 7.6 x 7.6 cm (500-S)
  - 1.9 x 30 cm (500-L)
  - 30.5 x 30.5 cm (500-L with LS-845)
- Sintering Chamber
- Room temperature process
- Sinter on heat sensitive materials: PET & Paper
- Pulse duration 520 µs

System Description

SINTERON 500 systems consist of a table top controller, separate lamp housing, sintering chamber and lamp housing air cooling. The controller provides all power and user control of the flashlamp mounted in an air cooled lamp housing. The energy into the flash lamp is user controlled by adjusting the lamp voltage.

CONTROLLER with power supply

The SINTERON 500 can be ordered with different configurations, as shown in the ordering guide on page 6.

Lamp Housing Options

Two flashlamp housing options are available with optional attached sintering chambers. Selection is based on desired curing area and user adjustable pulse energy range. The controller is used with both lamp housings.

Model LH-910 Spiral Lamp Housing

The LH-910 spiral lamp housing provides a curing area of 7.6 x 7.6 cm at a distance of 2.5 cm from the lamp housing window. An optional lamp chamber, model LC-915 integrates the LH-910 optical source to provide a light blocking chamber with an adjustable platform to place samples. The height of the sample platform can be user adjusted from 2.5 to 7.5 cm from the lamp housing window.

The chamber access door has an interlock to prevent the lamp from flashing when open.

SPIRAL LAMP HOUSING- Model LH-910
Shown with model LC-915 chamber

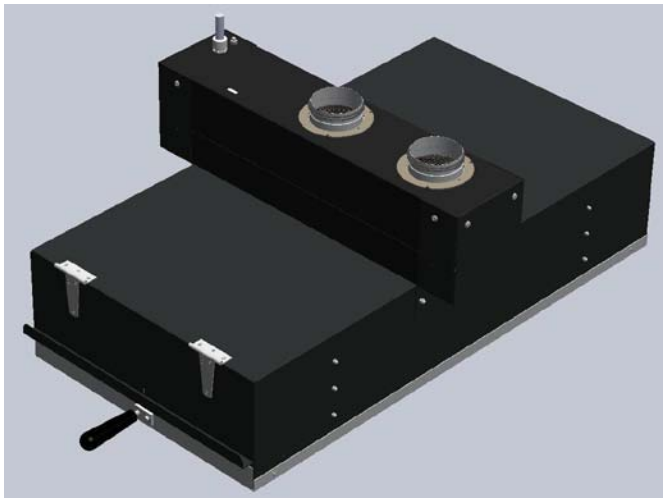
Model LH-840 Linear Lamp Housing

The LH-840 linear lamp housing provides a curing area of 1.9 x 30.5 cm (0.75" x 12"). The flash lamp is mounted inside the housing with provisions for external air cooling.

LINEAR LAMP HOUSING - Model LH-840

Model LS-845 Linear Stage with LH-840

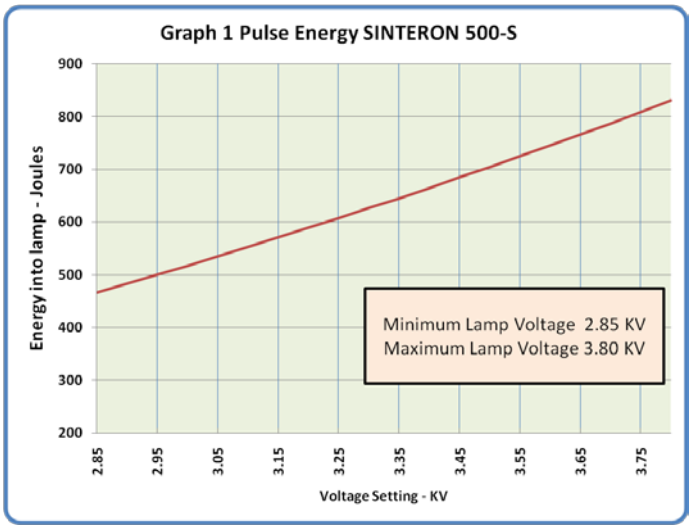
Model LS-845 linear stage integrates the LH-840 optical source to provide a single axis linear motion for area sintering applications. The sample tray is 35.6 x 45.7 cm (14" x 18") with a treatment area up to 30.5 x 30.5 cm (12" x 12"). The linear stage offers precise adjustment for the speed of the sample up to 2.5 cm/s (1"/s) or 1.5 m/min (5'/min). The height of the sample from the lamp can be adjusted up to 5.5 cm (2.25") starting at a distance of 1.3 cm (0.5") from the lamp window. The focal plane for the lamp housing is approximately 2.5 cm (1") from the lamp window. A stepper drive allows for precision staging of the sample with digital control of the speed and pulses. The linear stage has internal interlocks for door and light shielding for safe and easy usage.

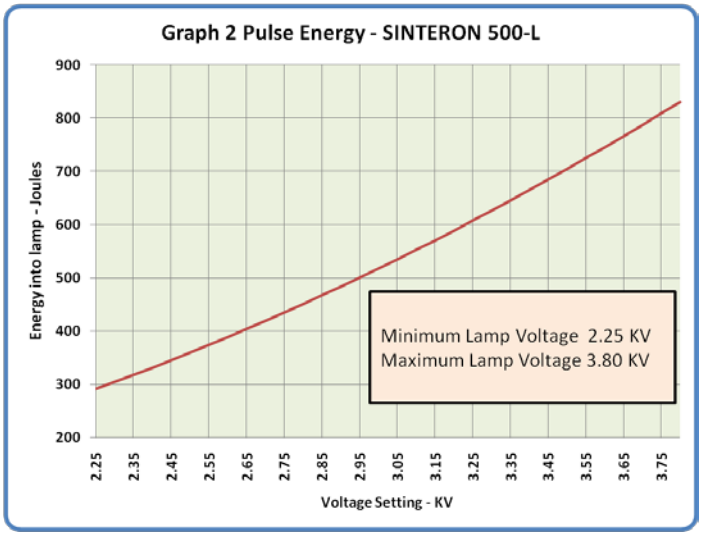


LINEAR STAGE – Model LS-845, with Model LH-840 lamp housing mounted on top

Pulse Energy

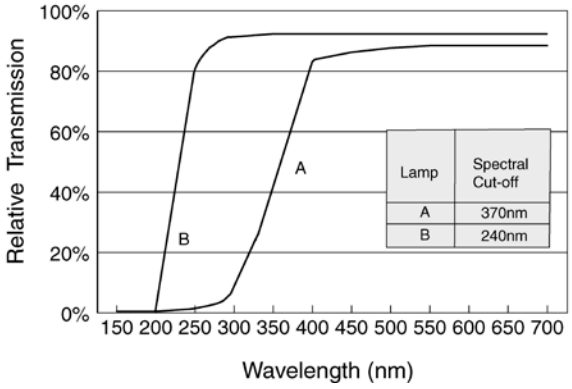
Pulse energy is controlled by adjusting the lamp voltage as shown in graph 1 and 2. It is important to note the recommended operating voltage range.





Lamp Spectra

The Xenon flash lamp produces a broadband spectrum suitable for materials that absorb UV light from 240 to 1000 nm. Lamps are available with two different spectral cut-offs, as illustrated in graph 3, producing unique wavelength properties suitable for specific types of substrate materials. Both lamp types do not produce ozone.



Graph 3 – Spectral cut-off wavelengths

Selecting a Lamp

Selection of lamp type is based on the relative diameter of the nano material and the thermal characteristics of the substrate. Table 1 provides a guide to assist in selecting the flash lamp type. The pulse energy shown is representative and should be determined by actual testing. For large diameter nano materials such as copper, the SINTERON 2000 system from Xenon should be considered. It offers a pulse energy adjustment range of 150 to 2000 Joules as well as selectable pulse durations from 580 to 2000 µs.

INK MATERIAL	SUBSTRATE	LAMP TYPE		PULSE ENERGY (Joules)
		A	B	
Ag - small size	Low Temp.	√		500
Ag - large size	High Temp.		√	800
Cu - small size	All	√		800
Cu - large size	All	√	√	1500*

*** Refer to SINTERON 2000 System**

Lamp Cooling

Forced air cooling for the lamp housing must be supplied by a user air system or the optional blower kit: model BL-1020 (60Hz) or BL1030 (50Hz).

SPECIFICATIONS

All specifications are typical unless otherwise noted ($T_{AMBIENT}$ @ +25°C, V_{INPUT} = 208 Vrms)

System Units [1]	
Controller	
Lamp Housing with Flashlamp	
	Model LH-910 Housing; Type A or Type B Lamp Spectra [2]
	Model LH-840 Housing; Type A or Type B Lamp Spectra [2]
Sintering Chamber	
	Model LC-915 for use with LH-910 Housing and Spiral Lamp
	Model LS-845 for use with LH-840 Housing and Linear Lamp
Lamp Housing Blower [3]	
	Model BL-1020 (60 Hz mains power)
	Model BL-1030 (50 Hz mains power)
	Lamp Housing Blower Kit [4]
Interlocks [5]	
Lamp Housings	Access cover open prevents flashing
Sintering Chambers	Access door open prevents flashing
User Controls	
Mains Voltage	ON/OFF
High voltage [6]	ON/OFF
Manual Flash Trigger Mode	OFF/CONT/BURST
Lamp Select [7]	Lamp A / No Lamp / Lamp B
Continuous Flash Trigger Mode	START/STOP
Lamp Operating Voltage [8]	
Model 500-S	2.85 KV - 3.80 KV
Model 500-L	2.25 KV - 3.80 KV
Programmable timer	1 to 999 seconds in 1 sec interval
Pulsed Light	
Power output to flashlamp	2300 Joules/second, max
Pulse rate	1.8 pulses/second, max, factory set
Pulse Duration	520 µs
Dose [9]	
Model 500-S	4.0 J/cm²
Model 500-L	4.9 J/cm²
Pulse energy safe operating range [8]	
Model 500-S	465 - 830 Joules/pulse
Model 500-L	290 - 830 Joules/pulse

Specifications continued on next page

SPECIFICATIONS - continued

Lamp Housings	
Model LH-910	Spiral lamp, Type A or Type B Spectra
Sintering Area [9]	7.6 x 7.6 cm (3" x 3")
Model LH-840	Linear lamp, Type A or Type B Spectra
Sintering Area [9]	1.9 x 30.5 cm (0.75" x 12") or 30.5 x 30.5 cm (12" x 12") with LS-845
Cooling	
Controller	Internal fan, continuous ON
Lamp Housing	External blower[1]
Model BL-1020	1020 m³/h, 60 Hz mains power
Model BL-1030	1020 m³/h, 50 Hz mains power
Power Input	
Controller	1-phase 200-240 Vrms, 50/60 Hz, 30 amps, max
Lamp Housing [10]	+24 Vdc
Mains power cord	2.4 meters (8 feet)
Lamp Housing Model BL-1020	1-phase 200-240 Vrms, 60 Hz, 6 amps
Lamp Housing Model BL-1030	1-phase 200-240 Vrms, 50 Hz, 6 amps
Outline Dimensions	Height x Width x Length
LH-910 lamp housing w/LC-915	229 x 229 x 317 mm (9.0" x 9.0" x 12.5")
LH-840 lamp housing	190 x 762 x 178 mm (7.50" x 30.0" x 7.0")
LS-845 linear stage	254 x 590 x 1510 mm (10" x 23.1" x 59.5")
Controller	226 x 480 x 706 mm (8.8" x 18.9" x 27.8")
Weight	
LH-910 lamp housing w/LC-915	7.0 kg (15.5 pounds)
LH-840 lamp housing	14.5 kg (32 pounds)
LS-845 linear stage	27.3 kg (60 pounds)
Controller	39 kg (87 pounds)
Operating Environment	
Temperature	0 - 40°C (32-104°F)
Relative Humidity	10 - 90% (non-condensing)

Notes:

1 - System may be configured with different lamp types, lamp housings, sintering chambers and blowers.

2 - Lamp type A has spectral cutoff of 370 nm; lamp type B has a spectral cutoff of 240 nm. See graph 3.

3 – Blower models BL-1020 or BL-1030 can be used with lamp housing, model LH-910 or LH-840.

4 - Lamp Housing Blower Kit includes blower, blower filter, metallic ducting, duct clamps and mains power cord.

5 - To prevent operator exposure lamp will not flash if lamp housing cover or the sintering chamber door is open

6 - There is a 5-second delay after the HV ON switch is turned ON. The HV light will indicate when power is ON.

7 - System may be configured with two lamp housings. Consult with factory for information on this operation.

8 - Pulse energy is set by adjusting lamp voltage using potentiometer located at rear of controller.

9 - Measured @ 2.54 cm (1.0") from lamp housing window.

10 - Lamp Housing power is supplied from the controller via a cable connection.

Specifications subject to change without notice

ORDERING INFORMATION

The SINTERON 500 ordering options are shown below. Contact Xenon sales for assistance in selecting any of the options shown to best suit your application.

SINTERON 500 - L / L / 3 / B

LAMP SPECTRA	
A	Type A - spectral cutoff 370 nm
B	Type B - spectral cutoff 240 nm

BLOWER KIT FOR LAMP HOUSING	
3	BL-1030 - 1020 m³/h, 60 Hz mains power
2	BL-1020 - 1020 m³/h, 50 Hz mains power
N	No Blower Kit

SINTERING CHAMBER	
S	Model LC-915 - used with LH-910
L	Model LS-845 - used with LH-840
N	No Chamber

SINTERING AREA	
S	7.6 x 7.6 cm (3" x 3") - LH-910/LC-915
L	1.9 x 30.5 cm (0.75" x 12") - LH-840
	30.5 x 30.5 (12" x 12") - LS-845/LH-840
C	Controller Only

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