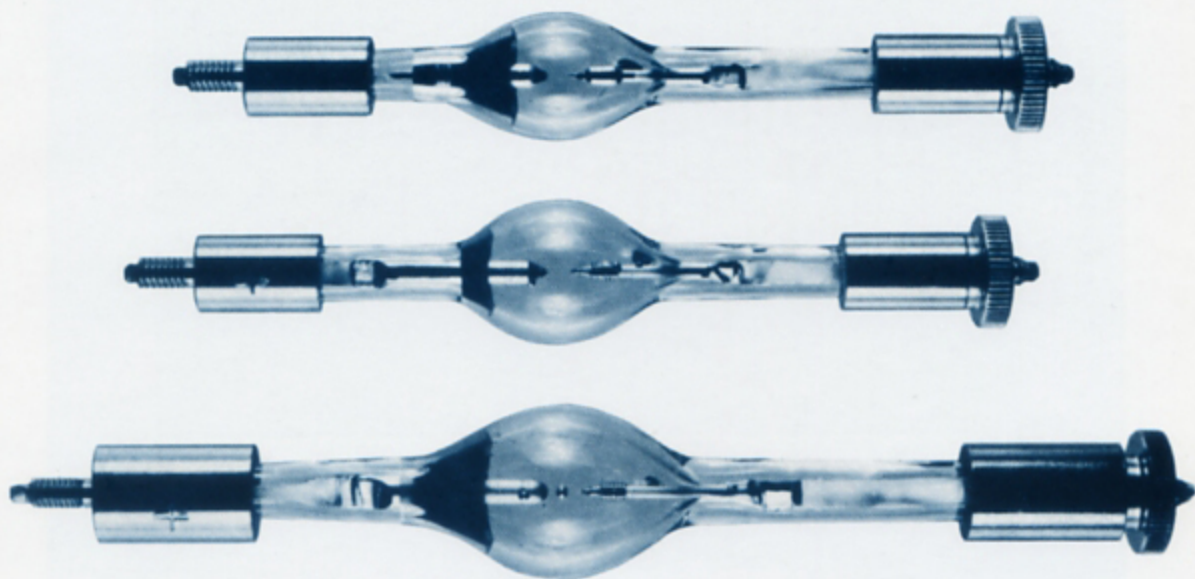


# MERCURY SHORT ARC LAMPS

## for Photolithography



### FEATURES

- Spectral characterization to match photoresist materials
- Specially processed electrodes to insure arc stability
- Improved processing to extend lamp life and radiation output
- New assembly techniques to strengthen construction and increase mechanical reliability

ADVANCED RADIATION CORPORATIONS' series of direct current Mercury Short Arc Lamps for photolithography represents the state-of-the-art in design manufacture, and performance of high intensity ultraviolet sources. These lamps provide intense radiation corresponding to the photosensitivity of most presently available photoresist materials; the lamps satisfy the demands of arc stability and long reliable life necessary for economic manufacture of integrated circuitry in today's sophisticated electronics industry.

The point source configuration of the short arc lamp makes this series of lamps ideally suited for photochemistry, fluorescence microscopy, micro-film enlargement, optical instrumentation, and other applications requiring high intensity ultraviolet radiation.

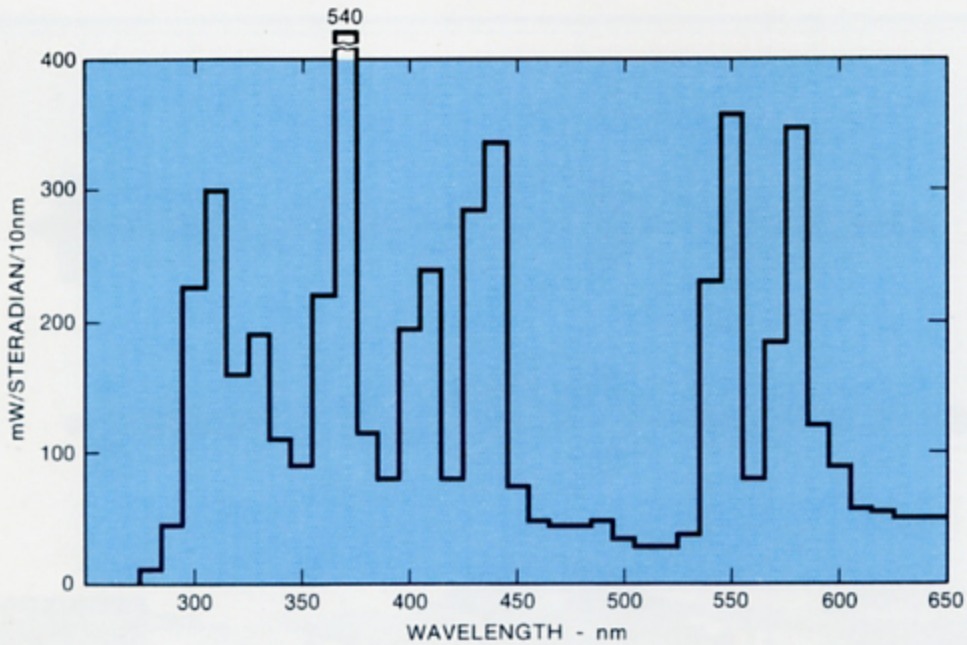


**Advanced Radiation Corporation**

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# MERCURY SHORT ARC LAMP Model HSA-200 D.C.

## SPECTRAL RADIANCE



## OPTICAL

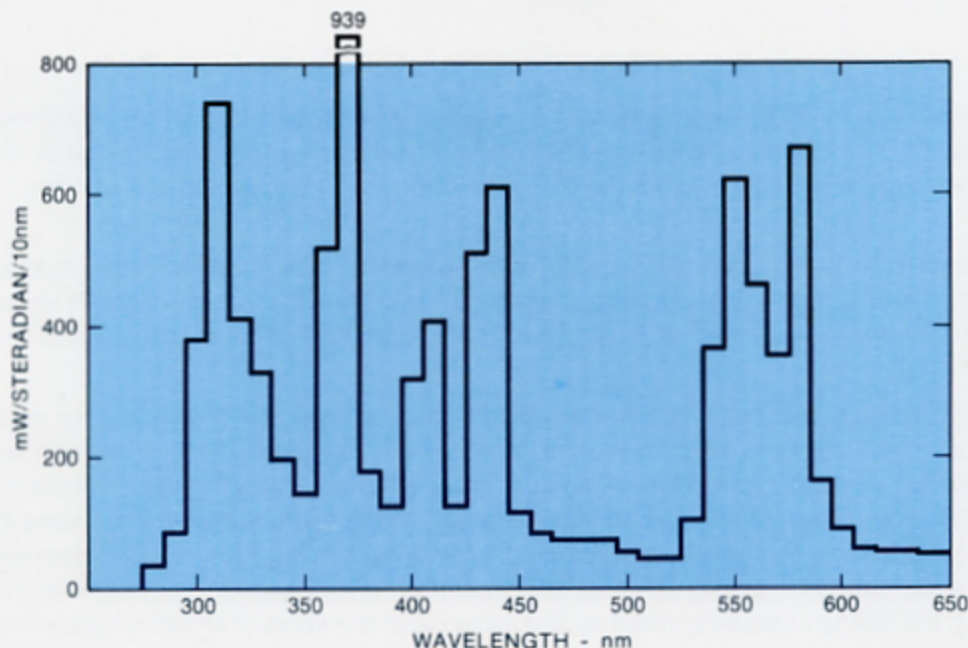
Arc Size: (H* X W)	.08 inches X .04 inches
Total Luminous Flux:	10,000 Lumens
Luminous Efficiency:	50 Lumens/Watt
Arc Brightness:	40,000 Cdla/Cm <sup>2</sup>
Solid Angle of Output:	10 Steradians
Power Radiated:	
300 - 350 nm:	9.4 Watts
350 - 400 nm:	11.0 Watts
400 - 450 nm:	10.8 Watts
450 - 500 nm:	2.4 Watts
500 - 600 nm:	14.7 Watts
Total Radiation (275 - 650 nm):	52.3 Watts
*Electrode spacing at operating power.	

## ELECTRICAL

Current Type:	D.C.
Power, Rated:	200 Watts
Maximum:	230 Watts
Minimum:	160 Watts
Operating Voltage:	57 ± 8 Volts
Operating Current:	3.1 - 4.1 Amperes
Starting Pulse:	15 Kilovolts



## SPECTRAL RADIANCE



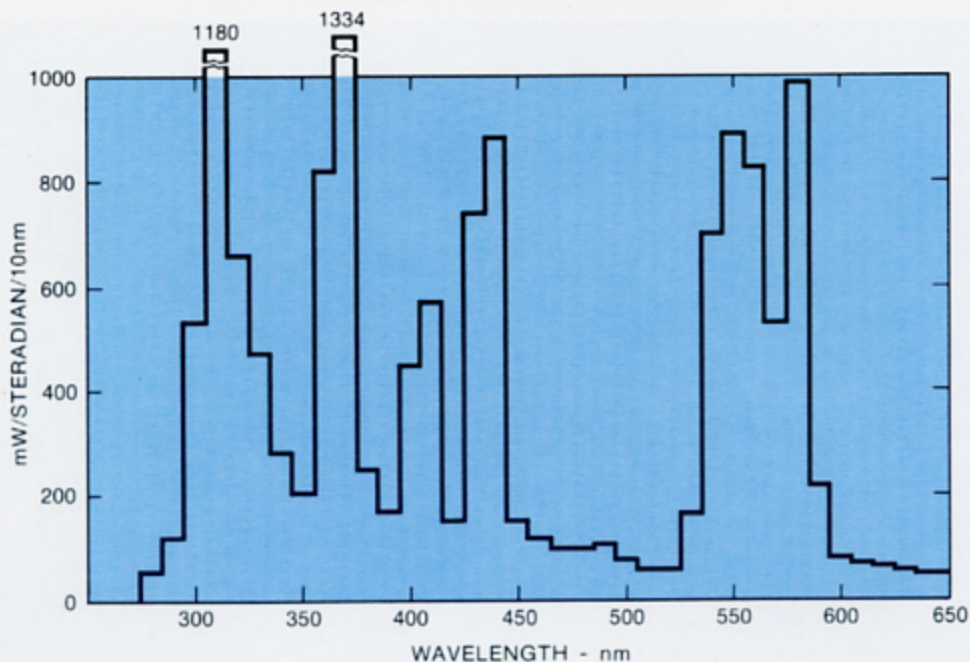
## OPTICAL

Arc Size: (H* X W)	.09 inches X .04 inches
Total Luminous Flux:	19,300 Lumens
Luminous Efficiency:	55 Lumens/Watt
Arc Brightness:	39,500 CdIa/Cm <sup>2</sup>
Solid Angle of Output:	10.2 Steradians
Power Radiated:	
300 - 350 nm:	18.8 Watts
350 - 400 nm:	20.4 Watts
400 - 450 nm:	19.0 Watts
450 - 500 nm:	3.9 Watts
500 - 600 nm:	29.6 Watts
Total Radiation (275 - 650 nm):	99.2 Watts
*Electrode spacing at operating power.	

## ELECTRICAL

Current Type:	D.C.
Power, Rated:	350 Watts
Maximum:	385 Watts
Minimum:	275 Watts
Operating Voltage:	60 ± 10 Volts
Operating Current:	5.0 - 7.0 Amperes
Starting Pulse:	15 Kilovolts

## SPECTRAL RADIANCE



## OPTICAL

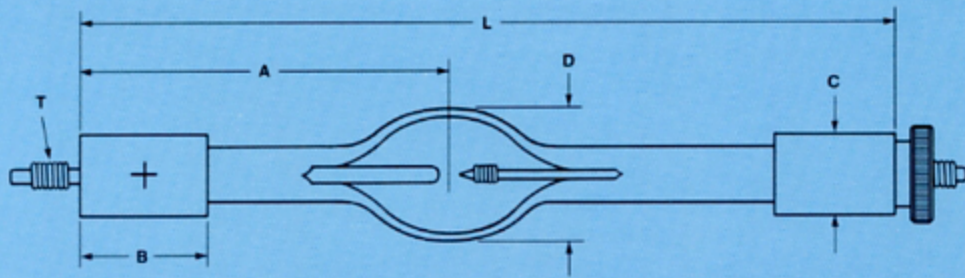
Arc Size: (H* × W)	.14 inches × .08 inches
Total Luminous Flux:	29,750 Lumens
Luminous Efficiency:	59.5 Lumens/Watt
Arc Brightness:	32,000 Cdla/Cm <sup>2</sup>
Solid Angle of Output:	10.3 Steradians
Power Radiated:	
300 - 350 nm:	30.4 Watts
350 - 400 nm:	29.5 Watts
400 - 450 nm:	27.6 Watts
450 - 500 nm:	5.6 Watts
500 - 600 nm:	44.6 Watts
Total Radiation (275 - 650 nm):	145.5 Watts
*Electrode spacing at operating power.	

## ELECTRICAL

Current Type:	D.C.
Power, Rated:	500 Watts
Maximum:	550 Watts
Minimum:	400 Watts
Operating Voltage:	76 ± 9 Volts
Operating Current:	5.8 – 7.5 Amperes
Starting Pulse:	15 Kilovolts



# MERCURY SHORT ARC LAMPS — PHYSICAL DIMENSIONS



Model	DIMENSION					T (Base Style)
	L	A	B	C	D	
<b>HSA-200 D.C.</b>	3.82 in. (97mm)	1.61 in. (41mm)	0.62 in. (16mm)	0.394 in. (10mm)	0.62 in. (16mm)	Sleeve with knurled nut (1)
<b>HSA-350</b>	3.94 in. (100mm)	1.85 in. (47mm)	0.62 in. (16mm)	0.394 in. (10mm)	0.75 in. (19mm)	Sleeve with knurled nut (1)
<b>HSA-500</b>	5.55 in. (141mm)	2.68 in. (68mm)	0.79 in. (20mm)	0.50 in. (12.7mm)	0.91 in. (23mm)	Sleeve with knurled nut (2)
<b>HSA-200 C.B.</b>	3.88 in. (98.6mm)	1.54 in. (39mm)	0.62 in. (16mm)	0.394 in. (10mm)	0.62 in. (16mm)	Sleeve with knurled nut (1)
<b>HSA-200 TAM.</b>	3.82 in. (97mm)	1.61 in. (41mm)	0.62 in. (16mm)	0.394 in. (10mm)	0.62 in. (16mm)	Sleeve with knurled nut (1)
<b>HSA-350 TAM.</b>	4.57 in. (116mm)	2.48 in. (63mm)	0.62 in. (16mm)	0.394 in. (10mm)	0.75 in. (19mm)	Sleeve with knurled nut (1)

(1) The standard base has an 8-32 thread but is also available with metric threads.  
 (2) The standard base has a metric thread but is also available with American Std. threads.

Mercury lamps operate with an internal pressure that approaches 40 atmospheres and the erythmal flux is extremely high. A shielded enclosure should therefore be used for protection. When cold, the lamp is at a reduced pressure and is safe to handle.

Before operating the lamp, clean the quartz surfaces of all foreign matter including oil from the fingers.

Direct Current Mercury Short Arc Lamps are designed to be operated vertically with the anode down. An operating base temperature above 200°C will cause deterioration of the molybdenum ribbon hermetic seal and short life of the lamp.

Reverse polarity to the electrodes will cause immediate destruction of the cathode thermal balance; subsequent correct polarity operation will produce an unstable arc and may cause violent lamp failure.

The spectral radiation distributions presented here are in block format to simplify interpretation of emitted power for 10 nm wavelength intervals. Total watts radiated can be determined by multiplying the block height value by the solid angle of output for the particular lamp of interest.

There will be a slight difference in spectral radiation from lamp to lamp; this is due to small differences in operating pressure, arc spacing, and operating current. Major output differences will only be observed when a lamp is operated at power levels other than the design rated power of the lamp.

The operating voltage of a mercury short arc lamp may vary by a volt or two in your equipment when compared to factory readings specified on the lamp container. This difference is due to different thermal conditions and will have no noticeable effect on operation or performance of the lamp. It is important, however, that excessive forced air cooling to limit base temperatures does not cause mercury condensation inside the lamp bulb. Condensed mercury results in lower operating pressure and decreased lamp output; continued operation at low operating pressure will severely shorten lamp life due to cathode sputtering and more rapid transport of anode tungsten vapors to the lamp envelope.

In addition to the lamps listed in this catalogue, ADVANCED RADIATION CORPORATION manufactures other mercury, xenon, and mercury-xenon high performance lamps for laser and other electro-optical systems. Each lamp is optimized for spectral efficiency, operating life, and system mechanical and optical interfacing. In addition to our standard lines of high intensity arc lamps ARC designs and manufactures special lamps for new applications. We invite your inquiries and will provide application assistance.

Information furnished by ADVANCED RADIATION CORPORATION is believed to be accurate and reliable; however, no responsibility is assumed by ARC for its use.

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