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Find the *Roper Technologies / Acton Research Corporation MS-416* at our website: *Click HERE*

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Model MS-416 (110 Volt)
Mercury Pen-Ray Light Source

Ver 2.0

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Description:
The ARC Model MS-416 is low pressure mercury light source with power supply and mounting flange, compatible with ARC SpectraPro® series monochromators and spectrographs. The MS-416 produces line spectrum, which is suitable for wavelength calibration purposes.

CAUTION

The MS-416 mercury light source produces ultraviolet radiation, which is harmful to eyes and skin. Do not operate the MS-416 unless it is properly mounted on the entrance slit of the monochromator. Do not look directly at the lamp output under any circumstances!

Installation:
The MS-416 mounts directly to the entrance slit of the SpectraPro® monochromator. The user positions the lamp housing so that the aperture faces the entrance slit of the monochromator, with the power cord positioned at the bottom of the lamp housing when mounted. This insures that the lamp aperture correctly aligns to the slit opening (aperture). The lamp housing bolts directly to the entrance slit with screws provided.

Operation of the MS-416:
This light source is intended for use with SpectraPro® series monochromators. Mount the lamp housing to the entrance slit of the monochromator, then connect the lamp power cord to the power supply. Connect the power supply into a fused 110 volts, 60 Hz outlet, then switch the power supply to the “ON” position. The lamp should now be producing line output. Reference information about the mercury lamp provided can be found on the attached page.

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THERMAL AND OPTICAL CHARACTERISTICS

Intensity of Spectral Lines

The principle irradiance from a PEN-RAY® Lamp, approximately 90%, is at the 254nm line. Five other lines include most of the balance, i.e., 313,365,405,436,546nm.
Charles B. Childs reports, in a paper entitled "Low-Pressure Mercury Arc for Ultraviolet Calibration,"* "the 254nm line comprised 92% of the total irradiance, and 12 other lines comprised the remaining 8%." He assigned the 254nm line an arbitrary relative intensity of 1.0 and related the 12 liens to this as shown in Figure 7. Childs found all the PEN-RAY Lamps tested had intensities within 10% of 3.9 ?W/cm^2 at 100cm for the 254nm line. Our measurements, made on a Bausch & Lomb 1 ½ meter diffraction grating spectrograph, with a calibrated standard from the Bureau of Standards, gave 42 ?W/cm^2 at 30 cm for the 254nm line. The two figures are in close agreement (within 3%) if the "inverse square law" is approximately correct for the conditions stated.

296.5 nm	6.0×10^{-3}	366.3 nm	1.4×10^{-3}
302.2 nm	1.1×10^{-2}	404.7 nm	8.9×10^{-3}
312.5 nm	7.1×10^{-3}	435.8 nm	1.7×10^{-2}
313.2 nm	1.1×10^{-3}	546.1 nm	1.2×10^{-2}
365.0 nm	8.9×10^{-2}	577.0 nm	1.7×10^{-3}
365.5 nm	2.1×10^{-3}	579.0 nm	1.8×10^{-3}

Figure 7

*Excerpt from a paper entitled "Low Pressure Mercury Arc for Calibration," APPLIED OPTICS, Vo. 1, No 6, 711-716 (1962)

Spectrograms of PEN-RAY Quartz Lamps

A spectrogram of a typical PEN-RAY Lamp showing relative intensities of the various spectral lines is shown in Figure 8. This represents operation from a stock power supply, SCT-1, with a current of approximately 18ma measured in normal laboratory environment in still air. Note the high proportion of the 254nm line as compared to the 546 and 43a6 lines. However, there is usually sufficient intensity of these visible lines for easy calibration of most instruments.

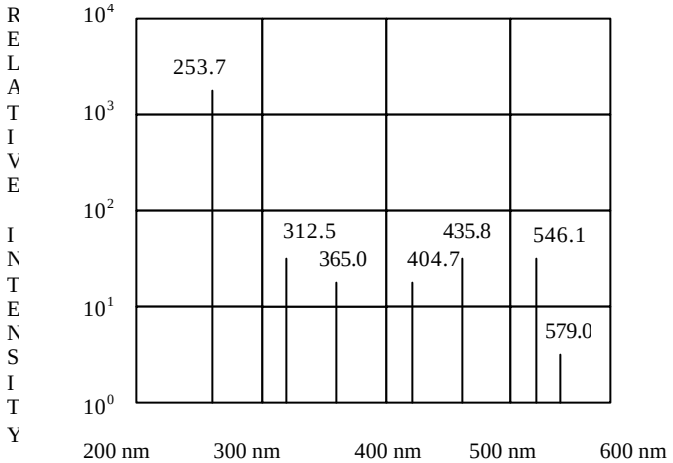


Figure 8

Intensity Change as a Function of Current

Comparison is with a stock PEN-RAY Lamp operating at 18ma with its emission for each line being set at 100%. If greater intensity of the *visible* spectral lines is desired, the PEN-RAY Lamp may be operated at a higher current. Figure 9 is a chart illustrating percentage changes of intensity at various operating currents, as compared with a PEN-RAY Lamp operated at 18ma measured in normal laboratory in still air. It will be noted that the visible lines are of higher intensity, with lowered intensity in the far ultraviolet region.

Wavelength	CURRENT		
nm	30 MA	35 MA	40 MA
253.7 nm	34%	35%	35%
313.2 nm	100%	83%	150%
365.0 nm	130%	130%	160%
404.7 nm	130%	130%	155%
435.8 nm	125%	130%	150%
546.1 nm	150%	150%	220%

*Above characteristics derived from operation of the 11SC-1 PEN-RAY Lamp with the SCT-1 power supply. Other PEN-RAY Lamps demonstrate similar optical characteristics.

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