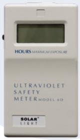
SOLAR® LIGHT

USER MANUAL

MODEL 6D ULTRAVIOLET SAFETY METER

INTRODUCTION

The model 6D Ultraviolet Safety Meter is sensitive to most of the ultraviolet region and gives an accurate measurement of hazardous radiation to which an industrial worker may be subject to.

The meter indicates how long a worker may remain at the measured position before reaching the threshold limit value (TLV) specified as hazardous in the 1994-1995 standards published by the American Conference of Governmental Industrial Hygienists (ACGIH). The proposal states that total UV exposure in an 8 hour working period, TLV, should not exceed 3 millijoules per centimeter squared at 270 nm. Other wavelengths have their Threshold Limit Values set by the Relative Spectral Weighting Function marked SWF.

Personnel working with or in the vicinity of sources producing ultraviolet radiation should not be exposed to levels exceeding the exposure limits. The Spectral Sensitivity of the meter is shown in Fig. 1.

The ultraviolet exposure limits do not apply to photosensitive individuals or to individuals concomitantly exposed to photosensitizing agents. These values should be used as guides in the control of exposure to continuous sources where the exposure duration is not less than 0.1ms. These values should be used as guides in the control of exposure and should not be regarded as a fine line between safe and dangerous levels.

CALIBRATION

The effective irradiance exposure for the unprotected eye or skin should not exceed the values found in *Threshold Limit Values and Biological Exposure Indices* within an 8 hour period. To determine the effective ultraviolet irradiance, Es of a broad band source, the following weighting formula should be used:

$$E_S = \sum_{200}^{400} E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$$

where Eλ is the spectral irradiance in W/(cm^2 nm), S(λ) is the relative spectral effectiveness found in *Threshold Limit Values and Biological Exposure Indices*, and Δλ is the bandwidth in nm. The summation extends from 200 to 400nm. The permissible exposure time t(max) in seconds, for exposure to ultraviolet radiation incident upon the unprotected eye or skin may be computed by:

$$t(\max) = \frac{0.003\ J \cdot cm^{-2}}{E_S}$$

where E_s is in W/cm^2. While it is generally accepted that the eye is the part of the body most vulnerable to UV exposure, **the ACGIH criteria apply to unprotected human skin as well.**

For better understanding of the TLVs, it is essential that the ACGIH publication of be consulted.

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CE Compliant

SOLAR® LIGHT

UV Safety Meter Model 6D

Measures UV Radiation and Gives a Safe Exposure Time Based on ACGIH Recommendations

USING THE METER

The meter displays the time (in hours and 1/100 parts of an hour) after which the TLV is reached.

Since the spectral response of the meter differs from the published Relative Spectral Weighting Function, the reading of the meter may have an error factor depending on the spectral output of the measured light source. The correction factor was calculated for some typical sources. Correction factors for other sources can be calculated upon request. Caution should be taken when measuring sources generating mostly UV wavelengths shorter than 250nm since the reading of the meter can be substantially lower than actual hazard.

TO MEASURE A SOURCE

- Turn the power ON by sliding the ON/OFF switch on the side of the case.
- Hold the meter steady pointing the sensor towards the potential source of UV hazard.
- If the readings vary, take 3 consecutive readings and average.
- Multiply the reading by the correction factor that is source dependent. The result is in hours and 1/100 of an hour.

LIGHT SOURCE	CORRECTION FACTOR
Quartz Halogen Lamp (150W)	1.0
Xenon Arc Lamps (150W)	0.85
Direct Sunlight (30° SZA, 2.7mm Ozone Column)	4.81
Mercury Discharge Lamp	0.65
Metal Halide Lamp	0.66

The smallest possible reading is 0.02-0.03 hours (90 and 108 seconds respectively). This means extremely hazardous UV radiation that will deliver TLV in less than 108 seconds.

The maximum reading is 10.00 hours that means no UV hazard exists. When the UV light is weak (the meter reads 6 hours or more) the reading tends to vary, especially when hand held. Using a steady support or averaging consecutive readings will give meaningful result.

If the **LOBAT** sign on the display is ON the battery should be changed. Use standard 9V battery for replacement. An average battery life should be over 100 hours of continuous operation.

TECHNICAL SPECIFICATIONS

SPECIFICATIONS	
Spectral Response	See Figure 1
Detector Viewing Angle	±30°
Battery	9V
Power Consumption	<3mA
Operating Environment	0.40°C - *No Humidity Condensation*
Weight	7 oz. (200g)
Dimensions	6"L x 3.2"W x 1.5"H (15 x 8 x 3 cm)

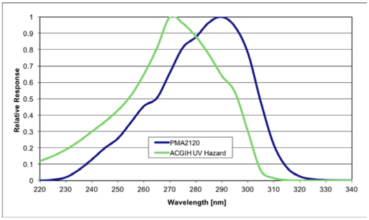

Fig. 1. Linear Spectral Response

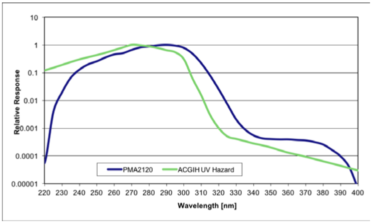

Fig. 2. Log Spectral Response

REFERENCES

Threshold Limit Values and Biological Exposure Indices (Pub. No. 0206) ACGIH, 6500 Glenway Ave., Cincinnati, OH 45211-4438, tel. 513-661-7881