Sensors • Blue Light Safety Detector

PMA2121

Measures Hazardous Blue Radiation in the Workplace in Accordance with ACGIH Guidelines

Applications

- Industrial and Laboratory Safety
- Welding Stations
- Printing
- UV Curing and Photolithography
- Lighting
- Safety Glass Testing
- Environmental Testing

Features and Benefits

- High Sensitivity
- Dynamic Range $2*10^5$
- Excellent Long-Term Stability
- Cosine Corrected
- NIST Traceable Calibration
- Ease of Use

The PMA2121 blue light safety detector offers an accurate, easy, inexpensive way to measure the blue light radiation hazard to eyes for a wide range of occupations. Employers, safety officers and risk managers can use this detector to protect workers against the effects of excessive daily blue light exposure. Such exposure, according to numerous medical studies, can inflict permanent and irreversible damage to the eye causing visual field defects and visual impairment.

The PMA2121 detector indicates the effective irradiance weighted with the American Conference of Governmental Industrial Hygienists (ACGIH) Spectral Weighting Function for blue light hazard. Light sources that may produce a blue light hazard include: monochromatic and collimated lasers as well as collimated arc, or tungsten lamps (e.g. search lamps). Flash lamps generally do not present serious hazard because of the limited energy of the flash as compared to continuous sources.

To protect against retinal photochemical injury from chronic blue-light the max. exposure limit for a source subtending less than 0.011 radian should not exceed 10mJ/cm^2 per 10,000 seconds of exposure (approx. 2 hours 47 minutes). For exposure periods greater than 10,000 seconds the weighted irradiance should not exceed 1µW/cm^2.

For example, if the radiation is produced by a point source and the irradiance measured by the PMA2121 is 70µW/cm^2 then the max exposure time would be calculated as: 10 [mJ/cm^2] / 70 [µW/cm^2] = 143 seconds = 2 minutes and 23 seconds.

Care should be taken to assure that the source does not contain dangerous levels of other harmful radiation such as the ultraviolet radiation. See the PMA2120 UV radiation safety detector brochure for more details.

For a worker having a lens removed (cataract surgery), there will be an increased risk of injury and a different spectral weighting function should be

SOLAR® LIGHT

used[1]. The PMA can also be set to continuously monitor blue light and sound an alarm when the preset dose or irradiance level is reached.

Calibration

The PMA2121 detector is calibrated by transfer from a NIST traceable quartz-halogen standard lamp. The spectral irradiance of the lamp is cross-multiplied by the ACGIH blue light spectral weighting function and the effective power of the hazardous blue radiation is calculated. The PMA2121 detector is then exposed to this radiation and adjusted accordingly.

The basic radiometric uncertainty of this calibration is under 5%. Additional correction may be needed when measuring sources producing narrow radiation peaks. The detector requires yearly re-calibration.

Specifications

Spectral Response	Follows ACGIH blue hazard action spectrum Figure 1
Angular Response	5% for Angles <60°, Figure 2
Range	200 [mW/cm2] or 2000 [W/m^2]
Display Resolution	0.001 [MED/Hr], 0.01[µW/cm^2]
Operating Environment	32 to 120 °F (0 to +50 °C) No Precipitation
Cable	6 ft. Straight Cable (1.82m)
Diameter	1.6" (40.6mm)
Height	1.8" (45.8mm)
Weight	7.1 oz. (200 grams)
150W Halogen Lamp at 50cm Distance	Approx. 70 µW/cm^2 (1MED/Hr)
150W Xe Arc Lamp at 50cm dDistance	Approx. 80 µW/cm^2 (1MED/Hr)
40W Fluorescent Tube at 2m Distance	Approx. 5 µW/cm^2 (1MED/Hr)

Ordering Information

PMA2121	Blue Light Safety Detector
See list of accessories for mounting hardware available	

References

[1] "Documentation of the threshold limit values for Physical Agents in the Work Environment" American Conference of Governmental Industrial Hygienists, Inc.
[2] Sliney,D.H.,Eye Hazards of Environmental Lighting, Ann. N.Y. Acad. Sci. 453:114-120 (1985)

SL/Sensors/PMA2121_09/2014

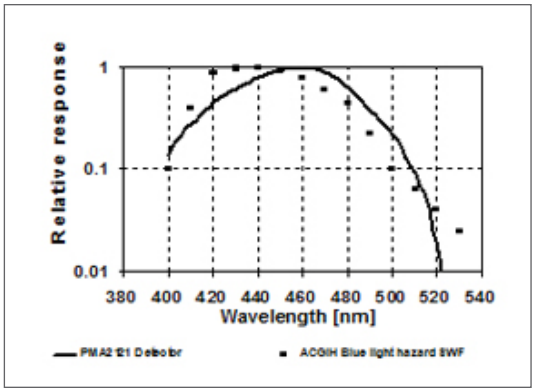

Fig. 1. PMA2121 Spectral Response

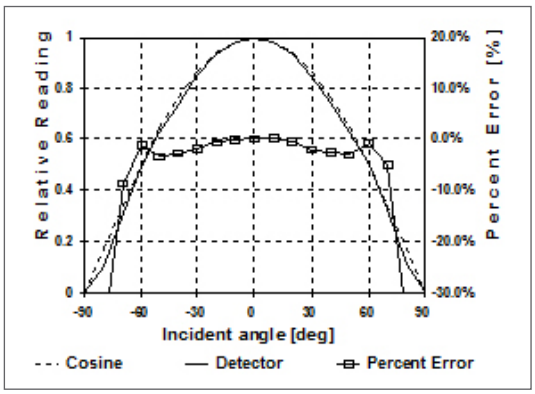

Fig. 2. PMA2121 Solar Simulator Spectral Output