

international light.nc.

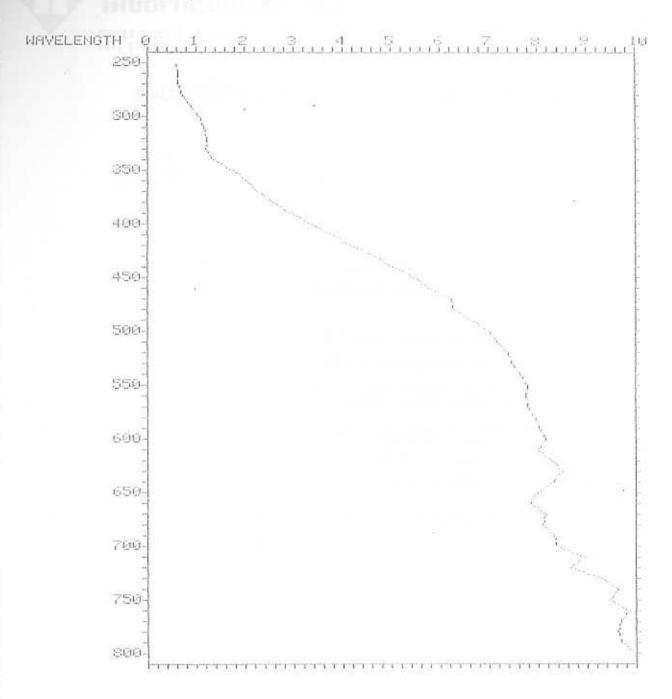
DEXTER INDUSTRIAL GREEN, NEWBURYPORT, MASS. 01950 Tel. 617-465-5923 Telex 94-7135

PHOTODETECTOR CALIBRATION CERTIFICATE

International Light certifies that the instrument described below has been compared with laboratory working standards whose calibrations are traceable to the US National Bureau of Standards and are in accordance with the requirements of Mil-STD-45662 Rev. 10 June 1980.

Detector: INS250 #37		Diffuser:	
Filter:		Attenuator:	
		SEE CHART	(4)
ENSITIVITY FACTOR:	12.00		
		assuming monochromatic irradiance at	
	(A) (Sr) (cm²) (W-	1) assuming monochromatic radiance at	rim.
3	(A)(W-1) assumi less than sen	ing monochromatic source with beam diameter nsitive surface diameter, atn	m wavelengti
	——(A)(cm ^a)(rm)(W- a calibration	-1) assuming continuous spectral irradiance ove o bandwidth ofnm centered at	r <u>n</u> m.
	(A) (ft2) (lm-1)	assuming K color temperature source	į.
		ningK color temperature luminance.	
		CALIBRATION: The "Grain of Wheat" Lamp for O or 40.76 millicandela.	-11
INS250 #37 has an output	of 5.12 % 10-1 (LM Scribe Line		user next
INS250 #37 has an output	of 5.12 % 10-1 (LM Scribe Line Groove No	or 40.76 millicandela. Front surface of diff.	user next assembly.
INS250 #37 has an output	of 5.12 % 10-1 (LM Scribe Line Groove No. X Other SEE NOTE onal Bureau of Star P.), DR #10 - June Y TRANSFER STANDAR	Front surface of diff formed by filter or diffuser elements and element, counted from front surface of ABOVE. Indards Detector Response & Intercomparison pack 1980 D(S):	user next assembly. kage
INS250 #37 has an output EFERENCE PLANE: RIMARY STANDARD: US Nati (D.R.I. NTERNATIONAL LIGHT PRIMAR IL D.R.I.P. #01. IL	Scribe Line Scribe Line Froove No. X Dther SEE NOTE Onal Bureau of Star P.), DR #10 - June Y TRANSFER STANDARD D. R. I. P. #02, IL D.	Front surface of diff formed by filter or diffuser elements and element, counted from front surface of ABOVE. Indards Detector Response & Intercomparison pack 1980 D(S):	user next assembly.
INS250 #37 has an output EFERENCE PLANE: RIMARY STANDARD: US Nati (D. R. I. NTERNATIONAL LIGHT PRIMAR IL D.R. I.P. #01. IL	of 5.12 % 10-1 (LMScribe LineGroove No X DtherSEE NDTE onal Bureau of Sta. p.), DR #10 - June y TRANSFER STANDAR! D.R.I.P. #02, IL D.	Front surface of diff formed by filter or diffuser elements and element, counted from front surface of ABOVE. Indards Detector Response & Intercomparison pack 1980 D(S):	user next assembly. kage
INS250 #37 has an output EFERENCE PLANE: RIMARY STANDARD: US Nati (D. R. I. NTERNATIONAL LIGHT PRIMAR	of 5.12 % 10-1 (LM Scribe LineGroove No. X DtherSEE NOTE onal Bureau of Star p.1, DR #10 - June y TRANSFER STANDAR D.R.I.P. #02, IL D.	Front surface of diff formed by filter or diffuser elements and element, counted from front surface of ABOVE. Indards Detector Response & Intercomparison pack 1980 D(S):	user next assembly. kage

This is a spectral plot of file 'INS230#20' normalized to 10





international light inc.

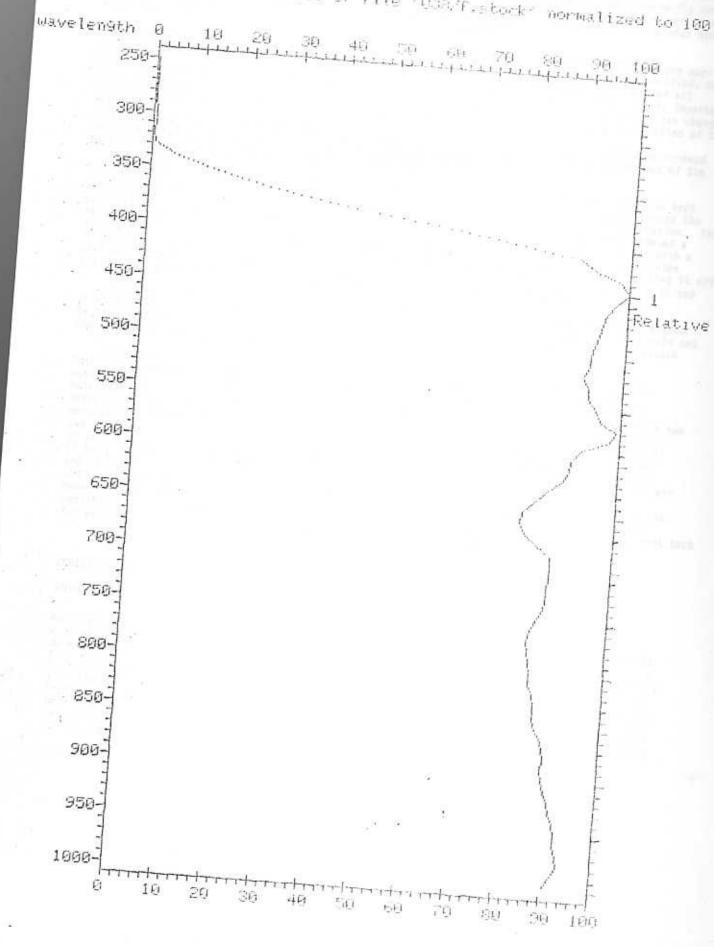
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Rendered To: COMER		
Detector: SED100 #	1153 Diffuser: W #4091	
Filter: F #5744	Attenuator:	
Spectral Response ((half power points): SEE CHART	((f
ENSITIVITY FACTOR:		
2.23 X 10-2	(A) (cu²) (W-1) assuming monochromatic irradiance at 600	rım.
	(A) (Sr) (cm²) (W-1) assuming monochromatic radiance at	rm.
Ø .	(A) (W-1) assuming monochromatic source with beam diameter less than sensitive surface diameter, atnu	wavelength
·	(A)(cm ^e)(nm)(W ⁻¹) assuming continuous spectral irradiance over a calibration bandwidth ofnm centered at	rito.
8	(A) (ft ^e) (lm ⁻¹) assuming K color temperature source.	
	(A) (fL-1) assuming K color temperature luminance.	
when used with an IL17	700.	
when used with an IL17	Scribe Line Front surface of diffu Front Surface of diffu Scribe No. ONE formed by filter or diffuser elements and n element, counted from front surface of	ser ext assembly.
	Scribe LineFront surface of diffu X Groove NoONEformed by filter or diffuser elements and n	ser ext assembly.
FERENCE PLANE: RIMARY STANDARD: US Na (D. R. NTERNATIONAL LIGHT PRIM	Scribe Line Front surface of diffu Torove No. ONE formed by filter or diffuser elements and n element, counted from front surface of Other Stional Bureau of Standards Detector Response & Intercomparison pack MARY TRANSFER STANDARD(S):	assembly.
FERENCE PLANE: IMARY STANDARD: US Na (D. R. ITERNATIONAL LIGHT PRIM IL D.R.I.P. #01. I	Scribe Line Front surface of diffuser Scribe Line No. ONE formed by filter or diffuser elements and nelement, counted from front surface of Other Stional Bureau of Standards Detector Response & Intercomparison pack I.P.), DR #10 - June 1980 MRY TRANSFER STANDARD(S):	assembly. age y 1980
FERENCE PLANE: RIMARY STANDARD: US Na (D.R. (D.R. (D.R.)	Scribe Line Front surface of diffu X Groove No. ONE formed by filter or diffuser elements and n element, counted from front surface of Other Stional Bureau of Standards Detector Response & Intercomparison pack I.P.), DR #10 - June 1980 MARY TRANSFER STANDARD(S): IL D.R.I.P. #02, IL D.R.I.P. #03 30 Jul	assembly. age y 1980
FERENCE PLANE: RIMARY STANDARD: US Na (D. R. (D. R	Scribe Line Front surface of diffu TGroove No. ONE formed by filter or diffuser elements and n element, counted from front surface of Other Stional Bureau of Standards Detector Response & Intercomparison pack I.P.), DR #10 - June 1980 WHY TRANSFER STANDARD(S): IL D.R.I.P. #02, IL D.R.I.P. #03 Sen Halogen M. Radiometer	assembly. age y 1980
FERENCE PLANE: RIMARY STANDARD: US NA (D. R. ITERNATIONAL LIGHT PRIM IL D.R.I.P. #01. I GHT SOURCE: IP Tungst WSTRUMENTATION: #IL #0 EMPERATURE: 22 degrees	Scribe Line Front surface of diffu Torove No. ONE formed by filter or diffuser elements and nelement, counted from front surface of Other Stional Bureau of Standards Detector Response & Intercomparison pack I.P.), DR #10 - June 1980 WHY TRANSFER STANDARD(S): IL D.R.I.P. #02, IL D.R.I.P. #03 Sen Halogen M. Radiometer	assembly. age y 1980
RIMARY STANDARD: US Na (D.R.) NTERNATIONAL LIGHT PRIM IL D.R.I.P. #01. I SIGHT SOURCE: IP Tungst NSTRUMENTATION: #IL #0 EMPERATURE: 22 degrees	Scribe Line Front surface of diffuser No. ONE formed by filter or diffuser elements and nelement, counted from front surface of Other Other Stional Bureau of Standards Detector Response & Intercomparison pack I.P.), DR #10 - June 1980 MAY TRANSFER STANDARD(S): IL D.R.I.P. #02, IL D.R.I.P. #03 30 Jule Halogen M. Radiometer RELATIVE HUMIDITY: 40%	assembly. age y 1980

this is a spectral Plot of File (USB, F. stock) normalized to 100



The photodetector described on the front of this certificate is a delicate precision instrument and should be handled very, very carefully. Unusual stresses or sudden shocks can permanently damage the detector or at the least, render the calibration void. Discoloration, chips, cracks, and other physically evident signs of change should be checked out immediately. Below are a few helpful hints meant to aid in prolonging the quality and life of your detector.

PHOTODETECTOR ELEMENT PLACEMENT, DIFFUSERS, ATTENUATORS & FILTERS! All calibrations are performed with diffusers, attenuators and filters in a specific order. Unless otherwise specified, the light flux should first come in contact with the diffuser, then the attenuator, and last of all the filters before coming in contact with the sensitive surface of the cell or tube. It is important that the above order be followed for two reasons: (1) Changing the order of the elements can change the calibration slightly. (2) Placing an attenuator after a filter can accelerate degradation of that filter.

SPECIAL NOTE: For the PT100 and PT170 series detectors, filters and attenuators should be screwed into the diffuser cap (attenuators first) so that the stamped serial numbers are facing out of the back of the cap toward the sensitive area of the detector.

CLEANING DIFFUSERS: The diffuser surface (sandblasted side) on all diffusers should be kept as clean and dust free as possible. Dust, finger prints, or any other contaminates can change the transmission and/or spectral response of a diffuser drastically: This can void the calibration. The best way to care for a diffuser is not to handle it at all. If, however, the diffuser side of a diffuser does become contaminated you can reasonably restore the surface by washing it off with a high grade Freon (Trichlorotrifloroethane) solvent or methanol alcohol. DO NOT attempt to wipe the surface dry, but allow it to dry on its own. NOTE: The process can be improved by drying it off with an air hose. Before using an air hose, check the air system that you are about to use to see that it has a moisture oil filter which keeps the air free of any contaminants.

FILTERS: Filters and the polished side of a diffuser, may be cleaned using the above method or with a more readily available glass and/or plastic cleaner. In all cases the cleaner should not be the type that will leave behind a film of its own or contain strong solvents which can attack the filter and its cementing compounds.

CALIBRATION SCHEDULE: In most cases detectors should be calibrated at leat once yearly. Detectors that are used daily on production line or for quality control and health hazard measurements should be checked and/or calibrated more often (usually once every six months). ALTERNATE METHOD: One method for checking detector calibrations which is used, it to purchase two detectors. One detector is kept stored in an out of the way place while the second is used to work with. Whenever the calibration of the "work" detector is to be checked or is in question, the "stored" detector is then taken out of storage and the results from the two are compared. If they compare, it is reasonable to assume that both detectors still have valid calibrations. If both detectors do not compare, the two detectors and instrument should be sent back for repair and calibration.

(NOTE: The above check does not tell you which detector has changed, only that one detector has. However, when one is familiar with the detectors and the source he is measuring, it is highly possible to determine which detector has changed. The detector that has changed now can be sent back for repair and calibration while the second detector is used to take its place).

TYPICAL SYMBOLS AND PREFIXES

SYMBOLS & PREFIXES

H	= nanometers = (mμ) = 10(Å) = Watts = .centimeters	A - Amperes mu - Hillimicrons sec - second	fL = Foot Lamberts m = Meter m = Milli = (10 ⁻³)
ft lm lx	= Angstroms = Steradian = feet = lumens = lux = candela	fc = foot-candle s = distance source to detector J = Joules u = Micron y = Standard Observer Curve	k = kilo = (10+3 μ = micro = (10-6) M = Mega = (10-6) n = nano = (10-9) G = Giga = (10+9)



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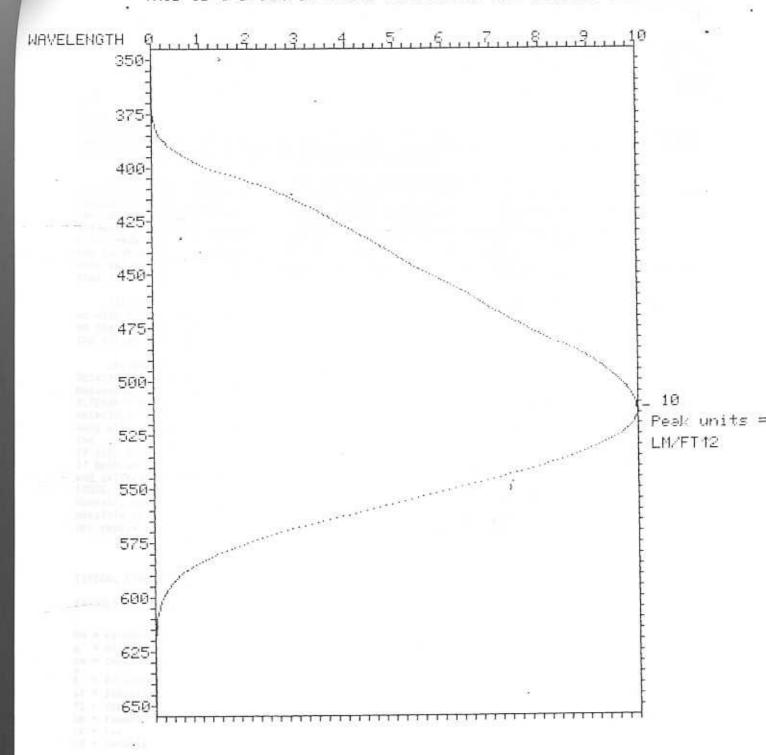
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PROTECTION AND CONTRACTOR OF COMME			
Devector; SEDIWW #115.		Diffuser: W #4091	
Filter: ICIE #5905		Attenuator:	
Spectral Response (half	power points):_	SEE CHART	
SENSITIVITY FACTOR:			20
	_(A)(cm²)(W-1) as	ssuming monochromatic irradiance at	E)(II
	_(A) (Sr) (cm²) (W-1) assuming monochromatic radiance at	Total
1	(0) (U-1) accumin	ng monochromatic source with beam diameter sitive surface diameter, at	
	_(A).(cm²) (nm) (W-1 a calibration) assuming continuous spectral irradiance ove bandwidth of nm centered at	er TM
	_(A) (ft²) (Im-1) a:	ssuming K color temperature source	
	(A)(fL-1) assumi	ngK color temperature luminance.	
		d directly in scotopic lumens per square tor 3.61 % 10-8 (A)(FT2)(LM-1).	
FERENCE PLANE:	Scribe Line Groove No. OME		user next assembly.
EFERENCE PLANE:	Scribe Line Groove No. OME	formed by filter or diffuser planate and	user next assembly.
EFERENCE PLANE:	Scribe Line Groove No. ONE Other SEE NOTE A DR #10 - June 11	Front surface of diffu formed by filter or diffuser elements and r element, counted from front surface of MROVE.	assembly.
EFERENCE PLANE: X IMARY STANDARD: US Nationa (D.R.I.P.) IERNATIONAL LIGHT PRIMARY TI IL D.R.I.P. #01. IL D.R.	Scribe Line Groove No. OME Other SEE NOTE A Dureau of Standa DR #10 - June 1: RANSFER STANDARD (S I.P. #02, IL D.R.	Front surface of diffusion of diffusion plement, counted from front surface of diffusion element, counted from front surface of MROVE. ards Detector Response & Intercomparison pack 988 S): J.P. #03 Jul	assembly.
EFERENCE PLANE: X X XIMARY STANDARD: US Nationa (D.R.I.P.) ITERNATIONAL LIGHT PRIMARY TO IL D.R.I.P. #01. IL D.R. GHT SOURCE: 1P Tungsten Hal	Scribe Line Groove No. ONE Other SEE NOTE A Bureau of Standa DR #10 - June 1 RANSFER STANDARD(S I.P. #02, IL D.R.	Front surface of diffuser elements and relement, counted from front surface of MROVE. ards Detector Response & Intercomparison pack 980 S): J.P. #03 30 Jul	assembly.
EFERENCE PLANE: X X X X X X X X X X X X X	Scribe Line Groove No. ONE Other SEE NOTE A Dureau of Standa DR #10 - June 19 ANSFER STANDARD(S I.P. #02, IL D.R. ogen	Front surface of diffusion of diffuser elements and relement, counted from front surface of MROVE. ards Detector Response & Intercomparison pack 980 S): .I.P. #03 30 Jul	assembly.
EFERENCE PLANE: X X X X X X X X X X X X X	Scribe Line Groove No. ONE Other SEE NOTE A Dureau of Standa DR #10 - June 19 RANSFER STANDARD(S I.P. #02, IL D.R. ogen	Front surface of diffuser elements and relement, counted from front surface of MROVE. ards Detector Response & Intercomparison pack 980 S): J.P. #03 30 Jul	assembly.
EFERENCE PLANE: X RIMARY STANDARD: US Nationa (D.R.I.P.) ITERNATIONAL LIGHT PRIMARY TO IL D.R. I.P. #01. IL D.R. GHT SOURCE: 1P Tungsten Hall STRUMENTATION: #519 Radione MPERATURE: 22 degrees C LIBRATED BY: () + 1.	Scribe Line Groove No. ONE Other SEE NOTE A Dureau of Standa DR #10 - June 19 ANSFER STANDARD(S I.P. #02, IL D.R. oqen ter	Front surface of diffuser elements and relement, counted from front surface of MROVE. ards Detector Response & Intercomparison pack (S): J.P. #03 30 Jul	assembly.

SEE015/CZIE/W 106064501 6/17/81

This is a spectral plot, normalized in relative units.



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nm = nanometers = (mμ) = 10(Å) W = Watts cm = centimeters	A - Amperes mu - Millimicrons sec - second	fL = Foot Lamberts m = Meter m = Milli = (10 ⁻³)
A = Angstroms sr = Steradian ft = feet lm = lumens lx = lux cd = candela	fc = foot-candle s = distance source to detector J = Joules p = Micron y = Standard Observer Curve	k = kilo = (10+6) μ = micro = (10-6) Η = Mega = (10-9) n = nano = (10+9) G = Giga = (10)