

SCIENTECH®



Pyroelectric Detector

Setup and Operating
Procedures

Thank you for choosing a Scientech Vector pyroelectric detector. Scientech, an ISO 9001 registered company, and our employees are pleased to provide you with a product designed for years of reliable service. Please read this manual completely before using your indicator. This information will enable you to fully utilize the equipment and should be located nearby for reference. The detector is intended to be used only in the manner outlined in this manual. Misuse of the equipment may cause product failure.

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DETECTOR OPERATING PARAMETERS:

Pyroelectric Detector 1:

Model No: _____
 Serial No: _____
 Calibration Wavelength: _____ nm or μm
 Output Sensitivity: _____ V/J
 Calibration Temp: _____ °C

Pyroelectric Detector 2:

Model No: _____
 Serial No: _____
 Calibration Wavelength: _____ nm or μm
 Output Sensitivity: _____ V/J
 Calibration Temp: _____ °C

VECTOR™ PYROELECTRIC DETECTOR SPECIFICATIONS:

Model	P 25	PHF 25	PHD 25	PHDX 25	PHDX25UV	SP 25	SPHF 25	SPHD 25
Aperture Diameter	25.4 mm	25.4 mm	25.4 mm	7mm	7mm	25.4 mm	25.4 mm	25.4 mm
Spectral Response	.193-26µm		.193-10.6µm	.4-2µm	.193-2µm	.193-26µm		.193-10.6µm
Maximum Average Power	5 W with full illumination of the detector							
Minimum Energy	7% of selected range							
Noise Equivalent Energy	4 µJ							
Maximum Energy Density	Note 1		Note 2	Note 3	Note 4	Note 1		Note 2
Peak Power Density	n/a		100MW/cm ²	800MW/cm ²	400MW/cm ²	n/a		100MW/cm ²
Accuracy	5%	5%	8% [^]	8% [^]	8% [^]	5%	5%	8% [^]
Output Sensitivity	8 V/J	8 V/J	2 V/J	2 V/J	2 V/J	8 V/J	8 V/J	2 V/J
Maximum Repetition Rate	100 pps	400 pps	40 pps	40 pps	40 pps	100 pps	400 pps	40 pps
Maximum Pulse Duration	0.2 msec	0.045 msec	0.2 msec	0.2 msec	0.2 msec	0.2 msec	0.045 msec	0.2 msec
Dimensions D x L - inches	2.4 x 2.3	2.4 x 2.3	2.4 x 2.3	2.4 x 3.9	2.4 x 3.9	2.3x2.3x0.6	2.3x2.3x0.6	2.3x2.3x0.6
cm	6.1 x 5.8	6.1 x 5.8	6.1 x 5.8	6.1 x 9.9	6.1 x 9.9	5.8x5.8x1.4	5.8x5.8x1.4	5.8x5.8x1.4
Weight - pounds/kgs	0.9/1.4	0.9/1.4	0.9/1.4	1.1/0.5	1.1/0.5	0.3/0.14	0.3/0.14	0.3/0.14
Indicator Compatibility	H410, H410D, S310, S310D, D200PC, D200P							

Model	P 50	PHF 50	PHD 50	PHDX 50	PHDX50UV	SP 50	SPHF 50	SPHD 50
Maximum Beam Diameter	50.8 mm	50.8 mm	50.8 mm	15 mm	15 mm	50.8 mm	50.8 mm	50.8 mm
Spectral Response	.193-26µm		.193-10.6µm	.4-2µm	.193-2µm	.193-26µm		.193-10.6µm
Maximum Average Power	10 W with full illumination of the detector							
Minimum Energy	7% of selected range							
Noise Equivalent Energy	16 µJ							
Maximum Energy Density	Note 1		Note 2	Note 3	Note 4	Note 1		Note 2
Peak Power Density	n/a		100MW/cm ²	800MW/cm ²	400MW/cm ²	n/a		100MW/cm ²
Accuracy	5%	5%	8% [^]	8% [^]	8% [^]	5%	5%	8% [^]
Output Sensitivity	2 V/J							
Maximum Repetition Rate	50 pps	400 pps	20 pps	20 pps	20 pps	50 pps	400 pps	20 pps
Maximum Pulse Duration	0.4 msec	0.045 msec	0.4 msec	0.4 msec	0.4 msec	0.4 msec	0.045 msec	0.4 msec
Dimensions D x L - inches	3.5 x 2.3	3.5 x 2.3	3.5 x 2.3	3.5 x 3.9	3.5 x 3.9	3x3x0.6	3x3x0.6	3x3x0.6
cm	8.8 x 5.8	8.8 x 5.8	8.8 x 5.8	8.8 x 9.9	8.8 x 9.9	7.6x7.6x1.5	7.6x7.6x1.5	7.6x7.6x1.5
Weight - pounds/kgs	1.5/0.68	1.5/0.68	1.5/0.68	1.7/0.77	1.7/0.77	0.4/0.18	0.4/0.18	0.4/0.18
Indicator Compatibility	H410, H410D, S310, S310D, D200PC, D200P							

[^]Beam centered on absorber

- Note 1: Max J/cm² = 316 x (pulse width)^{1/2}
- Note 2: HD models Max J/cm² = 4500 x (pulse width)^{1/2} to a maximum of 1.4 J/cm².
Maximum pulse width of the pyroelectric detector must be observed.
- Note 3: HDX models Max J/cm² = 36,000 x (pulse width)^{1/2} to a maximum of 12.6 J/cm².
Maximum pulse width of the pyroelectric detector must be observed.
- Note 4: HDXUV models Max J/cm² = 18,000 x (pulse width)^{1/2} to a maximum of 5.6 J/cm².
Maximum pulse width of the pyroelectric detector must be observed.

CE MARK CERTIFICATION:

All of the pyroelectric detectors listed in this manual have been certified for the European CE mark.

ENVIRONMENTAL REQUIREMENTS:

This product is intended for indoor use at altitudes up to 2000 meters, Pollution Degree 2 in accordance with IEC 664 and transient overvoltages according to Installation Categories (Overvoltage Categories) II. Note that each of the above detectors will not pass the IEC 801 Publication, Part 3, Radiated Electromagnetic Field Requirements. The system, meter and detector, is designed to measure radiation within the test's radiation band. The detectors were held outside the radiated electromagnetic field during this test. It is up to the user to be aware of RF fields present during measurements and their effects if any on those measurements.

ABSORPTION OF HD ABSORBING MATERIAL:

Warning: You must exercise caution when using HD detectors. They exhibit spectral reflection of between 7% and 18%, of the input power, back out of the aperture. Please refer to Figure 1 to determine the reflectance for the wavelength you are measuring. These detectors should be treated as a partial mirror or any other type of reflective optic and the appropriate caution level observed, especially at the CO₂ wavelength.

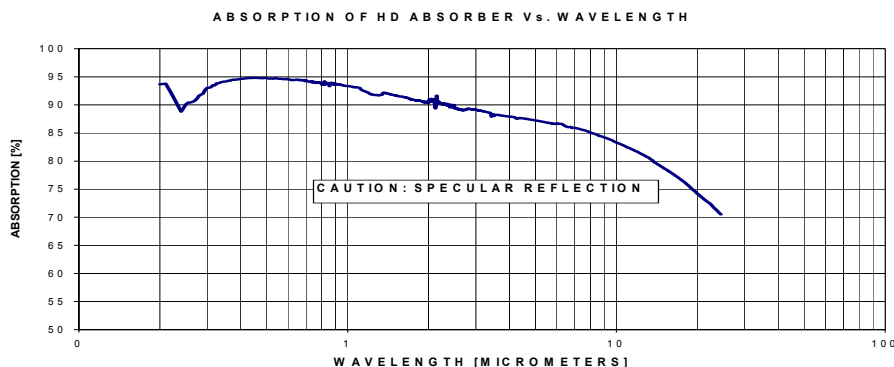


Figure 1

Note: HD detectors might show “beam” marks on the absorbing surface. These marks are characteristic of the material and do not affect the performance of the detector. Do not rub off or remove the marks. Polishing or cleaning the absorbing surface might change the performance of the pyroelectric detector.

UNPACKING AND SET UP:

The detector and accessories are shipped in custom packing materials. All packing materials should be saved for future damage free shipments.

A ½” diameter mounting post is included. Screw the post into the mounting hole in the body of the detector. Mount the post to your optical bench or working surface. An optional mounting base, Scientech Model 301-019, is available for this purpose.

A 3 meter BNC interconnect cable is included for all standard models. A BNC cable is permanently hardwired to slim profile models. If you are using a Scientech indicator, connect the detector to the indicator with its cable. Follow the detailed set up instructions that are in the indicator’s instruction manual. If you are not using a Scientech indicator, operating requirements are contained in this manual.

PYROELECTRIC DETECTOR ABSORPTION CHARACTERISTICS:

Pyroelectric detector models P25, P50, SP25 and SP50 are coated with a special black absorbing material which provides a very flat spectral response over a broad wavelength band. Pyroelectric detector models PHD25, PHDX25, PHDX25UV, PHD50, PHDX50, PHDX50UV, SPHD25, and SPHD50 are coated with a special high damage absorbing material which provides absorption over a broad wavelength band. Models PHF25, PHF50, SPHF25 and SPHF50 have a partially absorbing, partially reflecting chromium coating. The relative spectral responses of these detectors are shown in the graph in Figure 2. Please be aware of the absorption differences between the detector’s calibration wavelength and your operational wavelength. Detailed absorption information is contained in the charts at the end of this manual.

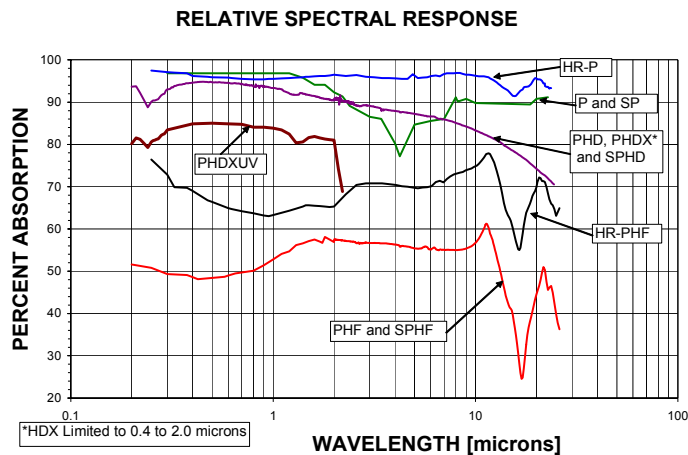


Figure 2

Before using your Vector pyroelectric detector, please review the energy density formulas given in the chart at the front of this manual. Familiarize yourself with all of the specifications of the detector models which you are using. A damage test slide is provided with each P and PHF type detectors, *but not with PHD type detectors*. Fire the beam at the test slide before using the detector to be sure you are operating under safe conditions.

CORRECTING PYROELECTRIC DETECTOR OPERATING PARAMETERS FOR USE AT DIFFERENT WAVELENGTHS:

NOTE: Due to variability in the manufacturing process the absorption characteristics of the HD and P model detectors can vary in the UV region (190 to 400nm). Scientech recommends optical calibration at 266nm if the detector is to be used in the UV region instead of relying on an absorption rate in the chart at the end of this manual.

All pyroelectric detectors are calibrated at a specific wavelength and the detector's output sensitivity is derived for that wavelength. The output sensitivity and calibration wavelength is recorded in the Operating Parameters section at the front of the manual and on the detector's serial tag. When a pyroelectric detector is used at a wavelength other than the calibration wavelength, its output sensitivity can be adjusted to compensate for the absorption rate at the new wavelength. The new output sensitivity is calculated as follows:

1. Find the absorption rate from the chart at the end of this manual for the calibration wavelength of your pyroelectric detector.
2. Find the absorption rate for the wavelength where you will be working.
3. Determine the new output sensitivity using the following formula:

$$\frac{\text{absorption rate of new wavelength}}{\text{absorption rate of the calibration wavelength}} \times \text{output sensitivity (V/J)} = \text{output sensitivity for new wavelength from serial tag}$$

DETECTOR OPERATION WITHOUT AN INDICATOR:

Pyroelectric detectors can be operated with a 1MΩ input oscilloscope. The peak voltage shown on the oscilloscope can be divided by the V/J output sensitivity of the detector to calculate energy.

FACTORY RECALIBRATION:

Scientech recommends that a complete calibration be performed annually to verify system accuracy. Please contact our Product Service Department at (800)525-0522 or (303)444-1361 or Fax (303)444-9229 or email inst@scientech-inc.com to arrange for a NIST traceable, factory calibration.

LIMITED WARRANTY:

All Scientech Laser Power and Energy Measurement Systems are warranted against defects in materials and workmanship for two (2) years from date of delivery. During the warranty period, Scientech will repair, or at its option replace at no charge, components that prove to be defective. The equipment must be returned, shipping prepaid, to Scientech's product service facility. This limited warranty does not apply if the equipment is damaged by accident or misuse or as a result of service or modification by other than a Scientech service facility. The foregoing warranty is in lieu of all other warranties expressed or implied including but not limited to any implied warranty of merchantability, fitness, or adequacy for any special incidental or consequential damages whether in contract, tort, or otherwise.

RETURNED GOODS PROCEDURE:

Should it become necessary to return any item to Scientech for any reason, please contact our Product Service Department at (800)525-0522 or (303)444-1361 or Fax (303)444-9229 or email inst@scientech-inc.com. When you call, please be ready to provide model number, serial number, and a description of the problem. Frequently we can provide self-help information which will eliminate the need for returning the unit(s).

If equipment return is required, please pack the items in the original box and packing material. As an alternate, place the equipment in a snug-fitting box, and then pack that box in a larger box with at least four inches of packing material. Scientech does not assume responsibility for under packed items. Please include the name and phone number of the person we should contact regarding repair questions.

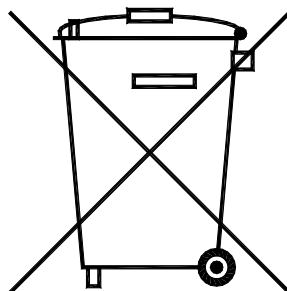
Normally, products are repaired and shipped within 5 working days after their arrival at the product service facility. This is an average time and could vary depending on the workload.

Shipping Address: Scientech, Inc.
 Product Service Department
 5649 Arapahoe Ave.
 Boulder, Colorado 80303 U.S.A.

DISPOSAL OF ELECTRICAL AND ELECTRONIC EQUIPMENT:

Scientech, Inc. recommends the following for disposal of electrical and electronic equipment:

1. The best option is to reuse the equipment in its entirety.
2. Where the equipment can not be reused in its entirety, priority should be given to reuse of its subassemblies and components.
3. Where reuse is not appropriate, electrical and electronic equipment, including batteries, should be recycled according to local ordinances.
4. Waste electrical and electronic equipment should never be mixed with municipal waste.



HD PYROELECTRIC ABSORPTION VS. WAVELENGTH:

Use this table for all standard and slim profile HD model pyroelectric detectors.

Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %
0.200	93.66	0.480	94.71	0.735	93.99	0.990	93.34
0.210	93.78	0.485	94.75	0.740	94.21	0.995	93.35
0.220	92.18	0.490	94.80	0.745	93.98	1.000	93.34
0.230	90.44	0.495	94.76	0.750	93.98	1.005	93.33
0.240	88.79	0.500	94.73	0.755	94.08	1.010	93.33
0.250	90.07	0.505	94.70	0.760	94.04	1.015	93.33
0.255	90.42	0.510	94.67	0.765	93.89	1.020	93.29
0.260	90.41	0.515	94.68	0.770	93.94	1.025	93.28
0.265	90.56	0.520	94.70	0.775	94.01	1.030	93.28
0.270	90.71	0.525	94.66	0.780	93.91	1.035	93.25
0.275	91.13	0.530	94.66	0.785	94.03	1.040	93.23
0.280	91.63	0.535	94.70	0.790	93.96	1.045	93.17
0.285	91.85	0.540	94.75	0.795	93.89	1.050	93.14
0.290	92.01	0.545	94.73	0.800	93.64	1.055	93.12
0.295	92.73	0.550	94.66	0.805	93.65	1.060	93.12
0.300	93.02	0.555	94.63	0.810	93.67	1.065	93.14
0.305	93.04	0.560	94.64	0.815	93.53	1.070	93.17
0.310	93.15	0.565	94.64	0.820	94.21	1.075	93.16
0.315	93.53	0.570	94.62	0.825	93.61	1.080	93.13
0.320	93.45	0.575	94.56	0.830	93.81	1.085	93.12
0.325	93.82	0.580	94.59	0.835	93.83	1.090	93.09
0.330	93.83	0.585	94.56	0.840	93.83	1.095	93.06
0.335	93.96	0.590	94.56	0.845	93.93	1.100	93.03
0.340	94.07	0.595	94.61	0.850	93.84	1.105	93.01
0.345	94.14	0.600	94.55	0.855	93.31	1.110	93.00
0.350	94.15	0.605	94.51	0.860	93.65	1.115	92.83
0.355	94.19	0.610	94.50	0.865	93.90	1.120	92.76
0.360	94.31	0.615	94.45	0.870	93.84	1.125	92.67
0.365	94.30	0.620	94.38	0.875	93.92	1.130	92.60
0.370	94.44	0.625	94.44	0.880	93.81	1.135	92.57
0.375	94.48	0.630	94.42	0.885	93.85	1.140	92.56
0.380	94.46	0.635	94.44	0.890	93.54	1.145	92.51
0.385	94.53	0.640	94.48	0.895	93.88	1.150	92.47
0.390	94.53	0.645	94.50	0.900	93.60	1.155	92.43
0.395	94.57	0.650	94.46	0.905	93.70	1.160	92.42
0.400	94.62	0.655	94.49	0.910	93.62	1.165	92.37
0.405	94.63	0.660	94.39	0.915	93.68	1.170	92.32
0.410	94.65	0.665	94.43	0.920	93.66	1.175	92.30
0.415	94.72	0.670	94.41	0.925	93.64	1.180	92.24
0.420	94.70	0.675	94.44	0.930	93.60	1.185	92.23
0.425	94.78	0.680	94.36	0.935	93.67	1.190	92.21
0.430	94.74	0.685	94.37	0.940	93.59	1.195	92.16
0.435	94.80	0.690	94.36	0.945	93.60	1.200	92.08
0.440	94.76	0.695	94.19	0.950	93.50	1.205	92.02
0.445	94.80	0.700	94.37	0.955	93.49	1.210	91.94
0.450	94.79	0.705	94.25	0.960	93.51	1.215	91.91
0.455	94.79	0.710	94.20	0.965	93.45	1.220	91.92
0.460	94.79	0.715	94.16	0.970	93.42	1.225	91.88
0.465	94.76	0.720	94.08	0.975	93.40	1.230	91.87
0.470	94.78	0.725	94.11	0.980	93.35	1.235	91.82
0.475	94.75	0.730	94.21	0.985	93.37	1.240	91.81

Wavelength μm	Absorption %
1.245	91.78
1.250	91.79
1.255	91.76
1.260	91.75
1.265	91.76
1.270	91.79
1.275	91.75
1.280	91.74
1.285	91.74
1.290	91.74
1.295	91.71
1.300	91.72
1.305	91.70
1.310	91.70
1.315	91.73
1.320	91.78
1.325	91.78
1.330	91.79
1.335	91.76
1.340	91.77
1.345	91.82
1.350	91.94
1.355	92.17
1.360	92.17
1.365	92.17
1.370	92.15
1.375	92.12
1.380	92.12
1.385	92.12
1.390	92.10
1.395	92.04
1.400	91.99
1.405	92.00
1.410	92.02
1.415	91.98
1.420	91.95
1.425	91.95
1.430	91.96
1.435	91.94
1.440	91.91
1.445	91.86
1.450	91.77
1.455	91.77
1.460	91.80
1.465	91.79
1.470	91.79
1.475	91.77
1.480	91.75
1.485	91.73
1.490	91.69
1.495	91.69
1.500	91.68
1.505	91.71

Wavelength μm	Absorption %
1.510	91.70
1.515	91.66
1.520	91.58
1.525	91.59
1.530	91.59
1.535	91.58
1.540	91.57
1.545	91.53
1.550	91.52
1.555	91.50
1.560	91.49
1.565	91.51
1.570	91.50
1.575	91.49
1.580	91.49
1.585	91.50
1.590	91.47
1.595	91.45
1.600	91.44
1.605	91.44
1.610	91.43
1.615	91.36
1.620	91.32
1.625	91.33
1.630	91.34
1.635	91.34
1.640	91.31
1.645	91.29
1.650	91.24
1.655	91.26
1.660	91.30
1.665	91.24
1.670	91.24
1.675	91.20
1.680	91.15
1.685	91.16
1.690	91.18
1.695	91.13
1.700	91.09
1.705	91.04
1.710	91.03
1.715	90.97
1.720	90.99
1.725	90.96
1.730	90.92
1.735	90.89
1.740	90.92
1.745	90.92
1.750	90.89
1.755	90.89
1.760	90.89
1.765	90.86
1.770	90.87

Wavelength μm	Absorption %
1.775	90.84
1.780	90.86
1.785	90.83
1.790	90.78
1.795	90.77
1.800	90.80
1.805	90.79
1.810	90.77
1.815	90.76
1.820	90.75
1.825	90.76
1.830	90.81
1.835	90.71
1.840	90.74
1.845	90.71
1.850	90.77
1.855	90.71
1.860	90.74
1.865	90.70
1.870	90.73
1.875	90.67
1.880	90.67
1.885	90.64
1.890	90.64
1.895	90.61
1.900	90.59
1.905	90.53
1.910	90.48
1.915	90.63
1.920	90.45
1.925	90.48
1.930	90.48
1.935	90.48
1.940	90.52
1.945	90.45
1.950	90.41
1.955	90.47
1.960	90.50
1.965	90.56
1.970	90.47
1.975	90.49
1.980	90.46
1.985	90.36
1.990	90.39
1.995	90.36
2.000	90.39
2.001	90.68
2.004	90.79
2.005	90.49
2.007	90.53
2.010	90.56
2.013	90.54
2.015	90.52

Wavelength μm	Absorption %
2.016	90.87
2.019	91.03
2.020	90.69
2.022	90.68
2.025	90.67
2.026	90.99
2.029	90.92
2.030	90.60
2.032	90.61
2.035	90.63
2.038	90.66
2.040	90.69
2.041	90.70
2.045	90.70
2.048	90.69
2.050	90.68
2.051	91.03
2.054	91.07
2.055	90.70
2.058	90.67
2.060	90.63
2.061	91.02
2.064	91.03
2.065	90.64
2.068	90.64
2.070	90.63
2.071	91.01
2.074	90.96
2.075	90.55
2.077	90.55
2.080	90.54
2.081	90.91
2.084	90.76
2.085	90.43
2.088	90.47
2.090	90.51
2.091	90.87
2.094	90.90
2.095	90.53
2.098	90.57
2.100	90.61
2.101	90.99
2.104	90.90
2.105	90.50
2.108	90.45
2.110	90.40
2.111	90.41
2.115	90.43
2.118	90.80
2.120	89.36
2.125	90.44
2.122	90.44
2.125	90.60

Wavelength μm	Absorption %
2.129	90.76
2.130	90.41
2.132	90.05
2.135	90.41
2.136	90.43
2.139	90.84
2.140	90.48
2.143	90.46
2.145	91.65
2.146	90.04
2.150	90.45
2.153	90.44
2.155	90.42
2.157	90.39
2.160	90.36
2.161	90.69
2.164	90.76
2.165	90.43
2.168	90.44
2.170	90.44
2.171	90.41
2.175	90.38
2.179	90.38
2.180	90.37
2.182	90.40
2.185	90.44
2.186	90.42
2.190	90.41
2.193	90.39
2.195	90.37
2.197	90.38
2.200	90.39
2.201	90.34
2.205	90.29
2.208	90.33
2.210	90.36
2.212	90.33
2.215	90.29
2.216	90.27
2.220	90.26
2.224	90.21
2.225	90.16
2.227	90.20
2.230	90.24
2.231	90.24
2.235	90.25
2.239	90.22
2.240	90.19
2.243	90.14
2.245	90.08
2.247	90.17
2.250	90.25
2.251	90.21

Wavelength μm	Absorption %
2.255	90.17
2.258	90.14
2.260	90.11
2.262	90.12
2.265	90.13
2.270	90.24
2.274	90.20
2.275	90.17
2.278	90.17
2.280	90.17
2.282	90.14
2.285	90.11
2.286	90.15
2.290	90.19
2.294	90.11
2.295	90.03
2.298	90.10
2.300	90.18
2.303	90.14
2.305	90.10
2.307	90.08
2.310	90.07
2.311	90.09
2.315	90.10
2.319	90.07
2.320	90.04
2.323	90.03
2.325	90.02
2.327	90.00
2.330	89.98
2.332	89.97
2.335	89.95
2.336	89.94
2.340	89.93
2.344	90.08
2.345	90.23
2.348	90.08
2.350	89.93
2.353	89.96
2.355	89.99
2.357	89.98
2.360	89.98
2.361	89.88
2.365	89.79
2.366	89.82
2.370	89.85
2.374	89.98
2.375	90.10
2.379	89.97
2.380	89.84
2.383	89.82
2.385	89.79
2.387	89.86

Wavelength μm	Absorption %
2.390	89.92
2.392	89.92
2.395	89.91
2.396	89.72
2.400	89.53
2.401	89.57
2.405	89.61
2.410	89.84
2.414	89.79
2.415	89.73
2.419	89.85
2.420	89.96
2.423	89.88
2.425	89.79
2.428	89.91
2.430	90.03
2.432	89.89
2.435	89.75
2.437	89.68
2.440	89.61
2.441	89.78
2.445	89.95
2.446	89.90
2.450	89.86
2.451	89.73
2.455	89.59
2.460	89.75
2.465	89.83
2.469	89.81
2.470	89.80
2.474	89.66
2.475	89.51
2.479	89.72
2.480	89.92
2.483	89.79
2.485	89.66
2.488	89.82
2.490	89.98
2.493	89.79
2.495	89.59
2.498	89.49
2.500	89.38
2.503	89.38
2.507	89.38
2.512	89.35
2.517	89.37
2.522	89.39
2.527	89.41
2.532	89.43
2.537	89.36
2.542	89.34
2.547	89.27
2.552	89.24

Wavelength μm	Absorption %
2.557	89.30
2.562	89.25
2.567	89.23
2.572	89.29
2.577	89.25
2.582	89.28
2.588	89.26
2.593	89.20
2.598	89.18
2.603	89.18
2.608	89.13
2.614	89.11
2.619	89.12
2.624	89.16
2.630	89.10
2.635	89.10
2.640	89.13
2.646	89.20
2.651	89.21
2.656	89.11
2.662	89.06
2.667	89.03
2.673	88.98
2.678	89.03
2.684	89.06
2.690	89.10
2.695	89.05
2.701	89.09
2.706	89.10
2.712	89.05
2.718	89.06
2.723	89.05
2.729	89.09
2.735	89.09
2.741	89.13
2.747	89.19
2.752	89.19
2.758	89.16
2.764	89.20
2.770	89.23
2.776	89.23
2.782	89.24
2.788	89.30
2.794	89.32
2.800	89.27
2.806	89.27
2.812	89.26
2.818	89.25
2.824	89.27
2.830	89.26
2.837	89.24
2.843	89.29
2.849	89.31

Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %
2.855	89.26	3.233	88.79	3.725	88.11	4.394	87.66
2.862	89.24	3.241	88.75	3.736	88.10	4.409	87.64
2.868	89.25	3.249	88.75	3.747	88.09	4.424	87.63
2.874	89.23	3.257	88.76	3.758	88.07	4.440	87.62
2.881	89.24	3.265	88.75	3.768	88.07	4.455	87.61
2.887	89.26	3.274	88.74	3.779	88.07	4.470	87.61
2.894	89.24	3.282	88.73	3.790	88.06	4.486	87.59
2.900	89.19	3.290	88.72	3.802	88.05	4.501	87.58
2.907	89.22	3.299	88.71	3.813	88.04	4.517	87.56
2.913	89.20	3.307	88.69	3.824	88.02	4.533	87.55
2.920	89.22	3.315	88.68	3.835	88.03	4.549	87.55
2.926	89.24	3.324	88.67	3.847	88.02	4.565	87.54
2.933	89.20	3.333	88.65	3.858	88.00	4.581	87.51
2.940	89.21	3.341	88.65	3.870	87.99	4.597	87.49
2.946	89.17	3.350	88.63	3.881	87.99	4.613	87.50
2.953	89.17	3.358	88.62	3.893	87.98	4.630	87.49
2.960	89.17	3.367	88.61	3.905	87.97	4.646	87.48
2.966	89.17	3.376	88.59	3.916	87.96	4.663	87.46
2.973	89.15	3.385	88.57	3.928	87.96	4.680	87.45
2.980	89.12	3.394	88.55	3.940	87.96	4.697	87.44
2.987	89.14	3.402	88.51	3.952	87.95	4.714	87.43
2.994	89.17	3.411	88.35	3.964	87.94	4.731	87.41
3.001	89.14	3.420	88.05	3.977	87.93	4.749	87.40
3.008	89.11	3.429	87.89	3.989	87.90	4.766	87.39
3.015	89.09	3.439	88.03	4.001	87.90	4.784	87.38
3.022	89.08	3.448	88.18	4.013	87.90	4.801	87.37
3.029	89.08	3.457	88.23	4.026	87.88	4.819	87.36
3.036	89.06	3.466	88.26	4.038	87.89	4.837	87.35
3.043	89.07	3.475	88.29	4.051	87.89	4.855	87.34
3.050	89.06	3.485	88.30	4.064	87.90	4.873	87.32
3.057	89.04	3.494	88.28	4.077	87.88	4.892	87.31
3.065	89.03	3.504	88.11	4.089	87.85	4.910	87.30
3.072	89.02	3.513	88.01	4.102	87.85	4.929	87.29
3.079	89.01	3.523	88.11	4.115	87.85	4.948	87.27
3.087	89.00	3.532	88.19	4.129	87.83	4.967	87.25
3.094	89.01	3.542	88.23	4.142	87.82	4.986	87.24
3.101	89.00	3.552	88.26	4.155	87.82	5.005	87.22
3.109	88.99	3.561	88.24	4.168	87.82	5.025	87.20
3.116	88.99	3.571	88.21	4.182	87.80	5.044	87.20
3.124	88.95	3.581	88.22	4.195	87.77	5.064	87.18
3.131	88.93	3.591	88.22	4.209	87.70	5.084	87.16
3.139	88.97	3.601	88.22	4.223	87.60	5.104	87.14
3.146	88.96	3.611	88.21	4.236	87.56	5.124	87.13
3.154	88.92	3.621	88.21	4.250	87.60	5.144	87.10
3.162	88.89	3.631	88.20	4.264	87.60	5.165	87.10
3.170	88.88	3.641	88.20	4.278	87.57	5.185	87.09
3.177	88.86	3.652	88.19	4.293	87.58	5.206	87.08
3.185	88.85	3.662	88.18	4.307	87.61	5.227	87.07
3.193	88.86	3.672	88.17	4.321	87.64	5.248	87.05
3.201	88.85	3.683	88.15	4.336	87.65	5.270	87.03
3.209	88.83	3.693	88.14	4.350	87.66	5.291	87.01
3.217	88.82	3.704	88.13	4.365	87.67	5.313	87.00
3.225	88.80	3.714	88.11	4.380	87.67	5.335	86.98

Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %
5.357	86.95	6.682	86.05	8.879	84.32	13.09	80.67
5.379	86.95	6.717	86.06	8.940	84.27	13.23	80.54
5.401	86.94	6.752	86.07	9.002	84.22	13.36	80.36
5.424	86.90	6.787	86.00	9.065	84.17	13.50	80.24
5.447	86.89	6.823	85.91	9.129	84.11	13.65	80.08
5.470	86.86	6.859	85.86	9.194	84.06	13.79	79.83
5.493	86.86	6.895	85.91	9.260	84.00	13.94	79.67
5.516	86.86	6.932	85.93	9.326	83.95	14.09	79.57
5.540	86.83	6.970	85.92	9.394	83.90	14.25	79.42
5.564	86.80	7.007	85.91	9.462	83.83	14.40	79.29
5.588	86.78	7.045	85.87	9.532	83.78	14.57	79.14
5.612	86.79	7.084	85.86	9.603	83.72	14.73	78.98
5.636	86.77	7.123	85.84	9.674	83.64	14.90	78.81
5.661	86.76	7.162	85.79	9.747	83.55	15.07	78.66
5.686	86.76	7.202	85.77	9.821	83.46	15.25	78.54
5.711	86.74	7.242	85.74	9.896	83.38	15.43	78.39
5.736	86.68	7.283	85.70	9.972	83.32	15.62	78.23
5.762	86.59	7.324	85.66	10.05	83.26	15.81	78.05
5.787	86.62	7.366	85.63	10.13	83.19	16.00	77.89
5.813	86.66	7.408	85.61	10.21	83.13	16.20	77.73
5.839	86.66	7.450	85.56	10.29	83.06	16.41	77.54
5.866	86.64	7.493	85.52	10.37	82.99	16.62	77.36
5.893	86.61	7.537	85.50	10.45	82.90	16.84	77.17
5.919	86.63	7.581	85.48	10.54	82.82	17.06	76.95
5.947	86.63	7.626	85.46	10.60	82.79	17.29	76.77
5.974	86.64	7.671	85.42	10.63	82.76	17.52	76.57
6.002	86.67	7.716	85.36	10.63	82.76	17.52	76.57
6.030	86.66	7.763	85.32	10.71	82.69	17.76	76.38
6.058	86.60	7.809	85.28	10.80	82.61	18.01	76.15
6.086	86.62	7.857	85.24	10.89	82.51	18.26	75.87
6.115	86.64	7.905	85.18	10.99	82.42	18.52	75.62
6.144	86.63	7.953	85.13	11.08	82.35	18.79	75.36
6.173	86.62	8.002	85.09	11.18	82.29	19.06	75.07
6.203	86.62	8.052	85.02	11.27	82.21	19.35	74.81
6.232	86.61	8.102	84.97	11.37	82.13	19.64	74.56
6.263	86.58	8.153	84.94	11.47	82.06	19.94	74.25
6.293	86.54	8.205	84.91	11.58	81.94	20.26	73.99
6.324	86.47	8.257	84.86	11.68	81.86	20.58	73.73
6.355	86.39	8.310	84.82	11.79	81.79	20.91	73.41
6.386	86.34	8.364	84.77	11.89	81.69	21.25	73.14
6.418	86.26	8.418	84.73	12.00	81.60	21.61	72.90
6.450	86.23	8.473	84.69	12.12	81.50	21.97	72.65
6.482	86.15	8.529	84.60	12.23	81.40	22.35	72.37
6.514	86.12	8.585	84.50	12.35	81.29	22.74	71.98
6.547	86.10	8.642	84.47	12.47	81.21	23.15	71.60
6.580	86.05	8.700	84.45	12.59	81.10	23.57	71.31
6.614	86.03	8.759	84.41	12.71	80.98	24.01	70.85
6.648	86.03	8.819	84.37	12.84	80.85	24.46	70.50
				12.96	80.74		

Note: Due to variability in the manufacturing process the absorption in the UV region varies.
Calibration at 266nm is recommended if the detector is to be used in the UV region.

HF MODEL PYROELECTRIC DETECTOR ABSORPTION VS. WAVELENGTH:

Use this table for standard and slim profile high frequency (HF) model pyroelectric detectors.

Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %	Wavelength μm	Absorption %
0.200	58.05	0.68	51.99	1.19	57.51	1.70	59.91
0.210	57.59	0.69	52.06	1.20	57.58	1.71	59.78
0.220	58.33	0.70	52.17	1.21	57.75	1.72	59.65
0.230	57.76	0.71	52.23	1.22	57.93	1.73	59.60
0.240	57.18	0.72	52.29	1.23	58.09	1.74	59.65
0.250	56.55	0.73	52.36	1.24	58.27	1.75	59.70
0.260	56.08	0.74	52.45	1.25	58.40	1.76	59.84
0.270	55.63	0.75	52.48	1.26	58.51	1.77	59.93
0.280	55.35	0.76	52.51	1.27	58.66	1.78	60.09
0.290	55.07	0.77	52.54	1.28	58.81	1.79	60.26
0.300	54.79	0.78	52.66	1.29	58.91	1.80	60.49
0.310	54.56	0.79	52.61	1.30	59.04	1.81	60.49
0.320	54.21	0.80	51.81	1.31	59.14	1.82	60.48
0.330	53.91	0.81	52.05	1.32	59.22	1.83	60.47
0.340	53.74	0.82	52.29	1.33	59.32	1.84	60.44
0.350	53.03	0.83	52.23	1.34	59.36	1.85	60.38
0.360	52.95	0.84	52.73	1.35	59.44	1.86	60.40
0.370	52.62	0.85	53.33	1.36	59.48	1.87	60.41
0.375	52.42	0.86	53.37	1.37	59.53	1.88	60.39
0.380	52.21	0.87	53.53	1.38	59.60	1.89	60.35
0.390	51.81	0.88	53.69	1.39	59.63	1.90	60.39
0.400	51.25	0.89	53.82	1.40	59.64	1.91	60.32
0.410	50.94	0.90	53.97	1.41	59.72	1.92	60.34
0.420	50.77	0.91	54.12	1.42	59.75	1.93	60.26
0.425	50.65	0.92	54.26	1.43	59.81	1.94	60.10
0.430	50.52	0.93	54.34	1.44	59.87	1.95	60.00
0.440	50.36	0.94	54.53	1.45	59.92	1.96	59.95
0.450	50.18	0.95	54.59	1.46	59.92	1.97	59.98
0.460	49.96	0.96	54.70	1.47	59.99	1.98	59.88
0.470	49.87	0.97	54.74	1.48	60.00	1.99	59.84
0.480	49.83	0.98	54.88	1.49	60.02	2.000	59.87
0.490	49.73	0.99	55.04	1.50	60.06	2.003	60.35
0.500	49.68	1.00	55.16	1.51	60.11	2.006	60.39
0.510	49.64	1.01	55.34	1.52	60.11	2.009	60.40
0.520	49.65	1.02	55.51	1.53	60.16	2.012	60.38
0.530	49.70	1.03	55.68	1.54	60.13	2.016	60.35
0.540	49.83	1.04	55.84	1.55	60.10	2.019	60.31
0.550	49.86	1.05	56.01	1.56	60.22	2.022	60.32
0.560	49.95	1.06	56.14	1.57	60.26	2.025	60.36
0.570	50.08	1.07	56.33	1.58	60.28	2.028	60.37
0.575	50.17	1.08	56.49	1.59	60.32	2.031	60.34
0.580	50.25	1.09	56.62	1.60	60.36	2.034	60.31
0.590	50.47	1.10	56.77	1.61	60.34	2.038	60.29
0.600	50.70	1.11	56.87	1.62	60.30	2.041	60.27
0.610	50.91	1.12	56.99	1.63	60.25	2.044	60.28
0.620	51.08	1.13	57.10	1.64	60.20	2.047	60.31
0.630	51.27	1.14	57.19	1.65	60.18	2.051	60.33
0.640	51.44	1.15	57.29	1.66	60.18	2.054	60.31
0.650	51.64	1.16	57.36	1.67	60.22	2.057	60.30
0.660	51.78	1.17	57.40	1.68	60.14	2.060	60.28
0.670	51.86	1.18	57.47	1.69	60.06	2.064	60.25

Wavelength μm	Absorption %
2.067	60.27
2.070	60.28
2.073	60.24
2.077	60.24
2.080	60.24
2.083	60.25
2.087	60.26
2.09	60.25
2.094	60.25
2.097	60.25
2.100	60.23
2.104	60.24
2.107	60.26
2.111	60.24
2.114	60.22
2.117	60.22
2.121	60.22
2.124	60.23
2.128	60.23
2.131	60.22
2.135	60.21
2.138	60.20
2.142	60.20
2.145	60.17
2.149	60.16
2.153	60.16
2.156	60.17
2.160	60.18
2.163	60.17
2.167	60.15
2.171	60.13
2.174	60.12
2.178	60.13
2.182	60.16
2.185	60.16
2.189	60.15
2.193	60.14
2.196	60.12
2.200	60.12
2.204	60.11
2.208	60.10
2.211	60.11
2.215	60.11
2.219	60.09
2.223	60.08
2.226	60.08
2.230	60.06
2.234	60.05
2.238	60.06
2.242	60.05
2.246	60.01
2.250	60.00
2.254	60.02

Wavelength μm	Absorption %
2.257	60.06
2.261	60.05
2.265	60.05
2.269	60.05
2.273	60.01
2.277	59.99
2.281	59.99
2.285	59.99
2.289	60.00
2.293	60.01
2.297	60.00
2.301	59.97
2.306	59.96
2.310	59.96
2.314	59.96
2.318	59.96
2.322	59.96
2.326	59.97
2.330	59.96
2.335	59.96
2.339	59.95
2.343	59.94
2.347	59.92
2.352	59.91
2.356	59.92
2.360	59.92
2.364	59.92
2.369	59.92
2.373	59.91
2.377	59.90
2.382	59.89
2.386	59.90
2.390	59.91
2.395	59.89
2.399	59.87
2.404	59.87
2.408	59.86
2.413	59.85
2.417	59.84
2.422	59.85
2.426	59.86
2.431	59.85
2.435	59.83
2.440	59.82
2.445	59.81
2.449	59.82
2.454	59.83
2.458	59.84
2.463	59.83
2.468	59.82
2.472	59.81
2.477	59.78
2.482	59.78

Wavelength μm	Absorption %
2.487	59.79
2.491	59.80
2.496	59.81
2.501	59.80
2.506	59.78
2.511	59.75
2.516	59.74
2.520	59.75
2.525	59.74
2.530	59.72
2.535	59.70
2.540	59.69
2.545	59.65
2.550	59.65
2.555	59.63
2.560	59.54
2.565	59.51
2.570	59.52
2.575	59.49
2.581	59.47
2.586	59.44
2.591	59.41
2.596	59.43
2.601	59.43
2.607	59.43
2.612	59.45
2.617	59.46
2.622	59.49
2.628	59.48
2.633	59.54
2.638	59.61
2.644	59.60
2.649	59.58
2.655	59.53
2.660	59.40
2.665	59.23
2.671	59.23
2.676	59.32
2.682	59.44
2.687	59.47
2.693	59.46
2.699	59.51
2.704	59.49
2.710	59.44
2.716	59.38
2.721	59.36
2.727	59.49
2.733	59.45
2.739	59.36
2.744	59.46
2.750	59.47
2.756	59.39
2.762	59.36

Wavelength μm	Absorption %
2.768	59.39
2.774	59.45
2.780	59.44
2.786	59.44
2.792	59.49
2.798	59.46
2.804	59.44
2.810	59.50
2.816	59.50
2.822	59.51
2.828	59.51
2.834	59.51
2.840	59.53
2.847	59.55
2.853	59.58
2.859	59.64
2.866	59.68
2.872	59.67
2.878	59.63
2.885	59.57
2.891	59.53
2.897	59.50
2.904	59.49
2.910	59.50
2.917	59.49
2.924	59.48
2.930	59.49
2.937	59.49
2.943	59.48
2.950	59.49
2.957	59.48
2.964	59.48
2.970	59.48
2.977	59.48
2.984	59.48
2.991	59.47
2.998	59.47
3.005	59.48
3.012	59.47
3.019	59.46
3.026	59.45
3.033	59.45
3.040	59.45
3.047	59.45
3.054	59.46
3.062	59.46
3.069	59.45
3.076	59.45
3.083	59.46
3.091	59.47
3.098	59.46
3.105	59.45
3.113	59.46

Wavelength μm	Absorption %
3.120	59.47
3.128	59.47
3.135	59.47
3.143	59.48
3.151	59.47
3.158	59.47
3.166	59.47
3.174	59.48
3.182	59.48
3.189	59.48
3.197	59.47
3.205	59.47
3.213	59.47
3.221	59.46
3.229	59.47
3.237	59.48
3.245	59.47
3.253	59.47
3.262	59.46
3.270	59.46
3.278	59.46
3.286	59.46
3.295	59.46
3.303	59.46
3.312	59.46
3.320	59.46
3.328	59.46
3.337	59.45
3.346	59.45
3.354	59.44
3.363	59.43
3.372	59.41
3.381	59.41
3.389	59.40
3.398	59.39
3.407	59.37
3.416	59.36
3.425	59.37
3.434	59.38
3.443	59.39
3.452	59.39
3.462	59.39
3.471	59.39
3.480	59.38
3.490	59.37
3.499	59.36
3.508	59.36
3.518	59.37
3.528	59.39
3.537	59.39
3.547	59.39
3.557	59.38
3.566	59.38

Wavelength μm	Absorption %
3.576	59.37
3.586	59.36
3.596	59.36
3.606	59.36
3.616	59.36
3.626	59.35
3.636	59.35
3.646	59.35
3.657	59.34
3.667	59.32
3.677	59.32
3.688	59.32
3.698	59.32
3.709	59.31
3.720	59.30
3.730	59.29
3.741	59.28
3.752	59.28
3.763	59.27
3.774	59.26
3.785	59.26
3.796	59.25
3.807	59.23
3.818	59.22
3.829	59.21
3.841	59.21
3.852	59.20
3.864	59.19
3.875	59.19
3.887	59.18
3.898	59.17
3.910	59.16
3.922	59.15
3.934	59.14
3.946	59.13
3.958	59.12
3.970	59.11
3.982	59.10
3.994	59.09
4.007	59.08
4.019	59.07
4.032	59.06
4.044	59.05
4.057	59.05
4.070	59.04
4.082	59.03
4.095	59.02
4.108	59.01
4.121	59.00
4.134	58.99
4.148	58.98
4.161	58.97
4.174	58.96

Wavelength μm	Absorption %
4.188	58.92
4.201	58.80
4.215	58.63
4.229	58.56
4.242	58.64
4.256	58.66
4.270	58.60
4.284	58.59
4.299	58.66
4.313	58.71
4.327	58.75
4.342	58.77
4.356	58.76
4.371	58.75
4.386	58.73
4.401	58.72
4.416	58.71
4.431	58.70
4.446	58.69
4.461	58.68
4.477	58.66
4.492	58.65
4.508	58.65
4.523	58.64
4.539	58.63
4.555	58.62
4.571	58.61
4.587	58.60
4.604	58.59
4.620	58.57
4.636	58.56
4.653	58.55
4.670	58.54
4.687	58.52
4.704	58.50
4.721	58.48
4.738	58.46
4.755	58.44
4.773	58.41
4.791	58.38
4.808	58.36
4.826	58.33
4.844	58.30
4.862	58.28
4.881	58.26
4.899	58.24
4.918	58.22
4.936	58.20
4.955	58.18
4.974	58.17
4.993	58.14
5.013	58.12
5.032	58.12

Wavelength μm	Absorption %
5.052	58.11
5.071	58.09
5.091	58.09
5.111	58.08
5.131	58.07
5.152	58.08
5.172	58.07
5.193	58.04
5.214	58.05
5.235	58.07
5.256	58.08
5.278	58.08
5.299	58.10
5.321	58.08
5.343	58.08
5.365	58.14
5.387	58.14
5.410	58.14
5.432	58.18
5.455	58.23
5.478	58.33
5.501	58.41
5.525	58.44
5.548	58.45
5.572	58.52
5.596	58.58
5.620	58.57
5.645	58.60
5.669	58.63
5.694	58.58
5.719	58.50
5.745	58.46
5.770	58.47
5.796	58.37
5.822	58.22
5.848	58.06
5.875	57.92
5.901	57.91
5.928	57.88
5.956	57.88
5.983	57.96
6.011	57.91
6.039	57.83
6.067	57.94
6.095	58.06
6.124	58.12
6.153	58.16
6.183	58.24
6.212	58.32
6.242	58.35
6.272	58.34
6.303	58.25
6.333	58.12

Wavelength μm	Absorption %
6.365	57.97
6.396	57.83
6.428	57.83
6.460	57.76
6.492	57.75
6.525	57.77
6.557	57.69
6.591	57.67
6.624	57.73
6.658	57.81
6.693	57.88
6.727	57.88
6.762	57.82
6.798	57.76
6.834	57.73
6.870	57.79
6.906	57.84
6.943	57.79
6.981	57.76
7.018	57.74
7.057	57.78
7.095	57.77
7.134	57.73
7.174	57.76
7.214	57.79
7.254	57.78
7.295	57.76
7.336	57.78
7.378	57.80
7.420	57.77
7.462	57.76
7.506	57.77
7.549	57.76
7.593	57.76
7.638	57.77
7.683	57.77
7.729	57.76
7.775	57.75
7.822	57.74

Wavelength μm	Absorption %
7.870	57.74
7.918	57.73
7.966	57.73
8.015	57.73
8.065	57.73
8.116	57.73
8.167	57.74
8.218	57.74
8.271	57.75
8.324	57.76
8.378	57.77
8.432	57.78
8.487	57.80
8.543	57.82
8.600	57.84
8.657	57.87
8.715	57.91
8.774	57.94
8.834	57.98
8.894	58.02
8.956	58.07
9.018	58.14
9.081	58.20
9.145	58.26
9.210	58.32
9.276	58.39
9.343	58.45
9.410	58.52
9.479	58.61
9.549	58.69
9.620	58.79
9.691	58.91
9.764	59.04
9.838	59.18
9.913	59.34
9.990	59.51
10.07	59.69
10.15	59.88
10.23	60.09

Wavelength μm	Absorption %
10.31	60.33
10.39	60.59
10.47	60.88
10.56	61.18
10.65	61.51
10.73	61.88
10.82	62.26
10.91	62.62
11.01	63.01
11.10	63.50
11.20	63.99
11.29	64.25
11.39	64.19
11.49	63.83
11.60	63.27
11.70	62.55
11.81	61.82
11.92	61.29
12.03	60.83
12.14	60.22
12.25	59.45
12.37	58.61
12.49	57.76
12.61	56.91
12.73	56.06
12.86	55.20
12.99	54.32
13.12	53.42
13.25	52.50
13.39	51.53
13.53	50.51
13.67	49.46
13.82	48.42
13.97	47.38
14.12	46.39
14.28	45.49
14.43	44.72
14.60	44.02
14.76	43.45

Wavelength μm	Absorption %
14.93	43.14
15.11	42.72
15.28	41.67
15.47	40.14
15.65	38.41
15.84	36.53
16.04	34.41
16.24	32.05
16.45	29.57
16.66	27.22
16.87	25.74
17.10	26.08
17.32	28.33
17.56	31.38
17.80	34.24
18.05	36.63
18.30	38.49
18.56	39.88
18.83	41.13
19.11	42.50
19.40	43.95
19.69	45.40
19.99	46.70
20.31	47.76
20.63	48.85
20.96	50.32
21.31	52.14
21.66	53.52
22.03	52.80
22.41	49.83
22.80	47.84
23.21	48.44
23.63	48.80
24.07	47.13
24.53	44.58
25.00	41.82
25.49	39.64
26.00	38.04

Note: Due to variability in the manufacturing process the absorption in the UV region varies. Calibration at 266nm is recommended if the detector is to be used in the UV region.

P MODEL PYROELECTRIC DETECTOR ABSORPTION VS. WAVELENGTH:

Use this table for standard and slim profile painted (P) model pyroelectric detectors.

Wavelength μm	Absorption %
0.30	96.850
0.40	96.850
0.50	96.850
0.60	96.850
0.70	96.850
0.80	96.850
0.90	96.850
1.00	96.850
1.10	96.850
1.20	96.850
1.30	96.309
1.40	95.768

Wavelength μm	Absorption %
1.50	94.931
1.60	94.094
1.70	94.094
1.80	94.094
1.90	93.209
2.00	92.323
2.00	92.323
2.10	91.831
2.20	91.339
2.39	89.092
3.00	86.542
3.42	86.032

Wavelength μm	Absorption %
4.00	80.251
4.22	77.191
5.00	84.672
6.00	85.522
7.00	86.032
8.00	91.133
8.17	90.113
9.00	90.793
10.00	89.772
18.61	89.432
20.00	90.793
22.80	91.133