

### Free Standing Wire Grids



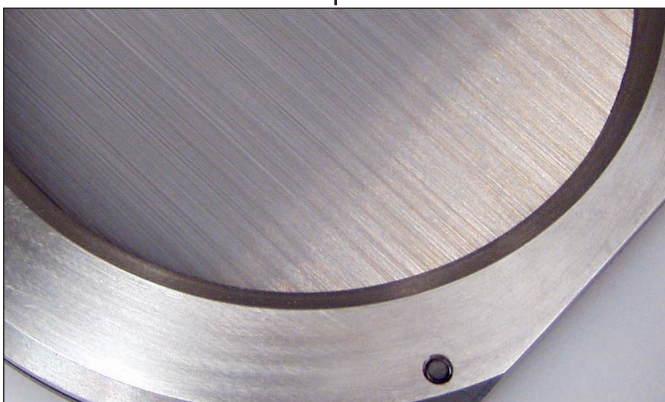
Extremely efficient polarizers can be made, for the mid-IR to millimeter wavelengths using free standing wire grids (unsupported wires). The only requirement is that the wavelength is much greater than the wire spacing. The absorption of radiation in the wires is very low and the polarization efficiency is unaffected by any small irregularities in the wire spacing at wavelengths significantly larger than the wire spacing ( $\lambda \gg d$ ). At wavelengths close to the wire spacing, the polarization efficiency drops and becomes a more complex function of the wire diameter and wire spacing.

Tungsten or gold plated tungsten wires of 5, 10, 25 or 50 $\mu$ m diameter, or beryllium-copper wire of 25 or 50 $\mu$ m, can be wound onto a support ring, or frame, and the wire spacing varied between 12.5 $\mu$ m and 1.8mm according to customer requirements.

Mounts can be custom designed and fabricated in a choice of material including aluminum, stainless steel, Invar, Tufnol, glass fiber and molybdenum. The wires can be bonded using special adhesives depending on application.

#### Features

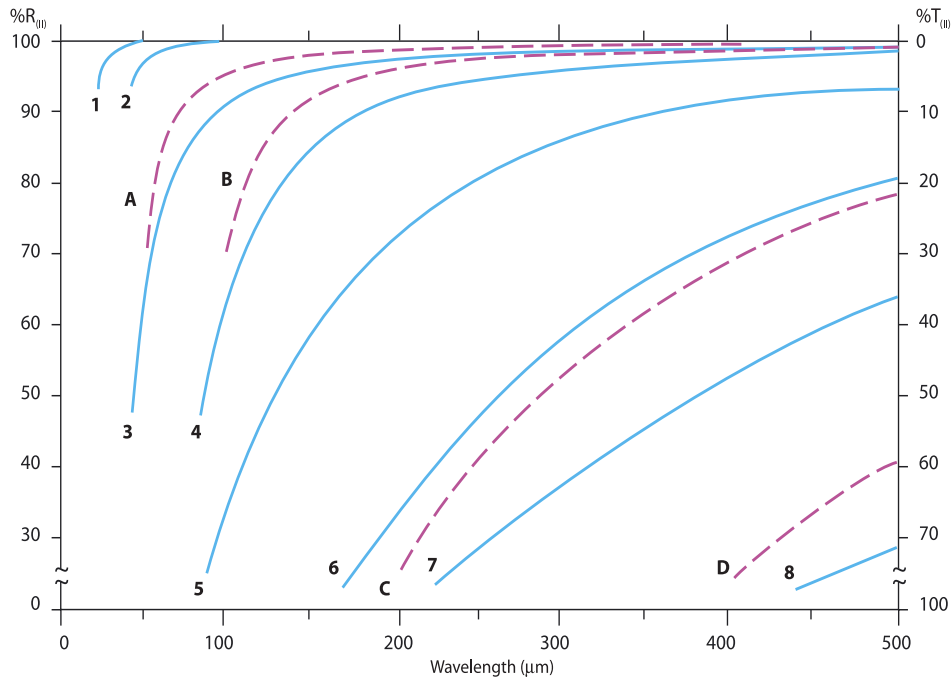
- Mid IR to mm wavelengths, 20 $\mu$ m - >10mm
- High degree of polarization: >99.9%
- High transmission efficiency
- No beam deviation or dispersion
- Choice of materials and custom design



#### Applications

- Far-IR wavelength polarization
- Interferometric Beamsplitters
- Variable attenuation/reflection of polarized sources
- Coupling devices for long wavelength lasers (gas discharge or optical pumped)

## Transmission characteristics of free standing wire grid polarizers showing effect of wire diameter and spacing



Curve	wire diameter (μm), a	wire spacing (μm), d	a/d
1	5	12.5	0.4
2	10	25	0.4
3	5	25	0.2
4	10	50	0.2
5	5	50	0.1
6	10	100	0.1
7	5	100	0.05
8	10	200	0.05
A	5	25	0.2
B	10	50	0.2
C	5	100	0.05
D	10	200	0.05

Note: Curves A - D = 45° incidence (rotated about wire direction)

## Ordering Information

Part Number	Anodized Aluminum Frame			Wire Diameter (μm)	Wire Spacing (μm)
	O.D.(mm)	I.D.(mm)	Thick(mm)		
57200	50	25	10	5	12.5
57201	50	25	10	10	25
57202	80	50	12	5	12.5
57203	80	50	12	10	25
57204	105	75	12	5	12.5
57205	105	75	12	10	25
57206	130	100	12	5	12.5
57207	130	100	12	10	25
57100	140	120	12.7	10	25
57110	140	120	12.7	10	50
57130	133.35	95.25	12.7	10	25
57135	133.35	95.25	12.7	5	12.5

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