

Polarizers

Standard Infrared Polarizers (GS57010 Series)

Polarizers are commonly used to polarize radiation from unpolarized sources, attenuated radiation from polarized sources, or act as polarizing beamsplitters. Specac offers a range of holographic wire polarizers laid onto a transmitting substrate material for use in the 2 - 35 μ m (5000 cm^{-1} - 285 cm^{-1}) spectral range.

These precision polarizers are manufactured in a class 1000 clean room facility at Specac's United Kingdom factory, by means of a holographic fabrication technique originally developed in conjunction with the United Kingdom's National Physical Laboratory (NPL).

The process involves exposing a photo-resist coating on a suitable material substrate to an interferometrically-generated fringe pattern from a monochromatic UV source. The regular sinusoidal profile of the developed photo-resist is subsequently metal coated at an oblique angle to create an array of fine parallel lines at a set period.

This technique lends itself well to the generation of extremely uniform sub-micron grid wire spacings at 4000 lines / mm, which have significantly reduced level of light scattering in comparison to traditional ruled wire grid polarizers. As the wire grid is formed on the photo-resist itself, the technique is also well suited to fabricating polarizers on substrates that do not otherwise lend themselves to the ruling process.

Specac offers a wide range of polarizers on infrared material substrates such as Barium Fluoride (BaF₂), Calcium Fluoride (CaF₂), KRS-5, Zinc Selenide (ZnSe), and Germanium (Ge), in a range of categories to meet a broad scope of customer requirements.

Illustrations, descriptions and specifications in this datasheet were correct at the time of going to press. However, Specac's policy is one of continuous product development and we reserve the right to change descriptions and specifications at any time.

For the latest details please contact your local Specac office or representative.



Features of GS57010 Series Polarizers

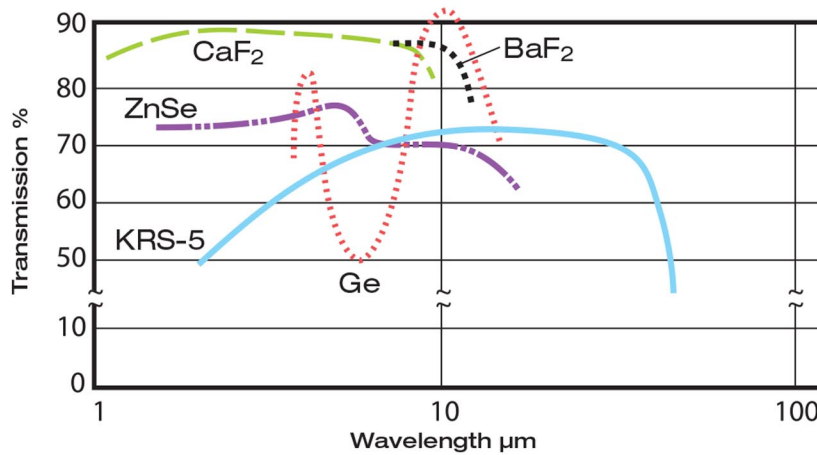
- 4000 lines/mm on substrate
- Choice of KRS-5, Ge, BaF₂, CaF₂ and ZnSe substrates
- Choice of C.A. and O.D. sizes
- Free standing by use of own ring mount
- Fit into polarizer rotatable mount options GS57340 Series and GS12510 Benchmark Series (38mm C.A.)

Applications

- Infrared spectroscopy of materials (typically plastics / polymers and crystallography)
- Infrared microscopy (sample characterization)
- NIR/Mid-IR thermal imaging systems
- Plasma diagnostics
- Beamsplitters in polarized light interferometry
- Analysis in infrared astronomy
- Low power laser polarization and beam attenuation
- Coupling devices for Mid-IR and long wavelength lasers

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	Substrate	KRS-5	CaF ₂	BaF ₂	Ge	ZnSe
Spectral Range (μm)		2 - 35	1 - 10	1 - 12.5	8 - 12	1 - 15
Grid Period (μm)		0.25	0.25	0.25	0.4	0.25

Transmission	2.5μm	72	89	88		76
Efficiency % (K1)	5.0μm	84	88	88		85
	8.0μm				87	
	10.0μm	75	50	84	91	74
Transmission of Unwanted Radiation % (K2)	2.5μm	1.50	1.00	1.10		1.40
	5.0μm	0.50	0.28	0.30		0.50
	8.0μm				0.35	
	10.0μm	0.23	0.10	0.20	0.25	0.20
Degree of Polarization % (K1-K2)/(K1+K2)	2.5μm	95.8	97.8	97.5		96.3
	5.0μm	98.8	99.3	99.3		98.8
	8.0μm				99.2	
	10.0μm	99.7	99.6	99.5	99.4	99.4
Extinction Ratio expressed as K1/K2	2.5μm	48:1	89:1	80:1		54:1
	5.0μm	168:1	314:1	293:1		170:1
	8.0μm				249:1	
	10.0μm	326:1	500:1	420:1	364:1	370:1

These specifications represent typical minimum performance. Actual results may vary. Maximum operating temperature for Ge is 80°C, all others are 110°C. Other materials, including sapphire, CsI and MgF and custom specifications available upon request.

	Substrate		Ring Mount		Part Number
	OD (mm)	CA (mm)	OD (mm)	t (mm)	

KRS-5	25.0*	unmounted	N/A	N/A	GS57001
	29.0	25.0	41.0	6.7	GS57010
	42.0	38.0	55.0	8.7	GS57012
	54.0	50.0	70.0	8.7	GS57014
Ge	25.0*	unmounted	N/A	N/A	GS57003
	29.0	25.0	41.0	6.7	GS57070
	42.0	38.0	55.0	8.7	GS57072
	54.0	50.0	70.0	8.7	GS57074
	75.0	71.0	90.0	9.7	GS57076
CaF ₂	25.0*	unmounted	N/A	N/A	GS57006
	29.0	25.0	41.0	6.7	GS57080
	42.0	38.0	55.0	8.7	GS57082
	54.0	50.0	70.0	8.7	GS57084
	75.0	71.0	90.0	9.7	GS57086
BaF ₂	25.0*	unmounted	N/A	N/A	GS57008
	29.0	25.0	41.0	6.7	GS57090
	42.0	38.0	55.0	8.7	GS57092
	54.0	50.0	70.0	8.7	GS57094
	75.0	71.0	90.0	9.7	GS57096
ZnSe	25.0*	unmounted	N/A	N/A	GS57016
	29.0	25.0	41.0	6.7	GS57050
	42.0	38.0	55.0	8.7	GS57052
	54.0	50.0	70.0	8.7	GS57054
	75.0	71.0	90.0	9.7	GS57056

* The unmounted 25.0mm polarizers are 2mm thick.

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