

High Extinction Ratio (HER) Infrared Polarizers

Polarizers are commonly used to polarize radiation from unpolarized sources, attenuate radiation from polarized sources, or act as polarizing beamsplitters. Specac offers a range of holographic wire-grid polarizers for use in the 2-30 μ m 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 (2500 - 4000 lines/mm), which have a significantly reduced level of light scattering in comparison to traditional ruled wire grid polarizers. As the wire grid is

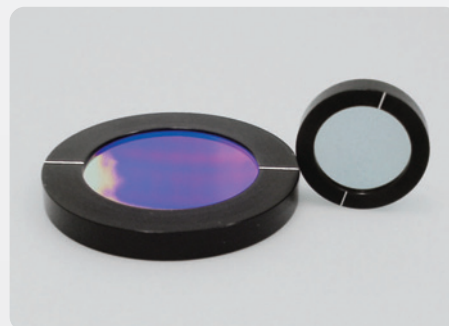
formed on the photo-resist itself, the technique is also well suited to fabricating polarizers on substrates that do not otherwise lend themselves to the ruling process.

Specac offers a range of polarizers on infrared materials 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.

Standard, High Extinction Ratio (HER), and Image Quality High Extinction Ratio (IQ-HER) polarizers are offered mounted or unmounted, with a range of diameters from 25 to 75 mm depending on substrate material. Square polarizers in these categories are also available upon request. The performance of Specac polarizers does not vary significantly with change of incident angle between 0 to 20 degrees.

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



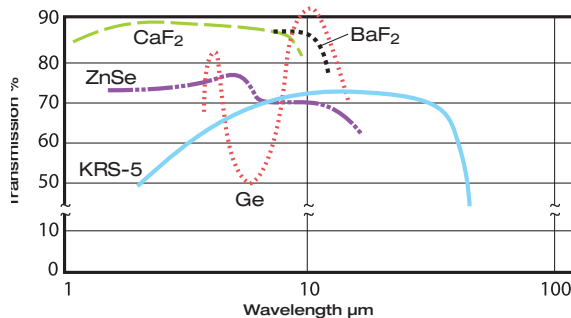
- Illustrations, descriptions and specifications in this data sheet were correct at the time of going to press. However, Specac's policy is one of continuous product development and we reserve the right to change descriptions and specifications at any time. For the latest details please contact your local Specac office or representative.

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Spectral Range (μm) Grid Period (μm)	Substrate	KRS-5	CaF2	BaF2	Ge	ZnSe
		2 - 35	1 - 10	1 - 12.5	8 - 12	1 - 15
		0.25	0.25	0.25	0.4	0.25
Transmission Efficiency % (K1)	2.5μm	70	84	84		74
	5.0μm	80	86	86		81
	8.0μm				85	
	10.0μm	72	48	80	88	72
Transmission of Unwanted Radiation % (K2)	2.5μm	0.35	0.25	0.28		0.52
	5.0μm	0.15	0.13	0.15		0.20
	8.0μm				0.14	
	10.0μm	0.12	0.05	0.07	0.14	0.12
Degree of Polarization % (K1-K2) / (K1+K2)	2.5μm	99.0	99.4	99.3		99.6
	5.0μm	99.6	99.6	99.6		99.5
	8.0μm				99.6	
	10.0μm	99.7	99.8	99.8	99.6	99.6
Extinction/Contrast Ratio expressed as K1/K2	2.5μm	200:1	336:1	300:1		142:1
	5.0μm	533:1	662:1	573:1		405:1
	8.0μm				607:1	
	10.0μm	600:1	960:1	1143:1	629:1	600:1

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.



Polarizer categories

FT-IR Infrared Polarizers

These polarizers are offered on BaF2, CaF2, KRS-5, Ge, and ZnSe substrates. Spring mounted with a 25mm clear aperture, they fit directly into the aperture ports of all Benchmark baseplate compatible accessories.

Standard Infrared Polarizers

These polarizers are offered on BaF2, CaF2, KRS-5, Ge, and ZnSe substrates, in a choice of support rings. Manufactured at 4000 lines/mm, they ensure enhanced performance at shorter wavelengths for precision applications.

High Extinction Ratio (HER) Infrared Polarizers

These polarizers are offered on BaF2, CaF2, KRS-5, Ge, and ZnSe substrates, in a choice of support rings. Manufactured at 4000 lines/mm, with an enhanced coating process, they ensure a higher degree of polarization extinction without jeopardising transmission throughput.

Image Quality Infrared Polarizers

These polarizers are offered on Ge and ZnSe substrates, in a choice of support rings. Anti-reflection coatings and a high specification of optical flatness and parallelism make these polarizers well suited for imaging applications.

Opto-Physics Infrared Polarizers

These polarizers are offered from stock on BaF2, CaF2, KRS-5, and ZnSe substrates, in standard 25 or 50 mm support rings. Manufactured at 2500 lines/mm, they provide acceptable polarization performance at an economical price.

	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
CaF2	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
BaF2	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

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