

Product Overview

Microstructured optical components

Index

Page	Content
3	Positive Fresnel Lenses
5	Negative Fresnel Lenses
6	Fresnel Prisms
7	Fresnel Beamsplitter
8	Fresnel Cylindrical Lenses
9	Lenticulars
10	Corner Cube Retro-Reflectors
11	Surface Relief Diffusive Microstructures

The following product lists provide an overview on our freely available standard products.

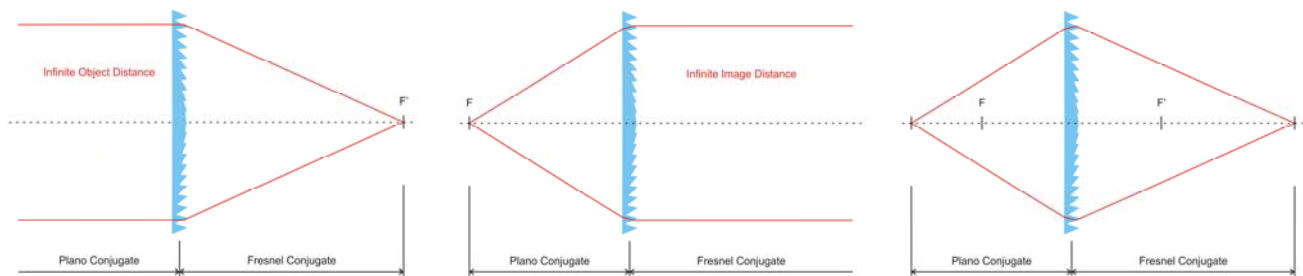
Notes:

- Focal lengths listed apply to 546nm for PMMA (tolerance $\pm 5\%$)
- The standard material used is PMMA (refractive index = 1.49; relative dispersion = 58). Other materials are available.
- The thickness mentioned is our standard thickness. Other thicknesses ($\geq 0,8\text{mm}$) are possible.
- Outside diameter / size may be up to 5 – 20 mm beyond clear aperture. Other dimensions or special trimmings can be realized upon request.
- To determine the number of lines per mm, use 1/facet spacing.
- Special designs possible on request.

Positive Fresnel Lenses

Positive Fresnel lenses can be designed as a collimator, collector or with finite conjugates.

They are usually corrected for spherical aberration and can be aluminized on the structured side for use as a mirror.



Part Number	Focal Length	Facet Spacing	Fresnel Conjugate	Plano Conjugate	Clear Aperture	Thickness
SC 230	6.3 mm	0.102 mm	6.3 mm	infinity	10.0 mm	1.8 mm
SC 245	10.8 mm	0.125 mm	10.8 mm	infinity	6.4 mm	1.8 mm
SC 926	16.1 mm	0.102 mm	infinity	16.1 mm	7.0 mm	1.8 mm
SC 231	16.3 mm	0.127 mm	infinity	16.3 mm	18.0 mm	1.8 mm
SC 259	18.3 mm	0.254 mm	infinity	18.3 mm	17.3 mm	1.8 mm
SC 253	24.0 mm	0.475 mm	infinity	24.0 mm	23.3 mm	1.8 mm
SC 256	26.6 mm	0.508 mm	infinity	26.6 mm	59.7 mm	1.8 mm
SC 258	28.7 mm	0.635 mm	infinity	28.7 mm	45.0 mm	1.8 mm
SC 234	38.0 mm	0.381 mm	38.0 mm	infinity	56.3 mm	1.8 mm
SC 244	40.8 mm	0.381 mm	40.8 mm	infinity	86.9 mm	1.8 mm
SC 297	42.4 mm	0.076 mm	42.4 mm	infinity	29.8 mm	1.8 mm
SC 252	48.3 mm	0.076 mm	48.3 mm	infinity	63.3 mm	1.8 mm
SC 235	50.8 mm	0.229 mm	infinity	50.8 mm	77.0 mm	1.8 mm
SC 241	51.0 mm	0.762 mm	51.0 mm	infinity	109.8 mm	1.8 mm
SC 211	57.8 mm	0.076 mm	263.9 mm	74.0 mm	88.4 mm	1.8 mm
SC 277	68.5 mm	0.076 mm	infinity	68.5 mm	88.9 mm	1.8 mm
SC 250	69.6 mm	0.279 mm	infinity	69.6 mm	75.4 mm	1.8 mm
SC 236	72.5 mm	0.279 mm	infinity	72.5 mm	101.3 mm	1.8 mm
SC 251	76.3 mm	0.127 mm	76.3 mm	infinity	82.1 mm	1.8 mm
SC 237	77.5 mm	0.254 mm	infinity	77.5 mm	59.4 mm	1.8 mm
SC 949	97.1 mm	0.254 mm	infinity	97.1 mm	201.8 mm	1.8 mm

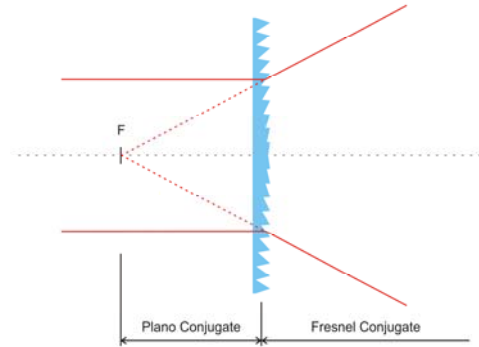
Positive Fresnel Lenses

Part Number	Focal Length	Facet Spacing	Fresnel Conjugate	Plano Conjugate	Clear Aperture	Thickness
SC 242	101.1 mm	0.305 mm	101.1 mm	infinity	85.8 mm	1.8 mm
SC 239	102.8 mm	0.508 mm	infinity	102.8 mm	133.9 mm	1.8 mm
SC 228	111.8 mm	0.508 mm	infinity	111.8 mm	164.0 mm	1.8 mm
SC 255	128.3 mm	0.254 mm	infinity	128.3 mm	126.7 mm	1.8 mm
SC 948	129.1 mm	0.350 mm	infinity	129.1 mm	180.5 mm	1.8 mm
SC 209	137.8 mm	0.254 mm	infinity	137.8 mm	151.0 mm	1.8 mm
SC 248	151.7 mm	0.127 mm	151.7 mm	infinity	152.9 mm	1.8 mm
SC 249	152.0 mm	0.381 mm	152.0 mm	infinity	205.4 mm	1.8 mm
SC 223	152.8 mm	0.254 mm	infinity	152.8 mm	202.4 mm	1.8 mm
SC 246	203.0 mm	0.457 mm	infinity	203.0 mm	228.9 mm	1.8 mm
SC 950	219.0 mm	0.302 mm	infinity	219.0 mm	223.3 mm	1.8 mm
SC 210	225.5 mm	0.178 mm	2007.0 mm	254.0 mm	257.6 mm	1.8 mm
SC 264	234.7 mm	0.508 mm	infinity	234.7 mm	253.1 mm	1.8 mm
SC 917	239.6 mm	0.152 mm	infinity	239.6 mm	386.4 mm	1.8 mm
SC 921	253.6 mm	0.254 mm	infinity	253.6 mm	179.0 x 128.4 mm ²	1.8 mm
SC 221	254.1 mm	0.508 mm	infinity	254.1 mm	255.8 mm	1.8 mm
SC 928	255.3 mm	0.152 mm	infinity	255.3 mm	386.6 mm	1.8 mm
SC 208	279.3 mm	0.508 mm	infinity	279.3 mm	405.8 mm	1.8 mm
SC 205	282.8 mm	0.076 mm	610.0 mm	531.5 mm	330.4 mm	1.8 mm
SC 268	304.6 mm	0.508 mm	infinity	304.6 mm	291.9 mm	1.8 mm
SC 240	317.0 mm	0.205 mm	infinity	317.0 mm	382.4 mm	1.8 mm
SC 934	336.5 mm	0.152 mm	infinity	336.5 mm	386.0 mm	1.8 mm
SC 265	385.6 mm	0.508 mm	626.9 mm	1013.6 mm	324.0 mm	1.8 mm
SC 2045	391.5 mm	0.508 mm	6096.0 mm	419.0 mm	452.9 mm	1.8 mm
SC 229	400.0 mm	0.508 mm	infinity	400.0 mm	386.0 mm	1.8 mm
SC 903	500.5 mm	0.508 mm	1500.0 mm	750.0 mm	657.0 mm	2.5 mm
SC 943	502.1 mm	0.100 mm	infinity	502.1 mm	549.7 mm	2.5 mm
SC 273	505.5 mm	0.203 mm	749.0 mm	1575.0 mm	405.9 mm	1.8 mm
SC 214	607.8 mm	0.508 mm	infinity	607.8 mm	460.9 mm	1.8 mm
SC 922	698.6 mm	0.508 mm	infinity	698.6 mm	615.7 mm	2.5 mm
SC 213-600	763.4 mm	0.508 mm	infinity	763.4 mm	600.0 x 590.0 mm ²	2.5 mm
SC 2135	764.0 mm	0.508 mm	infinity	764.0 mm	437.3 mm	2.5 mm

Negative Fresnel Lenses

A negative Fresnel lens is the opposite of a positive Fresnel lens with diverging light rays.

It can be aluminized on the structured side for use as a mirror.

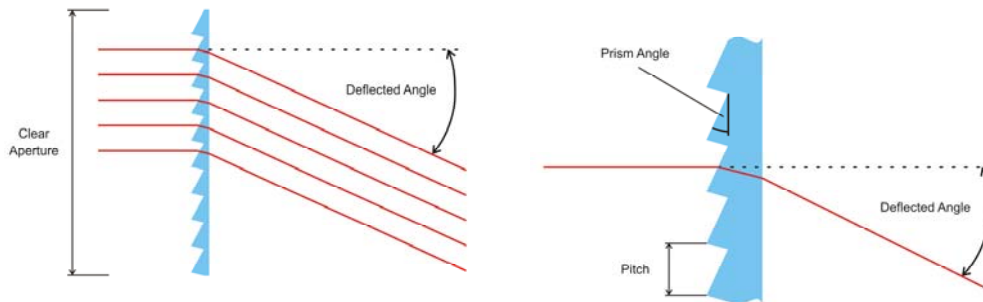


Part Number	Focal Length	Facet Spacing	Fresnel Conjugate	Plano Conjugate	Clear Aperture	Thickness
SC 259 neg.	-18.3 mm	0.254 mm	infinity	-18.3 mm	16.6 mm	1.8 mm
SC 239 neg.	-102.8 mm	0.508 mm	infinity	-102.8 mm	139.4 mm	1.8 mm
SC 902 neg.	-129.6 mm	0.254 mm	infinity	-129.6 mm	230.1 mm	1.8 mm
DC 1100L neg.	-185.8 mm	0.508 mm	infinity	-185.8 mm	269.0 mm	1.8 mm
DC 427L neg.	-205.7 mm	0.508 mm	infinity	-205.7 mm	302.0 mm	1.8 mm
DC 434U neg.	-255.3 mm	0.508 mm	infinity	-255.3 mm	302.0 mm	1.8 mm
SC 973 neg.	-508.0 mm	0.508 mm	infinity	-508.0 mm	408.7 mm	1.8 mm
SC 2135 neg.	-764.0 mm	0.508 mm	infinity	-764.0 mm	436.3 mm	1.8 mm

Fresnel Prisms

A Fresnel prism has a linear structure with a constant prism angle.

It deflects collimated light with a constant deflection angle.

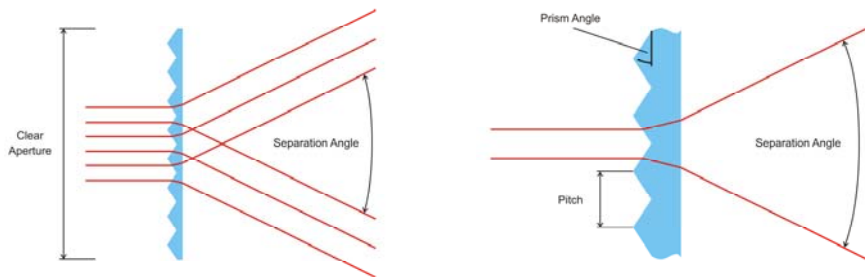


Part Number	Prism Angle	Deflected Angle	Facet Spacing	Clear Aperture	Prism Length	Thickness
PR 727	11°	5°	0.508 mm	303.7 x 164.4 mm ²	303.7 mm	1.8 mm
PR 709	20°	10°	1.016 mm	216.6 x 216.6 mm ²	216.6 mm	1.8 mm
PR 723	24°	12°	0.152 mm	165.2 x 165.2 mm ²	165.2 mm	1.8 mm
PR 675	30°	15°	0.330 mm	456.5 x 374.0 mm ²	456.5 mm	2.5 mm
PR 729	31°	16°	0.152 mm	241.7 x 240.3 mm ²	241.7 mm	1.8 mm
PR 712	41°	23°	0.127 mm	147.6 x 146.7 mm ²	147.6 mm	1.8 mm

Fresnel Beamsplitter

A Fresnel beamsplitter has a linear structure with two facets of opposite slope angles.

The light is split into two beams and the included angle between the two beams is referred to as the separation angle.

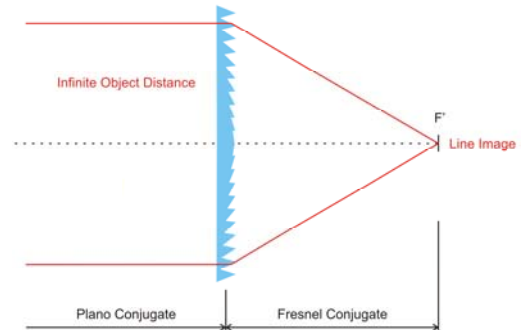


Part Number	Prism Angle	Separation Angle	Facet Spacing	Clear Aperture	Prism Length	Thickness
PR 775	20°	20°	0.508 mm	369.4 x 367.0 mm ²	369.4 mm	2.5 mm
PR 765	30°	32°	2.000 mm	164.9 x 164.7 mm ²	164.9 mm	1.8 mm
PR 703	39°	42°	0.508 mm	308.6 x 308.6 mm ²	308.6 mm	1.8 mm
PR 757	45°	51°	1.016 mm	256.4 x 206.9 mm ²	256.4 mm	1.8 mm
PR 713	45°	51°	0.305 mm	340.1 x 269.2 mm ²	340.1 mm	1.8 mm

Fresnel Cylindrical Lenses

A Fresnel cylindrical lens has a linear fresnel structure.

It collects light in one direction and the result is a line image instead of a point image.

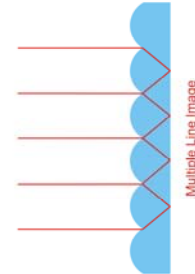


Part Number	Focal Length	Facet Spacing	Fresnel Conjugate	Plano Conjugate	Clear Aperture	Thickness
CY 575	12.7 mm	0.127 mm	12.7 mm	infinity	311.7 x 13.2 mm ²	1.8 mm
CY 585	37.6 mm	0.254 mm	infinity	37.6 mm	206.7 x 42.6 mm ²	1.8 mm
CY 581	76.2 mm	0.254 mm	infinity	76.2 mm	364.5 x 77.4 mm ²	1.8 mm
CY 570	138.0 mm	0.254 mm	390.5 mm	211.7 mm	142.6 x 117.0 mm ²	1.8 mm

Lenticulars

Lenticulars have linear structures where every groove has a small radius creating multiple line images.

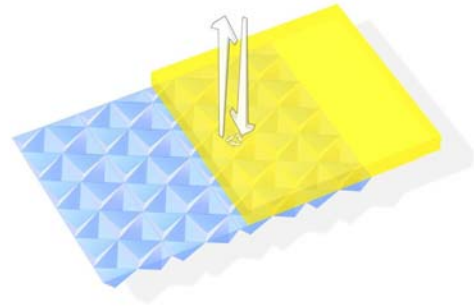
They are primarily used for projection screens and three dimensional images.



Part Number	Radius	Facet Spacing	Clear Aperture	Lenticular Length	Thickness
LN 760	0.077 mm	0.127mm	61.5 x 61.5 mm ²	61.5 mm	1.8 mm
LN 611	0.157 mm	0.187 mm	99.2 x 99.2 mm ²	99.2 mm	1.8 mm
LN 615	0.380 mm	0.763 mm	Ø 89.4 mm	-	1.8 mm
LN 629	0.483 mm	0.381 mm	114.3 x 114.3 mm ²	114.3 mm	1.8 mm
LN 663	0.544 mm	0.508 mm	512.7 x 422.1 mm ²	512.7 mm	2.5 mm
LN 692	0.762 mm	0.162 mm	230.2 x 180.0 mm ²	180.0 mm	1.8 mm
LN 636	0.762 mm	0.186 mm	260.2 x 259.2 mm ²	259.2 mm	1.8 mm
LN 669	0.762 mm	0.386 mm	259.0 x 258.3 mm ²	258.3 mm	1.8 mm
LN 676	1.118 mm	0.559 mm	432.0 x 429.1 mm ²	429.1 mm	2.5 mm
LN 665	3.175 mm	2.794 mm	174.2 x 121.9 mm ²	174.2 mm	1.8 mm

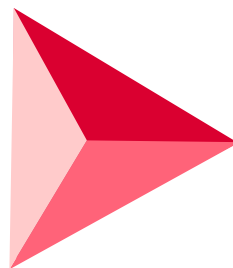
Corner Cube Retro-Reflectors

Corner cube retro-reflectors are very small, efficient prism corner reflectors that send back light in nearly the same direction from which it came.



Part Number	Cube Size ,A'	Clear Aperture	Thickness
OT 853	0.864 mm per side	225.5 mm diameter	1.8 mm
OT 867	0.254 mm per side	284.5 mm triangle	1.8 mm

|-----A-----|



Surface Relief Diffusive Microstructures

Surface relief diffusive microstructures (SRDM) are used for distributing light in a defined angle range. They homogenize irregular light distributions as well as local intensity peaks.

There is also the possibility to apply those diffusive microstructures directly into the plano side of all our plastic optical components.

Part Number	Peak Gain	Symmetric Half Angle	Clear Aperture	Thickness	Transmission ¹
BP 321	200.3	± 2.8°	Ø 400.0 mm	1.8 mm	91 %
BP 336	67.5	± 3.9°	Ø 300.0 mm	1.8 mm	88 %
BP 302	118.6	± 4.0°	Ø 125.0 mm	1.8 mm	92 %
SN 1333	89.5	± 4.75°	232.0 x 232.0 mm ²	1.8 mm	92 %
BP 331	44.3	± 5.0°	Ø 300.0 mm	1.8 mm	87 %
BP 304	33.5	± 7.4°	Ø 200.0mm	1.8 mm	89 %
SN 1334	32.5	± 7.8°	231.0 x 231.0 mm ²	1.8 mm	92 %

¹ Average in the visible spectrum of light

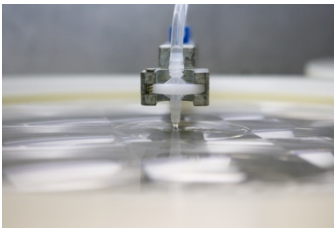
Surface Enhancements

at a glance



Metallization

- vacuum deposition of substrates up to 19" in diameter
- standard process: aluminum + top coat lacquer on the structured surface
- customization possible (adhesion promoter, other metallization materials, protective layers)



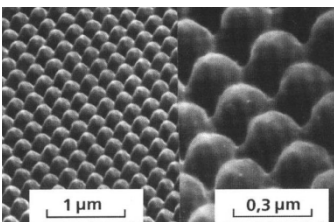
Hard Coatings

- spin-coating process on plano surfaces
- use of UV-curing or thermal curing lacquers
- even layer thickness on flat substrates up to 19" in diameter
- resistant according to DIN 52347



Interference Layers

- physical vapor deposition equipment with calotte system (Ø 1100 mm)
- individual substrate fixing
- standard process: BBAR coating for the visible light range (VIS)
- customization of the layer design is possible



Anti-Reflective Nanostructures

- periodical Motheye-Structure
- stochastic anti-reflective nanostructure PlasmAR®
- on plano and microstructured surfaces
- applicable to different polymers



Printing

- silk-screen printing (max. dimension 490 mm x 310 mm)
- pad-printing – primarily used for printing logos (max. dimension Ø 55 mm)

Produkt Overview

Engineered to Save Energy™



ORAFOL Fresnel Optics GmbH

Flurstedter Marktweg 13, 99510 Apolda, Germany
Tel: +49 (0) 3644 5011-0 • Fax: +49 (0) 3644 5011-50
info@fresnel-optics.de • www.fresnel-optics.de