

Laser Grade Optical Flats

- Fused Silica - BK7, Pyrex, Zerodur™
- Borosilicate Glass for low expansion applications
- Single or double surface polish
- Super-polish minimizes subsurface damage for high power laser use
- Standard diameters from 10mm to 152.4mm



Laser components require highly polished substrates as well as high performance coatings. Scattering of laser light, or worse, laser damage can occur if the substrate is made of inferior material or if it is inadequately polished. Although our coatings may be applied to a wide variety of substrates, we offer a popular selection of laser grade optical substrates.

Ultra-Violet grade synthetic fused silica provides the best Ultra-Violet and visible transmission characteristics and is a highly durable material. It is recommended for short wavelength applications. Laser grade BK7 optical glass is the most commonly used material for laser mirrors and windows. For applications where low thermal expansion is important we offer a range of pyrex and Zerodur™ substrates also.

Our standard substrates have a laser polish on one surface and a commercial polish or ground on the back surface. We also offer “window” substrates which are laser polished on both surfaces. These should be selected for transmitting applications such as beamsplitters.

The polishing techniques we use produce a super polish with a surface roughness of 5 to 10 Angstroms and very low scatter. Material of 6 to 7 times grit diameter is removed during each grind and polish process to ensure very little sub-surface fracturing. This results in a substrate which is capable of withstanding high energy laser radiation.

Specifications & Tolerances

Surface flatness:	1λ , $\lambda/4$, $\lambda/10$, $\lambda/20$
Thickness:	<50.8mm ± 0.1 mm, >50.8mm ± 0.2 mm
Surface quality:	10-5, 20-10
Bevel:	0.2mm x 45° typical
Diameter:	<50.8mm +0, -0.1mm, ≥ 50.8 mm +0, -0.2mm
Parallelism:	≤ 3 arcmin
Material:	Synthetic Fused Silica, BK7, Pyrex
Clear aperture:	>90% diameter

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

As well as the substrates offered here we can provide a wide selection of shapes and sizes, with plano, spherical or cylindrical surfaces, so please call and ask for the exact substrate you need.

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com
WEB
www.optosigma.com

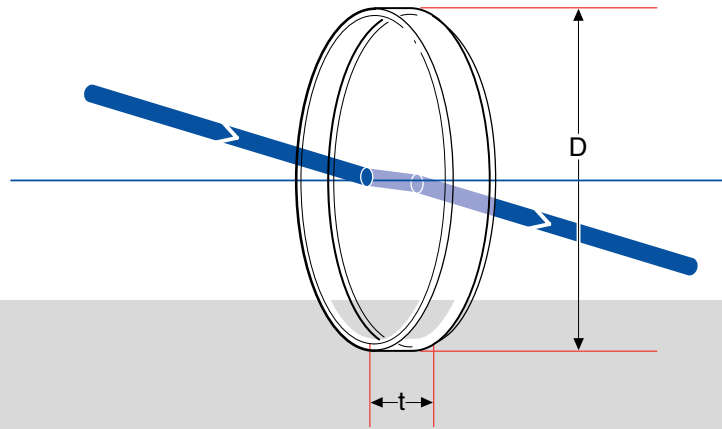
 **OptoSigma®**

OPTICAL COMPONENTS

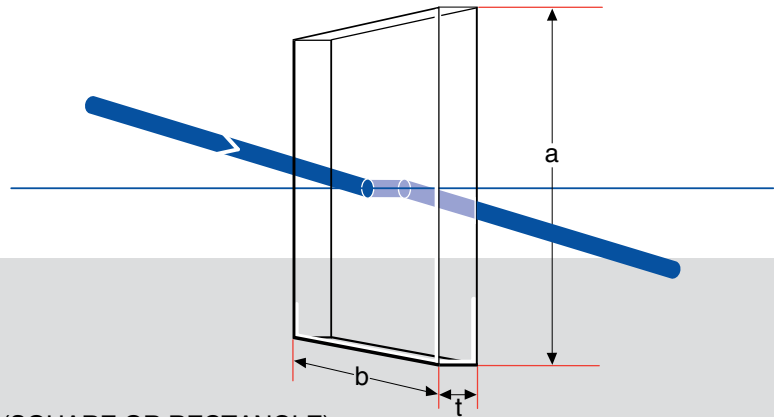
Spherical Lenses
 Cylindrical Lenses
 Lens Kits
 Achromatic Doublets
 Multi-Element
 Micro Optics
 Mirrors
 Prisms

Substrates & Windows

Beamsplitters
 Polarizers
 Filter & Apertures



SUBSTRATE



OPTICAL FLATS (SQUARE OR RECTANGLE)

Optical Flats-Round

Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Rear Surface	Price	PART NUMBER
10.0	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-0523
10.0	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-0525
10.0	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 30.00	047-0710
10.0	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 30.00	048-0312
12.7	5.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 32.00	047-0535
12.7	5.0	SFS	$\lambda/10$	10 - 5	Polished	\$ 46.00	048-0115
15.0	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 42.00	047-0536
15.0	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 42.00	047-0537
15.0	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 30.00	047-0715
15.0	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 42.00	048-0322
19.1	5.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 47.00	047-0545
20.0	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 22.00	047-0548
20.0	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 18.00	047-0342
20.0	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 22.00	047-0549
20.0	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 42.00	047-0720
20.0	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 57.00	048-0342
25.0	5.0	BK7	λ	10 - 5	Polished	\$ 26.00	047-0170
25.0	5.0	BK7	$\lambda/4$	10 - 5	Polished	\$ 30.00	047-0350

ORDERING
 &
 TECHNICAL SUPPORT
 (949) 851-5881
 FAX (949) 851-5058
 E-MAIL
sales@optosigma.com
 WEB
www.optosigma.com



Optical Flats-Round (continued)

Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Rear Surface	Price	PART NUMBER
25.0	5.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 32.00	047-0550
25.0	5.0	BK7	$\lambda/20$	10 - 5	Polished	\$ 50.00	047-0725
25.0	6.0	SFS	$\lambda/20$	20 - 10	Polished	\$ 70.00	048-0352
25.4	5.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 58.00	047-0565
25.4	5.0	SFS	$\lambda/10$	20 - 10	Polished	\$ 67.00	048-0145
30.0	5.0	BK7	λ	10 - 5	Polished	\$ 32.00	047-0190
30.0	5.0	BK7	$\lambda/4$	10 - 5	Polished	\$ 37.00	047-0370
30.0	5.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 46.00	047-0570
30.0	5.0	BK7	$\lambda/20$	10 - 5	Polished	\$ 75.00	047-0730
30.0	6.0	SFS	$\lambda/20$	20 - 10	Polished	\$ 110.00	048-0372
38.1	6.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 74.00	047-0585
40.0	6.0	BK7	λ	10 - 5	Polished	\$ 45.00	047-0230
40.0	6.0	BK7	$\lambda/4$	10 - 5	Polished	\$ 52.00	047-0390
40.0	6.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 55.00	047-0590
40.0	6.0	BK7	$\lambda/20$	10 - 5	Polished	\$ 120.00	047-0735
40.0	8.0	SFS	$\lambda/20$	20 - 10	Polished	\$ 190.00	048-0392
50.0	8.0	BK7	λ	10 - 5	Polished	\$ 50.00	047-0240
50.0	8.0	BK7	$\lambda/4$	10 - 5	Polished	\$ 55.00	047-0440
50.0	8.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 90.00	047-0660
50.0	8.0	BK7	$\lambda/20$	10 - 5	Polished	\$ 180.00	047-0740
50.0	10.0	SFS	$\lambda/20$	20 - 10	Polished	\$ 260.00	048-0442
50.8	8.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 89.00	047-0675
50.8	8.0	SFS	$\lambda/10$	20 - 10	Polished	\$ 121.00	048-0195
60.0	10.0	PYREX	λ	10 - 5	Polished	\$ 65.00	049-0150
60.0	10.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 100.00	049-0179
60.0	10.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 150.00	049-0558
60.0	10.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 300.00	049-0790
76.2	12.0	BK7	$\lambda/10$	10 - 5	Polished	\$ 58.00	047-0685
80.0	12.0	PYREX	λ	10 - 5	Polished	\$ 90.00	049-0155
80.0	12.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 120.00	049-0220
80.0	12.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 155.00	049-0580
80.0	12.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 400.00	049-0792
100.0	15.0	PYREX	λ	10 - 5	Polished	\$ 115.00	049-0160
100.0	15.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 165.00	049-0230
100.0	15.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 210.00	049-0590
130.0	18.0	PYREX	λ	10 - 5	Polished	\$ 185.00	049-0165
130.0	18.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 325.00	049-0260
130.0	18.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 440.00	049-0678
150.0	20.0	PYREX	λ	10 - 5	Polished	\$ 250.00	049-0170
150.0	20.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 475.00	049-0270
150.0	20.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 495.00	049-0680

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com

Optical Flats-Square (continued)

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

	Size, a x b (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Rear Surface	Price	PART NUMBER
	10 x 10	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 20.00	047-1330
	10 x 10	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 20.00	047-1332
	10 x 10	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 40.00	047-1392
	10 x 10	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 52.00	048-1101
	15 x 15	3.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 25.00	047-1220
	15 x 15	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-1340
	15 x 15	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 25.00	047-1222
	15 x 15	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-1342
	15 x 15	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 55.00	047-1393
	15 x 15	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 65.00	048-1102
	20 x 20	3.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 30.00	047-1228
	20 x 20	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 40.00	047-1348
	20 x 20	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 30.00	047-1230
	20 x 20	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 40.00	047-1350
	20 x 20	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 75.00	047-1394
	20 x 20	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 95.00	048-1103
	25 x 25	5.0	BK7	λ	10 - 5	Ground	\$ 30.00	047-1140
	25 x 25	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 45.00	047-1240
	25 x 25	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 55.00	047-1360
	25 x 25	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 105.00	047-1395
	25 x 25	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 125.00	048-1115
	30 x 30	5.0	BK7	λ	10 - 5	Ground	\$ 40.00	047-1150
	30 x 30	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 60.00	047-1250
	30 x 30	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 70.00	047-1370
	30 x 30	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 145.00	047-1397
	30 x 30	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 200.00	048-1125
	40 x 40	6.0	PYREX	λ	10 - 5	Polished	\$ 60.00	049-1510
	40 x 40	6.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 65.00	049-1550
	40 x 40	6.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 90.00	049-1660
	40 x 40	6.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 210.00	049-1710
	50 x 50	8.0	PYREX	λ	10 - 5	Polished	\$ 70.00	049-1511
	50 x 50	8.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 105.00	049-1560
	50 x 50	8.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 125.00	049-1670
	50 x 50	8.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 275.00	049-1715
	60 x 60	10.0	PYREX	λ	10 - 5	Polished	\$ 95.00	049-1513
	60 x 60	10.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 145.00	049-1562
	60 x 60	10.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 225.00	049-1675
	60 x 60	10.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 450.00	049-1720
	80 x 80	12.0	PYREX	λ	10 - 5	Polished	\$ 149.00	049-1515
	80 x 80	12.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 195.00	049-1565
	80 x 80	12.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 285.00	049-1677
	80 x 80	12.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 600.00	049-1725
	100 x 100	15.0	PYREX	λ	10 - 5	Polished	\$ 185.00	049-1518
	100 x 100	15.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 305.00	049-1570
	100 x 100	15.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 350.00	049-1680
	130 x 130	18.0	PYREX	λ	10 - 5	Polished	\$ 260.00	049-1520
	130 x 130	18.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 385.00	049-1572
	130 x 130	18.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 600.00	049-1685
	150 x 150	20.0	PYREX	λ	10 - 5	Polished	\$ 385.00	049-1522
	150 x 150	20.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 665.00	049-1575
	150 x 150	20.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 935.00	049-1690

ORDERING
&

TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com

Optical Flats-Rectangle

Size, a x b (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Rear Surface	Price	PART NUMBER
10 x 15	3.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 25.00	047-1721
10 x 15	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-1730
10 x 15	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 25.00	047-1720
10 x 15	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 26.00	047-1731
10 x 15	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 55.00	047-1740
10 x 15	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 65.00	048-1222
15 x 25	3.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 30.00	047-1722
15 x 25	3.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 40.00	047-1732
15 x 25	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 30.00	047-1723
15 x 25	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 40.00	047-1733
15 x 25	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 75.00	047-1741
15 x 25	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 90.00	048-1225
20 x 30	5.0	BK7	λ	10 - 5	Ground	\$ 30.00	047-1710
20 x 30	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 45.00	047-1724
20 x 30	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 55.00	047-1734
20 x 30	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 105.00	047-1742
20 x 30	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 120.00	048-1226
25 x 35	5.0	BK7	λ	10 - 5	Ground	\$ 42.00	047-1711
25 x 35	5.0	BK7	$\lambda/4$	10 - 5	Ground	\$ 65.00	047-1725
25 x 35	5.0	BK7	$\lambda/10$	10 - 5	Ground	\$ 75.00	047-1735
25 x 35	5.0	BK7	$\lambda/20$	10 - 5	Ground	\$ 150.00	047-1743
25 x 35	6.0	SFS	$\lambda/20$	20 - 10	Ground	\$ 200.00	048-1230
30 x 40	6.0	PYREX	λ	10 - 5	Polished	\$ 55.00	049-2485
30 x 40	6.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 90.00	049-2345
30 x 40	6.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 105.00	049-2458
30 x 40	6.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 220.00	049-2495
30 x 40	8.0	SFS	$\lambda/20$	20 - 10	Polished	\$ 260.00	048-1235
40 x 50	8.0	PYREX	λ	10 - 5	Polished	\$ 70.00	049-2486
40 x 50	8.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 105.00	049-2350
40 x 50	8.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 115.00	049-2460
40 x 50	8.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 255.00	049-2496
50 x 60	10.0	PYREX	λ	10 - 5	Polished	\$ 90.00	049-2487
50 x 60	10.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 135.00	049-2352
50 x 60	10.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 190.00	049-2462
50 x 60	10.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 375.00	049-2497
60 x 80	12.0	PYREX	λ	10 - 5	Polished	\$ 145.00	049-2488
60 x 80	12.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 190.00	049-2355
60 x 80	12.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 220.00	049-2465
60 x 80	12.0	PYREX	$\lambda/20$	10 - 5	Polished	\$ 435.00	049-2498
80 x 100	15.0	PYREX	λ	10 - 5	Polished	\$ 175.00	049-2489
80 x 100	15.0	PYREX	$\lambda/4$	10 - 5	Polished	\$ 270.00	049-2360
80 x 100	15.0	PYREX	$\lambda/10$	10 - 5	Polished	\$ 320.00	049-2470

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com



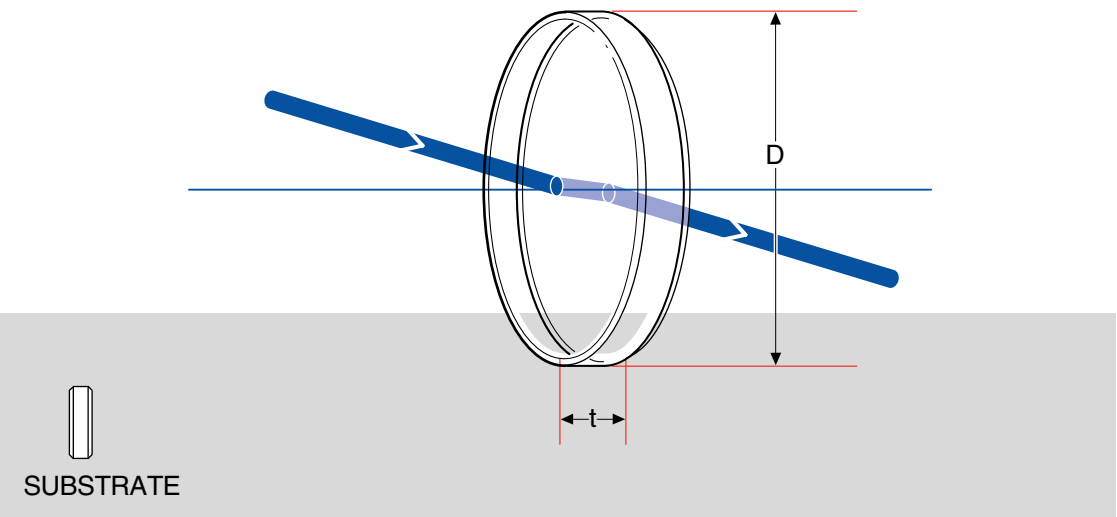
Low Scattering Substrates

- Low scattering substrates are precision polished on both surfaces
- Surface roughness is <2 angstroms.
- Available as parallel or wedged substrates.



Specifications & Tolerances

Dimensions: $\pm 0.2\text{mm}$ Thickness: $\pm 0.1\text{mm}$
 Clear aperture: 90% Wedged angle: ± 5 arcmin
 Material: Synthetic Fused Silica, UV Grade CaF₂ (CFU)



Low Scattering Substrates

Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Parallelism (arcsec)	Surface Quality	Price	PART NUMBER
25.4	5.0	SFS	$\lambda/10$	≤ 5	10 - 5	\$ 205.00	048-2640
30.0	3.0	SFS	$\lambda/10$	≤ 5	10 - 5	\$ 235.00	048-2650
30.0	5.0	SFS	$\lambda/10$	≤ 5	10 - 5	\$ 250.00	048-2652
50.0	5.0	SFS	$\lambda/10$	≤ 5	10 - 5	\$ 425.00	048-2670
25.4	5.0	CFU	$\lambda/10$	≤ 5	20 - 10	\$ 400.00	049-4420
30.0	5.0	CFU	$\lambda/10$	≤ 5	20 - 10	\$ 440.00	049-4425

Low Scattering Wedged Substrates

Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Wedge Degree	Surface Quality	Price	PART NUMBER
30.0	5.0	SFS	$\lambda/10$	1	10 - 5	\$ 425.00	048-2680
50.0	8.0	SFS	$\lambda/10$	1	10 - 5	\$ 895.00	048-2685
30.0	5.0	CFU	$\lambda/10$	1	20-10	\$ 655.00	049-4430

ORDERING
 &
 TECHNICAL SUPPORT
 (949) 851-5881
 FAX (949) 851-5058
 E-MAIL
 sales@optosigma.com
 WEB
 www.optosigma.com



Concave Mirror Substrates

Radius of Curvature, r (mm)	Diameter, D (mm)	Edge, te (mm)	Center, tc (mm)	Price	PART NUMBER
10	15.0	7.0	3.6	\$ 95.00	047-5110
20	15.0	5.0	3.5	\$ 70.00	047-5112
30	15.0	5.0	4.0	\$ 72.00	047-5114
40	15.0	5.0	4.3	\$ 72.00	047-5115
50	15.0	5.0	4.4	\$ 70.00	047-5116
100	15.0	5.0	4.7	\$ 65.00	047-5121
250	15.0	5.0	4.9	\$ 60.00	047-5125
500	15.0	5.0	4.9	\$ 60.00	047-5128
1000	15.0	5.0	5.0	\$ 60.00	047-5132
2000	15.0	5.0	5.0	\$ 65.00	047-5134
4000	15.0	5.0	5.0	\$ 65.00	047-5137
5000	15.0	5.0	5.0	\$ 65.00	047-5138
10000	15.0	5.0	5.0	\$ 65.00	047-5139
20000	15.0	5.0	5.0	\$ 65.00	047-5140
30000	15.0	5.0	5.0	\$ 65.00	047-5141
50	25.0	7.0	5.4	\$ 90.00	047-5216
100	25.0	5.0	4.2	\$ 85.00	047-5221
250	25.0	5.0	4.6	\$ 85.00	047-5225
500	25.0	5.0	4.8	\$ 80.00	047-5228
1000	25.0	5.0	4.9	\$ 80.00	047-5232
2000	25.0	5.0	4.9	\$ 80.00	047-5234
4000	25.0	5.0	5.0	\$ 80.00	047-5237
5000	25.0	5.0	5.0	\$ 80.00	047-5238
10000	25.0	5.0	5.0	\$ 80.00	047-5239
20000	25.0	5.0	5.0	\$ 80.00	047-5240
30000	25.0	5.0	5.0	\$ 80.00	047-5241
50	25.4	7.0	5.4	\$ 90.00	047-5316
100	25.4	5.0	4.2	\$ 85.00	047-5321
250	25.4	5.0	4.6	\$ 85.00	047-5325
500	25.4	5.0	4.8	\$ 80.00	047-5328
1000	25.4	5.0	4.9	\$ 80.00	047-5332
50	50.0	13.0	6.3	\$ 145.00	047-5416
100	50.0	10.0	6.8	\$ 130.00	047-5421
250	50.0	8.0	6.7	\$ 130.00	047-5425
500	50.0	8.0	7.4	\$ 130.00	047-5428
1000	50.0	8.0	7.7	\$ 130.00	047-5432
2000	50.0	8.0	7.8	\$ 130.00	047-5434
4000	50.0	8.0	7.9	\$ 130.00	047-5437
5000	50.0	8.0	7.9	\$ 130.00	047-5438
10000	50.0	8.0	8.0	\$ 130.00	047-5439
20000	50.0	8.0	8.0	\$ 130.00	047-5440
30000	50.0	8.0	8.0	\$ 130.00	047-5441
50	50.8	13.0	6.3	\$ 145.00	047-5516
100	50.8	10.0	6.8	\$ 130.00	047-5521
250	50.8	8.0	6.7	\$ 130.00	047-5525
500	50.8	8.0	7.4	\$ 130.00	047-5528
1000	50.8	8.0	7.7	\$ 130.00	047-5532

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

Specifications & Tolerances

Diameter:

+0 - 0.1mm

Thickness:

± 0.2mm

Surface Quality:

20-10

Radius:

± 2%

Material:

BK7

Clear Aperture:

80%

Surface Figure:

 $\lambda/2$ ORDERING
&
TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com

- Spherical Lenses
- Cylindrical Lenses
- Lens Kits
- Achromatic Doublets
- Multi-Element
- Micro Optics
- Mirrors
- Prisms

Substrates & Windows

- Beamsplitters
- Polarizers
- Filter & Apertures

Wedged Substrates

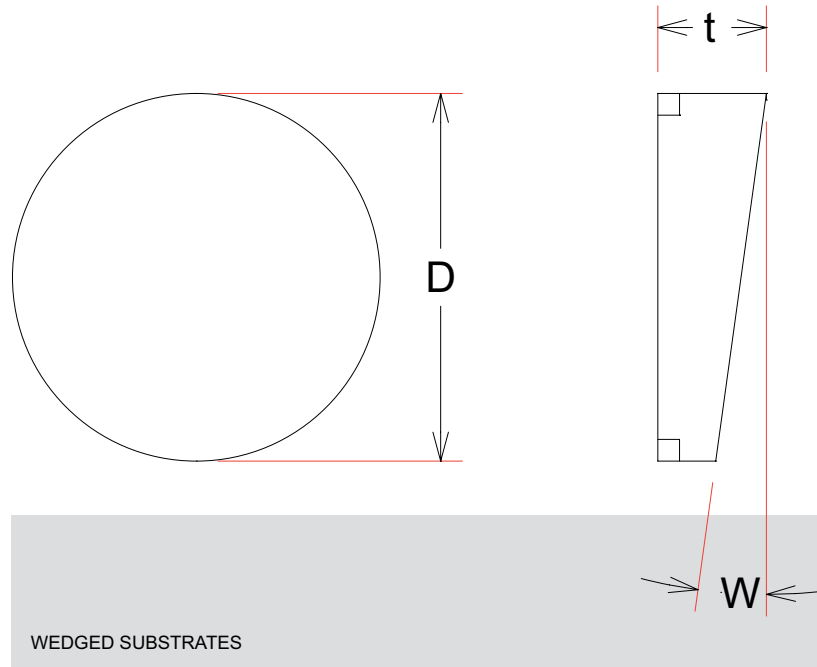
- BK7, Fused Silica and Excimer Grade Fused Silica
- Available in wedge angles 0.5, 1, 2 and 3 degrees
- Wedge angle used to reduce reflection from rear surface



Specifications & Tolerances

Diameter: $\leq 50\text{mm} +0, -0.1\text{mm}$
 $> 50\text{mm} +0, -0.2\text{mm}$
 Thickness: $\leq 50\text{mm} \pm 0.1\text{mm}$
 $> 50\text{mm} \pm 0.2\text{mm}$
 Wedge angle: $\leq \pm 5$ arcmin

Clear aperture: 90%
 Material: BK7, Synthetic Fused Silica,
 Synthetic Fused Silica for Excimer Laser
 Coating: Optional
 (see Anti-Reflection coatings)



Wedged Substrates

Wedge Angle (°)	Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Price	PART NUMBER
0.5	30.0	5.0	BK7	$\lambda/20$	10 - 5	\$ 190.00	047-4030
0.5	50.0	8.0	BK7	$\lambda/20$	10 - 5	\$ 450.00	047-4050
0.5	30.0	5.0	SFS	$\lambda/20$	20-10	\$ 380.00	048-4030
0.5	50.0	8.0	SFS	$\lambda/20$	20-10	\$ 695.00	048-4050
1.0	10.0	5.0	BK7	$\lambda/20$	10 - 5	\$ 90.00	047-4110
1.0	15.0	5.0	BK7	$\lambda/20$	10 - 5	\$ 100.00	047-4115
1.0	20.0	5.0	BK7	$\lambda/20$	10 - 5	\$ 100.00	047-4120
1.0	25.0	5.0	BK7	$\lambda/20$	10 - 5	\$ 135.00	047-4125

ORDERING & TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com



Wedged Substrates

Wedge Angle (°)	Diameter, D (mm)	Thickness, t (mm)	Material	Surface Flatness	Surface Quality	Price	PART NUMBER
1.0	30.0	5.0	BK7	λ/20	10 - 5	\$ 160.00	047-4130
1.0	50.0	8.0	BK7	λ/20	10 - 5	\$ 400.00	047-4150
1.0	60.0	10.0	BK7	λ/20	10 - 5	\$ 525.00	047-4160
1.0	80.0	12.0	BK7	λ/20	10 - 5	\$ 600.00	047-4180
1.0	100.0	15.0	BK7	λ/20	10 - 5	\$ 925.00	047-4185
1.0	10.0	5.0	SFS	λ/20	20-10	\$ 175.00	048-4110
1.0	15.0	5.0	SFS	λ/20	20-10	\$ 195.00	048-4115
1.0	20.0	5.0	SFS	λ/20	20-10	\$ 210.00	048-4120
1.0	25.0	5.0	SFS	λ/20	20-10	\$ 250.00	048-4125
1.0	30.0	5.0	SFS	λ/20	20-10	\$ 300.00	048-4130
1.0	50.0	8.0	SFS	λ/20	20-10	\$ 580.00	048-4150
1.0	60.0	10.0	SFS	λ/20	20-10	\$ 960.00	048-4160
1.0	80.0	12.0	SFS	λ/20	20-10	\$ 1,400.00	048-4180
1.0	100.0	15.0	SFS	λ/20	20-10	\$ 2,100.00	048-4185
2.0	30.0	5.0	BK7	λ/20	10 - 5	\$ 190.00	047-4190
2.0	50.0	8.0	BK7	λ/20	10 - 5	\$ 450.00	047-4195
2.0	30.0	5.0	SFS	λ/20	20-10	\$ 190.00	048-4190
2.0	50.0	8.0	SFS	λ/20	20-10	\$ 695.00	048-4195
3.0	30.0	7.0	BK7	λ/20	10 - 5	\$ 220.00	047-4210
3.0	50.0	10.0	BK7	λ/20	10 - 5	\$ 550.00	047-4215
3.0	30.0	7.0	SFS	λ/20	20-10	\$ 420.00	048-4210
3.0	50.0	10.0	SFS	λ/20	20-10	\$ 860.00	048-4215
0.5	30.0	5.0	BK7	λ/10	10 - 5	\$ 95.00	047-4330
0.5	50.0	8.0	BK7	λ/10	10 - 5	\$ 240.00	047-4350
0.5	30.0	5.0	SFS	λ/10	20-10	\$ 190.00	048-4330
0.5	50.0	8.0	SFS	λ/10	20-10	\$ 370.00	048-4350
1.0	10.0	5.0	BK7	λ/10	10 - 5	\$ 45.00	047-4410
1.0	15.0	5.0	BK7	λ/10	10 - 5	\$ 95.00	047-4415
1.0	20.0	5.0	BK7	λ/10	10 - 5	\$ 55.00	047-4420
1.0	25.0	5.0	BK7	λ/10	10 - 5	\$ 65.00	047-4425
1.0	30.0	5.0	BK7	λ/10	10 - 5	\$ 75.00	047-4430
1.0	50.0	8.0	BK7	λ/10	10 - 5	\$ 190.00	047-4450
1.0	60.0	10.0	BK7	λ/10	10 - 5	\$ 265.00	047-4460
1.0	80.0	12.0	BK7	λ/10	10 - 5	\$ 315.00	047-4480
1.0	100.0	15.0	BK7	λ/10	10 - 5	\$ 465.00	047-4485
1.0	10.0	5.0	SFS	λ/10	20-10	\$ 90.00	048-4410
1.0	15.0	5.0	SFS	λ/10	20-10	\$ 95.00	048-4415
1.0	20.0	5.0	SFS	λ/10	20-10	\$ 105.00	048-4420
1.0	25.0	5.0	SFS	λ/10	20-10	\$ 135.00	048-4425
1.0	30.0	5.0	SFS	λ/10	20-10	\$ 160.00	048-4430
1.0	50.0	8.0	SFS	λ/10	20-10	\$ 290.00	048-4450
1.0	60.0	10.0	SFS	λ/10	20-10	\$ 460.00	048-4460
1.0	80.0	12.0	SFS	λ/10	20-10	\$ 795.00	048-4480
1.0	100.0	15.0	SFS	λ/10	20-10	\$ 1,050.00	048-4485
2.0	30.0	5.0	BK7	λ/10	10 - 5	\$ 95.00	047-4490
2.0	50.0	8.0	BK7	λ/10	10 - 5	\$ 240.00	047-4495
2.0	30.0	5.0	SFS	λ/10	20-10	\$ 190.00	048-4490
2.0	50.0	8.0	SFS	λ/10	20-10	\$ 370.00	048-4495
3.0	30.0	7.0	BK7	λ/10	10 - 5	\$ 110.00	047-4510
3.0	50.0	10.0	BK7	λ/10	10 - 5	\$ 265.00	047-4515
3.0	30.0	7.0	SFS	λ/10	20-10	\$ 220.00	048-4510
3.0	50.0	10.0	SFS	λ/10	20-10	\$ 430.00	048-4515
1.0	30.0	5.0	SFSK	λ/10	20-10	\$ 195.00	048-4630
1.0	50.0	8.0	SFSK	λ/10	20-10	\$ 345.00	048-4650

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com
WEB
www.optosigma.com

- Spherical Lenses
- Cylindrical Lenses
- Lens Kits
- Achromatic Doublets
- Multi-Element
- Micro Optics
- Mirrors
- Prisms

Substrates & Windows

- Beamsplitters
- Polarizers
- Filter & Apertures

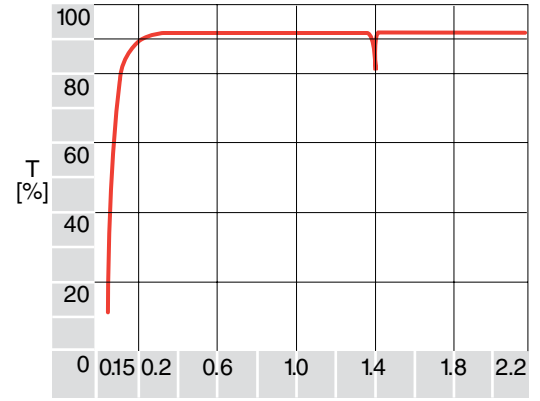
Synthetic fused silica is a manufactured product - and like all other manufactured products is available in a variety of quality levels. Most fused silica is used in the chemical business for containers, and in the electrical industry as insulators.

Fused Silica Windows

- Broad transmission spectrum
- Thermal stability
- Scratch resistant
- Round, square and rectangular sizes available



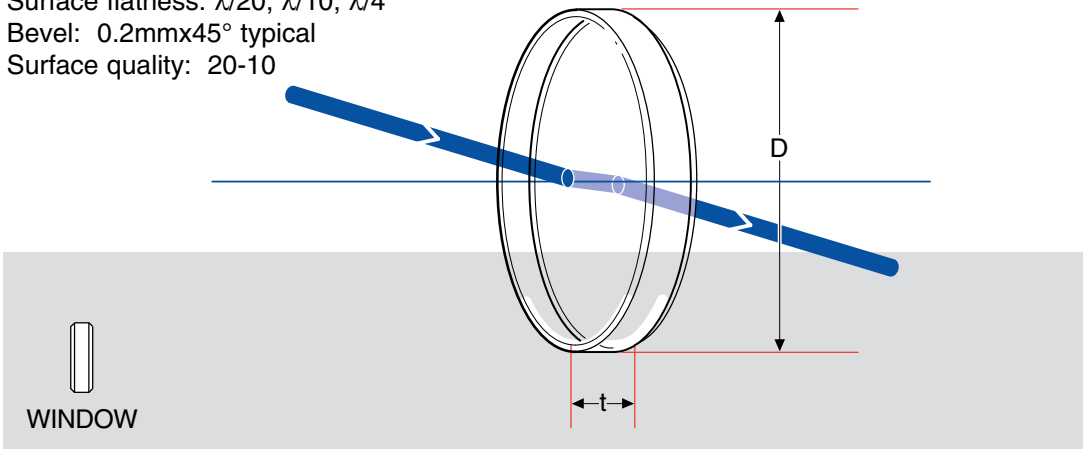
When the broadest transmission spectrum is required (from 185nm to over 2 microns) together with high durability, all for a reasonable cost, these windows are ideal. Fused silica is physically robust and resists chipping and scratches. The coefficient of thermal expansion is quite low, so these windows may be subjected to higher levels of thermal shock than glass or sapphire can withstand. Circular, square and rectangular shapes available.



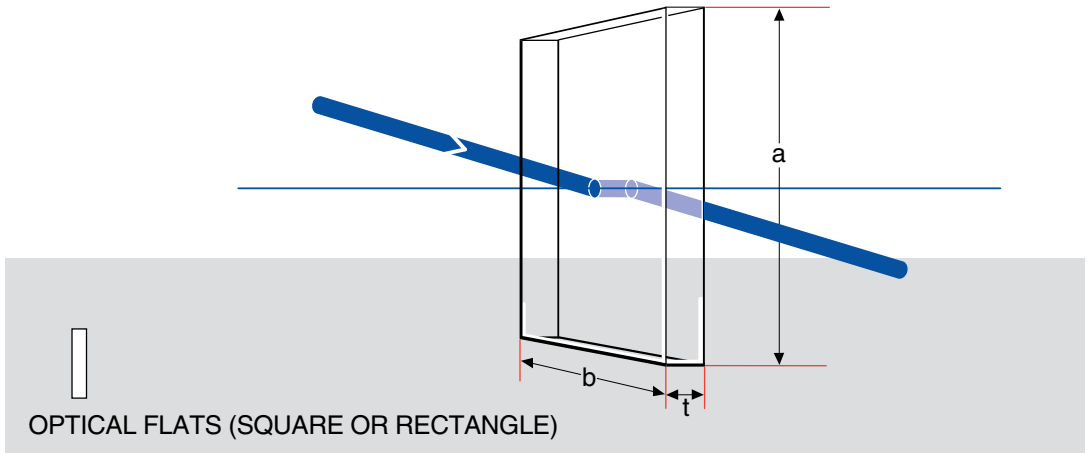
FUSED SILICA TRANSMITTANCE

Specifications & Tolerances

- Material: Ultra-Violet quality synthetic fused silica
- Refractive index: 1.46 @500nm
- Dimension: ≤50.8mm, ≤50x50 +0, -0.1mm
- ≥60mm, ≥60x60 +0, -0.2mm
- Thickness: ≤50.8mm, ≤50x50 ±0.1mm
- ≥60mm, ≥60x60 ±0.2mm
- Surface flatness: λ/20, λ/10, λ/4
- Bevel: 0.2mmx45° typical
- Surface quality: 20-10



WINDOW



OPTICAL FLATS (SQUARE OR RECTANGLE)

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com
WEB
www.optosigma.com



Fused Silica Windows, Square and Rectangular

Size, a x b (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
10 x 10	2.0	$\lambda/20$	$\lambda/20$	\$ 145.00	045-1711
10 x 10	3.0	$\lambda/20$	$\lambda/20$	\$ 155.00	045-1712
10 x 10	5.0	$\lambda/20$	$\lambda/20$	\$ 155.00	045-1714
15 x 15	3.0	$\lambda/20$	$\lambda/20$	\$ 170.00	045-1722
15 x 15	5.0	$\lambda/20$	$\lambda/20$	\$ 175.00	045-1724
20 x 20	3.0	$\lambda/20$	$\lambda/20$	\$ 195.00	045-1732
20 x 20	5.0	$\lambda/20$	$\lambda/20$	\$ 195.00	045-1734
25 x 25	5.0	$\lambda/20$	$\lambda/20$	\$ 240.00	045-1744
30 x 30	5.0	$\lambda/20$	$\lambda/20$	\$ 330.00	045-1764
40 x 40	6.0	$\lambda/20$	$\lambda/20$	\$ 420.00	045-1775
50 x 50	8.0	$\lambda/20$	$\lambda/20$	\$ 590.00	045-1777
10 x 10	1.0	$\lambda/10$	$\lambda/5$	\$ 80.00	045-1510
10 x 10	2.0	$\lambda/10$	$\lambda/5$	\$ 80.00	045-1511
10 x 10	3.0	$\lambda/10$	$\lambda/5$	\$ 80.00	045-1512
10 x 10	5.0	$\lambda/10$	$\lambda/5$	\$ 80.00	045-1514
10 x 20	5.0	$\lambda/10$	$\lambda/5$	\$ 58.00	045-0470
15 x 15	2.0	$\lambda/10$	$\lambda/5$	\$ 88.00	045-1521
15 x 15	3.0	$\lambda/10$	$\lambda/5$	\$ 88.00	045-1522
15 x 15	5.0	$\lambda/10$	$\lambda/5$	\$ 88.00	045-1524
15 x 30	5.0	$\lambda/10$	$\lambda/5$	\$ 95.00	045-0480
20 x 20	2.0	$\lambda/10$	$\lambda/5$	\$ 95.00	045-1531
20 x 20	3.0	$\lambda/10$	$\lambda/5$	\$ 95.00	045-1532
20 x 20	5.0	$\lambda/10$	$\lambda/5$	\$ 95.00	045-1534
20 x 35	5.0	$\lambda/10$	$\lambda/5$	\$ 152.00	045-0490
25 x 25	3.0	$\lambda/10$	$\lambda/5$	\$ 120.00	045-1542
25 x 25	5.0	$\lambda/10$	$\lambda/5$	\$ 121.00	045-0440
25 x 40	6.0	$\lambda/10$	$\lambda/5$	\$ 189.00	045-0550
30 x 30	3.0	$\lambda/10$	$\lambda/5$	\$ 165.00	045-1562
30 x 30	5.0	$\lambda/10$	$\lambda/5$	\$ 165.00	045-1564
30 x 50	8.0	$\lambda/10$	$\lambda/5$	\$ 299.00	045-0560
40 x 40	4.0	$\lambda/10$	$\lambda/5$	\$ 190.00	045-1573
40 x 40	6.0	$\lambda/10$	$\lambda/5$	\$ 210.00	045-1575
50 x 50	5.0	$\lambda/10$	$\lambda/5$	\$ 275.00	045-0447
50 x 50	8.0	$\lambda/10$	$\lambda/5$	\$ 289.00	045-0450
10 x 10	1.0	$\lambda/4$	$\lambda/5$	\$ 70.00	045-1610
10 x 10	2.0	$\lambda/4$	$\lambda/5$	\$ 70.00	045-1611
10 x 10	3.0	$\lambda/4$	$\lambda/5$	\$ 70.00	045-1612
10 x 10	5.0	$\lambda/4$	$\lambda/5$	\$ 70.00	045-1614
15 x 15	2.0	$\lambda/4$	$\lambda/5$	\$ 80.00	045-1621
15 x 15	3.0	$\lambda/4$	$\lambda/5$	\$ 80.00	045-1622
15 x 15	5.0	$\lambda/4$	$\lambda/5$	\$ 80.00	045-1624
20 x 20	2.0	$\lambda/4$	$\lambda/5$	\$ 90.00	045-1631
20 x 20	3.0	$\lambda/4$	$\lambda/5$	\$ 90.00	045-1632

For **broadband visible Anti-Reflection coatings** on both faces **append -A55** to part number and add \$30 for sizes up to 55mm, \$65 for up to 100mm and \$140 for larger sizes. Special shapes can be produced on request.

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com
WEB
www.optosigma.com

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

Fused Silica Windows, Square and Rectangular (continued)

Size, a x b (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
20 x 20	5.0	$\lambda/4$	≤ 5	\$ 90.00	045-1634
25 x 25	3.0	$\lambda/4$	≤ 5	\$ 110.00	045-1642
25 x 25	5.0	$\lambda/4$	≤ 5	\$ 110.00	045-1644
30 x 30	3.0	$\lambda/4$	≤ 5	\$ 150.00	045-1662
30 x 30	5.0	$\lambda/4$	≤ 5	\$ 150.00	045-1664
40 x 40	4.0	$\lambda/4$	≤ 5	\$ 180.00	045-1673
40 x 40	6.0	$\lambda/4$	≤ 5	\$ 190.00	045-1675
50 x 50	5.0	$\lambda/4$	≤ 5	\$ 245.00	045-1684
50 x 50	8.0	$\lambda/4$	≤ 5	\$ 265.00	045-1687

Fused Silica Windows, Circular

Size, D (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
10.0	2.0	$\lambda/20$	≤ 2	\$ 150.00	045-0810
10.0	3.0	$\lambda/20$	≤ 2	\$ 150.00	045-0811
10.0	5.0	$\lambda/20$	≤ 2	\$ 140.00	045-0813
15.0	3.0	$\lambda/20$	≤ 2	\$ 170.00	045-0820
15.0	5.0	$\lambda/20$	≤ 2	\$ 170.00	045-0825
20.0	3.0	$\lambda/20$	≤ 2	\$ 180.00	045-0830
30.0	5.0	$\lambda/20$	≤ 2	\$ 300.00	045-0840
40.0	6.0	$\lambda/20$	≤ 2	\$ 380.00	045-0850
50.0	8.0	$\lambda/20$	≤ 2	\$ 540.00	045-0860
60.0	10.0	$\lambda/20$	≤ 2	\$ 840.00	045-0870
80.0	12.0	$\lambda/20$	≤ 2	\$ 1,470.00	045-0880
100.0	15.0	$\lambda/20$	≤ 2	\$ 1,875.00	045-0890
10.0	1.0	$\lambda/10$	≤ 5	\$ 50.00	045-0305
10.0	2.0	$\lambda/10$	≤ 5	\$ 50.00	045-0306
10.0	3.0	$\lambda/10$	≤ 5	\$ 50.00	045-0310
10.0	5.0	$\lambda/10$	≤ 5	\$ 50.00	045-0315
12.7	3.0	$\lambda/10$	≤ 5	\$ 53.00	045-0320
12.7	5.0	$\lambda/10$	≤ 5	\$ 53.00	045-0325
15.0	2.0	$\lambda/10$	≤ 5	\$ 58.00	045-0329
15.0	3.0	$\lambda/10$	≤ 5	\$ 58.00	045-0330
15.0	5.0	$\lambda/10$	≤ 5	\$ 58.00	045-0335
19.1	3.0	$\lambda/10$	≤ 5	\$ 63.00	045-0340
19.1	5.0	$\lambda/10$	≤ 5	\$ 63.00	045-0345
20.0	2.0	$\lambda/10$	≤ 5	\$ 68.00	045-0349
20.0	3.0	$\lambda/10$	≤ 5	\$ 68.00	045-0350
20.0	5.0	$\lambda/10$	≤ 5	\$ 68.00	045-0355
25.0	2.0	$\lambda/10$	≤ 5	\$ 76.00	045-0359
25.0	3.0	$\lambda/10$	≤ 5	\$ 76.00	045-0360
25.0	5.0	$\lambda/10$	≤ 5	\$ 76.00	045-0365
25.4	3.0	$\lambda/10$	≤ 5	\$ 79.00	045-0370
25.4	5.0	$\lambda/10$	≤ 5	\$ 79.00	045-0375
30.0	2.0	$\lambda/10$	≤ 5	\$ 110.00	045-0379
30.0	3.0	$\lambda/10$	≤ 5	\$ 110.00	045-0380
30.0	5.0	$\lambda/10$	≤ 5	\$ 110.00	045-0385

ORDERING

&

TECHNICAL SUPPORT

(949) 851-5881

FAX (949) 851-5058

E-MAIL

sales@optosigma.com

WEB

www.optosigma.com



Fused Silica Windows, Circular (continued)

Size, D (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
38.1	4.0	$\lambda/10$	≤ 5	\$ 126.00	045-0390
38.1	6.0	$\lambda/10$	≤ 5	\$ 126.00	045-0395
40.0	4.0	$\lambda/10$	≤ 5	\$ 126.00	045-0400
40.0	6.0	$\lambda/10$	≤ 5	\$ 131.00	045-0405
50.0	5.0	$\lambda/10$	≤ 5	\$ 189.00	045-0410
50.0	8.0	$\lambda/10$	≤ 5	\$ 189.00	045-0415
50.8	5.0	$\lambda/10$	≤ 5	\$ 194.00	045-0420
50.8	8.0	$\lambda/10$	≤ 5	\$ 194.00	045-0425
60.0	6.0	$\lambda/10$	≤ 5	\$ 245.00	045-0432
60.0	10.0	$\lambda/10$	≤ 5	\$ 315.00	045-0433
76.2	12.0	$\lambda/10$	≤ 5	\$ 263.00	045-0427
80.0	8.0	$\lambda/10$	≤ 5	\$ 420.00	045-0429
80.0	12.0	$\lambda/10$	≤ 5	\$ 315.00	045-0430
100.0	10.0	$\lambda/10$	≤ 5	\$ 560.00	045-0434
100.0	15.0	$\lambda/10$	≤ 5	\$ 735.00	045-0435
130.0	13.0	$\lambda/10$	≤ 5	\$ 1,400.00	045-0436
130.0	18.0	$\lambda/10$	≤ 5	\$ 1,650.00	045-0437
150.0	15.0	$\lambda/10$	≤ 5	\$ 1,850.00	045-0438
150.0	20.0	$\lambda/10$	≤ 5	\$ 2,200.00	045-0439
10.0	1.0	$\lambda/4$	≤ 5	\$ 42.00	045-0608
10.0	2.0	$\lambda/4$	≤ 5	\$ 42.00	045-0609
10.0	3.0	$\lambda/4$	≤ 5	\$ 42.00	045-0610
10.0	5.0	$\lambda/4$	≤ 5	\$ 42.00	045-0612
12.7	3.0	$\lambda/4$	≤ 5	\$ 46.00	045-0620
15.0	2.0	$\lambda/4$	≤ 5	\$ 53.00	045-0629
15.0	3.0	$\lambda/4$	≤ 5	\$ 50.00	045-0630
15.0	5.0	$\lambda/4$	≤ 5	\$ 53.00	045-0632
19.1	3.0	$\lambda/4$	≤ 5	\$ 53.00	045-0640
20.0	2.0	$\lambda/4$	≤ 5	\$ 58.00	045-0649
20.0	3.0	$\lambda/4$	≤ 5	\$ 58.00	045-0650
20.0	5.0	$\lambda/4$	≤ 5	\$ 58.00	045-0652
25.0	2.0	$\lambda/4$	≤ 5	\$ 65.00	045-0659
25.0	3.0	$\lambda/4$	≤ 5	\$ 65.00	045-0660
25.0	5.0	$\lambda/4$	≤ 5	\$ 65.00	045-0662
25.4	3.0	$\lambda/4$	≤ 5	\$ 67.00	045-0670
30.0	2.0	$\lambda/4$	≤ 5	\$ 79.00	045-0679
30.0	3.0	$\lambda/4$	≤ 5	\$ 79.00	045-0680
30.0	5.0	$\lambda/4$	≤ 5	\$ 79.00	045-0690
38.1	4.0	$\lambda/4$	≤ 5	\$ 95.00	045-0700
40.0	3.0	$\lambda/4$	≤ 5	\$ 97.00	045-0709
40.0	4.0	$\lambda/4$	≤ 5	\$ 97.00	045-0710
40.0	6.0	$\lambda/4$	≤ 5	\$ 97.00	045-0712
50.0	3.0	$\lambda/4$	≤ 5	\$ 150.00	045-0719
50.0	5.0	$\lambda/4$	≤ 5	\$ 131.00	045-0720
50.0	8.0	$\lambda/4$	≤ 5	\$ 170.00	045-0723
50.8	5.0	$\lambda/4$	≤ 5	\$ 131.00	045-0730
60.0	6.0	$\lambda/4$	≤ 5	\$ 220.00	045-0740
60.0	10.0	$\lambda/4$	≤ 5	\$ 255.00	045-0745
80.0	8.0	$\lambda/4$	≤ 5	\$ 380.00	045-0750
80.0	12.0	$\lambda/4$	≤ 5	\$ 440.00	045-0755
100.0	10.0	$\lambda/4$	≤ 5	\$ 505.00	045-0760
100.0	15.0	$\lambda/4$	≤ 5	\$ 590.00	045-0765
130.0	13.0	$\lambda/4$	≤ 5	\$ 1,260.00	045-0770
130.0	18.0	$\lambda/4$	≤ 5	\$ 1,480.00	045-0775
150.0	15.0	$\lambda/4$	≤ 5	\$ 1,570.00	045-0780
150.0	20.0	$\lambda/4$	≤ 5	\$ 1,970.00	045-0785

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058

E-MAIL
sales@optosigma.com

WEB
www.optosigma.com



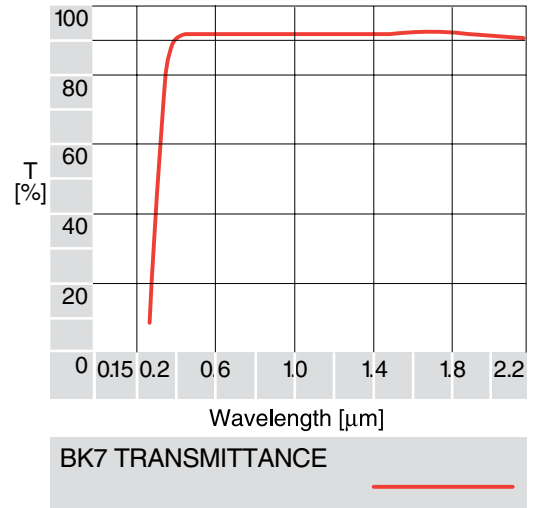
- Spherical Lenses
- Cylindrical Lenses
- Lens Kits
- Achromatic Doublets
- Multi-Element
- Micro Optics
- Mirrors
- Prisms
- Substrates & Windows
- Beamsplitters
- Polarizers
- Filter & Apertures

Glass Windows

- High quality optical glass
- Economical
- Suitable for Anti-Reflection coating



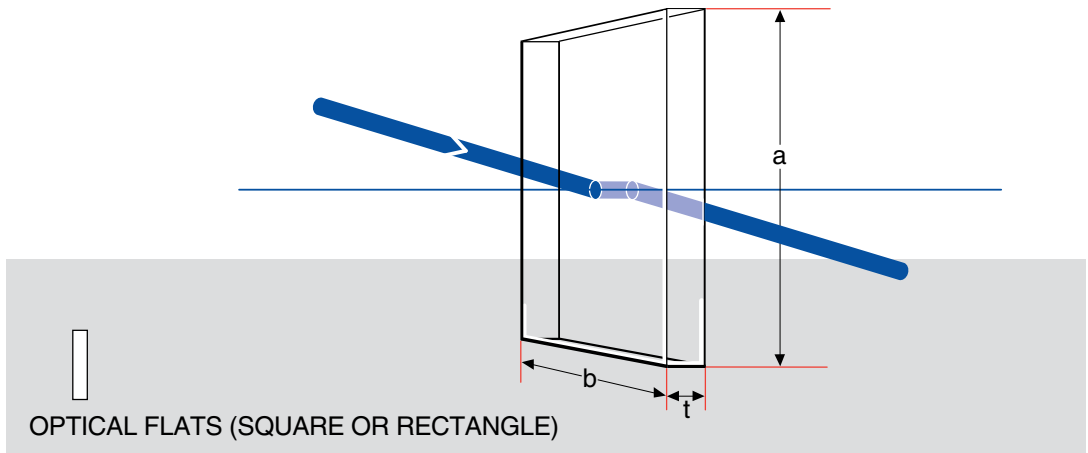
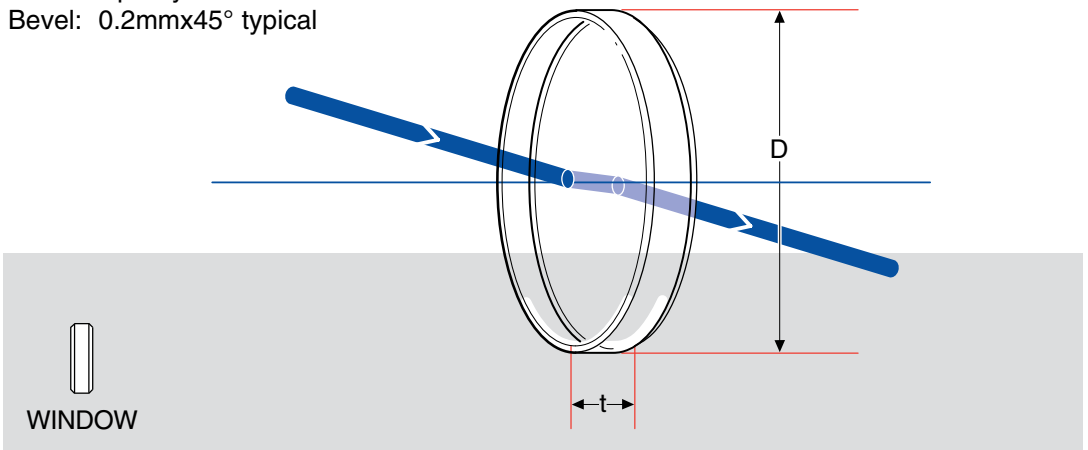
These superior glass windows are made from the best quality BK7. This material is very homogeneous and free from internal defects. The windows are precision polished on both surfaces and held parallel to $\leq 3\text{arcmin}$. $\lambda/10$ transmitted wavefront distortion is usually preferred but $\lambda/4$ is offered as an option when this is not an issue. Anti-Reflection coatings can be applied to these windows for a small additional cost (see pages 18 and 19).



Specifications & Tolerances

Material: BK7 grade A optical glass
 Refractive index: 1.52 @500nm
 Dimension: $\leq 50.8\text{mm}$, $\leq 50 \times 50 +0, -0.1\text{mm}$
 $\geq 60\text{mm}$, $\geq 60 \times 60 +0, -0.2\text{mm}$
 Thickness: $\leq 50.8\text{mm}$, $\leq 50 \times 50 \pm 0.1\text{mm}$
 $\geq 60\text{mm}$, $\geq 60 \times 60 \pm 0.2\text{mm}$
 Surface flatness: $\lambda/20$, $\lambda/10$, $\lambda/4$
 Surface quality: 10-5
 Bevel: 0.2mmx45° typical

We have a very large assortment of uncoated plano-plano glass and fused silica substrates that are ideal for many window applications. If you don't see the exact size or shape of window that you need, please let us know. And if you have OEM window requirements, we can provide you with a very competitive quotation — and reliable delivery performance.



ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com
WEB
www.optosigma.com



Glass Windows, Square and Rectangular

Size, a x b (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
10 x 10	2.0	$\lambda/20$	$\lambda/20$	\$ 90.00	044-1911
10 x 10	3.0	$\lambda/20$	$\lambda/20$	\$ 95.00	044-1912
10 x 10	5.0	$\lambda/20$	$\lambda/20$	\$ 95.00	044-1914
15 x 15	3.0	$\lambda/20$	$\lambda/20$	\$ 115.00	044-1922
15 x 15	5.0	$\lambda/20$	$\lambda/20$	\$ 115.00	044-1924
20 x 20	3.0	$\lambda/20$	$\lambda/20$	\$ 135.00	044-1932
20 x 20	5.0	$\lambda/20$	$\lambda/20$	\$ 145.00	044-1934
25 x 25	5.0	$\lambda/20$	$\lambda/20$	\$ 175.00	044-1935
30 x 30	5.0	$\lambda/20$	$\lambda/20$	\$ 240.00	044-1944
40 x 40	6.0	$\lambda/20$	$\lambda/20$	\$ 305.00	044-1955
50 x 50	8.0	$\lambda/20$	$\lambda/20$	\$ 425.00	044-1967
10 x 10	1.0	$\lambda/10$	$\lambda/5$	\$ 50.00	044-1132
10 x 10	2.0	$\lambda/10$	$\lambda/5$	\$ 50.00	044-1133
10 x 10	3.0	$\lambda/10$	$\lambda/5$	\$ 50.00	044-1134
10 x 10	5.0	$\lambda/10$	$\lambda/5$	\$ 50.00	044-1135
10 x 20	5.0	$\lambda/10$	$\lambda/5$	\$ 53.00	044-1140
15 x 15	2.0	$\lambda/10$	$\lambda/5$	\$ 60.00	044-1145
15 x 15	3.0	$\lambda/10$	$\lambda/5$	\$ 60.00	044-1146
15 x 15	5.0	$\lambda/10$	$\lambda/5$	\$ 60.00	044-1147
15 x 30	5.0	$\lambda/10$	$\lambda/5$	\$ 68.00	044-1150
20 x 20	2.0	$\lambda/10$	$\lambda/5$	\$ 70.00	044-1155
20 x 20	3.0	$\lambda/10$	$\lambda/5$	\$ 70.00	044-1156
20 x 20	5.0	$\lambda/10$	$\lambda/5$	\$ 70.00	044-1157
20 x 35	5.0	$\lambda/10$	$\lambda/5$	\$ 121.00	044-1160
25 x 25	3.0	$\lambda/10$	$\lambda/5$	\$ 95.00	044-1105
25 x 25	5.0	$\lambda/10$	$\lambda/5$	\$ 95.00	044-1110
25 x 40	6.0	$\lambda/10$	$\lambda/5$	\$ 147.00	044-1170
30 x 30	3.0	$\lambda/10$	$\lambda/5$	\$ 105.00	044-1175
30 x 30	5.0	$\lambda/10$	$\lambda/5$	\$ 105.00	044-1177
30 x 50	8.0	$\lambda/10$	$\lambda/5$	\$ 184.00	044-1180
40 x 40	4.0	$\lambda/10$	$\lambda/5$	\$ 155.00	044-1185
40 x 40	6.0	$\lambda/10$	$\lambda/5$	\$ 155.00	044-1187
50 x 50	5.0	$\lambda/10$	$\lambda/5$	\$ 236.00	044-1118
50 x 50	8.0	$\lambda/10$	$\lambda/5$	\$ 236.00	044-1120
10 x 10	1.0	$\lambda/4$	$\lambda/5$	\$ 45.00	044-1610
10 x 10	2.0	$\lambda/4$	$\lambda/5$	\$ 45.00	044-1611
10 x 10	3.0	$\lambda/4$	$\lambda/5$	\$ 50.00	044-1622
10 x 10	5.0	$\lambda/4$	$\lambda/5$	\$ 50.00	044-1624
15 x 15	2.0	$\lambda/4$	$\lambda/5$	\$ 60.00	044-1631
15 x 15	3.0	$\lambda/4$	$\lambda/5$	\$ 60.00	044-1632
15 x 15	5.0	$\lambda/4$	$\lambda/5$	\$ 60.00	044-1634
20 x 20	2.0	$\lambda/4$	$\lambda/5$	\$ 70.00	044-1641
20 x 20	3.0	$\lambda/4$	$\lambda/5$	\$ 70.00	044-1642
20 x 20	5.0	$\lambda/4$	$\lambda/5$	\$ 70.00	044-1644
25 x 25	3.0	$\lambda/4$	$\lambda/5$	\$ 85.00	044-1652
25 x 25	5.0	$\lambda/4$	$\lambda/5$	\$ 85.00	044-1654
30 x 30	3.0	$\lambda/4$	$\lambda/5$	\$ 105.00	044-1662
30 x 30	5.0	$\lambda/4$	$\lambda/5$	\$ 105.00	044-1664
40 x 40	4.0	$\lambda/4$	$\lambda/5$	\$ 150.00	044-1673
40 x 40	6.0	$\lambda/4$	$\lambda/5$	\$ 150.00	044-1675
50 x 50	5.0	$\lambda/4$	$\lambda/5$	\$ 205.00	044-1684
50 x 50	8.0	$\lambda/4$	$\lambda/5$	\$ 205.00	044-1687

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058

E-MAIL
sales@optosigma.com

WEB
www.optosigma.com

Glass Windows, Circular

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

	Diameter, D (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
	10.0	2.0	$\lambda/20$	≤ 2	\$ 75.00	044-2110
	10.0	3.0	$\lambda/20$	≤ 2	\$ 75.00	044-2111
	10.0	5.0	$\lambda/20$	≤ 2	\$ 75.00	044-2105
	15.0	3.0	$\lambda/20$	≤ 2	\$ 95.00	044-2121
	15.0	5.0	$\lambda/20$	≤ 2	\$ 95.00	044-2123
	20.0	3.0	$\lambda/20$	≤ 2	\$ 115.00	044-2131
	30.0	5.0	$\lambda/20$	≤ 2	\$ 165.00	044-2141
	40.0	6.0	$\lambda/20$	≤ 2	\$ 235.00	044-2151
	50.0	8.0	$\lambda/20$	≤ 2	\$ 345.00	044-2161
	60.0	10.0	$\lambda/20$	≤ 2	\$ 450.00	044-2171
	80.0	12.0	$\lambda/20$	≤ 2	\$ 615.00	044-2181
	100.0	15.0	$\lambda/20$	≤ 2	\$ 910.00	044-2191
	10.0	1.0	$\lambda/10$	≤ 5	\$ 39.00	044-1205
	10.0	2.0	$\lambda/10$	≤ 5	\$ 39.00	044-1207
	10.0	3.0	$\lambda/10$	≤ 5	\$ 37.00	044-1210
	10.0	5.0	$\lambda/10$	≤ 5	\$ 37.00	044-1215
	12.7	3.0	$\lambda/10$	≤ 5	\$ 42.00	044-1220
	12.7	5.0	$\lambda/10$	≤ 5	\$ 42.00	044-1230
	15.0	2.0	$\lambda/10$	≤ 5	\$ 47.00	044-1235
	15.0	3.0	$\lambda/10$	≤ 5	\$ 47.00	044-1240
	15.0	5.0	$\lambda/10$	≤ 5	\$ 47.00	044-1250
	19.1	3.0	$\lambda/10$	≤ 5	\$ 50.00	044-1260
	19.1	5.0	$\lambda/10$	≤ 5	\$ 50.00	044-1270
	20.0	2.0	$\lambda/10$	≤ 5	\$ 53.00	044-1275
	20.0	3.0	$\lambda/10$	≤ 5	\$ 53.00	044-1280
	20.0	5.0	$\lambda/10$	≤ 5	\$ 53.00	044-1290
	25.0	2.0	$\lambda/10$	≤ 5	\$ 58.00	044-1295
	25.0	3.0	$\lambda/10$	≤ 5	\$ 58.00	044-1300
	25.0	5.0	$\lambda/10$	≤ 5	\$ 58.00	044-1310
	25.4	3.0	$\lambda/10$	≤ 5	\$ 63.00	044-1320
	25.4	5.0	$\lambda/10$	≤ 5	\$ 63.00	044-1330
	30.0	2.0	$\lambda/10$	≤ 5	\$ 74.00	044-1335
	30.0	3.0	$\lambda/10$	≤ 5	\$ 74.00	044-1340
	30.0	4.0	$\lambda/10$	≤ 5	\$ 74.00	044-1345
	30.0	5.0	$\lambda/10$	≤ 5	\$ 74.00	044-1350
	38.1	4.0	$\lambda/10$	≤ 5	\$ 89.00	044-1360
	38.1	6.0	$\lambda/10$	≤ 5	\$ 89.00	044-1370
	40.0	4.0	$\lambda/10$	≤ 5	\$ 95.00	044-1380
	40.0	6.0	$\lambda/10$	≤ 5	\$ 95.00	044-1390
	50.0	5.0	$\lambda/10$	≤ 5	\$ 121.00	044-1400
	50.0	8.0	$\lambda/10$	≤ 5	\$ 121.00	044-1410
	50.8	5.0	$\lambda/10$	≤ 5	\$ 124.00	044-1420
	50.8	8.0	$\lambda/10$	≤ 5	\$ 124.00	044-1430
	60.0	6.0	$\lambda/10$	≤ 5	\$ 160.00	044-1435
	60.0	10.0	$\lambda/10$	≤ 5	\$ 160.00	044-1437
	76.2	8.0	$\lambda/10$	≤ 5	\$ 194.00	044-1440
	76.2	12.0	$\lambda/10$	≤ 5	\$ 194.00	044-1450
	80.0	8.0	$\lambda/10$	≤ 5	\$ 200.00	044-1460
	80.0	12.0	$\lambda/10$	≤ 5	\$ 200.00	044-1470
	100.0	10.0	$\lambda/10$	≤ 5	\$ 331.00	044-1480
	100.0	15.0	$\lambda/10$	≤ 5	\$ 331.00	044-1490

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058

E-MAIL
sales@optosigma.com

WEB
www.optosigma.com

Glass Windows, Circular (continued)

Diameter, D (mm)	Thickness, t (mm)	Surface Flatness	Parallelism (arcsec)	Price	PART NUMBER
130.0	13.0	$\lambda/10$	≤ 5	\$ 650.00	044-1492
130.0	18.0	$\lambda/10$	≤ 5	\$ 650.00	044-1493
150.0	15.0	$\lambda/10$	≤ 5	\$ 950.00	044-1495
150.0	20.0	$\lambda/10$	≤ 5	\$ 950.00	044-1496
10.0	1.0	$\lambda/4$	≤ 5	\$ 25.00	044-0100
10.0	2.0	$\lambda/4$	≤ 5	\$ 25.00	044-0105
10.0	3.0	$\lambda/4$	≤ 5	\$ 23.00	044-0119
10.0	5.0	$\lambda/4$	≤ 5	\$ 23.00	044-0120
12.7	3.0	$\lambda/4$	≤ 5	\$ 26.00	044-0121
12.7	5.0	$\lambda/4$	≤ 5	\$ 26.00	044-0122
15.0	2.0	$\lambda/4$	≤ 5	\$ 29.00	044-0106
15.0	3.0	$\lambda/4$	≤ 5	\$ 29.00	044-0123
15.0	5.0	$\lambda/4$	≤ 5	\$ 29.00	044-0124
19.1	3.0	$\lambda/4$	≤ 5	\$ 35.00	044-0126
19.1	5.0	$\lambda/4$	≤ 5	\$ 35.00	044-0127
20.0	2.0	$\lambda/4$	≤ 5	\$ 37.00	044-0125
20.0	3.0	$\lambda/4$	≤ 5	\$ 37.00	044-0128
20.0	5.0	$\lambda/4$	≤ 5	\$ 37.00	044-0129
25.0	2.0	$\lambda/4$	≤ 5	\$ 42.00	044-0133
25.0	3.0	$\lambda/4$	≤ 5	\$ 42.00	044-0130
25.0	5.0	$\lambda/4$	≤ 5	\$ 42.00	044-0135
25.4	3.0	$\lambda/4$	≤ 5	\$ 44.00	044-0140
25.4	5.0	$\lambda/4$	≤ 5	\$ 44.00	044-0145
30.0	2.0	$\lambda/4$	≤ 5	\$ 53.00	044-0146
30.0	3.0	$\lambda/4$	≤ 5	\$ 53.00	044-0150
30.0	4.0	$\lambda/4$	≤ 5	\$ 53.00	044-0151
30.0	5.0	$\lambda/4$	≤ 5	\$ 53.00	044-0153
38.1	4.0	$\lambda/4$	≤ 5	\$ 68.00	044-0155
38.1	6.0	$\lambda/4$	≤ 5	\$ 68.00	044-0157
40.0	3.0	$\lambda/4$	≤ 5	\$ 74.00	044-0159
40.0	4.0	$\lambda/4$	≤ 5	\$ 74.00	044-0160
40.0	6.0	$\lambda/4$	≤ 5	\$ 74.00	044-0163
50.0	3.0	$\lambda/4$	≤ 5	\$ 79.00	044-0168
50.0	5.0	$\lambda/4$	≤ 5	\$ 79.00	044-0170
50.0	8.0	$\lambda/4$	≤ 5	\$ 79.00	044-0173
50.8	5.0	$\lambda/4$	≤ 5	\$ 80.00	044-0175
50.8	8.0	$\lambda/4$	≤ 5	\$ 80.00	044-0177
60.0	6.0	$\lambda/4$	≤ 5	\$ 120.00	044-0178
60.0	10.0	$\lambda/4$	≤ 5	\$ 120.00	044-0179
76.2	8.0	$\lambda/4$	≤ 5	\$ 160.00	044-0180
76.2	12.0	$\lambda/4$	≤ 5	\$ 131.00	044-0183
80.0	8.0	$\lambda/4$	≤ 5	\$ 131.00	044-0190
80.0	12.0	$\lambda/4$	≤ 5	\$ 137.00	044-0193
100.0	10.0	$\lambda/4$	≤ 5	\$ 236.00	044-0220
100.0	15.0	$\lambda/4$	≤ 5	\$ 247.00	044-0223
130.0	13.0	$\lambda/4$	≤ 5	\$ 560.00	044-0195
130.0	18.0	$\lambda/4$	≤ 5	\$ 560.00	044-0196
150.0	15.0	$\lambda/4$	≤ 5	\$ 750.00	044-0198
150.0	20.0	$\lambda/4$	≤ 5	\$ 750.00	044-0199

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

For **broadband visible Anti-Reflection coatings** on both faces **append -A55** to part number and add \$30 for diameters up to 55mm and \$65 for up to 100mm, \$140.00 charge for larger sizes.

- Spherical Lenses
- Cylindrical Lenses
- Lens Kits
- Achromatic Doublets
- Multi-Element
- Micro Optics
- Mirrors
- Prisms

Substrates & Windows

- BeamSplitters
- Polarizers
- Filter & Apertures

Sapphire is very hard and is resistant to abrasion. For that very reason it is difficult to grind and polish to high levels of optical quality. Residual surface streaks, scratches, and a low level of minor surface pits are all too common on many sapphire parts from less experienced suppliers. Our optical shops have worked sapphire successfully for years - assuring you of a high and repeatable level of surface quality.

Sapphire Windows

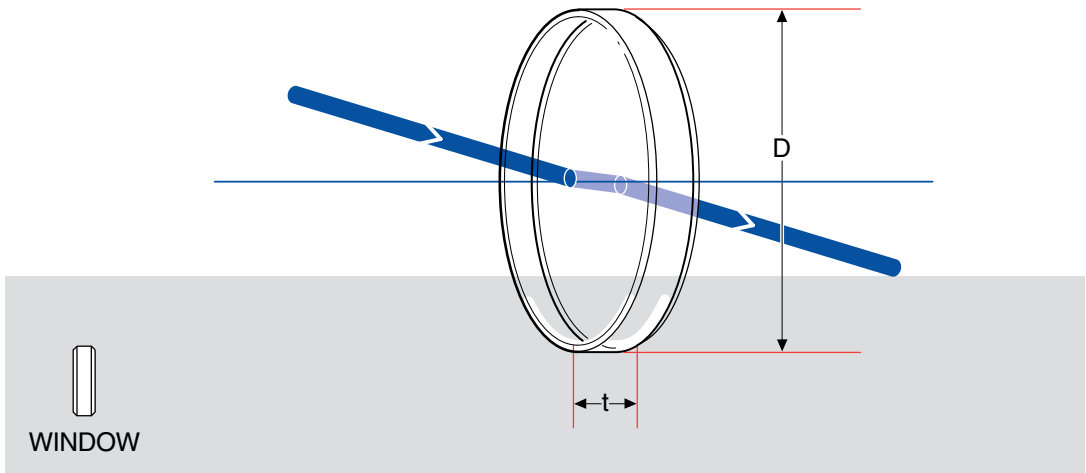
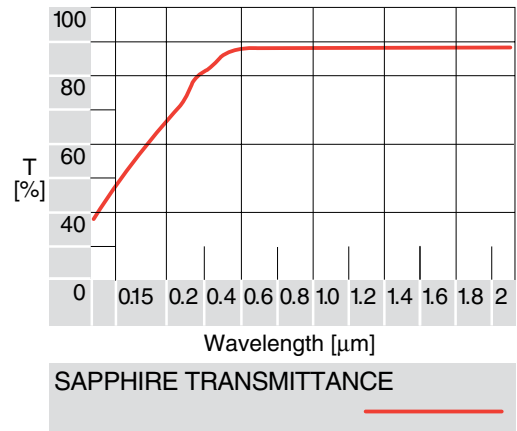
- High durability
- Broad transmission spectrum
- Standard diameters from 10mm to 50mm



When the most durable surface is required these sapphire windows provide the best solution. Sapphire has a very high abrasion resistance and a broad transmission spectrum covering the visible and near infrared regions of the spectrum (200nm to over 2microns).

Specifications & Tolerances

Material: Optical quality crystal sapphire
 Diameter: +0, -0.2mm
 Transmitted wavefront distortion: $\lambda/4$
 Surface quality: 40-20
 Both sides polished
 Refractive index: 1.77 @ 500nm
 Thickness: ± 0.2 mm
 Parallelism: ≤ 3 arcmin
 Bevel: 0.2mmx45° typical
 Crystal axis cut: random
 (c-cut available upon request)



Sapphire Windows

Diameter, D (Inches)	Diameter, D (mm)	Thickness, t (mm)	Price	PART NUMBER
0.39	10.0	2.0	\$ 45.00	046-0010
0.79	20.0	2.0	\$ 90.00	046-0020
1.18	30.0	2.0	\$ 125.00	046-0040
1.97	50.0	2.0	\$ 385.00	046-0060

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058
E-MAIL
sales@optosigma.com

WEB
www.optosigma.com



Master Flats

- Precision optical flats
- Reference surfaces to $\lambda/20$
- Standard diameters from 30mm to 150mm

These are precision polished, uncoated optical flats of fused silica or Zerodur®. They are used as optical reference surfaces in the laboratory and on the production floor. The Zerodur® substrates exhibit essentially a zero coefficient of thermal expansion over a fairly wide ambient temperature range and are therefore the most stable substrate available. However, the thermal expansion of fused silica is also quite low. If these flats are going to be used in a stable thermal environment then, fused silica will be adequate.

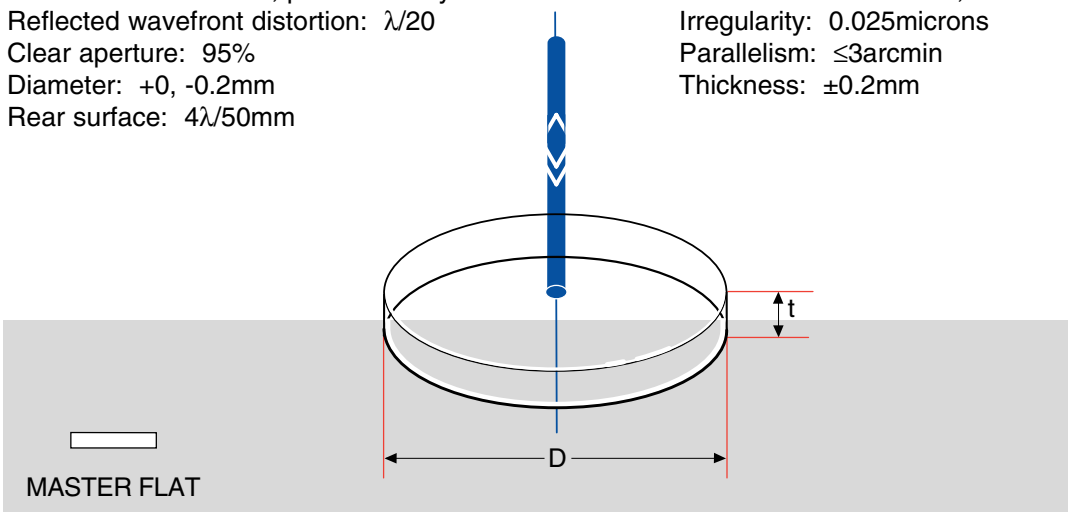
Each is supplied in a protective box and is provided with an interferogram showing the exact measured flatness of the master surface.

They are polished flat to $\lambda/20$ @633nm and parallel within 3arcmin.

Specifications & Tolerances

Surface flatness: $\lambda/20$, peak to valley
 Reflected wavefront distortion: $\lambda/20$
 Clear aperture: 95%
 Diameter: +0, -0.2mm
 Rear surface: $4\lambda/50$ mm

Surface flatness: $\lambda/100$, RMS
 Irregularity: 0.025microns
 Parallelism: ≤ 3 arcmin
 Thickness: ± 0.2 mm



Master Flats

Diameter, D (Inches)	Diameter, D (mm)	Thickness, t (mm)	Material	Price	PART NUMBER
1.18	30.00	10.00	fused silica	\$ 250.00	099-0440
1.97	50.00	10.00	fused silica	\$ 370.00	099-0450
3.94	100.00	17.00	Zerodur®	\$ 1,350.00	099-0460
5.91	150.00	25.00	Zerodur®	\$ 2,000.00	099-0470

Zerodur® is a registered trademark of Schott Glass Technologies.

Spherical Lenses

Cylindrical Lenses

Lens Kits

Achromatic Doublets

Multi-Element

Micro Optics

Mirrors

Prisms

Substrates & Windows

Beamsplitters

Polarizers

Filter & Apertures

We also carry an extensive range of uncoated plano-plano substrates that are ideal for many window applications. Because they are in production for other requirements their prices are very reasonable. Please call if you need only one or two special windows. And if your needs run to larger OEM quantities we will be pleased to competitively bid to your requirements.

ORDERING
&
TECHNICAL SUPPORT
(949) 851-5881
FAX (949) 851-5058

E-MAIL
sales@optosigma.com

WEB
www.optosigma.com