Laser Optics

Substrate for Laser Cavity

A. Substrate for Plano-Concave Mirror or Output coupler
Material: BK7 grade A fine annealed optical glass
Diameter tolerance: +0.0, -0.2mm
Center thickness tolerance: ±0.2mm
Surface quality: 10-5 scratch and dig
Surface fringe: λ/8@632.8nm

R(mm)	ϕ(mm)	T(mm)	Part No.	R(mm)	ϕ(mm)	T(mm)	Part No.
-25.0	10.0	3.0	LS0001	-250.0	10.0	3.0	LS0017
-25.0	25.4	6.35	LS0002	-250.0	25.4	6.35	LS0018
-30.0	10.0	3.0	LS0003	-300.0	10.0	3.0	LS0019
-30.0	25.4	6.35	LS0004	-300.0	25.4	6.35	LS0020
-40.0	10.0	3.0	LS0005	-400.0	10.0	3.0	LS0021
-40.0	25.4	6.35	LS0006	-400.0	25.4	6.35	LS0022
-50.0	10.0	3.0	LS0007	-500.0	10.0	3.0	LS0023
-50.0	25.4	6.35	LS0008	-500.0	25.4	6.35	LS0024
-80.0	10.0	3.0	LS0009	-800.0	10.0	3.0	LS0025
-80.0	25.4	6.35	LS0010	-800.0	25.4	6.35	LS0026
-100.0	10.0	3.0	LS0011	-1000.0	10.0	3.0	LS0027
-100.0	25.4	6.35	LS0012	-1000.0	25.4	6.35	LS0028
-150.0	10.0	3.0	LS0013	-2000.0	25.4	6.35	LS0029
-150.0	25.4	6.35	LS0014	-5000.0	25.4	6.35	LS0030
-200.0	10.0	3.0	LS0015	10000.0	25.4	6.35	LS0031
-200.0	25.4	6.35	LS0016				

Notes: R is radius of curvature

B: Substrate for Plano-Convex Mirror or Output coupler
Material: BK7 grade A fine annealed optical glass
Diameter: 25.4mm +0.0, -0.2mm
Center thickness: 6.35mm ±0.2mm
Surface quality: 10-5 scratch and dig
Surface fringe: λ/8@632.8nm

R(mm)	Part No.	R(mm)	Part No.
200.0	LP0001	800.0	LP0006
250.0	LP0002	1000.0	LP0007
300.0	LP0003	2000.0	LP0008
40.0	LP0004	5000.0	LP0009
500.0	LP0005	10000.0	LP0010

Notes: R is the radius of curvature

Laser Grade Right Angle Prism

Material: BK7 Grade A fine annealed Optical glass or UV grade fused silica
Dimension: +0.0, -0.2mm
Surface quality: 20/10
Flatness: λ/10@632.8nm
Angle tolerance (90°, 45°): <3′
Perpendicular: upon request

Materials	BK7	UV fused silica
Dimensions(mm)	Part No.	Part No.
A=B=C=5.0	LRP0001	
A=B=C=10.0	LRP0002	
A=B=C=12.7	LRP0003	LRP1003
A=B=C=15.0	LRP0004	
A=B=C=20.0	LRP0005	
A=B=C=25.4	LRP0006	LRP1006

Pellin-Broca Prism

Material: BK7 Grade A fine annealed Optical glass or UV grade fused silica
Index of Refraction: BK7 1.5183±0.0005
UV F.S. 1.46008 ±0.00005
Design wavelength: 546.1nm
Surface quality: 20/10 scratch and dig
Flatness: λ/10 per 25mm
α=79.5°±0.5°
β=60±1°

Materials	A(mm)	B(mm)	H(mm)	Part No.
BK7 grade A	23.5	40	12.7	PP0001
	36.0	60	25.4	PP0002
UV grade Fused Silica	11.0	20.0	6.4	PP0101
	23.5	40	12.7	PP0102

Dispersion Prism

Specifications:

Materials: UV grade fused silica
SF-14 glass
BK7 glass
Dimension: 0.2mm
Surface Flatness: $\lambda/2$ at 632.8nm
Angle: $\theta=60^{\circ}\pm3'$
Surface Quality: 20-10 scratch and dig
Note: Other optical glass is also available

Size (mm)	SF-14 Glass	UV Grade Fused Silica	BK7 Glass
	Part No.	Part No.	Part No.
A=h=15	DP0001	DP1001	DP2001
A=h=20	DP0002	DP1002	DP2002
A=h=25	DP0003	DP1003	DP3002

Nd: Laser (1064nm, 1053nm or 1047nm) Optics

A. 1064nm 1053nm 1047nm HR mirror and output Coupler

Specifications:

Substrate Material: BK7 grade A fine annealed
Diameter tolerance: +0.0, -0.2mm
Thickness tolerance: $\pm$0.2mm
Surface Quality: 10/5
Surface fringe: $\lambda/8$
Parallelism for Plano-flat of mirror: <1 arc minute
Parallelism for Plano-flat of output mirror: <30 arc seconds
HR mirror Coating: HR coating on S_1.
R> 99.8% @ 1064nm, 1053nm or 1047nm
Uncoated on S_2.
Output Coupler Coating: PR coating on S_1,
R tolerance $\pm$2% for R<95%, R tolerance $\pm$1% for R>95% @ 1064nm, 1053nm, 1047nm (R=50%, 60%, 70%, 80%, 85%, 90%, 94%, or 98% in stock)
AR coating on S_2 AR: R<0.2% @ 1064nm, 1053nm, 1047nm
Damage Threshold: 5 J/cm^2 at 1064nm, 10ns, 10Hz

1064nm 1053nm 1047nm HR mirror and output coupler

Dimensions			HR Mirror	Output Coupler
R(mm)	Φ(mm)	T(mm)	Part No.	Part No.
Infinity	10.0	3.0	HRM0001	OPC0001
Infinity	25.4	6.35	HRM0002	OPC0002
-25.0	10.0	3.0	HRM0003	OPC0003
-30.0	10.0	3.0	HRM0004	OPC0004
-40.0	10.0	3.0	HRM0005	OPC0005
-50.0	10.0	3.0	HRM0006	OPC0006
-50.0	25.4	6.35	HRM0007	OPC0007
-80.0	10.0	3.0	HRM0008	OPC0008
-80.0	25.4	6.35	HRM0009	OPC0009
-100.0	10.0	3.0	HRM0010	OPC0010
-100.0	25.4	6.35	HRM0101	OPC0101
-150.0	10.0	3.0	HRM0102	OPC0102
-150.0	25.4	6.35	HRM0103	OPC0103
-200.0	10.0	3.0	HRM0104	OPC0104
-200.0	25.4	6.35	HRM0105	OPC0105
-250.0	10.0	3.0	HRM0106	OPC0106
-250.0	25.4	6.35	HRM0107	OPC0107
-300.0	10.0	3.0	HRM0108	OPC0108
-300.0	25.4	6.35	HRM0109	OPC0109
-400.0	10.0	3.0	HRM0110	OPC0110
-400.0	25.4	6.35	HRM0201	OPC0201
-500.0	10.0	3.0	HRM0202	OPC0202
-500.0	25.4	6.35	HRM0203	OPC0203
-800.0	10.0	3.0	HRM0204	OPC0204
-800.0	25.4	6.35	HRM0205	OPC0205
-1000.0	10.0	3.0	HRM0206	OPC0206
-1000.0	25.4	6.35	HRM0207	OPC0207
-2000.0	25.4	6.35	HRM0208	OPC0208
-5000.0	25.4	6.35	HRM0209	OPC0209
-10000.	25.4	6.35	HRM0210	OPC0210
200.0	25.4	6.35	HRM0301	OPC0301
250.0	25.4	6.35	HRM0302	OPC0302
300.0	25.4	6.35	HRM0303	OPC0303
400.0	25.4	6.35	HRM0304	OPC0304
500.0	25.4	6.35	HRM0305	OPC0305
800.0	25.4	6.35	HRM0306	OPC0306
1000.0	25.4	6.35	HRM0307	OPC0307
2000.0	25.4	6.35	HRM0308	OPC0308
5000.0	25.4	6.35	HRM0309	OPC0309
10000.0	25.4	6.35	HRM0310	OPC0310

B. Flat Plate(1064nm, 1053nm, 1047nm 45° fold mirror)

Substrate Material: BK7

Surface Quality: 20/10

Surface fringe: λ/10

Diameter: +0, -0.2mm

Thickness: ±0.2mm

R>99.5% for random polarization

R_s>99.5%, R_p>99.2%

Part No.	Wavelength	Incidence angle	Materials	Φ (mm)	T (mm)
FPM0001	1064nm	45°	BK7	25.4	6.35
FPM0002			BK7	25.0	6.0
FPM0003			BK7	50.8	6.35
FPM0101	532nm	0°	BK7	25.4	6.35
FPM0102		0°	Fused Silica	25.4	6.35
FPM0103		45°	BK7	25.4	6.35
FPM0104		45°	Fused Silica	25.4	6.35
FPM0201	355nm	0°	Fused Silica	25.4	6.35
FPM0202		45°	Fused Silica	25.4	6.35

C. Flat Plate Harmanic Separator

Material: BK7 grade A

Diameter: 25.4mm±0.2mm

Thickness: 6.35±0.2mm

45°incidence, R for random polarization

Coating	HR1064 & HT 532			HT 1064 & HR532		
AOL	@1064nm	@532nm	Part No.	@532nm	@1064nm	Part No.
0°	R>99.5%	R<15%	FPS0001	R>99.5%	R<15%	FPS0101
45°	R>99.5%	R<15%	FPS0002	R>99.5%	R<15%	FPS0102

Notes: AOL means angle of incidence.

Other Laser line Mirror

Substrate Material: BK7

Dimensions: Φ25.4x6.35mm

$R=(R_s+R_p)/2$

R>99.8% (Second surface uncoated)

Laser	Wavelength	Incidence Angle	Part No.
Argon	514.5/488nm	0°	ARM0001
	514.5/488nm	45°	ARM0002
He-Ne	632.8nm	0°	HNM0001
	632.8nm	45°	HNM0002
Ti: Al_2O_3	700-900nm	0°	TIM0001
	700-900nm	45°	TIM0002

Metal Mirror

Diameter tolerance: ±0.2mm
Thickness tolerance: ±0.2mm
Flatness: see the table @ 632.8nm
Surface Quality: 60/40

Substrate	Φ(mm)	T(mm)	Flatness	Coating	Part No.
BK7	25.0	3.0	λ/4	Al+Protect	MM0001
	25.4	6.35	λ/10		MM0002
BK7	25.0	3.0	λ/4	Ag+Protect	MM0101
	25.4	6.35	λ/10		MM0102
BK7	25.0	3.0	λ/4	Au+Protect	MM0201
	25.4	6.35	λ/10		MM0202

Laser Line Interference Filter

Diameter: Φ25.4mm±0.2mm
Thickness: 3mm
Clear aperture: Φ22mm
FWHM: 10nm
Block: 0.01%(X ray-visible)

Wavelength(mm)	Wavelength Tolerance	Peak Transmission	Part No.
355	±2nm	30%	LLF0001
488	±2nm	50%	LLF0002
514.2	±2nm	60%	LLF0003
532	±2nm	60%	LLF0004
632.8	±2nm	60%	LLF0005
670	±2nm	60%	LLF0006
780	±2nm	60%	LLF0007
830	±2nm	60%	LLF0008
850	±2nm	60%	LLF0009
980	±2nm	60%	LLF0010
1064	±3nm	60%	LLF0011
1550		60%	LLF0012

Collimating and Focusing Lenses

Specifications:
Wavelength range: 635nm—980nm
Clear Aperture: 8.0±0.3mm
Surface Quality: 60/40 scratch and dig
Design wavelength: 780nm
Coatings: Broadband AR-Coatings
@635nm-980nm
Paraxial focal length: ±1% @780nm
Wavefront Distortion: λ/2
(P-v, over clear aperture @ 632.8nm)

Collimating and Focusing Lenses

Part No.	F(mm)	N.A.	Φ(mm)	T(mm)	F_w(mm)	F_b(mm)	Spot size(um)
CO0001	8.0	0.500	15.0	12	1.0	3.1	2.0
CO0002	15.0	0.267	15.0	12	6.8	12.7	3.0
CO0003	25.4	0.157	20.0	8	20.0	23.9	5.0

Focal Length in Millimeter

Part No.	635nm	650nm	670nm	780nm	830nm	980nm	
CO0001	7.96	7.97	7.97	8.00	8.01	8.04	
CO0002	14.94	14.95	14.96	15.00	15.03	15.08	
CO0003	25.40	25.40	25.39	25.40	25.41	25.46	