



OPTICS CATALOG

LASER SYSTEMS INC.

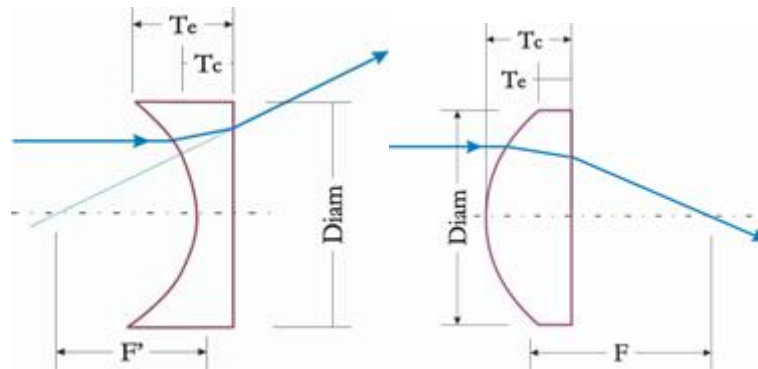
Products Contents

Section	Contents	Page
1	General Optics	2
1.1	Lenses	2
1.1.1	<i>Plano-Convex/Concave Lenses</i>	2
1.1.2	<i>Bi-Convex/Concave Lenses</i>	5
1.1.3	<i>Cylindrical Lenses</i>	7
1.1.4	<i>Meniscus Lenses</i>	9
1.2	Metallic Mirrors	10
1.2.1	<i>Flat Metallic Mirrors</i>	10
1.2.2	<i>Concave Metallic Mirrors</i>	11
1.3	Axicons	12
1.4	Prisms	13
1.4.1	Right angle/dispersion Prisms	13
1.4.2	Corner cube Prisms	14
1.5	Optical Windows	15
2	Polarization Optics	17
2.1	Continuously Variable Attenuators	17
2.1.1	<i>Continuously Variable Attenuator/Beamsplitter</i>	17
2.1.2	<i>Continuously Variable Attenuator for Femtosecond laser pulses</i>	18
2.2	Zero-order or Low-order waveplates (retardation plates)	19
2.3	Polarizing Cubes	20
2.4	Brewster type thin film Polarizers	21
3	Nonlinear Optics	22
3.1	Nonlinear Crystals	22
3.2	Photorefractive Crystals	27
4	Laser Crystals	28
4.1	Nd:YAG Laser Crystals	28
4.2	Nd:YVO4 Laser Crystals	29
4.3	Ti:Sapphire Laser Crystals	30
4.4	Nd:KGW Laser Crystals	30
4.5	Er:KYW Laser Crystals	31
4.6	Yb:KYW/KGW Laser Crystals	31
4.7	Passive Q-Switch Crystals	32
5	Laser Accessories	34
5.1	Beam Expanders	34
5.2	Tunable Beam Expanders	35
5.3	Laser Beam Visualizers	35
5.4	Ultra Fast Laser Shutter	36

1. General Optics

1.1. Lenses

1.1.1. Plano-Convex/Concave Lenses



These simplest positive or negative focus length lenses have flat surface on one side and spherical surface on the other. They are used to focusing light beam in telescopes, collimators or condenser systems, optical transceivers or other applications. We provide lenses up to 250 mm diameter. Under customers request lenses are anti-reflection coated.

Standard specifications

Material: BK7, FS, UVFS, CaF2, ZnSe
Diameter Tolerance +0.0, -0.15mm
Focal Length $\pm 3\%$
Centration <3 arc minutes
Clear Aperture >90%
Surface Figure L/4@632.8nm
Surface Quality 40-20 scratch & dig

Diameter	Focal Length
0.5"	25-10000mm
1"	30-10000mm
1.5"	50-10000mm
2"	80-10000mm
3"	100-10000mm

When Ordering please specify

Type: Plano/Convex or Plano/Concave
Focal length in mm
AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

1.1.1.1. BK7 Plano-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE1	Lens	PCX/PCV	BK7	0.5	25-1500mm	LLAR	10,800	9,000	7,500	5,700	JPY
LE5	Lens	PCX/PCV	BK7	1	200-10000mm	LLAR	11,400	9,600	8,100	6,600	JPY
LE2	Lens	PCX/PCV	BK7	1	30mm	LLAR	156,00	13,200	11,100	8,100	JPY
LE3	Lens	PCX/PCV	BK7	1	40mm	LLAR	12,600	10,800	8,700	7,200	JPY
LE4	Lens	PCX/PCV	BK7	1	50-150mm	LLAR	12,000	10,200	8,700	6,900	JPY
LE8	Lens	PCX/PCV	BK7	1.5	100-500mm	LLAR	17,700	15,000	12,600	9,900	JPY
LE6	Lens	PCX/PCV	BK7	1.5	50mm	LLAR	22,200	18,900	15,600	12,300	JPY
LE89	Lens	PCX/PCV	BK7	1.5	700-5000mm	LLAR	17,400	14,700	12,000	9,600	JPY
LE7	Lens	PCX/PCV	BK7	1.5	75mm	LLAR	20,100	17,400	13,800	10,800	JPY
LE9	Lens	PCX/PCV	BK7	2	100mm	LLAR	29,400	26,700	20,700	18,000	JPY
LE90	Lens	PCX/PCV	BK7	2	200-10000mm	LLAR	27,600	24,600	19,500	17,400	JPY

1.1.1.2. FS Plano-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE10	Lens	PCX/PCV	FS	0.5	25mm	LLAR	14,700	12,600	10,200	7,800	JPY
LE11	Lens	PCX/PCV	FS	1	30mm	LLAR	22,200	18,600	15,300	11,700	JPY
LE12	Lens	PCX/PCV	FS	1	40-10000mm	LLAR	19,500	16,200	13,200	10,200	JPY
LE13	Lens	PCX/PCV	FS	1.5	50mm	LLAR	29,700	24,900	20,400	15,600	JPY
LE14	Lens	PCX/PCV	FS	1.5	75-5000mm	LLAR	22,800	19,200	15,600	12,000	JPY
LE15	Lens	PCX/PCV	FS	2	100-10000mm	LLAR	29,700	24,900	20,400	15,600	JPY

1.1.1.3. UVFS Plano-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE16	Lens	PCX/PCV	UVFS	0.5	25-1500mm	LLAR	17,700	15,000	12,300	9,300	JPY
LE17	Lens	PCX/PCV	UVFS	1	30mm	LLAR	26,700	22,500	18,300	14,100	JPY
LE18	Lens	PCX/PCV	UVFS	1	40-10000mm	LLAR	23,400	19,500	15,900	12,300	JPY
LE19	Lens	PCX/PCV	UVFS	1.5	50mm	LLAR	35,700	30,000	24,300	18,600	JPY
LE20	Lens	PCX/PCV	UVFS	1.5	75-5000mm	LLAR	27,300	23,100	18,600	14,400	JPY
LE21	Lens	PCX/PCV	UVFS	2	100-10000mm	LLAR	35,700	30,000	24,300	18,600	JPY

1.1.1.4. BK7 Plano-Convex/Concave STANDARD Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (1-2 pcs)	Price (3-4pcs)	Currency
LE1S	Lens	PCV	BK7	1	25mm	no	11,400	10,800	JPY
LE2S	Lens	PCV	BK7	1	35mm	no	10,500	9,600	JPY
LE3S	Lens	PCX/PCV	BK7	1	50mm	no	10,200	8,700	JPY
LE4S	Lens	PCX/PCV	BK7	1	60mm	no	10,200	8,700	JPY
LE5S	Lens	PCX/PCV	BK7	1	75mm	no	10,200	8,700	JPY
LE6S	Lens	PCX/PCV	BK7	1	100mm	no	10,200	8,700	JPY
LE7S	Lens	PCX/PCV	BK7	1	125mm	no	10,200	8,700	JPY
LE8S	Lens	PCX/PCV	BK7	1	150mm	no	10,200	8,700	JPY
LE9S	Lens	PCX/PCV	BK7	1	200mm	no	10,200	8,700	JPY
LE10S	Lens	PCX/PCV	BK7	1	250mm	no	10,200	8,700	JPY
LE11S	Lens	PCX/PCV	BK7	1	300mm	no	10,200	8,700	JPY
LE12S	Lens	PCX/PCV	BK7	1	500mm	no	10,200	8,700	JPY
LE13S	Lens	PCX/PCV	BK7	1	750mm	no	10,200	8,700	JPY
LE14S	Lens	PCX/PCV	BK7	1	1000mm	no	10,200	8,700	JPY

1.1.1.5. UVFS Plano-Convex/Concave STANDARD Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (1-2 pcs)	Price (3-4pcs)	Currency
LE21S	Lens	PCX/PCV	UVFS	1	50mm	no	17,400	13,800	JPY
LE22S	Lens	PCX/PCV	UVFS	1	60mm	no	17,400	13,800	JPY
LE23S	Lens	PCX/PCV	UVFS	1	75mm	no	17,400	13,800	JPY
LE24S	Lens	PCX/PCV	UVFS	1	100mm	no	17,400	13,800	JPY
LE25S	Lens	PCX/PCV	UVFS	1	125mm	no	17,400	13,800	JPY
LE26S	Lens	PCX/PCV	UVFS	1	150mm	no	17,400	13,800	JPY
LE27S	Lens	PCX/PCV	UVFS	1	200mm	no	17,400	13,800	JPY
LE28S	Lens	PCX/PCV	UVFS	1	250mm	no	17,400	13,800	JPY
LE29S	Lens	PCX/PCV	UVFS	1	300mm	no	17,400	13,800	JPY
LE30S	Lens	PCX/PCV	UVFS	1	500mm	no	17,400	13,800	JPY
LE31S	Lens	PCX/PCV	UVFS	1	750mm	no	17,400	13,800	JPY
LE31S	Lens	PCX/PCV	UVFS	1	1000mm	no	17,400	13,800	JPY

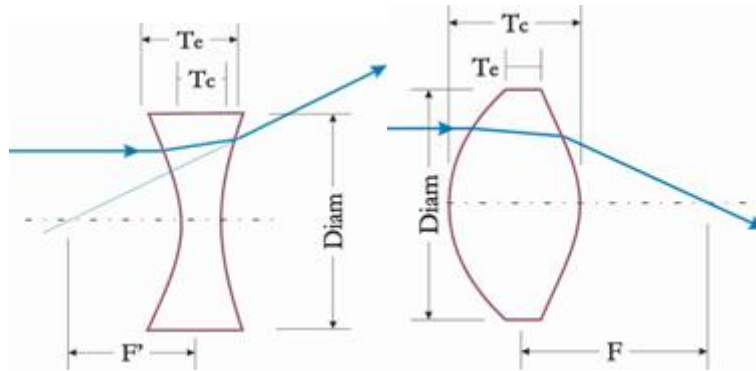
1.1.1.4. CaF2 Plano-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE22	Lens	PCX/PCV	CaF2	0.5	25-500mm	no	22,200	19,200	16,500	13,800	JPY
LE23	Lens	PCX/PCV	CaF2	1	30mm	no	28,200	24,900	21,300	17,700	JPY
LE24	Lens	PCX/PCV	CaF2	1	50-500mm	no	24,900	21,900	18,600	15,600	JPY
LE25	Lens	PCX/PCV	CaF2	2	100mm	no	44,100	38,700	33,000	27,600	JPY
LE26	Lens	PCX/PCV	CaF2	2	200-1000mm	no	41,700	36,600	31,200	26,100	JPY

1.1.1.5. ZnSe Plano-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE54	Lens	PCX/PCV	ZnSe	0.5	25-500mm	AR@10,6	29,100	21,600	16,200	10,800	JPY
LE91	Lens	PCX/PCV	ZnSe	1	40-500mm	AR@10,6	39,600	29,400	22,200	14,700	JPY
LE56	Lens	PCX/PCV	ZnSe	1.5	100-1000mm	AR@10,6	57,600	42,600	32,100	21,300	JPY
LE57	Lens	PCX/PCV	ZnSe	2	127mm	AR@10,6	82,500	61,200	45,900	30,600	JPY
LE58	Lens	PCX/PCV	ZnSe	2	200-1000mm	AR@10,6	79,500	58,800	44,100	29,400	JPY

1.1.2. Bi-Convex/Concave Lenses



Double convex or concave lenses are symmetrical, having equal radius on both sides.

The biconvex lenses are recommended for virtual imaging of real objects, and for positive conjugate ratios from 0.2 up to 5. Outside of this ratios range plano-convex lenses are usually more suitable. Biconvex lenses are used as magnifiers, objectives, some condensing systems. Since both surfaces contribute to the power of biconvex lenses, they have shorter focal lengths than PCX lenses of equal diameter and surface radius.

The biconcave lenses are often used to expand light beams or to increase focal lengths in optical systems, and are normally used in combination with other lenses. Among the many devices utilizing biconcave lenses are laser beam expanders, optical character readers, viewers and projection systems.

Standard specifications

Material: BK7, FS, UVFS, CaF2, ZnSe
Diameter Tolerance +0.0, -0.15mm
Focal Length $\pm 3\%$
Centration <3 arc minutes
Clear Aperture >90%
Surface Figure L/4@632.8nm
Surface Quality 40-20 scratch & dig

When Ordering please specify

Type: Bi/Convex or Bi/Concave
Focal length in mm
AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated
Include 4LM13 Self-Centering Lens/Optics Mount or <u>not include</u>

We provide a lenses with a wide range of **Specific Coatings** under customers request !

1.1.2.1. BK7 Bi-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE27	Lens	DCX/DCV	BK7	0.5	25-1500mm	LLAR	11,700	9,900	8,100	6,300	JPY
LE31	Lens	DCX/DCV	BK7	1	200-10000mm	LLAR	11,700	9,900	8,100	6,300	JPY
LE28	Lens	DCX/DCV	BK7	1	30mm	LLAR	16,200	13,800	11,100	8,700	JPY
LE29	Lens	DCX/DCV	BK7	1	40mm	LLAR	12,900	10,800	9,000	6,900	JPY
LE30	Lens	DCX/DCV	BK7	1	50-150mm	LLAR	12,300	10,500	8,400	6,600	JPY
LE34	Lens	DCX/DCV	BK7	1.5	100-5000mm	LLAR	18,900	15,900	12,900	9,900	JPY
LE32	Lens	DCX/DCV	BK7	1.5	50mm	LLAR	24,000	20,100	16,500	12,600	JPY
LE33	Lens	DCX/DCV	BK7	1.5	75mm	LLAR	20,700	17,400	14,100	10,800	JPY
LE35	Lens	DCX/DCV	BK7	2	100mm	LLAR	31,800	26,700	21,900	16,800	JPY
LE36	Lens	DCX/DCV	BK7	2	200-10000mm	LLAR	29,100	24,600	20,100	15,300	JPY

1.1.2.2. FS Bi-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE37	Lens	Bi-Convex/Concave	FS	0.5	25-1500mm	LLAR	16,800	14,100	11,700	9,000	JPY
LE38	Lens	Bi-Convex/Concave	FS	1	30mm	LLAR	25,200	21,300	17,400	13,200	JPY
LE39	Lens	Bi-Convex/Concave	FS	1	40-10000mm	LLAR	22,200	18,600	15,000	11,700	JPY
LE40	Lens	Bi-Convex/Concave	FS	1.5	50mm	LLAR	33,900	28,500	23,100	17,700	JPY
LE41	Lens	Bi-Convex/Concave	FS	1.5	75-5000mm	LLAR	26,100	21,900	17,700	13,800	JPY
LE42	Lens	Bi-Convex/Concave	FS	2	100-10000mm	LLAR	33,900	28,500	23,100	17,700	JPY

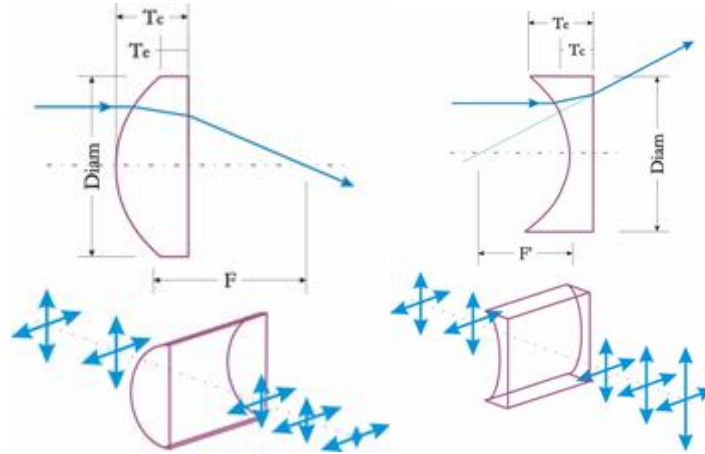
1.1.2.3. UVFS Bi-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE43	Lens	Bi-Convex/Concave	UVFS	0.5	25-1500mm	LLAR	20,400	17,100	13,800	10,800	JPY
LE44	Lens	Bi-Convex/Concave	UVFS	1	30mm	LLAR	30,300	25,500	20,700	15,900	JPY
LE45	Lens	Bi-Convex/Concave	UVFS	1	40-10000mm	LLAR	26,400	22,200	18,000	14,100	JPY
LE46	Lens	Bi-Convex/Concave	UVFS	1.5	50mm	LLAR	40,500	34,200	27,600	21,300	JPY
LE47	Lens	Bi-Convex/Concave	UVFS	1.5	75-5000mm	LLAR	31,200	26,400	21,300	16,500	JPY
LE48	Lens	Bi-Convex/Concave	UVFS	2	100-10000mm	LLAR	40,500	34,200	27,600	21,300	JPY

1.1.2.4. CaF2 Bi-Convex/Concave Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE49	Lens	Bi-Convex/Concave	CaF2	0.5	25-500mm	no	25,200	21,900	18,900	15,600	JPY
LE50	Lens	Bi-Convex/Concave	CaF2	1	30mm	no	32,400	28,200	24,300	20,100	JPY
LE51	Lens	Bi-Convex/Concave	CaF2	1	50-500mm	no	28,500	24,900	21,300	17,700	JPY
LE52	Lens	Bi-Convex/Concave	CaF2	2	100mm	no	50,400	44,100	37,800	31,500	JPY
LE53	Lens	Bi-Convex/Concave	CaF2	2	200-1000mm	no	47,700	41,700	35,700	29,700	JPY

1.1.3. Cylindrical Lenses



Cylindrical lenses condense or expand light in one dimension only.

Positive cylindrical lenses are used to focus light to a thin line for effective harmonic generation in nonlinear crystals, in laser scanners, spectroscopy, dye lasers, acousto-optics or other applications. They are the best for circularization of diode laser outputs, energy collection for linear detectors or for coupling to a slit input.

Negative focus length cylindrical lenses are used in laser scanners, spectroscopy, dye lasers, acousto-optics, optical processors or other applications. They are the best for circularization of diode laser outputs.

Standard specifications
Material: BK7, FS, UVFS, CaF2, ZnSe
Diameter Tolerance +0.0, -0.15mm
Focal Length $\pm 3\%$
Centration < 3 arc minutes
Clear Aperture $> 90\%$
Surface Figure L/4@632.8nm
Surface Quality 40-20 scratch & dig

Diameter	Focal Length
10x10mm	20-1000mm
20x40mm	30-2000mm

When Ordering please specify
Type: Plano/Convex or Concave
Focal length in mm
AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

1.1.3.1. BK7 Cylindrical Lenses

Code	Name	Type	Material	Height (mm)	Width (mm)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
CY88	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	10	10	20-1000mm	LLAR	17,400	15,300	12,300	10,200	JPY
CY81	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	20	20	100-1000mm	LLAR	21,900	19,500	15,600	12,900	JPY
CY82	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	20	20	50mm	LLAR	23,100	20,400	16,200	13,500	JPY
CY83	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	25	50	100-1000mm	LLAR	26,400	23,400	18,600	15,600	JPY
CY84	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	25	50	50mm	LLAR	27,600	24,300	19,500	16,200	JPY
CY86	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	30	30	100-1000mm	LLAR	24,600	21,600	17,400	14,400	JPY
CY85	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	30	30	50mm	LLAR	27,600	24,300	19,500	16,200	JPY
CY87	Cylindrical Lens	CYL Plano-Convex/Concave	BK7	50	50	100-1000mm	LLAR	33,600	29,700	23,700	19,800	JPY

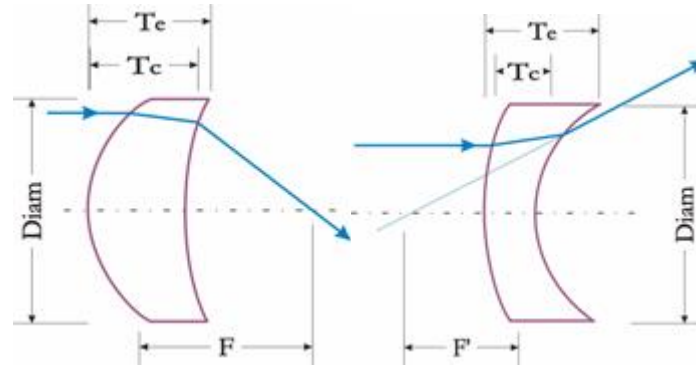
1.1.3.2. FS Cylindrical Lenses

Code	Name	Type	Material	Height (mm)	Width (mm)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
CY64	Cylindrical Lens	CYL Plano-Convex/Concave	FS	10	10	20-1000mm	LLAR	20,700	18,300	14,700	12,300	JPY
CY66	Cylindrical Lens	CYL Plano-Convex/Concave	FS	20	20	100-1000mm	LLAR	26,400	23,100	18,600	15,600	JPY
CY65	Cylindrical Lens	CYL Plano-Convex/Concave	FS	20	20	50mm	LLAR	27,600	24,300	19,500	16,200	JPY
CY70	Cylindrical Lens	CYL Plano-Convex/Concave	FS	25	50	100-1000mm	LLAR	31,800	28,200	22,500	18,600	JPY
CY69	Cylindrical Lens	CYL Plano-Convex/Concave	FS	25	50	50mm	LLAR	33,000	29,100	23,400	19,500	JPY
CY68	Cylindrical Lens	CYL Plano-Convex/Concave	FS	30	30	100-1000mm	LLAR	29,400	25,800	20,700	17,400	JPY
CY67	Cylindrical Lens	CYL Plano-Convex/Concave	FS	30	30	50mm	LLAR	33,000	29,100	23,400	19,500	JPY
CY71	Cylindrical Lens	CYL Plano-Convex/Concave	FS	50	50	100-1000mm	LLAR	40,500	35,700	28,500	23,700	JPY

1.1.3.3. UVFS Cylindrical Lenses

Code	Name	Type	Material	Height (mm)	Width (mm)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
CY72	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	10	10	20-1000mm	LLAR	22,200	19,500	15,600	13,200	JPY
CY74	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	20	20	100-1000mm	LLAR	28,200	24,900	19,800	16,500	JPY
CY73	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	20	20	50mm	LLAR	29,400	26,100	20,700	17,400	JPY
CY78	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	25	50	100-1000mm	LLAR	34,200	30,000	24,000	20,100	JPY
CY77	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	25	50	50mm	LLAR	35,400	31,200	24,900	20,700	JPY
CY76	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	30	30	100-1000mm	LLAR	31,500	27,600	22,200	18,600	JPY
CY75	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	30	30	50mm	LLAR	35,400	31,200	24,900	20,700	JPY
CY79	Cylindrical Lens	CYL Plano-Convex/Concave	UVFS	50	50	100-1000mm	LLAR	43,200	38,100	30,600	25,500	JPY

1.1.4. Meniscus Lenses



These positive or negative focus length lens have different radius on both sides.

Meniscus lenses are used in applications to reduce beam distortion. They are used to focussing light beam in telescopes, collimators or condenser systems, optical transceivers. They are also used to expand light beams or to increase focal lengths in optical systems or other applications.

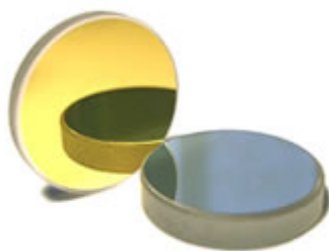
Standard specifications
Material: BK7, FS, UVFS, CaF2, ZnSe
Diameter Tolerance +0.0, -0.15mm
Focal Length $\pm 3\%$
Centration <3 arc minutes
Clear Aperture >90%
Surface Figure L/4@632.8nm
Surface Quality 40-20 scratch & dig

When Ordering please specify
Type: Positive or Negative
Focal length in mm
AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

1.1.4.1. ZnSe Meniscus Lenses

Code	Name	Type	Material	Diameter (inches)	Focal length	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
LE59	Lens	Meniscus	ZnSe	0.5	25-500mm	AR@10,6	77,700	57,600	43,200	28,800	JPY
LE60	Lens	Meniscus	ZnSe	1	40-500mm	AR@10,6	88,200	65,400	49,200	32,700	JPY
LE61	Lens	Meniscus	ZnSe	1.5	100-1000mm	AR@10,6	106,200	78,600	59,100	39,300	JPY
LE62	Lens	Meniscus	ZnSe	2	127mm	AR@10,6	131,100	97,200	72,900	48,600	JPY
LE63	Lens	Meniscus	ZnSe	2	200-1000mm	AR@10,6	128,100	94,800	71,100	47,400	JPY

1.2. Metallic Mirrors



Metallic coatings are convenient in that they are extremely broadband and can be used at any angle of incidence.

We offer gold, silver, aluminum and copper metallic high reflection coating formed by vacuum deposition. All metallic reflectors can be over-coated with dielectric film of magnesium fluoride (MgF_2) in order to prevent oxidation of the metallic surface and provide abrasion resistance.

Coating Type	Wavelength Range, nm	Average Reflectance
Gold	700 – IR	99 %
Silver	400 – IR	99 %
Aluminum	200 – IR	90 %
Copper	700 – IR	96%

When Ordering please specify
ROC: 50-10 000mm

Standard specifications
Shape: round
Substrate Material: BK7
Protection: SiO_2 coating
Diam tolerance: +0.00,-05mm
Surface finish: 60/40 scr/dig
Flatness: < L/4
Wedge: 3 arcmin
Clear Aperture: 90% of diam
ROC: 50-10 000mm

1.2.1. Flat Metallic Mirrors

1.2.1.1. Au coated flat Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM1	Metallic Mirror	Au	Flat	12.7	21,600	19,500	15,600	12,600	JPY
MM4	Metallic Mirror	Au	Flat	19.1	22,200	20,700	16,200	12,900	JPY
MM7	Metallic Mirror	Au	Flat	25.4	24,600	21,300	17,400	13,800	JPY
MM10	Metallic Mirror	Au	Flat	38.1	27,600	26,100	20,700	16,500	JPY
MM13	Metallic Mirror	Au	Flat	50.8	31,200	29,400	22,800	18,300	JPY

1.2.1.2. Ag coated flat Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM16	Metallic Mirror	Ag	Flat	12.7	17,400	15,600	13,800	11,100	JPY
MM19	Metallic Mirror	Ag	Flat	19.1	18,600	16,800	14,100	11,400	JPY
MM22	Metallic Mirror	Ag	Flat	25.4	19,200	17,100	14,700	11,700	JPY
MM25	Metallic Mirror	Ag	Flat	38.1	26,700	23,700	20,700	16,500	JPY
MM28	Metallic Mirror	Ag	Flat	50.8	30,000	24,900	21,000	16,800	JPY

1.2.1.3. Al coated flat Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM31	Metallic Mirror	Al	Flat	12.7	12,300	9,300	7,800	6,300	JPY
MM34	Metallic Mirror	Al	Flat	19.1	13,500	10,200	8,700	6,900	JPY
MM37	Metallic Mirror	Al	Flat	25.4	14,100	12,600	10,800	8,700	JPY
MM40	Metallic Mirror	Al	Flat	38.1	19,800	15,600	14,400	11,400	JPY
MM43	Metallic Mirror	Al	Flat	50.8	22,800	18,000	16,800	13,500	JPY

1.2.2. Concave Metallic Mirrors

1.2.2.1. Au coated concave Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM46	Metallic Mirror	Au	Concave	12.7	24,900	20,700	20,100	16,200	JPY
MM49	Metallic Mirror	Au	Concave	19.1	25,500	21,300	20,400	16,200	JPY
MM52	Metallic Mirror	Au	Concave	25.4	27,600	25,200	21,000	16,800	JPY
MM55	Metallic Mirror	Au	Concave	38.1	32,400	24,600	24,900	19,800	JPY
MM58	Metallic Mirror	Au	Concave	50.8	38,400	32,100	29,400	23,400	JPY

1.2.2.2. Ag coated concave Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM61	Metallic Mirror	Ag	Concave	12.7	23,400	18,000	14,700	11,700	JPY
MM64	Metallic Mirror	Ag	Concave	19.1	24,600	19,500	15,600	12,600	JPY
MM67	Metallic Mirror	Ag	Concave	25.4	25,500	20,400	16,200	12,900	JPY
MM70	Metallic Mirror	Ag	Concave	38.1	29,400	25,500	21,600	17,400	JPY
MM73	Metallic Mirror	Ag	Concave	50.8	34,200	28,500	24,300	19,500	JPY

1.2.2.3. Al coated concave Metallic Mirrors

Code	Name	Coating	Type	Diameter (mm)	Price (2-4pcs)	Price (5-10pcs)	Price (11-50pcs)	Price (>50pcs)	Currency
MM76	Metallic Mirror	Al	Concave	12.7	18,300	14,700	13,500	10,800	JPY
MM79	Metallic Mirror	Al	Concave	19.1	19,200	15,600	14,700	11,700	JPY
MM82	Metallic Mirror	Al	Concave	25.4	19,500	17,400	13,800	11,100	JPY
MM85	Metallic Mirror	Al	Concave	38.1	21,600	19,200	17,100	13,800	JPY
MM88	Metallic Mirror	Al	Concave	50.8	29,700	25,200	23,700	18,900	JPY

1.3. Axicons



Axicon can be used to convert a parallel laser beam into a ring, to create a non diffractive Bessel beam or to focus a parallel beam into long focus depth.

An axicon will create a non diffractive Bessel beam. This feature offered enhanced optical guiding, which was previously limited to the Rayleigh range of the Gaussian beam. The non-diffracting center of the Bessel beam has a propagation distance more times longer than the Rayleigh range of a Gaussian beam. The Bessel beams are used for optical trapping and manipulation of microscopic particles and biological cells, for microscopy, in optical coherence tomographic and etc.

Illuminating an axicon with the appropriate Laguerre Gaussian light beam efficiently generates a high-order Bessel beam of arbitrary order. High-order Bessel beams offer distinct advantages over other hollow light beams for atom guiding.

When Ordering please specify

Axicon cone angle (apex angle) in degrees

AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

1.3.1. BK7 Axicons

Code	Name	Material	Diameter (mm)	Apex angle	Coating	Price (2-4pcs)	Price (5-10pcs)	Price (11-20pcs)	Price (>20pcs)	Currency
AX1	Axicon	BK7	12.7	168-179deg	no	105,000	94,500	84,000	78,900	JPY
AX13	Axicon	BK7	25.4	168-179deg	no	117,000	105,300	93,600	87,900	JPY

1.3.2. UVFS Axicons

Code	Name	Material	Diameter (mm)	Apex angle	Coating	Price (2-4pcs)	Price (5-10pcs)	Price (11-20pcs)	Price (>20pcs)	Currency
AX12	Axicon	UVFS	12.7	168-179deg	no	132,000	118,800	105,600	99,000	JPY
AX14	Axicon	UVFS	25.4	168-179deg	no	138,000	124,200	110,400	103,500	JPY

1.4. Prisms



We offer wide range prisms from BK7 Grade A Optical Glass, Fused Silica or other laser grade material:

Equilateral Prisms, Penta Prisms, Beamsplitter Penta Prisms, Precision Beamsplitter Penta Prisms, Right-Angle Prisms, Dove Prisms, Roof Prisms, Corner Cube Retroreflectors, Anamorphic Prisms, Wedges Prisms, Rhomboid Prisms.

When Ordering please specify

AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

Prism angle: 90, 68, 45 deg or other

1.4.1. Right angle/dispersion Prisms

1.4.1.1. BK7 Right angle/dispersion Prisms

Code	Name	Material	Angle tolerance	Height (mm)	Width (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
PR19	Prism	BK7	<5arcmin	5	5	5	no	13,800	11,100	9,600	8,700	JPY
PR1	Prism	BK7	<3arcmin	5	5	5	no	10,200	7,800	6,600	6,000	JPY
PR20	Prism	BK7	<5arcmin	10	10	10	no	15,000	12,000	10,500	9,600	JPY
PR2	Prism	BK7	<3arcmin	10	10	10	no	11,100	8,400	7,200	6,300	JPY
PR21	Prism	BK7	<5arcmin	15	15	15	no	16,800	13,500	11,700	10,500	JPY
PR3	Prism	BK7	<3arcmin	15	15	15	no	13,200	9,900	8,700	7,800	JPY
PR22	Prism	BK7	<5arcmin	20	20	20	no	18,000	14,400	12,600	11,400	JPY
PR4	Prism	BK7	<3arcmin	20	20	20	no	14,700	11,100	9,600	8,400	JPY
PR23	Prism	BK7	<5arcmin	25	25	25	no	18,600	15,000	12,900	11,700	JPY
PR5	Prism	BK7	<3arcmin	25	25	25	no	16,200	12,300	10,500	9,300	JPY
PR24	Prism	BK7	<5arcmin	50	50	50	no	49,200	39,300	34,500	30,900	JPY
PR6	Prism	BK7	<3arcmin	50	50	50	no	41,400	31,500	27,000	24,000	JPY

1.4.1.2. FS Right angle/dispersion Prisms

Code	Name	Material	Angle tolerance	Height (mm)	Width (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
PR25	Prism	FS	<5arcmin	5	5	5	no	16,200	12,900	11,400	10,200	JPY
PR7	Prism	FS	<3arcmin	5	5	5	no	12,600	9,600	8,100	7,200	JPY
PR26	Prism	FS	<5arcmin	10	10	10	no	17,400	13,800	12,300	11,100	JPY
PR8	Prism	FS	<3arcmin	10	10	10	no	13,500	10,200	8,700	7,800	JPY
PR27	Prism	FS	<5arcmin	15	15	15	no	19,200	15,300	13,500	12,000	JPY
PR9	Prism	FS	<3arcmin	15	15	15	no	15,600	12,000	10,200	9,000	JPY
PR28	Prism	FS	<5arcmin	20	20	20	no	20,400	16,200	14,400	12,900	JPY
PR10	Prism	FS	<3arcmin	20	20	20	no	17,100	12,900	11,100	9,900	JPY
PR29	Prism	FS	<5arcmin	25	25	25	no	21,000	16,800	14,700	13,200	JPY
PR11	Prism	FS	<3arcmin	25	25	25	no	18,600	14,100	12,000	10,800	JPY
PR30	Prism	FS	<5arcmin	50	50	50	no	54,600	43,800	38,100	34,500	JPY
PR12	Prism	FS	<3arcmin	50	50	50	no	46,800	35,700	30,300	27,000	JPY

1.4.1.3. UVFS Right angle/dispersion Prisms

Code	Name	Material	Angle tolerance	Height (mm)	Width (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
PR31	Prism	UVFS	<5arcmin	5	5	5	no	17,700	14,400	12,600	11,100	JPY
PR13	Prism	UVFS	<3arcmin	5	5	5	no	13,800	10,500	9,000	8,100	JPY
PR32	Prism	UVFS	<5arcmin	10	10	10	no	19,200	15,300	13,500	12,000	JPY
PR14	Prism	UVFS	<3arcmin	10	10	10	no	15,000	11,400	9,600	8,700	JPY
PR33	Prism	UVFS	<5arcmin	15	15	15	no	21,000	16,800	14,700	13,200	JPY
PR15	Prism	UVFS	<3arcmin	15	15	15	no	17,100	12,900	11,100	9,900	JPY
PR34	Prism	UVFS	<5arcmin	20	20	20	no	22,500	18,000	15,600	14,100	JPY
PR16	Prism	UVFS	<3arcmin	20	20	20	no	18,900	14,400	12,300	10,800	JPY
PR35	Prism	UVFS	<5arcmin	25	25	25	no	23,100	18,600	16,200	14,700	JPY
PR17	Prism	UVFS	<3arcmin	25	25	25	no	20,400	15,600	13,200	12,000	JPY
PR36	Prism	UVFS	<5arcmin	50	50	50	no	60,000	48,000	42,000	37,800	JPY
PR18	Prism	UVFS	<3arcmin	50	50	50	no	51,600	39,000	33,600	30,000	JPY

1.4.2. Corner cube Prisms

1.4.2.1. BK7 corner cube Prisms

Code	Name	Material	Angle tolerance	Height (mm)	Width (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
PR37	Corner cube	BK7	<5arcmin	12.7			no	25,200	20,100	17,700	15,900	JPY
PR38	Corner cube	BK7	<5arcmin	25.4			no	28,800	23,100	20,100	18,000	JPY

1.4.2.2. UVFS corner cube Prisms

Code	Name	Material	Angle tolerance	Height (mm)	Width (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
PR39	Corner cube	UVFS	<5arcmin	12.7			no	35,400	28,200	24,900	22,200	JPY
PR40	Corner cube	UVFS	<5arcmin	25.4			no	40,800	32,700	28,500	25,800	JPY

1.5. Optical Windows



Various dimensions windows made from BK7, UVFS, FS, CaF₂, ZnSe, Sapphire, MgF₂. Windows are used to isolate different physical environments while allowing light to pass. When selecting windows you should consider the following properties of optical windows: transmission range, wavefront distortion, scattering, parallelism and resistance to certain environments. We offer windows of different materials and different degree of precision windows, from which you may choose in accordance with the properties you need. Special materials are available upon request.

Standard specifications

Shape: round
Material: BK7, UVFS, FS
Surface figure: L/10-L/8 per 1" diam
Surface quality: 40/20 scratch/dig
Parallelism: <3arcmin

Standard specifications

Shape: round
Material: ZnSe
Surface figure: L/2-L/4 per 1" diam
Surface quality: 40/20 scratch/dig
Parallelism: <3arcmin

When Ordering please specify

Wedge: 1,2 deg or other
AR Coatings: Broadband, Laser Line, Specific coating for wavelength range or Uncoated

1.5.1. BK7 Optical Windows

Code	Name	Material	Wedge	Diameter (mm)	Thickness (mm)	Coating	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
WD36	Brewster	BK7		12.5	5	no	20,400	16,800	14,100	12,600	JPY
WD21	Wedge	BK7	1 or 2 deg	12.5	5	no	8,700	7,200	6,000	5,400	JPY
WD1	Wedge	BK7		12.5	5	no	5,700	4,800	3,900	3,600	JPY
WD37	Brewster	BK7		25.4	6	no	24,600	20,100	17,100	15,300	JPY
WD22	Wedge	BK7	1 or 2 deg	25.4	6	no	10,200	8,400	7,200	6,300	JPY
WD2	Wedge	BK7		25.4	6	no	6,600	5,400	4,500	4,200	JPY
WD38	Brewster	BK7		38.1	6	no	35,700	29,400	24,600	22,200	JPY
WD23	Wedge	BK7	1 or 2 deg	38.1	6	no	17,100	14,100	12,000	10,800	JPY
WD3	Wedge	BK7		38.1	6	no	11,100	9,000	7,800	6,900	JPY
WD39	Brewster	BK7		50.8	8	no	43,800	36,000	30,300	27,300	JPY
WD24	Wedge	BK7	1 or 2 deg	50.8	8	no	22,800	18,600	15,600	14,100	JPY
WD4	Wedge	BK7		50.8	8	no	14,700	12,000	10,200	9,000	JPY
WD40	Brewster	BK7		76.2	10	no	67,200	55,200	46,500	41,700	JPY
WD25	Wedge	BK7	1 or 2 deg	76.2	10	no	42,900	35,100	29,400	26,400	JPY
WD5	Wedge	BK7		76.2	10	no	27,600	22,500	18,900	17,100	JPY

1.5.2. FS Optical Windows

Code	Name	Material	Wedge	Diameter (mm)	Thickness (mm)	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
WD41	Brewster windows	FS		12.5	5	24,600	20,100	16,800	15,300	JPY
WD26	Optical wedge windows	FS	1 or 2 deg	12.5	5	10,500	8,700	7,200	6,600	JPY
WD6	Optical windows	FS		12.5	5	6,900	5,700	4,800	4,200	JPY
WD42	Brewster windows	FS		25.4	6	29,400	24,300	20,400	18,300	JPY
WD27	Optical wedge windows	FS	1 or 2 deg	25.4	6	12,300	10,200	8,400	7,500	JPY
WD7	Optical windows	FS		25.4	6	7,800	6,600	5,400	4,800	JPY
WD43	Brewster windows	FS		38.1	6	42,900	35,100	29,700	26,700	JPY
WD28	Optical wedge windows	FS	1 or 2 deg	38.1	6	20,700	16,800	14,100	12,900	JPY
WD8	Optical windows	FS		38.1	6	13,200	10,800	9,300	8,400	JPY
WD44	Brewster windows	FS		50.8	8	52,500	43,200	36,300	32,700	JPY
WD29	Optical wedge windows	FS	1 or 2 deg	50.8	8	27,300	22,500	18,900	17,100	JPY
WD9	Optical windows	FS		50.8	8	17,700	14,400	12,300	10,800	JPY
WD45	Brewster windows	FS		76.2	10	80,700	66,000	55,500	50,100	JPY
WD30	Optical wedge windows	FS	1 or 2 deg	76.2	10	51,300	42,000	35,400	31,800	JPY
WD10	Optical windows	FS		76.2	10	33,000	27,300	22,800	20,400	JPY

1.5.3. UVFS Optical Windows

Code	Name	Material	Wedge	Diameter (mm)	Thickness (mm)	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
WD46	Brewster windows	UVFS		12.5	5	27,600	22,500	18,900	17,100	JPY
WD31	Optical wedge windows	UVFS	1 or 2 deg	12.5	5	12,000	9,900	8,100	7,500	JPY
WD11	Optical windows	UVFS		12.5	5	7,800	6,300	5,400	4,800	JPY
WD47	Brewster windows	UVFS		25.4	6	33,300	27,300	22,800	20,700	JPY
WD32	Optical wedge windows	UVFS	1 or 2 deg	25.4	6	13,800	11,400	9,600	8,700	JPY
WD12	Optical windows	UVFS		25.4	6	9,000	7,200	6,000	5,400	JPY
WD48	Brewster windows	UVFS		38.1	6	48,300	39,600	33,300	30,000	JPY
WD33	Optical wedge windows	UVFS	1 or 2 deg	38.1	6	23,100	18,900	15,900	14,400	JPY
WD13	Optical windows	UVFS		38.1	6	15,000	12,300	10,200	9,300	JPY
WD49	Brewster windows	UVFS		50.8	8	59,100	48,600	40,800	36,600	JPY
WD34	Optical wedge windows	UVFS	1 or 2 deg	50.8	8	30,900	25,200	21,300	19,200	JPY
WD14	Optical windows	UVFS		50.8	8	19,800	16,200	13,800	12,300	JPY
WD50	Brewster windows	UVFS		76.2	10	90,600	74,400	62,700	56,100	JPY
WD35	Optical wedge windows	UVFS	1 or 2 deg	76.2	10	57,900	47,400	39,900	35,700	JPY
WD15	Optical windows	UVFS		76.2	10	37,200	30,600	25,800	23,100	JPY

1.5.4. ZnSe Optical Windows

Code	Name	Material	Wedge	Diameter (mm)	Thickness (mm)	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
WD16	Optical windows	ZnSe		12.5	2	12,600	10,200	8,700	7,800	JPY
WD17	Optical windows	ZnSe		25.4	3	18,000	14,700	12,300	11,100	JPY
WD18	Optical windows	ZnSe		38.1	3	28,500	23,400	19,800	17,700	JPY
WD19	Optical windows	ZnSe		50.8	5	59,400	48,600	41,100	36,900	JPY
WD20	Optical windows	ZnSe		76.2	6.4	118,500	97,200	81,900	73,500	JPY

2. Polarization Optics

2.1. Continuously Variable Attenuators

2.1.1. Continuously Variable Attenuator/Beamsplitter



Divides laser beam into two beams of manually adjustable intensity ratio
Convenient 90deg angle between reflected and transmitted beams
Large dynamic range
Broadband transmission
Negligible beam deviation
Low dispersion for femtosecond laser pulses

Continuously Variable Attenuator/Beamsplitter for down to 100 fs laser pulses.

This variable attenuator/beamsplitter consists of 2 high-performance polarizing optics components placed in precision opto-mechanical Holder 5APH79T-1. Variable attenuator/beamsplitter incorporates a high-performance Polarizing Cube Beamsplitter which reflects s-polarized light 90 while transmitting p-polarized light. A rotating quartz Phase L/2 Waveplate is placed in the incident polarized laser beam. The intensity ratio of those two beams may be continuously varied without alteration of other beam parameters by rotating the waveplate. The intensity of either exit beam, and their intensity ratio, can be controlled over a wide dynamic range. Pure p-polarization could be selected for maximum transmission, or pure s-polarization for maximum attenuation of the transmitted beam.

Standard specifications

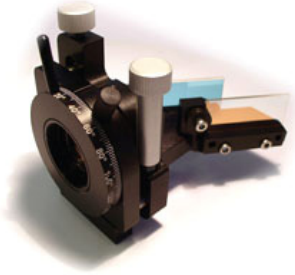
Central wavelengths: 780, 800, 1064 nm or other
Beam deviation: 40×10^{-6} rad, average over range
Aperture diameter: 10, 15, 20 mm
Damage Threshold: 200 mJ/cm ² pulsed at 1064 nm, typical
Antireflection Coating: R < 0.25% all entrance and exit surfaces
Time dispersion: negligible when pulse is down to 150fs
Extinction ratio: Ts/Tp < 1:1000

When Ordering please specify

Wavelength
Clear aperture
Waveplate order: ZO or LO

Code	Name	Type	Order	CA (mm)	Price (1-3pcs)	Price (4-9pcs)	Currency
ATB9	Continuous Variable Attenuator	Beamsplitter	LO	10	141,000	126,000	JPY
ATB3	Continuous Variable Attenuator	Beamsplitter	LO	15	144,000	135,000	JPY
ATB4	Continuous Variable Attenuator	Beamsplitter	LO	20	151,500	141,000	JPY
ATB10	Continuous Variable Attenuator	Beamsplitter	ZO	10	156,000	144,000	JPY
ATB1	Continuous Variable Attenuator	Beamsplitter	ZO	15	162,000	151,500	JPY
ATB2	Continuous Variable Attenuator	Beamsplitter	ZO	20	174,000	156,000	JPY

2.1.2. Continuously Variable Attenuator for Femtosecond laser pulses



Divides laser beam into two beams of manually adjustable intensity ratio
Large dynamic range
High Optical damage threshold
Negligible beam deviation
Low dispersion for femtosecond and high energy laser pulses

Continuously Variable Attenuator with Brewster type polarizers.

This variable attenuator/beamsplitter consists of 2 high-performance polarizing optics components placed in precision opto-mechanical Holder 5APH79T-1. The variable attenuator/beamsplitter incorporates 2 high-performance Brewster type polarizers, which reflect s-polarized light while transmitting p-polarized light. These two Brewster type polarizers are housed in special design opto-mechanical Adapter. This adapter allows to use either round shape either rectangular shape Brewster type polarizers as well. A rotating quartz Phase L/2 Waveplate is placed in the incident polarized laser beam. The intensity ratio of those two beams may be continuously varied without alteration of other beam parameters by rotating the waveplate. The intensity of either exit beam, or their intensity ratio, can be controlled over a wide dynamic range. P-polarization could be selected for maximum transmission, or high-purity s-polarization could be reflected when maximum attenuation of the transmitted beam takes place.

Standard specifications

Central wavelengths: 780, 800, 1064 nm or other
Beam deviation: 40×10^{-6} rad, average over range
Aperture diameter: 10, 15, 20 mm
Damage Threshold: 7 J/cm ² pulsed at 1064 nm, typical
Antireflection Coating: R < 0.25% all entrance and exit surfaces
Time dispersion: t < 4fs for 80fs Ti:Sapphire laser pulses
Polarization Contrast (after 1st polarizer): 1:190
Polarization Contrast (after 2nd polarizer): 1:7000

When Ordering please specify

Wavelength
Clear aperture
Waveplate order: ZO or LO

Code	Name	Type	Order	CA (mm)	Price (1-3pcs)	Price (4-9pcs)	Currency
ATF11	Continuous Variable Attenuator	Femtosecond	LO	10	162,000	147,000	JPY
ATF7	Continuous Variable Attenuator	Femtosecond	LO	15	168,000	154,500	JPY
ATF8	Continuous Variable Attenuator	Femtosecond	LO	20	171,000	160,500	JPY
ATF12	Continuous Variable Attenuator	Femtosecond	ZO	10	177,000	156,000	JPY
ATF5	Continuous Variable Attenuator	Femtosecond	ZO	15	183,000	165,000	JPY
ATF6	Continuous Variable Attenuator	Femtosecond	ZO	20	192,000	171,000	JPY

2.2. Zero-order or Low-order waveplates (retardation plates)



To suit different applications, air spaced, glued or optically contacted Zero Order compensated phase retardation plates are available. Waveplates are made from materials which exhibit birefringence. The velocities of the extraordinary and ordinary rays through the birefringent material varies inversely with their refractive indices. This difference in velocities gives rise to a phase difference when the two beams recombine. At any specific wavelength the phase difference is governed by the thickness of the retarder - waveplate.

L/2 Waveplates. A linearly polarized beam incident on a half wave crystal quartz waveplate emerges as a linearly polarized beam but rotated such that its angle to the optical axis is twice that of the incident beam. Therefore, half-waveplates can be used as continuously adjustable polarization rotators. Half-waveplates are used to rotate the plane of polarization, electro-optic modulation and as a variable ratio beamsplitter when used in conjunction with a polarization cube.

L/4 Waveplates - thin-film compensators. If the angle between the electric field vector of the incident linearly polarized beam and the retarder principal plane of the quarter-waveplate is 45°, the emergent beam is circularly polarized. When a quarter waveplate is double passed, i.e. by mirror reflection, it acts as a half waveplate and rotates the plane of polarization to a certain angle. Quarter waveplate are used in creating circular polarization from linear or linear polarization from circular, ellipsometry, optical pumping, suppressing unwanted reflection and optical isolation. Zero Order waveplates are generally preferred since they are least sensitive to variations in wavelength, angle of incidence and temperature. Air-spaced crystal quartz waveplates are also available. Its performance is as good as cemented zero-order waveplate. Additionally, the air-spaced construction enables it is suitable for the high power laser application. The damage threshold is more than 500 MW/cm².

Standard specifications

Wavelength: 240-2000nm
Material: Crystalline Quartz
AR/AR coated, R < 0.2% at each surface
Surface finish: 20/10 scr/dig
Retardation tolerance: L/500 @ 20 deg C
Wavefront distortion: L/10, wedge 3"
Damage threshold, typical: > 500 MW/cm ² , or > 5 J/cm ²
Mounted: 1", 1.5" or 2" diameter

When Ordering please specify

Wavelength: 240-2000nm
Retardation phase: L/2 or L/4
AR/AR coatings: <u>Coated</u> or Uncoated
Mounted: 1", 1.5", 2" or <u>Unmounted</u>

2.2.1. ZO Waveplates

Code	Name	Order	CA (mm)	Price (1-3pcs)	Price (4-9pcs)	Price (10-25pcs)	Currency
WP1	Waveplate	ZO	10	51,000	48,600	45,900	JPY
WP13	Waveplate	ZO	12.7	52,500	49,800	47,400	JPY
WP3	Waveplate	ZO	15	57,000	54,300	51,300	JPY
WP4	Waveplate	ZO	20	63,000	60,000	56,700	JPY
WP5	Waveplate	ZO	25.4	78,000	74,700	71,400	JPY
WP6	Waveplate	ZO	30	109,500	93,600	89,400	JPY
WP7	Waveplate	ZO	35	141,000	134,100	126,000	JPY
WP8	Waveplate	ZO	40	180,000	171,000	156,000	JPY
WP9	Waveplate	ZO	50	228,000	204,000	198,000	JPY

2.2.2. LO Waveplates

Code	Name	Order	CA (mm)	Price (1-3pcs)	Price (4-9pcs)	Price (10-25pcs)	Currency
WP30	Waveplate	LO	10	28,500	27,000	25,500	JPY
WP42	Waveplate	LO	12.7	30,000	28,500	27,000	JPY
WP32	Waveplate	LO	15	34,500	32,700	31,200	JPY
WP33	Waveplate	LO	20	37,500	35,700	33,900	JPY
WP34	Waveplate	LO	25.4	48,000	45,600	43,200	JPY
WP35	Waveplate	LO	30	69,000	65,700	62,100	JPY
WP36	Waveplate	LO	35	108,000	102,600	97,200	JPY
WP37	Waveplate	LO	40	123,000	117,000	110,700	JPY
WP38	Waveplate	LO	50	150,000	141,000	132,000	JPY

2.3. Polarizing Cubes



Standard specifications

Material: BK7
Wavelength: 250-2200nm
AR coated on four working surfaces
Surface finish: 20/10 scr/dig
Flatness < L/6
Deviation of the beam < 3 arcmin
Reflection Rs > 99,8%
Transmission Tp > 97%
Unmounted

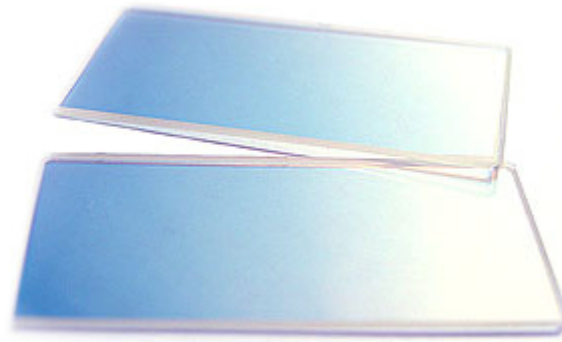
When Ordering please specify

Wavelength: 250-2200nm
AR/AR coatings: <u>Broadband</u> , Laser Line or Uncoated
Include holders: 5PM57, 5OM122T or <u>not include</u>

Holders for the polarization cubes are also available:
 5PM57 (L-shaped), Price 115 EUR
 5OM122T (side regulation), Price 92 EUR

Code	Name	Height (mm)	Width (mm)	Length (mm)	Price (1-3pcs)	Price (4-9pcs)	Price (10-25pcs)	Currency
PC1	Polarizing Cube	10	10	10	32,700	30,600	28,200	JPY
PC4	Polarizing Cube	15	15	15	34,500	32,100	29,700	JPY
PC7	Polarizing Cube	20	20	20	39,600	37,200	34,500	JPY
PC10	Polarizing Cube	25	25	25	44,400	41,100	37,800	JPY
PC13	Polarizing Cube	30	30	30	49,500	45,300	40,800	JPY
PC16	Polarizing Cube	35	35	35	56,100	51,900	47,400	JPY
PC19	Polarizing Cube	40	40	40	62,700	58,200	53,400	JPY
PC22	Polarizing Cube	50	50	50	69,300	64,500	59,400	JPY

2.4. Brewster type thin film Polarizers



Dielectric coated polarizers separate the s- and p-polarization.

These BK7, FS, UV FS dielectric coated polarizers separate the s- and p-polarization components of high energy laser beams and are intended for intra and extra cavity usage.

Dual band or other dimensions thin film polarizers are available on request.

Standard specifications
Material: BK7,UVFS
Surface quality: 20/10 scr/dig
Surface flatness: L/10 @633nm
Parallelism: <30 arcsec
Clear aperture: >90%
Angle of incidence: Brewster angle $\pm 2^\circ$
Extinction ratio T_p/T_s : >250:1
Laser damage threshold: 10 J/cm ² , in 10ns at 1064nm

When Ordering please specify

Wavelength: 240-1600nm

Code	Name	Material	Height (mm)	Width (mm)	Thickness (mm)	Shape	Price (1pcs)	Price (2-3pcs)	Price (4-6pcs)	Price (>7pcs)	Currency
BFP3	Brewster type thin film Polarizer	BK7	20	40	3	Rectangular	43,800	27,600	21,600	18,900	JPY
BFP4	Brewster type thin film Polarizer	BK7	60	120	3	Rectangular	98,400	84,000	78,000	75,000	JPY
BFP1	Brewster type thin film Polarizer	BK7	12.7		3	Round	39,000	24,600	18,600	14,700	JPY
BFP6	Brewster type thin film Polarizer	BK7	25.4		3	Round	40,800	26,400	20,100	16,800	JPY
BFP7	Brewster type thin film Polarizer	UVFS	20	40	3	Rectangular	47,700	30,000	23,700	20,400	JPY
BFP8	Brewster type thin film Polarizer	UVFS	60	120	3	Rectangular	117,000	104,400	98,700	96,000	JPY
BFP5	Brewster type thin film Polarizer	UVFS	12.7		3	Round	42,600	27,000	20,700	16,800	JPY
BFP2	Brewster type thin film Polarizer	UVFS	25.4		3	Round	44,400	28,800	22,200	18,600	JPY

3. Nonlinear Optics

3.1. Nonlinear Crystals

3.1.1. BBO Nonlinear Crystals



Broad phase-matchable SHG range from 409.6 nm to 3500 nm
Wide transmission region from 190 nm to 3500 nm
Large effective second-harmonic-generation (SHG) coefficient
High damage threshold of 10 GW/cm² for 100 ps pulse-width at 1064 nm
Good mechanical and physical properties

BBO is a non-linear optical crystal that combines a number of unique features.

These features of nonlinear BBO crystal include wide transparency and phase matching ranges, large non-linear coefficient, high damage threshold and excellent optical homogeneity. Therefore, BBO provides an attractive solution for various non-linear optical applications like OPO, OPA, OPCPA and other. As a result of large thermal acceptance bandwidth, high damage threshold and small absorption BBO well suits for frequency conversion of high peak or average power laser radiation. The large spectral transmission range as well as phase matching, especially in UV range, makes BBO perfectly suitable for frequency doubling of Dye, Ar ion and Copper vapour laser radiation, effective cascade harmonic generation (Frequency doublers, triplers, parametric amplifiers and wave mixers) of wide spread Nd:YAG as well as of Ti:Sapphire and Alexandrite laser radiation. Both angle tuned Type 1 (oo-e) and Type 2 (eo-e) of phase matching can be obtained increasing a number of advantages for different applications.

Standard specifications

Transparency range: 220-2600nm
Surface quality: 10/5 scratch/dig
Flatness at L=633nm: L /6
Parallelism: 10 arc sec
Perpendicularity: <5 arc min
Optical damage threshold, GW/cm ² : >5, t=10ns, @1064nm
Maximum available aperture: 10x10 mm
Maximum length: 15 mm
Aperture tolerance: +0.1/-0 mm
Length tolerance: +0.1/-0 mm

Various specifications KTP, KTA, KDP, BBO, LBO, GaSe, AgGaS₂, AgGaSe₂, LiIO₃, LiNbO₃ or other crystals are available on request.

When Ordering please specify

Application: [e.g. SHG@1064nm; OPO@532nm; DFG@(1064nm & 532nm), etc]
Orientation theta and phi degrees in range of 0-90 deg
Phase Matching: I Type (e-oo) or II Type (e-oe)
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	For	Height (mm)	Width (mm)	Length (mm)	Theta	Phi	Application	Coating	Price	Currency
NLC9	Nonlinear Crystal	BBO	Nd:YAG laser	3	3	7	22.8	90	SGH	AR @ 1064 + 532 nm	114,000	JPY
NLC12	Nonlinear Crystal	BBO	Nd:YAG laser	3	3	7	47.7	90	THG	AR @ 1064 + 532 nm/1064 + 532 + 266	118,500	JPY
NLC8	Nonlinear Crystal	BBO	Nd:YAG laser	4	4	7	22.8	90	SGH	AR @ 1064 + 532 nm	162,000	JPY
NLC14	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.05	48	90	SGH	AR(230-350)/AR(460-700)nm	186,000	JPY
NLC13	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.05	29.18	0	SGH	AR @ 800 + 400 nm	183,000	JPY
NLC18	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.15	29.18	0	SGH	AR @ 800 + 400 nm	162,000	JPY
NLC17	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.2	44.5	90	THG	AR @ 800 + 400 nm/ 800 + 400 + 266 nm	138,000	JPY
NLC16	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.25	41.7	0	SGH	AR @ 800 + 400 nm	132,000	JPY
NLC19	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	0.5	40	90	THG	AR @ 800 + 400 nm/ 800 + 400 + 266 nm	156,000	JPY
NLC20	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	1	29.18	0	SGH	AR @ 800 + 400 nm	126,000	JPY
NLC15	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	2	39	90	SGH	AR @ 800 + 400 nm	114,000	JPY
NLC5	Nonlinear Crystal	BBO	Nd:YAG laser	5	5	3	22.8	90	SGH	AR @ 1064 + 532 nm	129,000	JPY
NLC6	Nonlinear Crystal	BBO	Nd:YAG laser	5	5	4	22.8	90	SGH	AR @ 1064 + 532 nm	148,500	JPY
NLC22	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	6	29.18	0	SGH	AR @ 800 + 400 nm	174,000	JPY
NLC7	Nonlinear Crystal	BBO	Nd:YAG laser	5	5	7	22.8	90	SGH	AR @ 1064 + 532 nm	207,000	JPY
NLC21	Nonlinear Crystal	BBO	Ti:Sapphire laser	5	5	10	29.18	0	SGH	AR @ 800 + 400 nm	234,000	JPY
NLC3	Nonlinear Crystal	BBO	Nd:YAG laser	6	6	6	22.8	90	SGH	AR @ 1064 + 532 nm	237,000	JPY
NLC11	Nonlinear Crystal	BBO	Nd:YAG laser	6	6	6	47.7	90	THG	AR @ 1064 + 532 nm/1064 + 532 + 266	241,500	JPY
NLC4	Nonlinear Crystal	BBO	Nd:YAG laser	6	6	12	22.8	90	SGH	AR @ 1064 + 532 nm	363,000	JPY
NLC23	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.05	29.18	0	SGH	AR @ 800 + 400 nm	204,000	JPY
NLC24	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.05	42.4	0	SGH	AR @ 800 + 400 nm	204,000	JPY
NLC26	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.05	44.3	0	THG	AR @ 800 + 400 nm	204,000	JPY
NLC25	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.1	29.18	0	SGH	AR @ 800 + 400 nm	177,000	JPY
NLC27	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.15	44.3	0	THG	AR @ 800 + 400 nm	165,000	JPY
NLC28	Nonlinear Crystal	BBO	Ti:Sapphire laser	7	8	0.25	44.3	0	THG	AR @ 800 + 400 nm	147,000	JPY
NLC29	Nonlinear Crystal	BBO	Ti:Sapphire laser	10	10	4	27	0	OPA	AR @ 800 / 1000-2500 nm	378,000	JPY
NLC2	Nonlinear Crystal	BBO	Nd:YAG laser	10	10	4	22.8	90	SGH	AR @ 1064 + 532 nm	372,000	JPY
NLC10	Nonlinear Crystal	BBO	Nd:YAG laser	10	10	4	47.7	90	THG	AR @ 1064 + 532 nm/1064 + 532 + 266	381,000	JPY
NLC1	Nonlinear Crystal	BBO	Nd:YAG laser	10	10	5	22.8	90	SGH	AR @ 1064 + 532 nm	417,000	JPY

3.1.2. KTP Nonlinear Crystals



Efficient frequency conversion and Large non-linear optical coefficients
Wide angular bandwidth and small walk-off angle
Broad temperature and spectral bandwidth
Low cost compare with BBO and LBO

Single crystal Potassium Titanyl Phosphate is an excellent non-linear crystal.

It exhibits high optical quality, broad transparent range, relatively high effective SHG coefficient (about 3 times higher than that of KDP), rather high optical damage threshold, wide acceptance angle, small walk-off and type I and type II non-critical phase-matching (NCPM) in a wide wavelength range. KTP is the most commonly used material for frequency doubling of Nd:YAG lasers and other Nd-doped lasers, particularly at the low or medium power density.

Standard specifications
Transparency range: 350-4500nm
Surface quality: 10/5 scratch/dig
Flatness at L=633nm: L /6
Parallelism: 10 arc sec
Perpendicularity: <5 arc min
Optical damage threshold, MW/cm ² : >500, t=10ns, @1064nm
Maximum available aperture: 15x15 mm
Maximum length: 25 mm
Aperture tolerance: +0.1/-0 mm
Length tolerance: +0.1/-0 mm

When Ordering please specify
Application: [e.g. SHG@1064nm; OPO@532nm; DFG@(1064nm & 532nm), etc]
Orientation theta and phi degrees in range of 0-90 deg
Phase Matching: I Type (e-oo) or II Type (e-oe)
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	For	Height (mm)	Width (mm)	Length (mm)	Theta	Phi	Application	Coating	Price	Currency
NLC33	Nonlinear Crystal	KTP		3	3	5					81,000	JPY
NLC34	Nonlinear Crystal	KTP		3	3	10				AR @ 1064 + 532 nm	108,000	JPY
NLC35	Nonlinear Crystal	KTP		3	3	20				AR @ 1064 + 532 nm	156,000	JPY
NLC36	Nonlinear Crystal	KTP		4	4	10				AR @ 1064 + 532 nm	126,000	JPY
NLC37	Nonlinear Crystal	KTP		4	4	20					171,000	JPY
NLC38	Nonlinear Crystal	KTP		5	5	20					204,000	JPY
NLC39	Nonlinear Crystal	KTP		10	10	2					186,000	JPY
NLC40	Nonlinear Crystal	KTP		10	10	5			SGH	AR @ 1064 + 532 nm	246,000	JPY

3.1.3. LBO Nonlinear Crystals



Broad transparency range from 160 nm to 2600 nm
Relatively large effective SHG coefficient (about three times that of KDP)
High damage threshold (18.9 GW/cm² for a 1.3 ns laser at 1053nm)
Wide acceptance angle and small walk-off
Type I and Type II non-critical phase matching in a wide wavelength range

LBO's high damage threshold, wide acceptance angle, good thermal stability and wide transmission range make it ideal for frequency doubling of high power lasers.

It is unique in many aspects, especially its wide transparency range, moderately high non-linear coupling, high damage threshold and good chemical and mechanical properties. Its transmission range is from 210nm to 2300nm. LBO allows temperature-controllable non-critical phase-matching (NCPM) for 1000-1300nm, Type I SHG, and also provides room temperature NCPM for Type II SHG at 800-1100nm. It possesses a relatively large angular acceptance bandwidth, reducing the beam quality requirements for source lasers.

Standard specifications
Transparency range: 160-2800nm
Orientation accuracy of cut angle: 30 arc min
Surface quality: 10/5 scratch/dig
Flatness at L=633nm: L /6
Parallelism: 10 arc sec
Perpendicularity: <5 arc min
Optical damage threshold, GW/cm ² : >10, t=1ns, @1064nm
Maximum available aperture: 10x10 mm
Maximum length: 15 mm
Aperture tolerance: +0.1/-0 mm
Length tolerance: +0.1/-0 mm

When Ordering please specify
Application: [e.g. SHG@1064nm; OPO@532nm; DFG@(1064nm & 532nm), etc]
Orientation theta and phi degrees in range of 0-90 deg
Phase Matching: I Type (e-oo) or II Type (e-oe)
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	For	Height (mm)	Width (mm)	Length (mm)	Theta	Phi	Application	Coating	Price	Currency
NLC30	Nonlinear Crystal	LBO	for Nd:YAG laser	3	3	10			SGH	AR @ 1064 + 532 nm	108,000	JPY
NLC31	Nonlinear Crystal	LBO	for Nd:YAG laser	5	5	5			SGH	AR @ 1064 + 532 nm	147,000	JPY
NLC32	Nonlinear Crystal	LBO	for Nd:YAG laser	8	8	5			SGH	AR @ 1064 + 532 nm	228,000	JPY

3.1.4. AgGaS2 Nonlinear Crystals

Silver Thiogallate has been demonstrated to be an efficient frequency doubling crystal for infrared radiation.

This crystal has a high non-linear coefficient, high damage threshold, and a wide transmission range. It also has low optical absorption and scattering, low wavefront distortion. Among commercially available crystals, AgGaS₂ has the highest figure of merit for non-linear interactions in the near and deep infrared. Silver Selenogallate (AgGaSe₂) has band edges at 730 and 1800nm. Its useful transmission range lying within 916nm and wide phase matching provide excellent potential for OPO applications when pumped by variety of currently available lasers. Tuning within 2512nm was obtained when pumped by Ho:YLF laser at 2050nm; It has also been shown as an excellent crystal for non-linear three-wave interactions.

Standard specifications
Transparency range: 500-1200nm
Orientation accuracy of cut angle: 30 arc min
Surface quality: 20/10 scratch/dig
Flatness at L=633nm: L/4
Parallelism: 10 arc sec
Perpendicularity: <5 arc min
Optical damage threshold, GW/cm ² : >0.05, t=10ns, @1064nm
Maximum available aperture: 15x15 mm
Maximum length: 15 mm
Aperture tolerance: +0.1/-0 mm
Length tolerance: +0.1/-0 mm

When Ordering please specify
Application: [e.g. SHG@1064nm; OPO@532nm; DFG@(1064nm & 532nm), etc]
Orientation theta and phi degrees in range of 0-90 deg
Phase Matching: I Type (e-oo) or II Type (e-oe)
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	For	Height (mm)	Width (mm)	Length (mm)	Theta	Phi	Application	Coating	Price	Currency
NLC41	Nonlinear Crystal	AgGaS2		5	5	1.3	39	0	DFG	AR @ 1,2 – 2,4 / 2,4 – 12 mkm	117,000	JPY
NLC42	Nonlinear Crystal	AgGaS2		5	5	2	42	0	DFG	AR @ 1,2 – 2,2 / 4 – 14 mkm	126,000	JPY
NLC43	Nonlinear Crystal	AgGaS2		5	5	3	39	0	DFG	AR @ 1,2 – 2,4 / 2,4 – 12 mkm	132,000	JPY
NLC48	Nonlinear Crystal	AgGaS2		6	6	1	39		DFG	AR@(s1200-1480,p1650-2250nm)/AR@2.6-10µm,	189,000	JPY
NLC47	Nonlinear Crystal	AgGaS2		9	7	5	45		DFG	AR@1.064-1.8 micron / 2.4-11 micron	312,000	JPY
NLC49	Nonlinear Crystal	AgGaS2		10	10	2	41		DFG	1,8 µm – 2,60 µm -> 5,8 µm + broad AR coating	207,000	JPY
NLC50	Nonlinear Crystal	AgGaS2		10	10	5	45	45	OPO	AR@1.064 um&AR@1.2-1.45um on the two faces	597,000	JPY
NLC44	Nonlinear Crystal	AgGaS2		10	10	10	45	0		AR@1064nm +1450-1170nm on both faces	1,047,000	JPY
NLC46	Nonlinear Crystal	AgGaS2		10	10	20	33.5			1,92 µm – 2,39 µm -> 10 µm 1,68 µm – 2,09 µm -> 8,46 µm + broad AR coating,	1,671,000	JPY
NLC45	Nonlinear Crystal	AgGaS2		12	8	20	42		DFG	1,8 µm – 2,60 µm -> 5,8 µm + broad AR coating,	1,641,000	JPY

3.1.5. AgGaSe2 Nonlinear Crystals

Code	Name	Material	For	Height (mm)	Width (mm)	Length (mm)	Theta	Phi	Application	Coating	Price	Currency
NLC52	Nonlinear Crystal	AgGaSe2		5	5	2	55			AR@1200-2200nm; S2: AR@4000-14000nm	144,000	JPY
NLC53	Nonlinear Crystal	AgGaSe2		8.5	5	1	52			uncoated	228,000	JPY
NLC51	Nonlinear Crystal	AgGaSe2		10	10	2	48.8		DFG	1.87 +m – 2.47 +m -> 7,7 + broad AR coating	268,500	JPY
NLC54	Nonlinear Crystal	AgGaSe2		12	10	20	48.8		DFG	1.87 μm – 2.47 +m -> 7,7 μm + broad AR coating	2,427,000	JPY

3.2. Photorefractive Crystals

3.2.1. SBN Photorefractive Crystals



Strontium-Barium Niobate is an excellent optical and photorefractive material. Nominally pure and doped by Ce, Cr, Co, Fe. SBN crystals of different compositions are used in electro-optics, acousto-optics, photorefractive non-linear optics. A new growing technique (Stepanov Method)(*) provides excellent optical quality single crystals, free of growth striations, inclusions and other inhomogeneities, as well as definite cross section and linear dimensions up to 80 mm. SBN crystalline elements meet the requirements for different applications. Based on this unique crystal growing technique, large high quality SBN optical elements and photorefractive cells are available.

Code	Name	Mat.	Type	Height (mm)	Width (mm)	Len. (mm)	Description	Price	Curr.
SBN11	Crystal	SBN	SBN61 (nominally un-doped) crystal	5	5	0.5	Crystal has rough polish on the two 5*5mm faces .	147,000	JPY
SBN6	Crystal	SBN	SBN61 (nominally un-doped) crystal	5	5	1	Crystal has rough polish on the two 5*5mm faces.	132,000	JPY
SBN12	Crystal	SBN	SBN61 Doped with 0,1 wt% CeO2	5	5	5	Four faces polished, poled.	201,000	JPY
SBN5	Crystal	SBN	SBN75 (undoped) crystals	5	5	5	All six faces polished and poled.	258,000	JPY
SBN3	Crystal	SBN	SBN61, 0.75wt% La2O3 + 0.002wt% CeO2 doping	5	7.5	5	Crystal is poled and with all faces optical polished.	354,000	JPY
SBN2	Crystal	SBN	SBN: 60: 0.002 wt.%CeO2	5	10	5	Crystal is poled and with all faces optical polished.	447,000	JPY
SBN9	Crystal	SBN	SBN:61: 0.002wt.%CeO2	5	20	5	All surfaces polished, with electrodes.	657,000	JPY
SBN1	Crystal	SBN	SBN75, Cerium doping 0.015 wt% CeO2	7.5	6.5	7.5	All six faces polished and Crystal poled.	366,000	JPY
SBN13	Crystal	SBN	SBN60 Doping CeO2 0.08 wt	8	8	8	four faces polished, "C" axis on the two unpolished faces.	366,000	JPY
SBN14	Crystal	SBN	SBN61 crystal, 0.002% Ce doping	10	5	5	Crystal cut/polished suitable for laser application on the two surfaces.	435,000	JPY
SBN8	Crystal	SBN	SBN61 Doped with 0,02 wt% CeO2	14.8	6	5	6 faces polished.	492,000	JPY
SBN4	Crystal	SBN	SBN60: Ce doped 0.01 wt % CeO2 crystal	20	5.5	20	Unpoled, unpolished.	855,000	JPY
SBN15	Crystal	SBN	SBN60 crystals, 0.01 wt % CeO2	20	20	1.5	Crystal polished on 20*20mm fa	672,000	JPY
SBN10	Crystal	SBN	SBN doped with cerium, 0.002% wt. CeO2	23	5	5	All surfaces polished, with electrodes.	684,000	JPY
SBN7	Crystal	SBN	SBN:60 doped with cerium, 0.002% wt. CeO2	25	5	5	All surfaces polished, uncoated.	825,000	JPY

4. Laser Crystals

4.1. Nd:YAG Laser Crystals



Nd:YAG crystal is the most widely used solid-state laser material today. We offer periodic concentrated crystals. Now, we are able to stably supply Nd:YAG rods with high optical homogeneity, high damage threshold, consistent performance and high processing accuracy. Also we offer periodic concentrated crystals. YAG:Nd have three regions the first one about 5-7 mm in length has low (0.3-0.4 %) Nd-concentration, the middle part contain 1 -1.3 mol.% Nd, the length about 10-12 mm and the last part is like the first one.

Standard specifications

Shape: rectangular or round
 Nd-concentration: 0.5-1.4 mol.% or periodic concentrated
 End surfaces: Righth angle cut or Brewster cut

When Ordering please specify

Shape: rectangular or round
 Dimensions: (width x height) or diameter, length mm
 Nd-concentration: 0.5-1.4 mol.% or periodic concentrated
 End surfaces: Righth angle cut or Brewster cut
 Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC15	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3	3	3	Rect.		S1: AR@808 HR@1064 S2: HT@808AR@1064	73,800	JPY
LAC16	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3	3	4	Rect.		S1: AR@808 HR@1064 S2: HT@808AR@1064	75,000	JPY
LAC2	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	2		70	Round		AR/AR@1064 nm	93,000	JPY
LAC3	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3		75	Round		AR/AR@1064 nm	96,000	JPY
LAC4	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3		80	Round		AR/AR@1064 nm	111,000	JPY
LAC5	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3		95	Round		AR/AR@1064 nm	117,000	JPY
LAC6	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	3		104	Round		AR/AR@1064 nm	144,000	JPY
LAC12	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	4		50	Round		AR/AR@1064 nm	97,500	JPY
LAC7	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	4		104	Round		AR/AR@1064 nm	147,000	JPY
LAC13	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	5		20	Round		AR/AR@1064 nm	90,000	JPY
LAC14	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	5		50	Round		AR/AR@1064 nm	129,000	JPY
LAC8	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	5		90	Round		AR/AR@1064 nm	148,500	JPY
LAC9	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	5		152	Round		AR/AR@1064 nm	183,000	JPY
LAC1	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	6.3		75	Round		AR/AR@1064 nm	144,000	JPY
LAC10	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	6.35		100	Round		AR/AR@1064 nm	186,000	JPY
LAC11	Crystal	Nd:YAG	0,5-1,1 Nd atm.%	8		120	Round		AR/AR@1064 nm	255,000	JPY

4.2. Nd:YVO4 Laser Crystals



Nd: YVO₄ is one of the best laser host crystals for diode pumped solid state.

Neodymium doped yttrium vanadate (Nd:YVO₄) is one of the most promising commercially available diode pumped solid state laser materials. It has high laser induced damage threshold and good mechanical in addition to optical properties. Its large stimulated emission cross-section and high absorption of pump laser make it a right crystal for pocket baby laser.

Nd: YVO₄ can produce IRgreen and blue laser by using minor different set-up. A broad absorption band centered at 807 nm and favourable mechanical properties make Nd:YVO₄ well suited for compact, efficient, high power diode-pumped lasers. Natural birefringence gives rise to a highly polarized output at 1064.3 and 1342 nm.

Standard specifications

Shape: rectangular or round
 Nd-concentration: 0.3-1 mol.% or other
 End surfaces: Righth angle cut or Brewster cut

When Ordering please specify

Shape: rectangular or round
 Dimensions: (width x height) or diameter, length mm
 Nd-concentration: 0.3-1 mol.% or other
 End surfaces: Righth angle cut or Brewster cut
 Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC21	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	1	1	1	Rectangular		S1: AR@808 S2: AR@1064	39,000	JPY
LAC17	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	3	3	1	Rectangular		S1: HR914, AR808, AR1064, AR1340nm S2: HR1064, AR914	84,600	JPY
LAC18	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	3	3	3	Rectangular		S1: AR@808 HR@1064 S2: HT@808 AR@1064	78,000	JPY
LAC19	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	4	4	4	Rectangular		AR/AR @1064 nm	78,000	JPY
LAC22	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	5	22	2	Rectangular		S1: AR@808 S2: AR@1064	153,000	JPY
LAC20	Laser crystal	Nd:YVO4	0,1-4,0 Nd atm.%	3		27	Round		AR/AR @1064 nm	144,000	JPY

4.3. Ti:Sapphire Laser Crystals



Titanium doped Sapphire is the most widely used crystal generating ultra short femtosecond pulses, high gain and high power lasing.

Ti:Sapphire ($Al_2O_3:Ti_3+$) - titanium - doped sapphire crystals is the most widely used crystal for wavelength tunable lasers. It is also as excellent medium capable of generating ultra short pulse, high gain and high power lasing. Ti:Sapphire crystals can be effectively pumped by short pulse flashlamps in powerful laser systems. Also these crystals combine supreme physical and optical properties with broadest lasing range. Its indefinitely long stability and useful lifetime added to the lasing over entire band of 660-1050 nm challenge "dirty" dyes in variety of applications. Medical laser systems, lidars, laser spectroscopy, direct femtosecond pulse generation by Kerr-type mode-locking - there are few of existing and potential applications.

Standard specifications
End surfaces: Righth angle cut or Brewster cut

When Ordering please specify
Shape: rectangular or round
Dimensions: (width x height) or diameter, length mm
End surfaces: Righth angle cut or Brewster cut

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC23	Laser crystal	Ti:Sapphire		6	6	15	Rectangular	Right angle cut	uncoated	300,000	JPY
LAC24	Laser crystal	Ti:Sapphire		6		20	Round	Brewster angle cut	uncoated	306,000	JPY

4.4. Nd:KGW Laser Crystals



Nd:KGW crystals are low lasing threshold, highly efficient laser material exceptionally suitable for laser rangefinding applications.

The efficiency of Nd:KGW lasers is 3-5 times higher than the one of Nd:YAG lasers. Nd:KGW laser medium is one of the best choices ensuring effective laser generation at low pump energies (0.5 - 1 J).

Standard specifications
Shape: rectangular or round
End surfaces: Righth angle cut or Brewster cut

When Ordering please specify
Shape: rectangular or round
Dimensions: (width x height) or diameter, length mm
Nd-concentration
End surfaces: Righth angle cut or Brewster cut
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC26	Laser crystal	Nd:KGW	3,0-8,0 Nd atm.%	3		15	Round		AR/AR@1064 nm	66,000	JPY
LAC29	Laser crystal	Nd:KGW	3,0-8,0 Nd atm.%	3		35	Round		AR/AR@1064&1350 nm	108,000	JPY
LAC27	Laser crystal	Nd:KGW	3,0-8,0 Nd atm.%	4		50	Round		AR/AR@1064&1350 nm	111,000	JPY
LAC28	Laser crystal	Nd:KGW	3,0-8,0 Nd atm.%	5		50	Round		AR/AR@1064&1350 nm	129,000	JPY
LAC25	Laser crystal	Nd:KGW	3,0-8,0 Nd atm.%	6.25		75	Round		AR/AR@1064 nm	216,000	JPY

4.5. Er:KYW Laser Crystals

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC30	Laser crystal	Er:KYW	0,5-100,0 Er atm.%	5	5	20	Rectangular		uncoated	174,000	JPY

4.6. Yb:KYW/KGW Laser Crystals



Yb doped Potassium Gadolinium Tungstate single crystals are the new laser crystals for diode or laser pumped solid-state laser applications.

Yb:KGW crystals are used as lasing materials to generate ultrashort high power pulses. Yb:KGW can be used as ultrashort pulses amplifiers and these crystals are one of the best materials for high power thin disk lasers.

Standard specifications
Shape: rectangular or round
End surfaces: Righth angle cut or Brewster cut

When Ordering please specify
Shape: rectangular or round
Dimensions: (width x height) or diameter, length mm
Yb-concentration
End surfaces: Righth angle cut or Brewster cut
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Concentration	Height (mm)	Width (mm)	Length (mm)	Shape	End Surfaces	Coating	Price	Currency
LAC31	Laser crystal	Yb:KYW/KGW	typical Yb atm. 5%	5	5	2	Rectangular		AR/AR@980-1060nm	105,000	JPY

4.7. Passive Q-Switch Crystals



Passive Q-switches or saturable absorbers provide high power laser pulses without electro-optic Q-switches, thereby reducing the package size and eliminating a high voltage power supply. We offer a wide range of solid state saturable absorbers such as $\text{Co}_2^+:\text{MgAl}_2\text{O}_4$, $\text{Cr}_4^+:\text{YAG}$ or others.

4.7.1. Cr:YAG Passive Q-Switch Crystals

$\text{Cr}_4^+:\text{YAG}$ is an excellent passive Q-switch crystal for Nd and Yb doped lasers (especially for Nd:YAG, Nd:YLF or Yb:YAG), if the wavelength is in the range of 900-1200 nm.

When Ordering please specify

Shape: rectangular or round

Dimensions: (width x height) or diameter, length mm

Initial transmission

Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Height (mm)	Width (mm)	Length (mm)	Shape	Transmission	Coating	Price	Currency
PAC2	Passive Q-Switch Crystal	Cr:YAG	3	3	1.5	Rectangular	30-99%	AR/AR@1064 nm	73,800	JPY
PAC3	Passive Q-Switch Crystal	Cr:YAG	3	3	4	Rectangular	30-99%	AR/AR@1064 nm	75,000	JPY
PAC7	Passive Q-Switch Crystal	Cr:YAG	4	4	3	Rectangular	30-99%	S1: AR@1064 and HT@1572 S2: HR@1064, R>99,8% + PR85%+/-2%@1572	159,000	JPY
PAC1	Passive Q-Switch Crystal	Cr:YAG	4	4	7	Rectangular	30-99%	AR/AR@1064 nm	129,000	JPY
PAC5	Passive Q-Switch Crystal	Cr:YAG	4		7	Round	30-99%	AR/AR@1064 nm	93,000	JPY
PAC4	Passive Q-Switch Crystal	Cr:YAG	6		3	Round	30-99%	AR/AR@1064 nm	67,800	JPY
PAC6	Passive Q-Switch Crystal	Cr:YAG	8		0.3	Round	30-99%	AR/AR@1064 nm	138,000	JPY

4.7.2. Co:MgAl₂O₄ Passive Q-Switch Crystals

Co₂₊:MgAl₂O₄ is a relatively new material for saturable absorber passive Q-switching in lasers emitting from 1200 to 1600nm, in particular, for eye-safe 1540nm Er:glass laser. High absorption cross section of $3.5 \times 10^{-19} \text{ cm}^2$ permits Q-switching of Er:glass laser without intracavity focusing both with flash-lamp and diode-laser pumping. Negligible excited-state absorption results in high contrast of Q-switch, i.e. the ratio of initial (small signal) to saturated absorption is higher than 10. Finally, excellent optical, mechanical, and thermal properties of the crystal give an opportunity to design compact and reliable laser sources with this passive Q-switch.

Standard specifications
Shape: rectangular or round
Wavelength range: 1200-1600 nm
Damage threshold: 10 J/cm ²
Contrast: >10
Aperture: 5-12 mm
Thickness: 1-5 mm
Initial transmittance: 30-99%
AR coatings at 1540nm or other particular wavelengths

When Ordering please specify
Shape: rectangular or round
Dimensions: (width x height) or diameter, length mm
Initial transmission 30-99%
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Height (mm)	Width (mm)	Length (mm)	Shape	Transmission	Coating	Price	Currency
PAC11	Passive Q-Switch Crystal	Co:MgAl ₂ O ₄	6			Round	80%	AR/AR@1350 and 1540	132,000	JPY
PAC12	Passive Q-Switch Crystal	Co:MgAl ₂ O ₄	8			Round	92%	AR/AR@1350 and 1540	118,500	JPY
PAC10	Passive Q-Switch Crystal	Co:MgAl ₂ O ₄	9			Round	90%	AR/AR@1350 and 1540	126,000	JPY
PAC13	Passive Q-Switch Crystal	Co:MgAl ₂ O ₄	12.7			Round	90%	AR/AR@1350 and 1540	142,500	JPY

4.7.3. V:YAG Passive Q-Switch Crystals

V₃₊:YAG is a relatively new material for saturable absorber passive Q-switching in lasers emitting from 1060 to 1440nm, in particular, for 1300nm Nd-lasers. Extremely high ground state absorption (GSA) cross section of $7 \times 10^{-18} \text{ cm}^2$ near 1300nm and negligible excited state absorption (ESA) permits Q-switching of 1300 and 1440nm Nd-lasers without intracavity focusing both with flash-lamp and diode-laser pumping. Negligible excited-state absorption results in high contrast of Q-switch, i.e. the ratio of initial (small signal) to saturated absorption is higher than 10. Finally, excellent optical, mechanical, and thermal properties of the host crystal give an opportunity to design compact and reliable laser sources with this passive Q-switch.

Standard specifications
Shape: rectangular or round
Wavelength range: 1000-1450 nm
Damage threshold: 7-10 J/cm ²
Contrast: >10
Aperture: 5-20 mm
Thickness: 1-5 mm
Initial transmittance: 50-99%

When Ordering please specify
Shape: rectangular or round
Dimensions: (width x height) or diameter, length mm
Initial transmission 50-99%
Description of AR coatings on Side 1 and Side 2

Code	Name	Material	Height (mm)	Width (mm)	Length (mm)	Shape	Transmission	Coating	Price	Currency
PAC9	Passive Q-Switch Crystal	V:YAG	9			Round	94%	AR/AR@1350 and 1540	141,000	JPY
PAC8	Passive Q-Switch Crystal	V:YAG	9			Round	90%	AR/AR@1350 and 1540	141,000	JPY

5. Laser Accessories

5.1. Beam Expanders



Galilean and Keplerian Beam Expanders.

There are two basic types of simple beam expander. The Keplerian beam expander consists of a positive input lens and a positive objective. But the most common type of beam expander is derived from the Galilean telescope which usually has one negative input lens and one positive output lens. The input lens presents a virtual beam focus at the output. For low expansion ratios (1.3-20 times) the Galilean telescope is most often employed due to its simplicity, small package size and low cost.

We offer beamexpander made from two, three, or more sperical lens made from BK7, FS, UVFS or other glass. Also we produce beamexpanders with achromat lenses.

Beam Expanders for any wavelength from 266nm - 2000nm spectral range available on request!

Manually Adjustable 2x - 8x Laser Beam Expanders in four-element design with variable expansion factor 2x to 8x for variable wavelengths: 1064nm, 532nm and 355nm. Other wavelengths also available upon request.

Code	Name	Expansion ratio	Wavelength	Housing Diameter	Housing Length	Input aperture	Exit aperture	Price (1-2pcs)	Price (3-4pcs)	Price (5-8pcs)	Currency
BE-2X-355	Beam Expander	2x	355nm	25.4-38.1mm		>5mm	25mm	89,400	74,400	65,400	JPY
BE-3X-355	Beam Expander	3x	355nm	25.4-38.1mm		>5mm	25mm	89,400	74,400	65,400	JPY
BE-5X-355	Beam Expander	5x	355nm	25.4-mm		>3mm	18mm	91,500	76,500	67,500	JPY
BE-10X-355	Beam Expander	10x	355nm	25.4-mm		>3mm	18mm	97,200	82,200	73,200	JPY
BE-2X-532	Beam Expander	2x	532nm	25.4-38.1mm		>5mm	25mm	79,500	64,500	53,400	JPY
BE-3X-532	Beam Expander	3x	532nm	25.4-38.1mm		>5mm	25mm	79,500	64,500	53,400	JPY
BE-5X-532	Beam Expander	5x	532nm	25.4-mm		>3mm	18mm	82,200	67,200	55,800	JPY
BE-10X-532	Beam Expander	10x	532nm	25.4-mm		>3mm	18mm	87,000	72,000	59,700	JPY
BE-2X-1064-S	Beam Expander	2x	1064nm	25.4-38.1mm		>5mm	25mm	73,500	58,500	46,500	JPY
BE-3X-1064-S	Beam Expander	3x	1064nm	25.4-38.1mm		>5mm	25mm	73,500	58,500	46,500	JPY
BE-4X-1064-S	Beam Expander	4x	1064nm	25.4-38.1mm		>5mm	25mm	73,500	58,500	46,500	JPY
BE-5X-1064-S	Beam Expander	5x	1064nm	25.4mm		>3mm	18mm	76,200	59,700	46,500	JPY
BE-6X-1064-S	Beam Expander	6x	1064nm	25.4mm		>3mm	18mm	76,200	59,700	46,500	JPY
BE-8X-1064-S	Beam Expander	8x	1064nm	25.4mm	50mm	>3mm	18mm	79,800	64,200	52,500	JPY
BE-10X-1064-S	Beam Expander	10x	1064nm	25.4mm		>3mm	18mm	81,000	65,400	53,400	JPY
BE-12X-1064-S	Beam Expander	12x	1064nm	25.4mm		>3mm	18mm	81,000	65,400	53,700	JPY

5.2. Tunable Beam Expanders

Code	Name	Expansion ratio	Wavelength	Housing Diameter	Housing Length	Input aperture	Exit aperture	Price (1-2pcs)	Price (3-4pcs)	Price (5-8pcs)	Currency
BE-MA-355	Tunable Beam Expander	2x-8x	355nm	45-50mm	114-142mm	11mm	33mm	387,000	357,000	327,000	JPY
BE-MA-532	Tunable Beam Expander	2x-8x	532nm	45-50mm	114-142mm	11mm	33mm	294,000	264,000	238,500	JPY
BE-MA-1064	Tunable Beam Expander	2x-8x	1064nm	45-50mm	114-142mm	11mm	33mm	288,000	270,000	229,500	JPY

5.3. Laser Beam Visualizers



UVIRV and IRV Visualizers.

UVIRV model of Visualizer is intended for visualization of IR and UV coherent and incoherent radiation both from laser and other type-light sources. Visualizer requires no electrical power supply. It is an ecologically-safe ceramic tablet made of rare-earth element compounds. Visualizer provides luminescent conversion of the invisible IR and UV light to the red one, the dependence of the luminescent emission intensity on the visualized light intensity being nonlinear. IRV model of Visualizer is designed for conversion near IR radiation of pulsed and CW lasers in visible green light. The material of visualizer is special ceramic with anti-stokes luminophores. IRV tunable Q-switch laser visualizer is designed for conversion near IR radiation of pulsed lasers in visible radiation of second harmonic. The material of visualizer is organic polycrystals. Visualizer working surface diameter is 35 mm.

Spectral Ranges:

IRV: for 880-1070nm

UVIRV for 190-1600nm

Code	Name	Model	CA (mm)	Holder	Price (3-4pcs)	Price (5-10pcs)	Price (11-20pcs)	Price (21-50pcs)	Price (>50pcs)	Currency
VZ1	Beam Visualizer	IRV	10	Yes	16,200	14,700	12,900	12,300	9,900	JPY
VZ2	Beam Visualizer	IRV	25	Yes	18,600	16,800	15,000	14,100	11,400	JPY
VZ3	Beam Visualizer	IRV	35	Yes	20,400	18,300	16,200	15,300	12,600	JPY
VZ4	Beam Visualizer	UVIRV	10	Yes	19,200	17,400	15,300	14,400	12,000	JPY
VZ5	Beam Visualizer	UVIRV	25	Yes	23,400	21,000	18,600	17,700	14,400	JPY
VZ6	Beam Visualizer	UVIRV	35	Yes	25,800	23,100	20,700	19,500	15,900	JPY

5.4. Fast Shutter For High Power Laser



Laser shutter is designed for fast interruption or modulation of high power laser beams. Operation from UV to NIR and Middle Infrared (9000-12000nm) is available under request.

Standard specifications
Electrical power consumption, not more: 100/220V, 30W
Electronic box, max: 240x112x68mm
Shutter dimensions, max: 185x40x60mm
Control from external (0-5V) generator: Yes
Control via RS232 port, TTL signal: Yes
Laser power, max: 12W
Switching frequency range: 0-250Hz
Switching time (closed-open),: <3ms
Typiical open/closing front: 0.2ms
Laser beam polarization: Independent
Incident beam diameter, not more: 10mm

Code	Name	Description	Price	Currency
LS-10.6	Fast Laser Shutter for High Power Laser	Operation wavelength: 10600nm	1,260,000	JPY
LS-1064	Fast Laser Shutter for High Power Laser	Operation wavelength: 1064nm	987,000	JPY
LS-266	Fast Laser Shutter for High Power Laser	Operation wavelength: 266nm	1,056,000	JPY
LS-355	Fast Laser Shutter for High Power Laser	Operation wavelength: 355nm	1,047,000	JPY
LS-532	Fast Laser Shutter for High Power Laser	Operation wavelength: 532nm	996,000	JPY

株式会社 レーザーシステム

〒063-0801 札幌市西区二十四軒1条4丁目1番10号

TEL: 011.613.6388 **FAX:** 011.613.6389

URL: www.lasersystems.co.jp