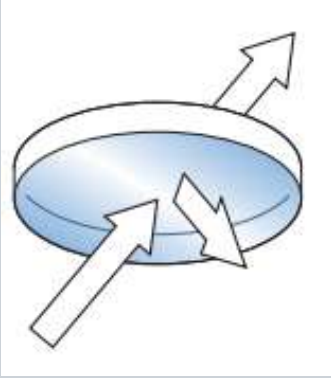
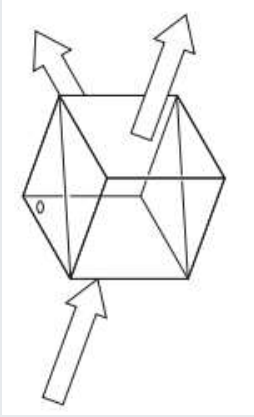
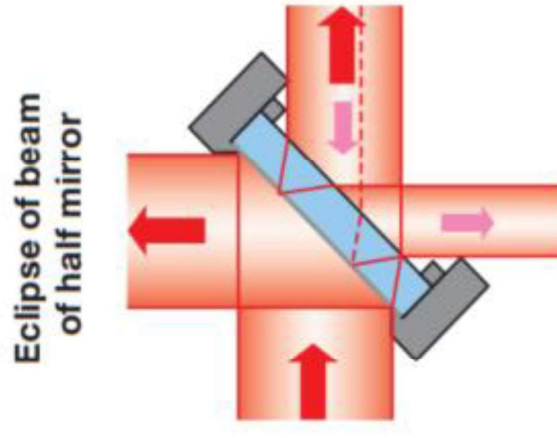
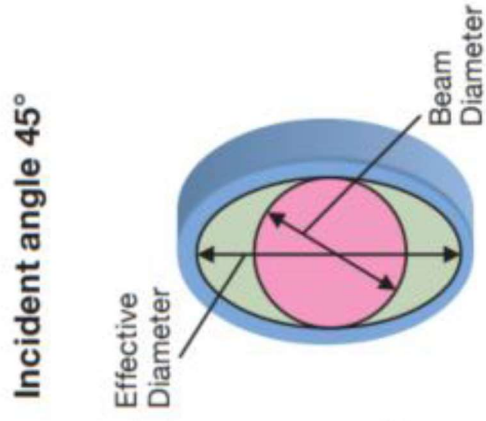
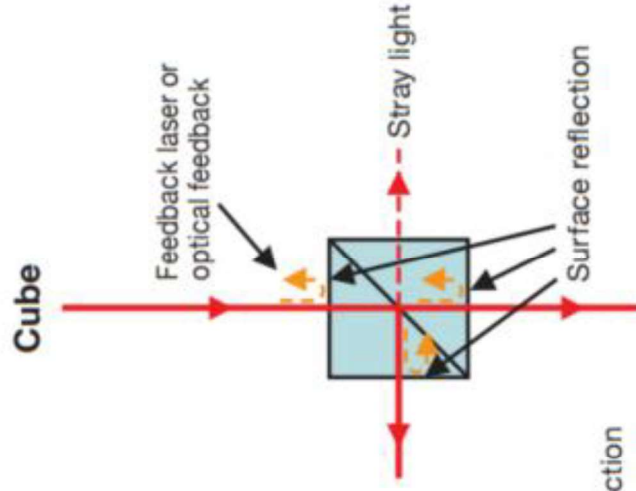
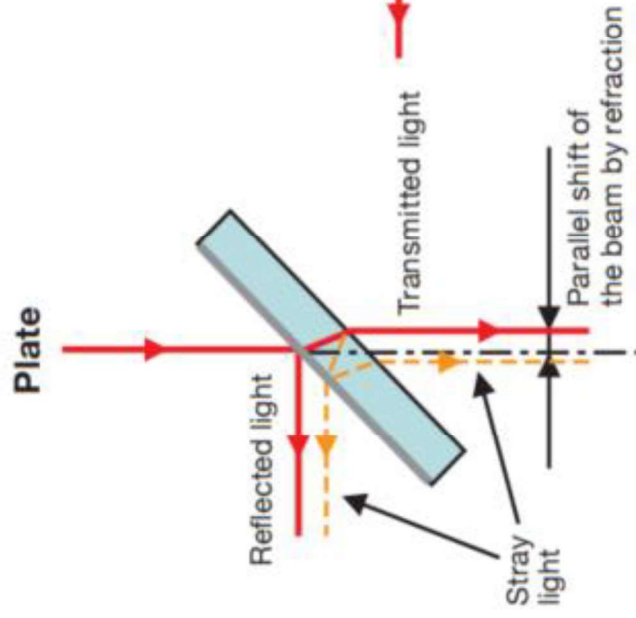


Beamsplitters

A beamsplitter is an optic that splits light into 2 directions.
The split ratio of light transmittance and reflectance is 1:1 and is called a half mirror.

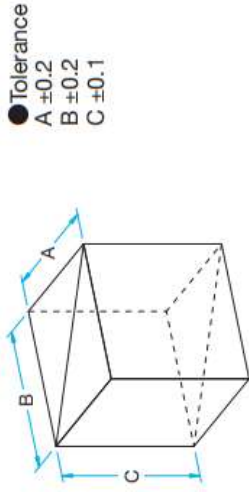
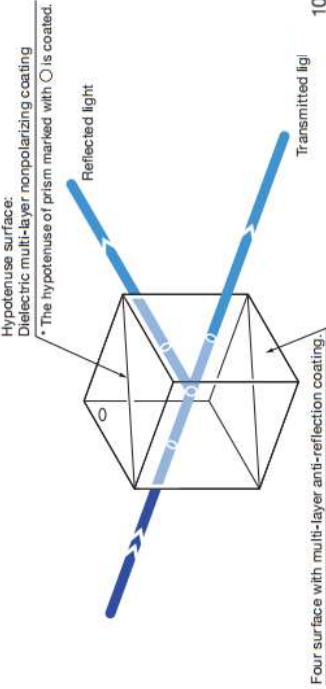
Type	Overview drawing	Features	Application
Plate		• Good fit for large beam size applications at a reasonable price. • Advantages : minimal back reflection, compact light-path as compared to cube type beamsplitters and low chromatic dispersion. • There may be a slight offset of the transmitted beam due to refraction. • For 45 degrees incident application, the clear aperture would be elliptical. • There may be some vignetting on angle of incidence.	Large beam size optical set up. Used in large beam size optical layouts. Used for monitoring optical systems, split beams into different wave_x0002_lengths, polarizations or intensities.
Cube		• Can be applied at its maximum effective area from any incident direction, easy to be applied in optical design and simple for optical set up adjustment High cost and high weight for large beam size application. • Feedback light at less than 1% may happen. • The transmittance light through the cube is longer than a plate type, the chromatic dispersion is higher. • Eliminates the problem of beam deviation.	For a compact size optical set up. For high accuracy experiment and optical set up usage.

Beamsplitters

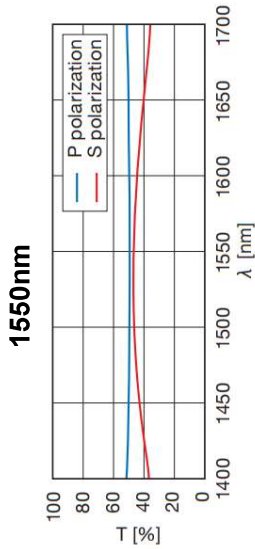
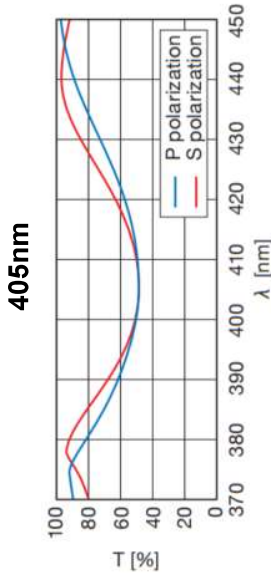
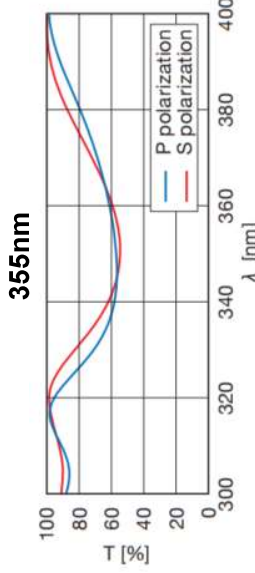
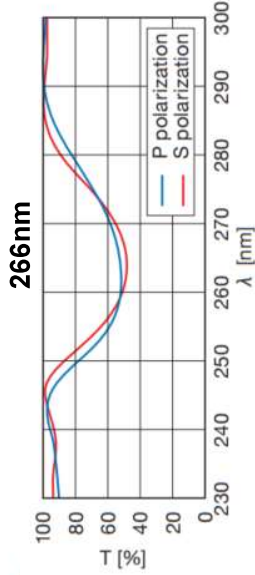


Non-polarizing Cube Half Mirrors | OP-HNPBS

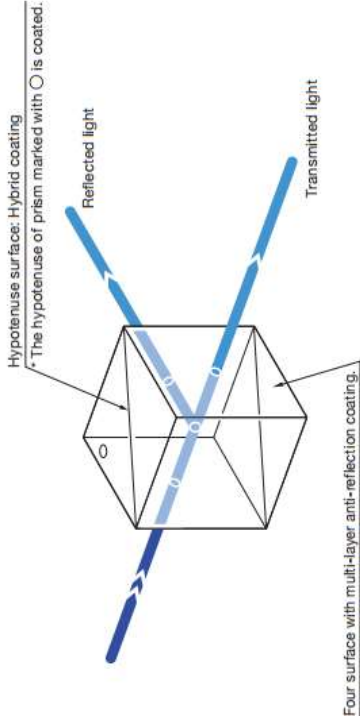
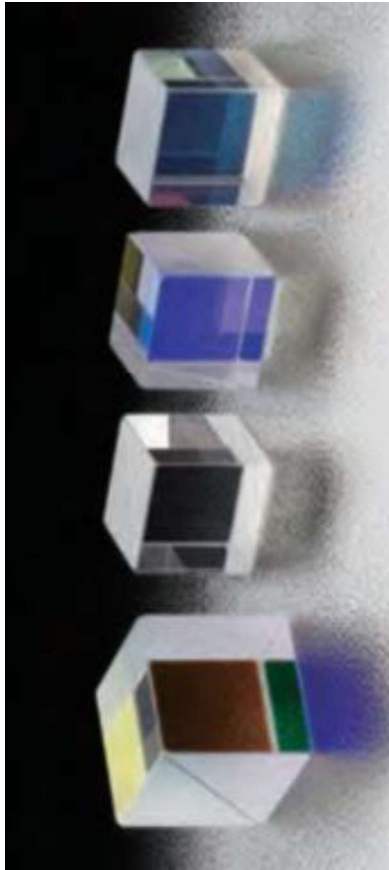
Half mirrors have an even 1:1 ratio of reflection and transmission in both linear polarized light and normal light source.



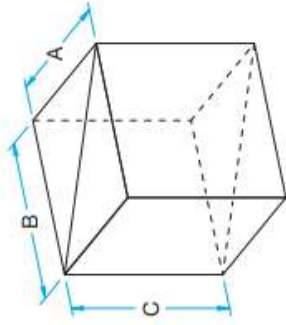
Material	Fused Silica
Surface flatness of substrate	$\lambda/4$
Beam Deviation	<5'
Coating	Hypotenuse Surface: Dielectric multi-layer nonpolarizing coating Four Surfaces: Multi-layer anti-reflection coating
Incident angle	0°
Divergence ratio (reflectance:transmittance)	1:1
Laser Damage Threshold	0.3J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10
Clear aperture	85% of Circle to actual dimension (80% of actual aperture for 5 and 7mm dimension (A=B=C) products.)



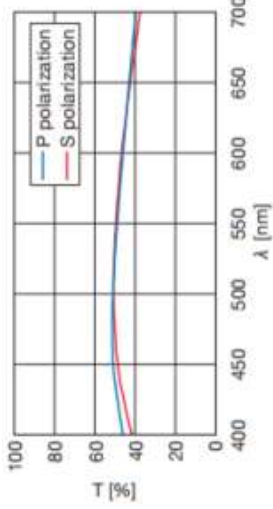
Hybrid Cube Half Mirrors | OP-BS-HB



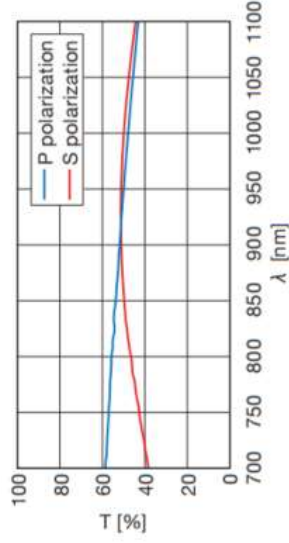
- Tolerance
- A ± 0.2
- B ± 0.2
- C ± 0.2



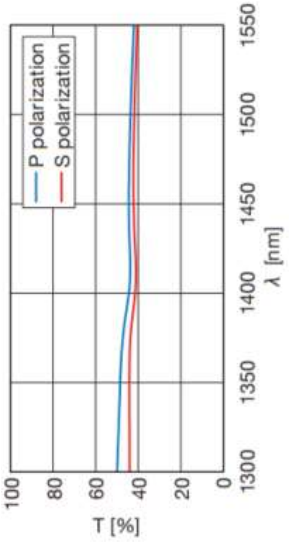
550 nm



NIR



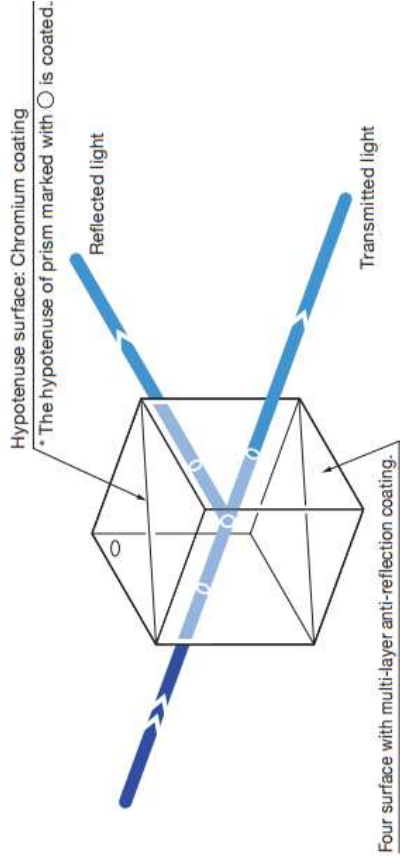
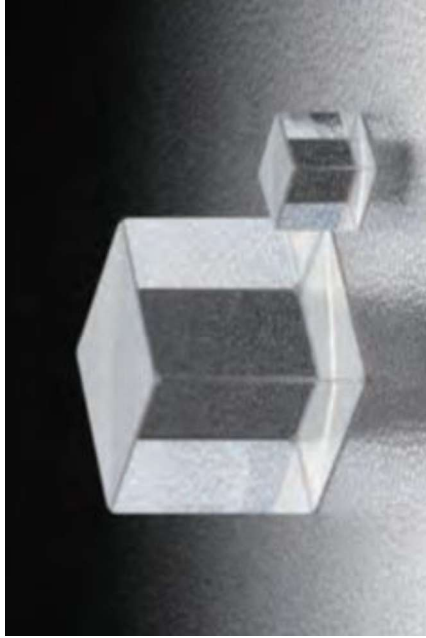
IR



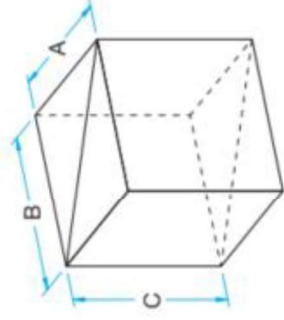
Material	Fused Silica
Surface flatness of substrate	$\lambda/4$
Beam Deviation	$<5'$
Coating	Hypotenuse surface:Hybrid coating (dielectric multi-layer coating and metallic coating) Four surfaces:Multi-layer anti-reflection coating
Incident angle	0°
Divergence ratio (reflectance:transmittance)	1:1
Laser Damage Threshold	0.3J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	40-20
Clear aperture	85% of actual dimension

Chromium Cube Half Mirrors

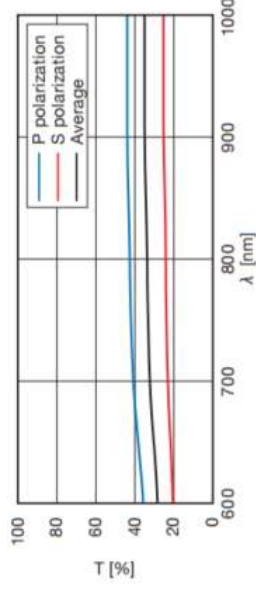
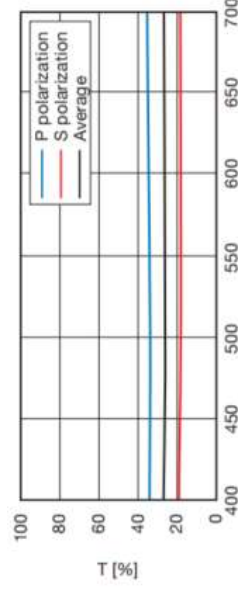
OP-BS-CH



● Tolerance
A ± 0.2
B ± 0.2
C ± 0.1



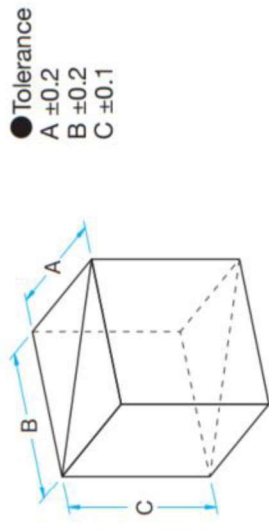
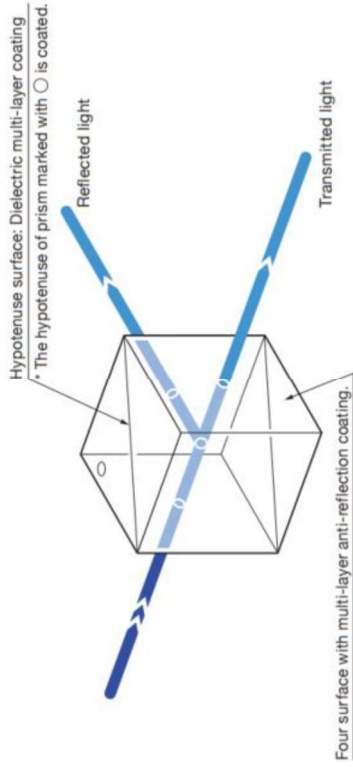
Material	Fused Silica
Surface flatness of substrate	$\lambda/4$
Beam Deviation	$<5'$
Coating	Hypotenuse surface:Chromium Four surfaces:Multi-layer anti-reflection coating
Incident angle	0°
Transmittance	Average $28\pm 5\%$ (The average value of the P-Polarization and the S-Polarization)
Divergence ratio (reflectance:transmittance)	1:1
Laser Damage Threshold	$0.3\text{J}/\text{cm}^2$ (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	40-20
Clear aperture	85% of actual aperture



Part Number	Wavelength Range [nm]	A=B=C [mm]
CSCH-10-550	400-700	10
CSCH-15-550	400-700	15
CSCH-20-550	400-700	20
CSCH-25-550	400-700	25
CSCH-30-550	400-700	30
CSCH-40-550	400-700	40
CSCH-50-550	400-700	50
CSCH-10-800	750-850	10
CSCH-15-800	750-850	15
CSCH-20-800	750-850	20

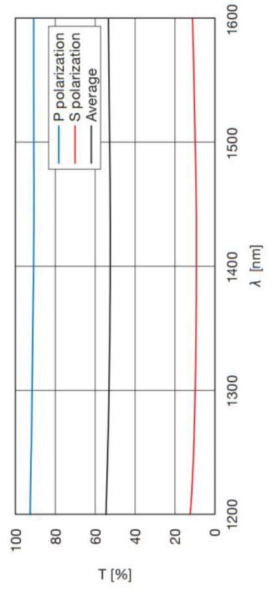
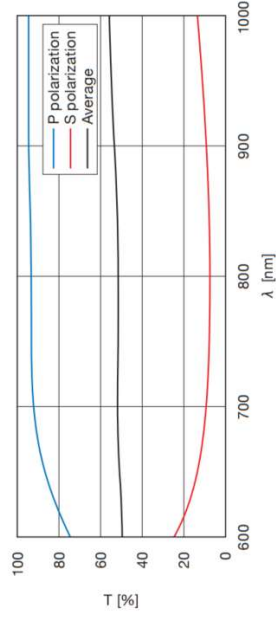
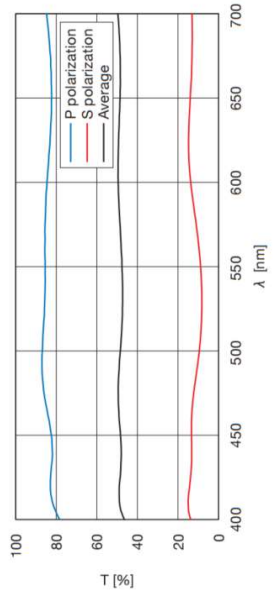
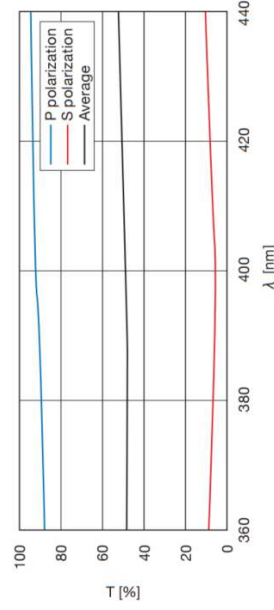
Dielectric Cube Half Mirrors

OP-BS-MH



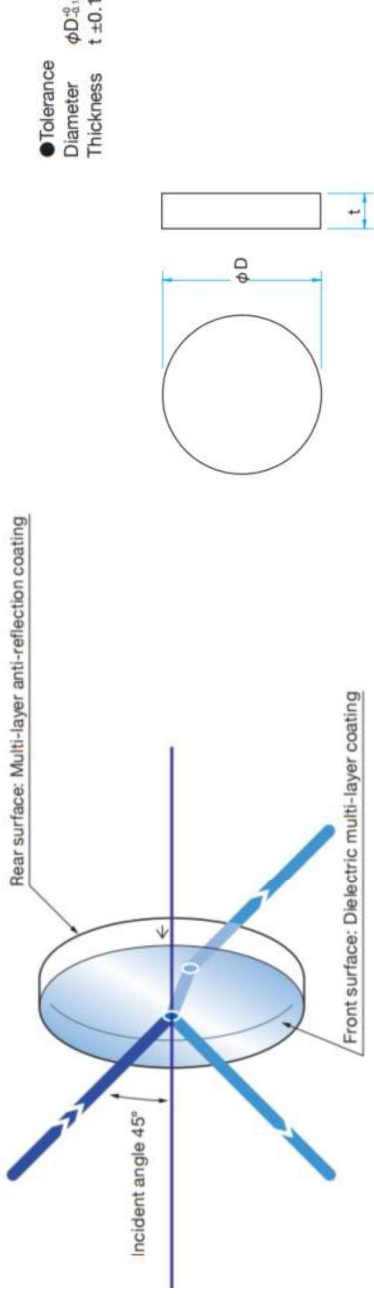
● Tolerance
A ± 0.2
B ± 0.2
C ± 0.1

Material	Fused Silica
Surface flatness of substrate	$\lambda/4$
Beam Deviation	$<5'$
Coating	Hypotenuse surface: Dielectric multi-layer coating Four surfaces: Multi-layer anti-reflection coating
Incident angle	0°
Divergence ratio (reflectance:transmittance)	1:1
Polarization of the incident beam	Unpolarized light or 45 degrees Linear polarization or circular polarization
Laser Damage Threshold	$0.3\text{J}/\text{cm}^2$ (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10
Clear aperture	85% of circle to actual dimension (80% of actual aperture for 5 and 7mm dimension (A=B=C) products.)

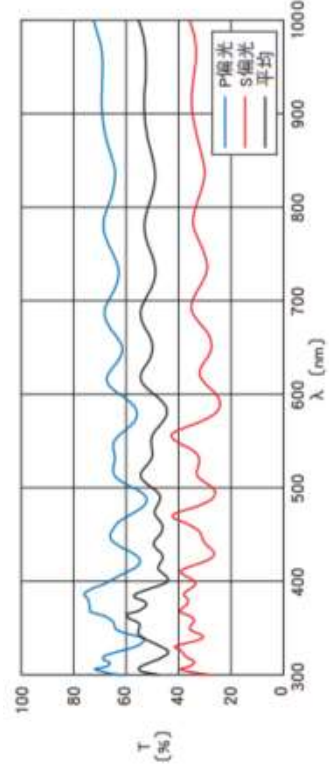
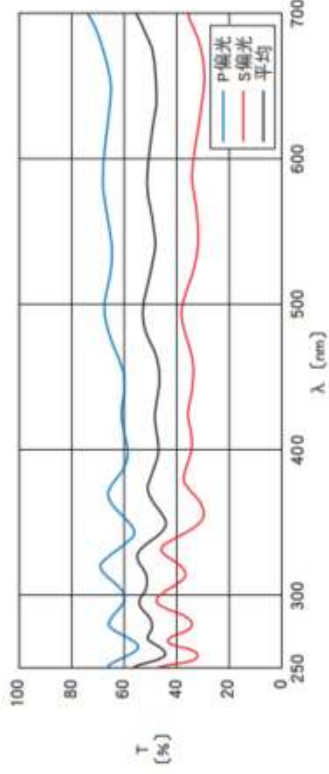


Broadband Dielectric Half Mirrors

OP-BS-WMH



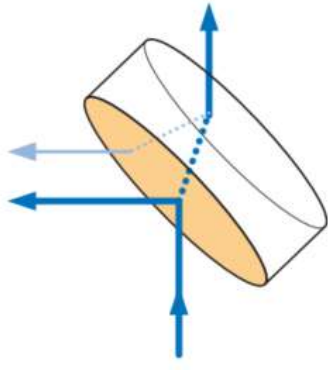
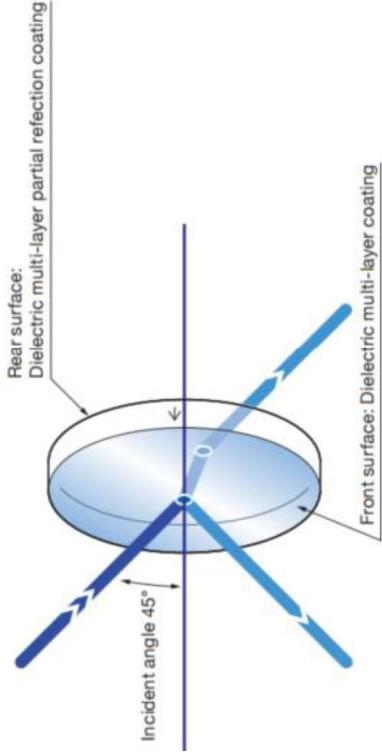
Part Number	Wavelength Range [nm]	Diameter ϕD [mm]	Thickness t [mm]	Material	Parallelism W	Transmittance (The average value of the P-Polarization and the S-Polarization) [%]	Laser Damage Threshold* [J/cm ²]
OPBSWMH-25.4C03-10-25/7	250-700	$\phi 25.4$	3	Fused Silica	<5"	Average 50 ± 10	0.5
OPBSWMH-30C03-10-25/7	250-700	$\phi 30$	3	Fused Silica	<5"	Average 50 ± 10	0.5
OPBSWMH-50C05-10-25/7	250-700	$\phi 50$	5	Fused Silica	<5"	Average 50 ± 10	0.5
OPBSWMH-25.4C03-10-3/10	300-1000	$\phi 25.4$	3	Fused Silica	<5"	Average 50 ± 10	0.5
OPBSWMH-30C03-10-3/10	300-1000	$\phi 30$	3	Fused Silica	<5"	Average 50 ± 10	0.5
OPBSWMH-50C05-10-3/10	300-1000	$\phi 50$	5	Fused Silica	<5"	Average 50 ± 10	0.5



* Laser pulse width 10ns, repetition frequency 20Hz

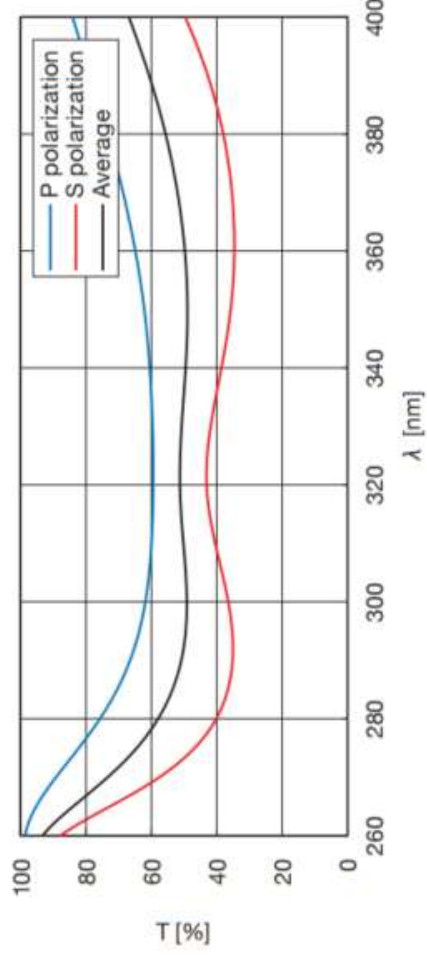
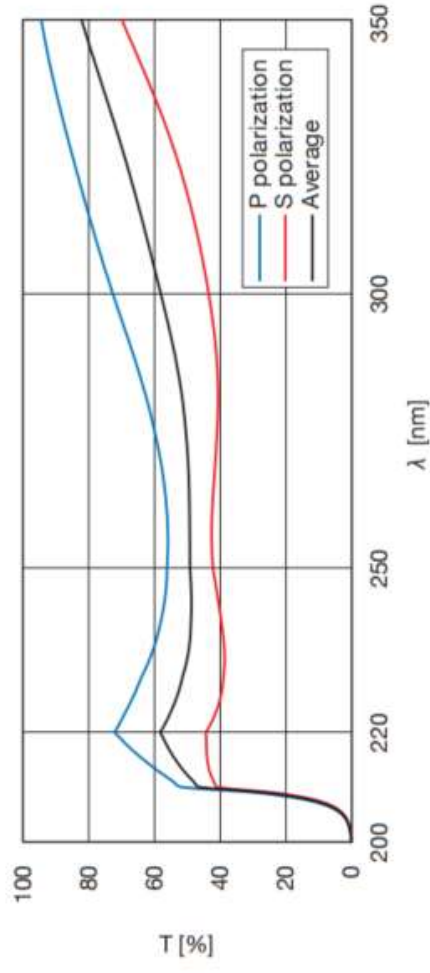
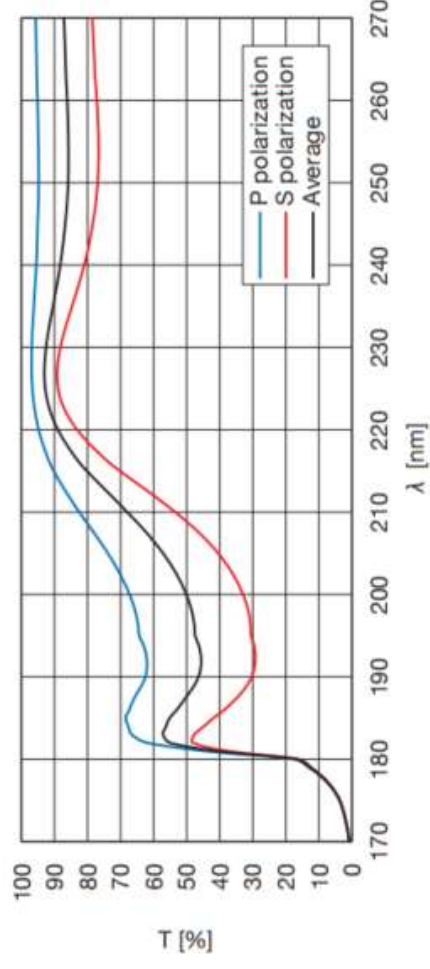
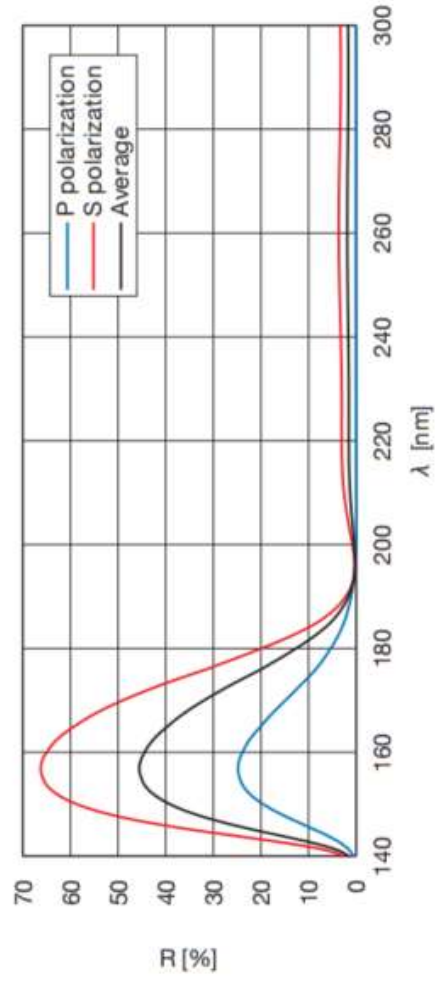
Laser Line Plate Half Mirrors

OP-BS-SMH



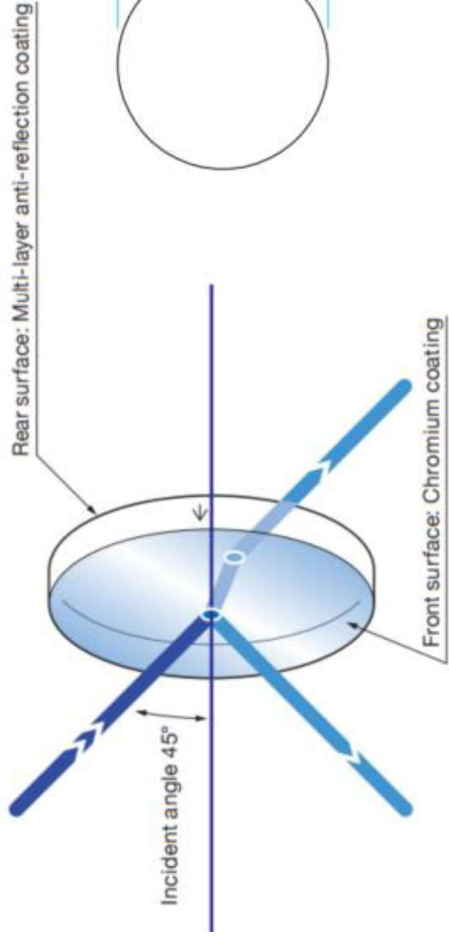
Material	Synthetic fused silica, CaF ₂
Surface Flatness	λ/10
Coating	Front surface: Dielectric multi-layer partial reflection coating Rear surface: Multi-layer anti-reflection coating
Incident angle	45°
Divergence ratio (reflectance:transmittance)	1:1
Surface Quality (Scratch-Dig)	10-5(PSMH-157:40-20)
Clear aperture	90% of actual aperture

Part Number	Wavelength Range [nm]	Diameter φD [mm]	Thickness t [mm]	Material	Parallelism W	Reflectance:R Transmittance:T (The average value of the P-Polarization and the S-Polarization) [%]	Laser Damage Threshold* [J/cm ²]
OPBSSMH-30C03-P-157	157	φ30	3	CaF ₂	<3'	R=40±10	0.5
OPBSSMH-50C05-P-157	157	φ50	5	CaF ₂	<3'	R=40±10	0.5
OPBSSMH-30C03-10-193	193	φ30	3	Fused Silica	<5"	T=45±5	1
OPBSSMH-30C05-10W-193	193	φ30	5	Fused Silica	1°±5'	T=45±5	1
OPBSSMH-50C05-10-193	193	φ50	5	Fused Silica	<5"	T=45±5	1
OPBSSMH-50C08-10W-193	193	φ50	8	Fused Silica	1°±5'	T=45±5	1
OPBSSMH-30C03-10-248/266	248-266	φ30	3	Fused Silica	<5"	T=50±3	2
OPBSSMH-30C05-10W-248/266	248-266	φ30	5	Fused Silica	1°±5'	T=50±3	2
OPBSSMH-50C05-10-248/266	248-266	φ50	5	Fused Silica	<5"	T=50±3	2
OPBSSMH-50C08-10W-248/266	248-266	φ50	8	Fused Silica	1°±5'	T=50±3	2
OPBSSMH-30C03-10-308/355	308-355	φ30	3	Fused Silica	<5"	T=Average 50±5	2
OPBSSMH-30C05-10W-308/355	308-355	φ30	5	Fused Silica	1°±5'	T=Average 50±5	2
OPBSSMH-50C05-10-308/355	308-355	φ50	5	Fused Silica	<5"	T=Average 50±5	2
OPBSSMH-50C08-10W-308/355	308-355	φ50	8	Fused Silica	1°±5'	T=Average 50±5	2



Chromium Plate Half Mirrors

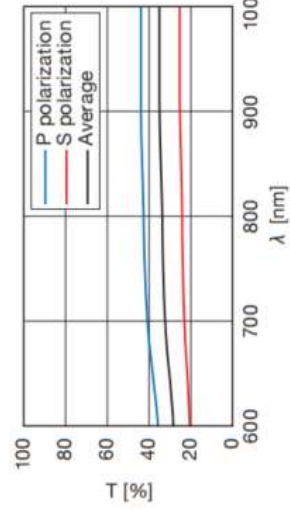
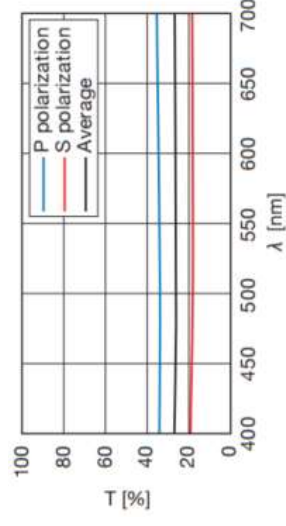
OP-BS-SCH



● Tolerance
≤ φ50
Diameter φD_{-0.1}
Thickness t ±0.1

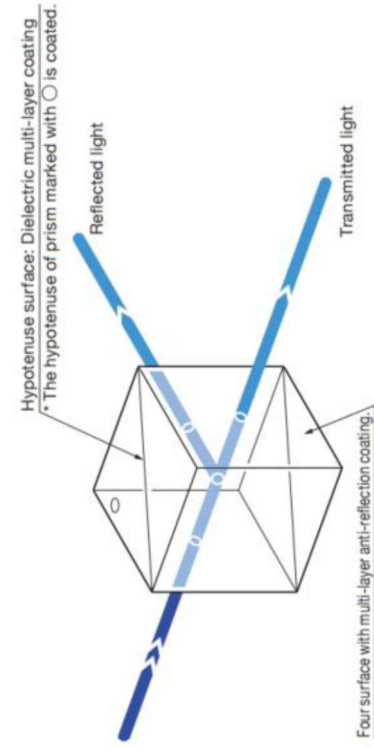
Material	BK7
Surface Flatness	λ/10
Coating	Front surface: Chromium Rear surface: Multi-layer anti-reflection coating
Incident angle	45°
Transmittance	Average 30±5% (The average value of the P-Polarization and the S-Polarization)
Divergence ratio (reflectance:transmittance)	1:1
Laser Damage Threshold	0.25J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	40-20
Clear aperture	90% of actual aperture

Part Number	Wavelength Range [nm]	Diameter φD [mm]	Thickness t [mm]	Parallelism W
OPBSSCH-25.4C03-10-550	400-700	φ25.4	3	<5"
OPBSSCH-30C03-10-550	400-700	φ30	3	<5"
OPBSSCH-30C05-10W-550	400-700	φ30	5	1°±5'
OPBSSCH-40C04-10-550	400-700	φ40	4	<5"
OPBSSCH-50C05-10-550	400-700	φ50	5	<5"
OPBSSCH-50C08-10W-550	400-700	φ50	8	1°±5'
OPBSSCH-60C06-10-550	400-700	φ60	6	<5"
OPBSSCH-100C10-10-550	400-700	φ100	10	<5"
OPBSSCH-100C15-10W-550	400-700	φ100	15	1°±5'
OPBSSCH-25.4C03-10-800	750-850	φ25.4	3	<5"
OPBSSCH-30C03-10-800	750-850	φ30	3	<5"
OPBSSCH-30C05-10W-800	750-850	φ30	5	1°±5'
OPBSSCH-50C05-10-800	750-850	φ50	5	<5"
OPBSSCH-50C08-10W-800	750-850	φ50	8	1°±5'

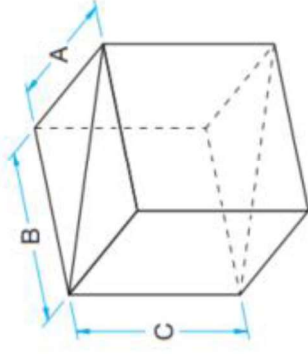


Dielectric Cube Beamsplitters

OP-BS-CSM

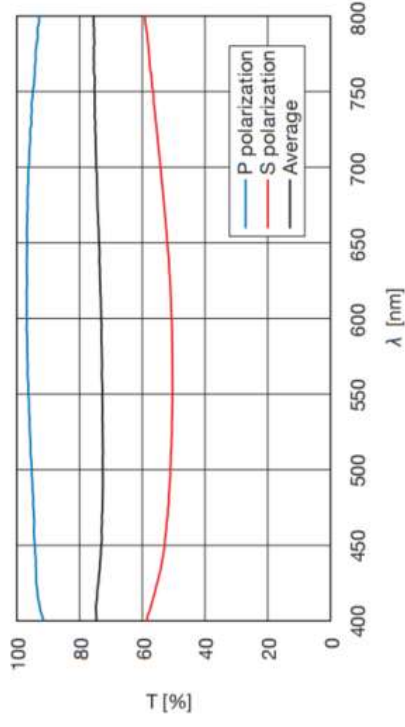
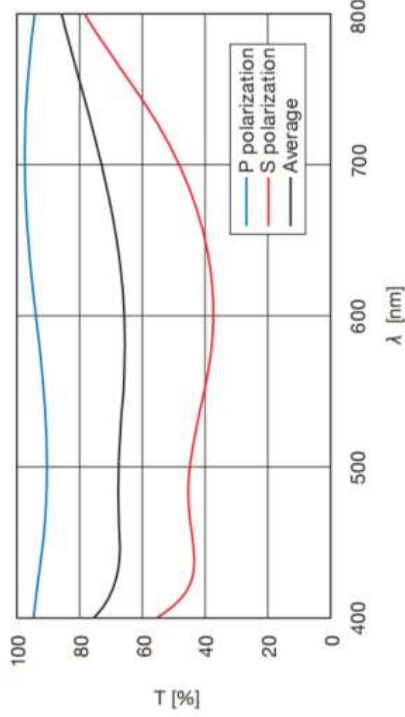


● Tolerance
A ± 0.2
B ± 0.2
C ± 0.1



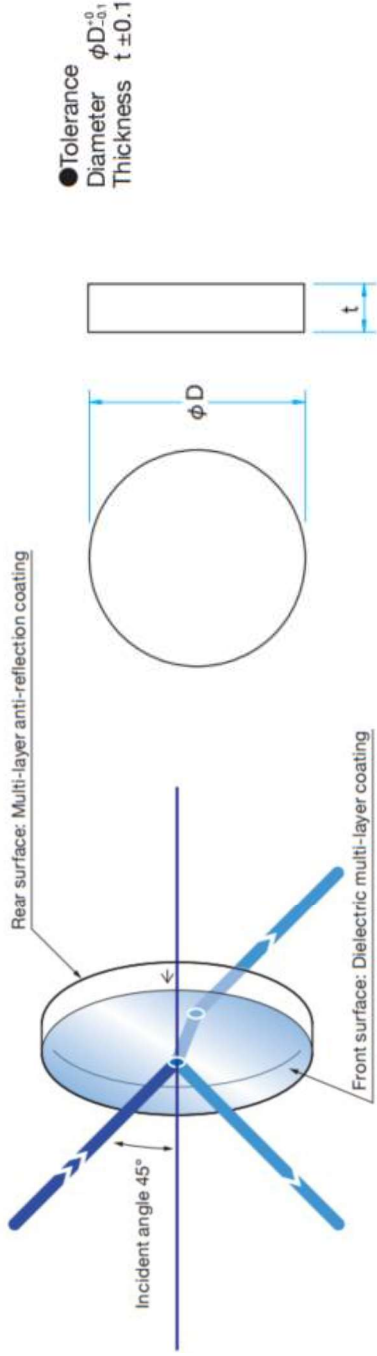
Material	BK7
Surface Flatness	$\lambda/4$
Wavelength Range	400-700nm
Beam Deviation	<5'
Coating	Hypotenuse surface: Dielectric multi-layer coating Four surfaces: Multi-layer anti-reflection coating
Incident angle	0°
Polarization of the incident beam	Unpolarized light or 45 degrees Linear polarization or circular polarization
Laser Damage Threshold	0.3J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10
Clear aperture	85% of actual aperture

Part Number	Reflectance: Transmittance	A=B=C [mm]	Transmittance at 550nm [%]	Transmittance at 400-700nm [%]
OPBSCSM33-10-550	1:2	10	67 $\pm$ 5	<80
OPBSCSM33-20-550	1:2	20	67 $\pm$ 5	<80
OPBSCSM25-10-550	1:3	10	75 $\pm$ 5	<90
OPBSCSM25-20-550	1:3	20	75 $\pm$ 5	<90



Dielectric Plate Beamsplitters

OP-BS-PSM



Material	BK7
Surface Flatness	$\lambda/10$
Coating	Front surface:Dielectric multi-layer coating Rear surface:Multi-layer anti-reflection coating
Wavelength Range	400-700nm
Incident angle	45°
Laser Damage Threshold	2.1J/cm ² (Laser pulse width 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	10-5
Clear aperture	90%of actual aperture

Part Number	Reflectance:Transmittance	Diameter ϕD [mm]	Thickness [mm]	Parallelism W	Transmittance at 550nm [%]	Transmittance at 400 - 700nm [%]
OPBSPSM33-25.4C03-10-550	1:2	$\phi 25.4$	3	<5"	67 ± 3	<80
OPBSPSM33-30C03-10-550	1:2	$\phi 30$	3	<5"	67 ± 3	<80
OPBSPSM33-30C05-10W-550	1:2	$\phi 30$	5	$1^\circ \pm 5'$	67 ± 3	<80
OPBSPSM25-25.4C05-10-550	1:3	$\phi 25.4$	3	<5"	75 ± 3	<90
OPBSPSM25-30C03-10-550	1:3	$\phi 30$	3	<5"	75 ± 3	<90
OPBSPSM25-30C05-10W-550	1:3	$\phi 30$	5	$1^\circ \pm 5'$	75 ± 3	<90

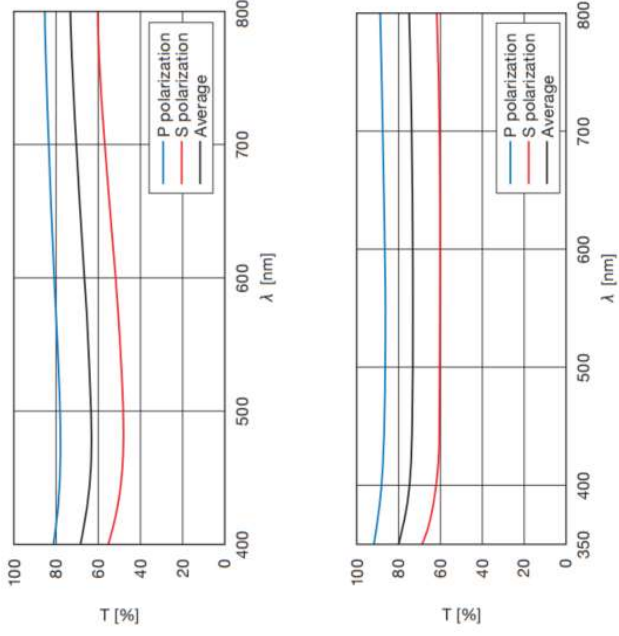
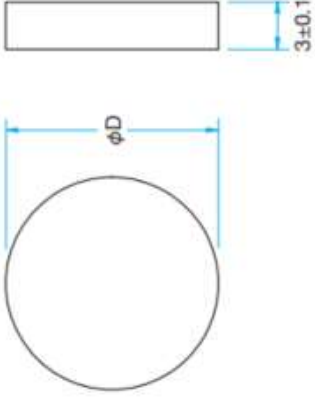
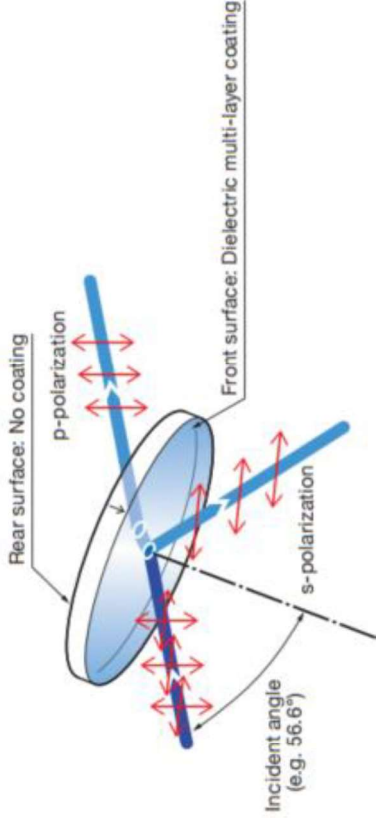


Plate Polarizing Beamsplitters | OP-P-BSC

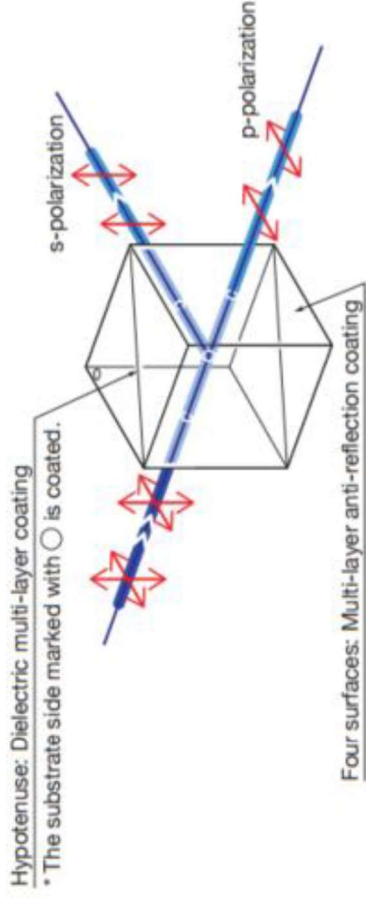
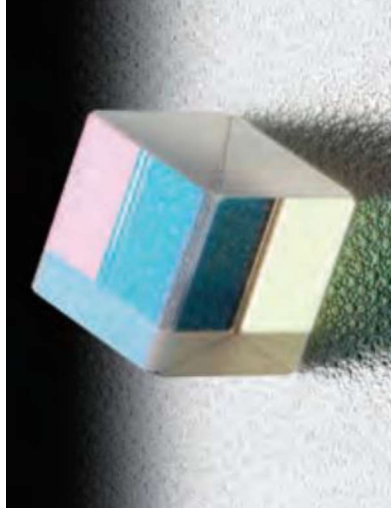


● Tolerance
Diameter $\phi D_{-0.1}^0$

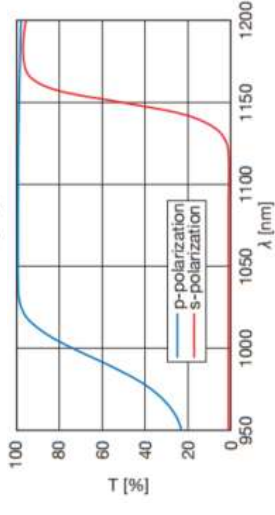
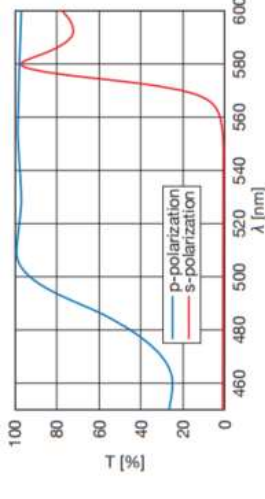
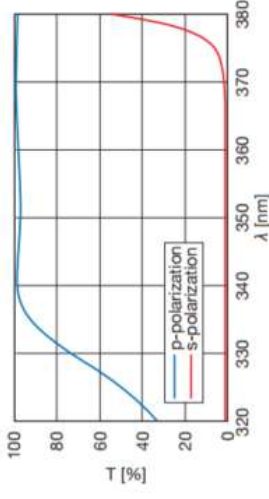
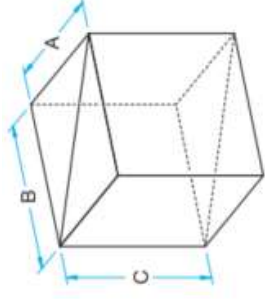
Material	Synthetic fused silica
Surface flatness of substrate	$\lambda/10$
Extinction ratio of transmission	Ts:Tp=1:200
Beam Deviation	<5"
Coating	Front surface:Dielectric multi-layer polarization coating Rear surface:No coating
Surface Quality (Scratch-Dig)	10-5
Clear aperture	90%of the diameter

Part Number	Wavelength Range [nm]	Diameter ϕD [mm]	Maximum diameter of transmitted beam [mm]	Material	Incident angle θ	Transmittance of P polarized light [%]	Reflectance of s polarized light [%]	Laser Damage Threshold* [J/cm ²]
OPPBSC-20C03-10-266	266	$\phi 20$	$\phi 10.0$	Fused silica	56.3	>92	>95	2
OPPBSC-25.4C03-10-266	266	$\phi 25.4$	$\phi 12.7$	Fused silica	56.3	>92	>95	2
OPPBSC-30C03-10-266	266	$\phi 30$	$\phi 15.0$	Fused silica	56.3	>92	>95	2
OPPBSC-20C03-10-355	355	$\phi 20$	$\phi 10.1$	Fused silica	55.9	>94	>95	2
OPPBSC-25.4C03-10-355	355	$\phi 25.4$	$\phi 13.1$	Fused silica	55.9	>94	>95	2
OPPBSC-30C03-10-355	355	$\phi 30$	$\phi 15.7$	Fused silica	55.9	>94	>95	2
OPPBSC-20C03-10-532	532	$\phi 20$	$\phi 9.9$	Fused silica	56.6	>95	>98	5
OPPBSC-25.4C03-10-532	532	$\phi 25.4$	$\phi 12.9$	Fused silica	56.6	>95	>98	5
OPPBSC-30C03-10-532	532	$\phi 30$	$\phi 15.4$	Fused silica	56.6	>95	>98	5
OPPBSC-20C03-10-1064	1064	$\phi 20$	$\phi 10.0$	Fused silica	56.4	>96	>98	7
OPPBSC-25.4C03-10-1064	1064	$\phi 25.4$	$\phi 12.9$	Fused silica	56.4	>96	>98	7
OPPBSC-30C03-10-1064	1064	$\phi 30$	$\phi 15.5$	Fused silica	56.4	>96	>98	7

High Power Polarizing Beamsplitters | OP-P-BSHP



- Tolerance
Length $A \cdot B \pm 0.2$
Height $C \pm 0.1$



Part Number	Wavelength Range [nm]	A=B=C [mm]	Material	Reflectance of S polarized light [%]	Laser Damage Threshold* [J/cm²]
OPPBSHP-10-355	355	10	Fused Silica	>97	2
OPPBSHP-12.7-355	355	12.7	Fused Silica	>97	2
OPPBSHP-15-355	355	15	Fused Silica	>97	2
OPPBSHP-20-355	355	20	Fused Silica	>97	2
OPPBSHP-10-532	532	10	Fused Silica	>97	5
OPPBSHP-12.7-532	532	12.7	Fused Silica	>97	5
OPPBSHP-15-532	532	15	Fused Silica	>97	5
OPPBSHP-20-532	532	20	Fused Silica	>97	5
OPPBSHP-10-1064	1064	10	Fused Silica	>97	7
OPPBSHP-12.7-1064	1064	12.7	Fused Silica	>97	7
OPPBSHP-15-1064	1064	15	Fused Silica	>97	7
OPPBSHP-20-1064	1064	20	Fused Silica	>97	7

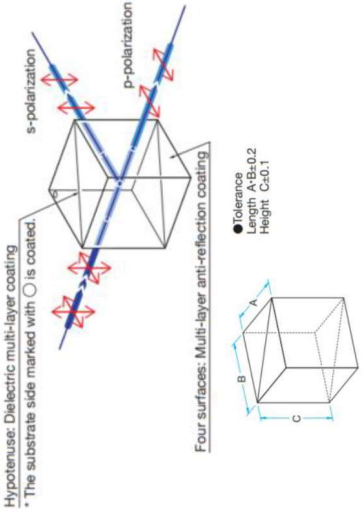
Material	Synthetic fused silica
Surface flatness of substrate	$\lambda/4$
Angular deviation of transmitted beam	$<10'$
Coating	Hypotenuse Surface: Dielectric multi-layer polarizing coating Four Surfaces: Narrowband multi-layer anti-reflection coating
Incident angle	0°
Transmittance of P polarized light	$>97\%$
Extinction ratio of transmission	Ts:Tp=1:200
Surface Quality (Scratch-Dig)	20-10
Clear aperture	Circle inscribed in a square of 85% of the dimensions

Broadband Polarizing Beamsplitters

OP-P-BSWB

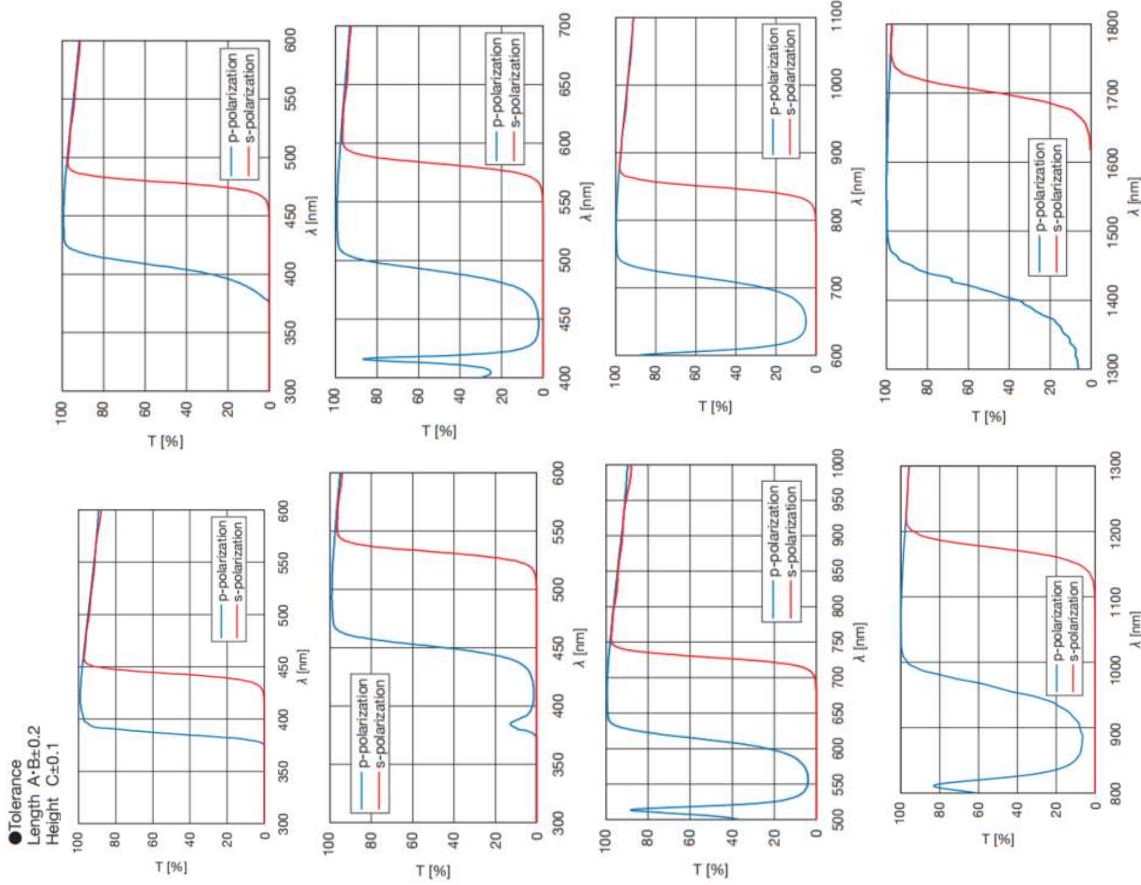
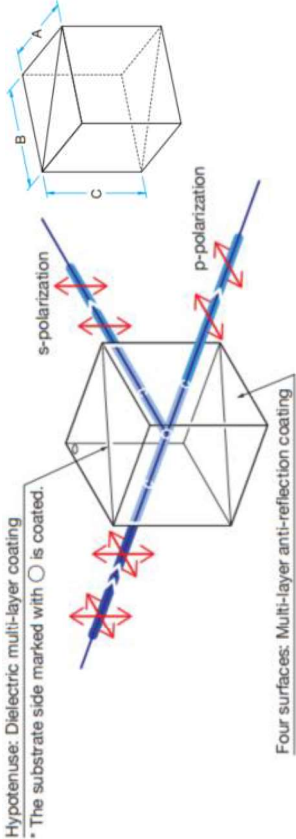
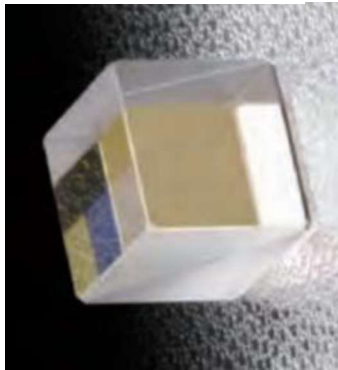


Material	Synthetic fused silica
Surface flatness of substrate	$\lambda/4$
Angular deviation of transmitted beam	$<10'$
Coating	Hypotenuse Surface: Dielectric multi-layer polarizing coating Four Surfaces: Narrowband multi-layer anti-reflection coating
Incident angle	0°
Laser Damage Threshold	$0.3\text{J}/\text{cm}^2$ (Laser pulse with 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10
Clear aperture	Circle inscribed in a square of 85% of the dimensions



Part Number	Wavelength Range [nm]	A=B=C [mm]	Material	Transmittance of P polarized light [%]	Reflectance of S polarized light [%]	Extinction ratio of transmission* Ts:Tp
PBSW-10-250	235-265	10	Synthetic fused silica	>85	>90	1:100
PBSW-12.7-250	235-265	12.7	Synthetic fused silica	>85	>90	1:100
PBSW-15-250	235-265	15	Synthetic fused silica	>85	>90	1:100
PBSW-20-250	235-265	20	Synthetic fused silica	>85	>90	1:100
PBSW-10-350	330-370	10	Synthetic fused silica	>85	>95	1:100
PBSW-12.7-350	330-370	12.7	Synthetic fused silica	>85	>95	1:100
PBSW-15-350	330-370	15	Synthetic fused silica	>85	>95	1:100
PBSW-20-350	330-370	20	Synthetic fused silica	>85	>95	1:100
PBSW-10-550	450-650	10	BK7	>85	>Average 85	1:200
PBSW-12.7-550	450-650	12.7	BK7	>85	>Average 85	1:200
PBSW-15-550	450-650	15	BK7	>85	>Average 85	1:200
PBSW-20-550	450-650	20	BK7	>85	>Average 85	1:200
PBSW-10-800	750-850	10	BK7	>92	>97	1:200
PBSW-12.7-800	750-850	12.7	BK7	>92	>97	1:200
PBSW-15-800	750-850	15	BK7	>92	>97	1:200
PBSW-20-800	750-850	20	BK7	>92	>97	1:200
PBSW-10-3/7	380-750	10	SK2	>Average 92	>Average 95	1:500*
PBSW-12.7-3/7	380-750	12.7	SK2	>Average 92	>Average 95	1:500*
PBSW-15-3/7	380-750	15	SK2	>Average 92	>Average 95	1:500*
PBSW-20-3/7	380-750	20	SK2	>Average 92	>Average 95	1:500*
PBSW-10-4/10	450-1080	10	SF15	>Average 92	>Average 95	1:500*
PBSW-12.7-4/10	450-1080	12.7	SF15	>Average 92	>Average 95	1:500*
PBSW-15-4/10	450-1080	15	SF15	>Average 92	>Average 95	1:500*
PBSW-20-4/10	450-1080	20	SF15	>Average 92	>Average 95	1:500*
PBSW-10-10/20	1000-2000	10	SF15	>Average 94	>Average 95	1:300*
PBSW-12.7-10/20	1000-2000	12.7	SF15	>Average 94	>Average 95	1:300*
PBSW-15-10/20	1000-2000	15	SF15	>Average 94	>Average 95	1:300*
PBSW-20-10/20	1000-2000	20	SF15	>Average 94	>Average 95	1:300*

Polarizing Beamsplitters | OP-P-BS



Material	BK7
Surface flatness of substrate	$\lambda/4$
Angular deviation of transmitted beam	<10'
Coating	Hypotenuse Surface: Dielectric multi-layer polarizing coating Four Surfaces: Narrowband multi-layer anti-reflection coating
Incident angle	0°
Transmittance of P polarized light	>97% (405nm: >90%)
Extinction ratio of transmission	Ts: Tp=1:1000
Laser Damage Threshold	0.3J/cm ² (Laser pulse with 10ns, repetition frequency 20Hz)
Surface Quality (Scratch-Dig)	20-10
Clear aperture	Circle inscribed in a square of 85% of the dimensions