

KUPO[®] OPTICS



MASTER OF WAVELENGTH CONTROL

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ABOUT KUPO OPTICS

KUPO Optics was founded in 1992. The core of our business is to offer optical filters and coatings with finest quality. Owing to uncompromising to the product quality, we have been established an excellent reputation in professional optical filter industry.

State-of-the-art Facilities

The facilities of KUPO Optics are the most state-of-the-art including planetary coating, accurate linear and laser cutting machine, high resolution spectrometers and so on. Those advanced facilities perfectly work with each other which makes precise filters and coatings on the market.

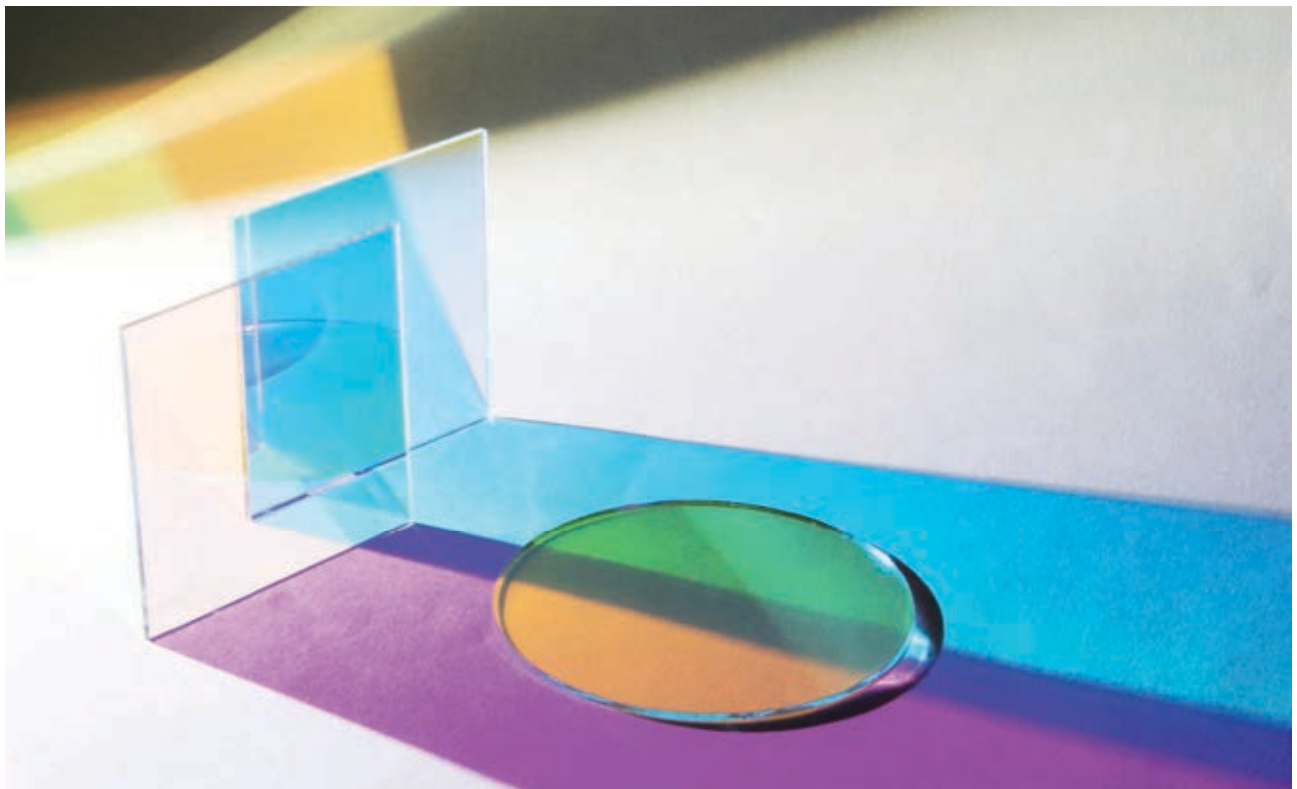
Wide Range Application

KUPO Optics manufactures optical filters and coatings for wide range of application including medical, fluorescence, machine vision, astronomy, defense systems, entertainment, and more.

Flexibility and Customize

There are abundant amount of stock products that can be offered immediately. Just pick out the suitable one, and it will be shipped to you in a short time. Moreover our experienced R&D team can also provide customized filters that meet your most demanding requirements.

KUPO Optics dedicates ourselves to ensure product quality and customer satisfaction. We provide products that make your business more advanced. Choose us, and we will be your helpful partner on the path of success.



FACILITIES

In order to provide optical filters with high quality, except for our massive experience, advanced facilities are necessary as well. Our sophisticated engineers are able to design the filter that meets your most demanding requirements while those facilities make the ideal products come true.

Cleanroom

Even a tiny particle will cause failure of the coating. Therefore, all of our filters are manufactured in the cleanroom that measure up to 2000 square meters in order to ensure the filters are correctly coated.



Coating Chambers

Our coating chamber is 1.7 meter height and dia. 1.5 meter inside the chamber. The coating thin-films are formed by evaporating the coating materials in a vacuumed chamber. With Ion Assistant Deposition (IAD), the thin-films will firmly attach to the glass substrates with great density.

The glass substrates are placed in the planetary rotating trays on the same horizontal level. This helps the evaporated coating materials evenly attach to the glass substrates which guarantees consistency of optical specification.



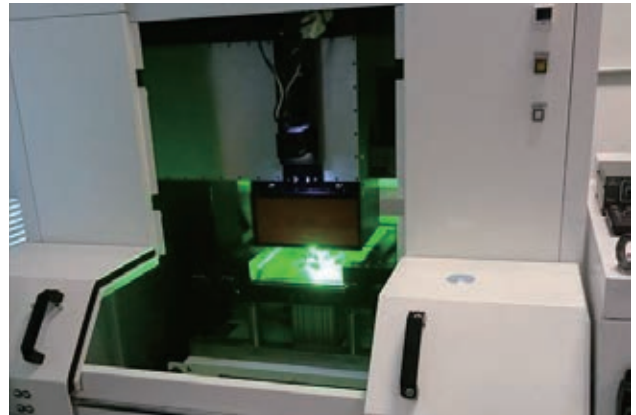


Cleaning

Cleaning is also a critical process during manufacturing. All substrates are cleaned by ultrasonic cleaning machine to ensure coating thin-films firmly attach to them. They will be cleaned again after coated in order to deliver the filter with completely clean surface.

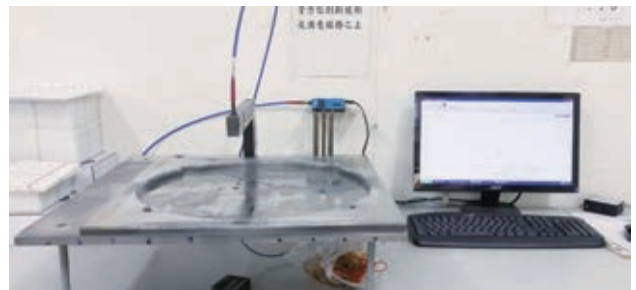
Cutting

With great cutting capability, we are able to provide the filters in various shapes. The original sheet is a large plate with diameter 450mm. By using precision linear cutting or more precise laser cutting, we are able to provide filters in any size, any shape.



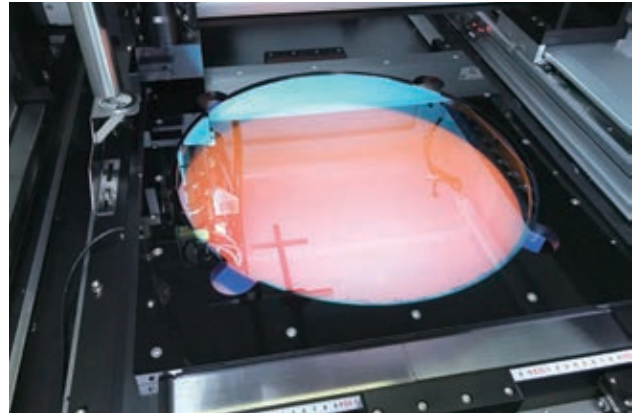
Spectrometer

A spectrometer is necessary to ensure the optical specification meeting the requirement. All coated filter will be inspected by the spectrometer before being shipped to our customer or put in stock. The filters will be scanned again before shipment in order to deliver the right product to customers.



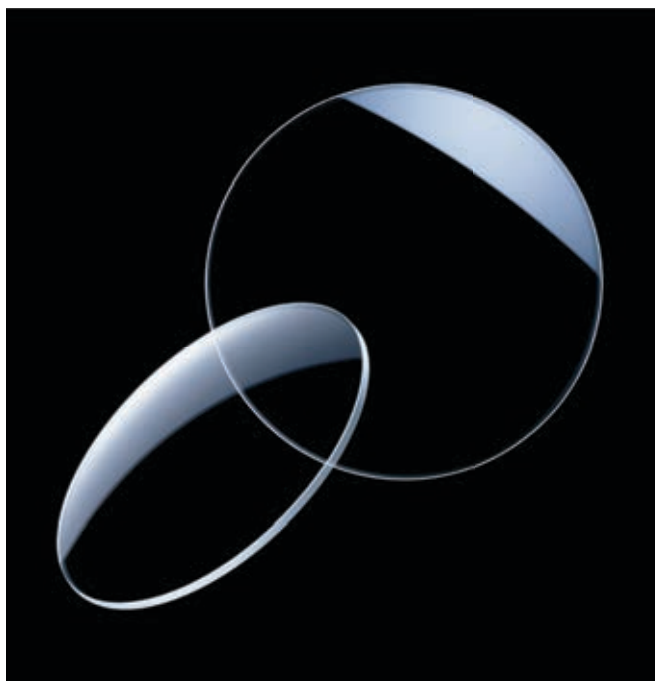
Surface Inspection

Customers who apply the filter in a precise instrument require filter with great surface quality. In order not to provide filter with severe issue of surface quality, we use surface quality inspection instrument to mark out the unacceptable scratch and dig.



GLASS SUBSTRATES

The glass substrates are the most fundamental and critical for making optical filters. In order to ensure the quality, KUPO Optics uses optical grade glasses as the essence of perfect filters.



Borofloat Glass

Thickness: 1.1mm, 2.0mm, 3.3mm, 3.8mm
Heat Resistance: Up to 450°C

Sodalime Glass

Thickness: 1.1mm, 2.0mm, 2.9mm
Heat Resistance: Up to 150°C

Borosilicate Glass (D263T)

Thickness: 0.21mm, 0.3mm, 0.55mm

Corning Eagle XG

Thickness: 0.7mm, 1.1mm
Heat Resistance: Up to 450°C

DICHROIC FILTERS

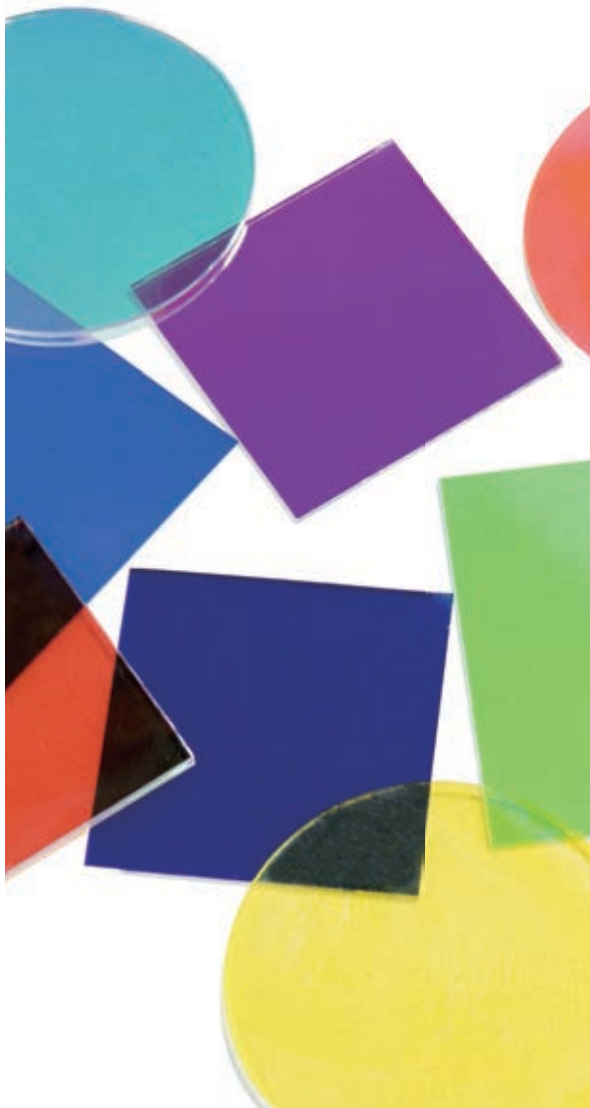
KUPO Optics offers dichroic filters coated with hard dielectric thin-films. The dielectric thin-films filter out the unwanted regions of visible spectrum and let the light of certain wavelength transmit so that you will see different colors when light passing through the dichroic filter.

The planetary running coating machine lets thin-films evenly attach to the glass substrates which guarantees consistency of optical specification from different pieces and different batches.

With Ion Assistant Deposition (IAD), the thin-films will firmly attach to the glass substrates with great density which makes our filters greatly resist the environmental degradation.

There are over 70 colors available which offers flexibility for you to choose the most suitable one for you.

For your unique project we are able to develop the required color as well.



Features

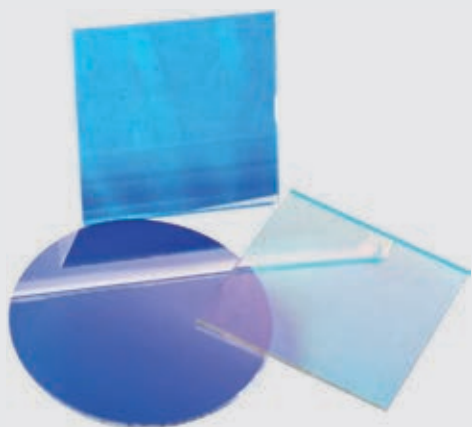
- Perfect piece-to-piece, batch-to-batch consistency
 - Pure, intense, true-to-life color
 - Great resistance of UV and heat (Compared to gel)
 - Great endurance of environmental degradation
-

Examples of Application

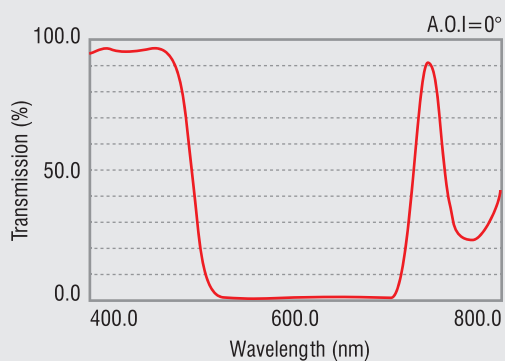
- Stage Lighting
 - Architectural Lighting
 - Projection System
 - Fluorescence Microscopy
-

General Specification

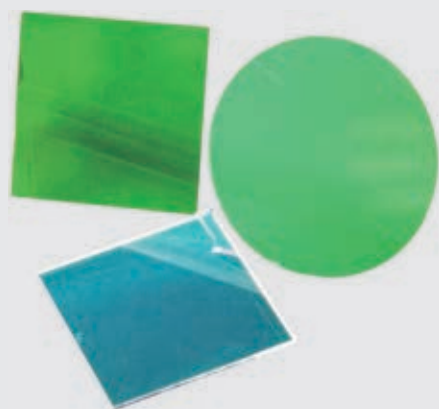
- Spectral Tolerance: $\pm 5\text{nm}$ at T50% for normal production
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



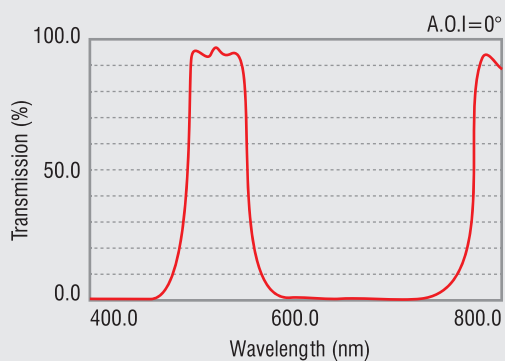
Shortpass Filters



V7101 BLUE-PURPLE	V79902 SPECIAL BLUE	B18103 DARK BLUE	B70704 ULTIMATE VIOLET
B71305 BLUE	B19506 ZENITH BLUE	B8507 BRIGHT BLUE	B71408 ELYSIAN BLUE
B6809 SKY BLUE	B14110 SHINY BLUE	B0611 BRILLIANT BLUE	B11812 LIGHT BLUE
C35413 STEEL BLUE	C11514 PRACOCK BLUE	C11715 ITALIAN BLUE	C13116 MARINE BLUE
C35317 LIGHTER BLUE	B72118 BARRY BLUE	B18319 MOONLIGHT BLUE	V79920 DEEP LAVENDER



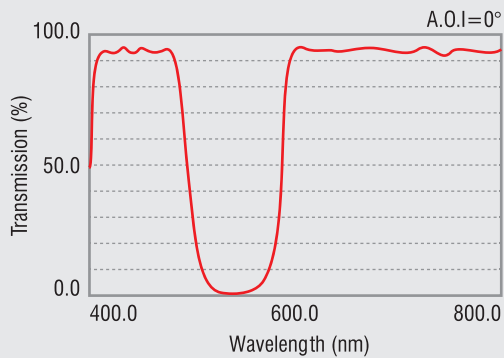
Bandpass Filters



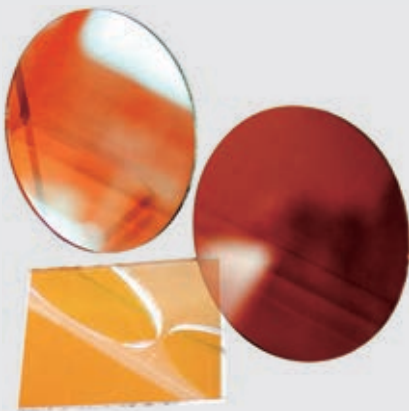
G32502 MALLARD GREEN	G32503 BERYL GREEN	G73504 VELVET GREEN	G13905 GREEN
G73606 DARK GREEN	G73607 JELLY GREEN	G73608 GRASS GREEN	G13909 PRIMARY GREEN
G2810 LIGHT GREEN	G73611 OASIS GREEN	G2812 FERN GREEN	G73813 PALE GREEN
G73814 LIME GREEN	G74015 YELLOW GREEN	G9017 JADE	G72918 SCUBA BLUE
G9019 DARK YELLOW GREEN			



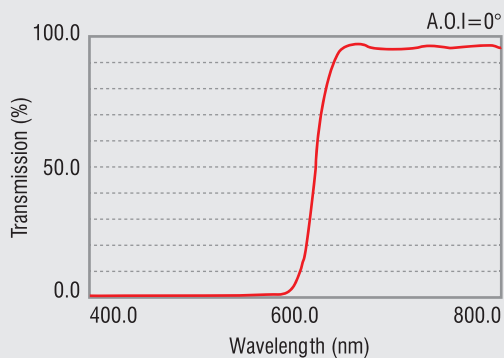
Notch Filters



M5601 MAGENTA	M79502 MAGICAL MAGENTA	M79303 VANITY FAIR	M4904 PLUM
M4905 DEEP MAGENTA	M79506 ROSE PINK	P12607 MAUVE	M79508 ROSE
P79909 SPECIAL LAVENDER	P12610 LIGHT PURPLE	P79711 PURPLE	P79712 DEEP PURPLE
M12613 FANTASY MAGENTA	M11114 BRIGHT PINK	M32815 PINK	M79516 DARK ROSE
M12617 MEDIUM PURPLE	M16918 PALE LAVENDER	M79818 CHRYSLIS PINK	M79720 DEEP PINK



Longpass Filters



Y10001 SPRING YELLOW	Y1002 MEDIUM YELLOW	Y10103 YELLOW	Y76704 CANARY
O10405 AMBER	O01506 STRAW	O17907 DEEP AMBER	O15808 LIGHT ORANGE
O77809 GOLDEN AMBER	O2201 GOLD ORANGE	O1911 SUNSET ORANGE	O16412 ORANGE
R2613 FIRE	R2714 RED	R15 RUBY RED	R16 BLOOD RED
R17 DARK RED	R2918 PLASA RED	Y1019 LIGHT YELLOW	O10520 BURNT YELLOW

Custom Design Available by Request

NEUTRAL DENSITY FILTERS

KUPO Optics provides Neutral Density Filters (ND Filters) that are able to evenly reduce the transmission in visible wavelength region. ND filter only reduces the intensity of visible light without changing the color scheme. The vividness of the imaging will not be affected.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Evenly reducing the intensity of visible light

Examples of Application

- Photography
- Photomicrography
- Machine Vision

General Specification

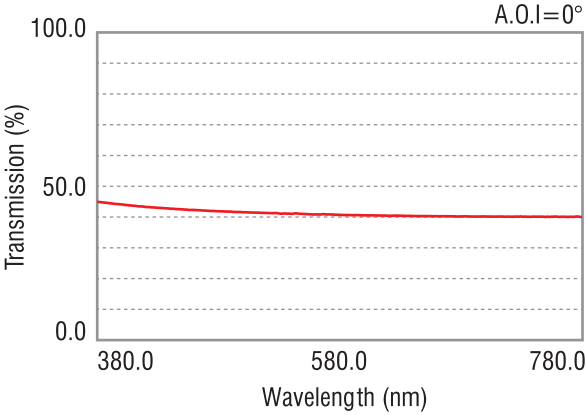
- Spectral Tolerance: 400~700nm Tavg +/- 3%
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



Shot without ND Filter

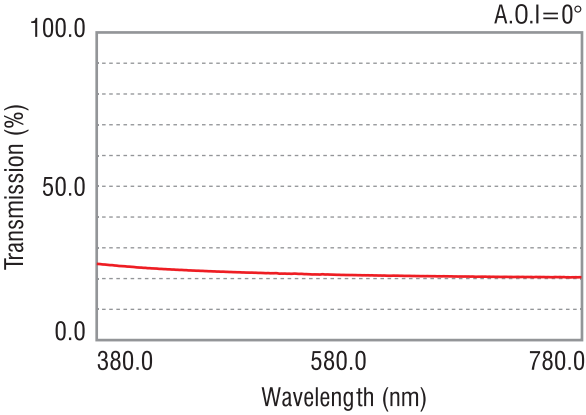
NDF-001

Reference color #LEE 209
400~700nm Tavg = 40% +/- 3%



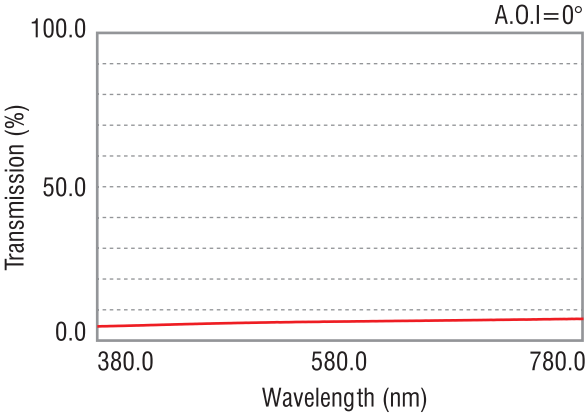
NDF-002

Reference color #LEE 210
400~700nm Tavg = 20% +/- 3%



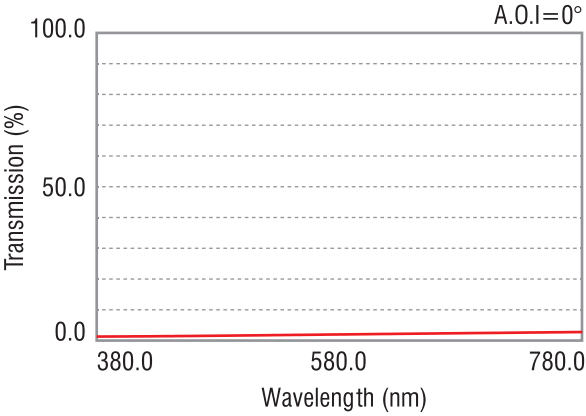
NDF-003

Reference color #LEE 211
400~700nm Tavg = 6.5% +/- 1.5%



NDF-004

Reference color #LEE 299
400~700nm Tavg = 2.5% +/- 1%



COLOR CORRECTION FILTERS

KUPO Optics provides color correction filters that are able to precisely convert the color temperature to what you required. There are full ranges of daylight and tungsten conversion available. For your unique project, definitely we can provide customized filter as well.

KUPO color correction filters are coated with hard dielectric thin-films with great density which makes our filter greatly resists environmental degradation.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Precise color temperature conversion
- Great resistance of UV and heat (Compared to gel)
- Great endurance of environmental degradation

Examples of Application

- Stage Lighting
- Photography
- Film Studio
- Cinematography

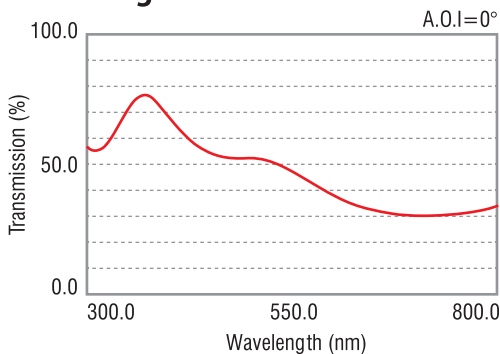
General Specification

- Spectral Tolerance: +/- 5nm at designated wavelength
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Blow conversion result is only for reference.
Actual result will be affected by the light source.



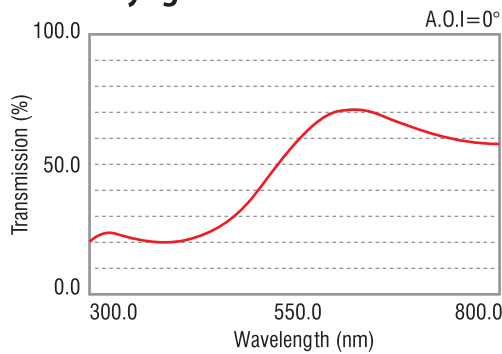
Tungsten Conversion



FULL C.T.B	HALF C.T.B	QUARTER C.T.B	CTB-004	CTB-200
CTB-001	CTB-002	CTB-003	3200/5400	3200/10850
3200/6870	3200/4260	3200/3570		



Daylight Conversion



FULL C.T.O	HALF C.T.O	QUARTER C.T.O	CTO-008	CTO-009
CTO-001	CTO-002	CTO-003	6500/3100	6500/5300
6500/3000	6500/3460	6500/4740		
CTO-010	CTO-011	CTO-013	014	CTO-015
6500/3500	6500/3400	6500/2550	6500/2700	6500/2560

HOT MIRRORS / DIFFUSION HOT MIRRORS

KUPO Optics provides hot mirrors / diffusion hot mirrors that are able to reflect near infrared (NIR) while transmits great amount of visible light. With this feature, hot mirror is a great solution to protect components from damaged by the heat.

Near infrared is the source of the heat. Some components that are sensitive to infrared will be damaged after being exposed to infrared for a long time. In order to protect those components, placing a filter that blocks IR is the solution.

On the other hand, with heat reflection feature, placing a hot mirror in front of a light source is able to reduce the heat distribute to the environment. Take spot light for example, placing a hot mirror in front of the light source, the

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent visible light transmission
- Infrared reflection

Examples of Application

- Projection System
- Illumination System
- Art Gallery
- Photographic and Film Apparatus

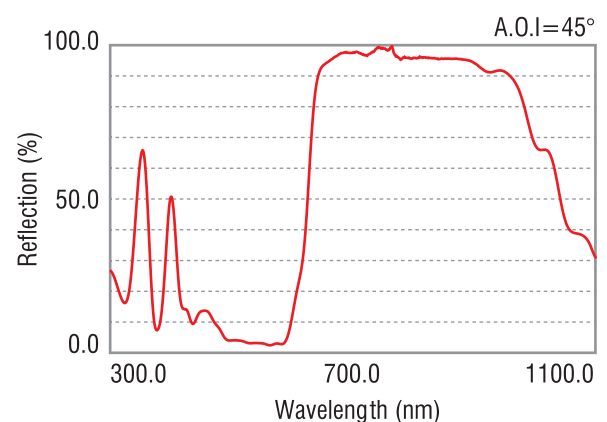
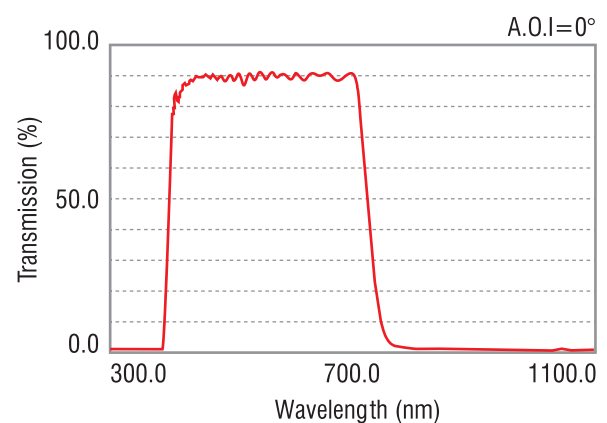
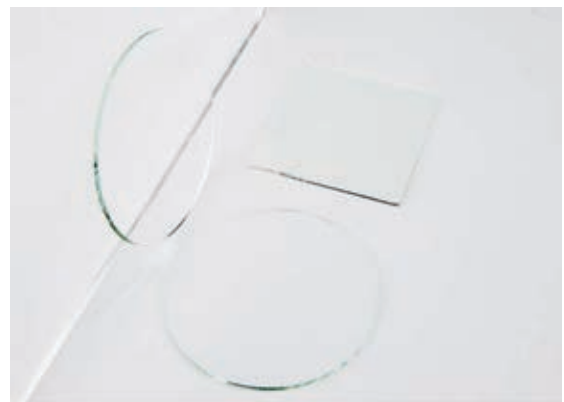
General Specification

- Spectral Tolerance: $\pm 10\text{nm}$ at designated wavelength
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

Optical Specification:

- $420 \sim 700\text{nm}$ $T_{\text{avg}} > 85\%$
- $T_{50\%} = 710 \pm 10\text{nm}$
- $750 \sim 1100\text{nm}$ $T_{\text{avg}} < 1\%$



UV / IR CUT OFF FILTERS

KUPO Optics provides UV/IR blocking filters that effectively block those damaging sources and transmit averagely 96% of visible light.

Near infrared is the major attributor of heat. Some components will be damaged when exposed to the heat continuously. For example in the projection system, the heat from light source will burn dichroic filters. By adding a UV/IR filter in between, the heat will be reflected back to light source to protect those filters.

Ultraviolet, on the other hand, contains large amount of energy. Because of this characteristic, some components will be damaged by UV as well. In order to protect those components, placing a filter that blocks UV will be an effective yet economic solution.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent visible light transmission
- Reflect IR and block UV

Examples of Application

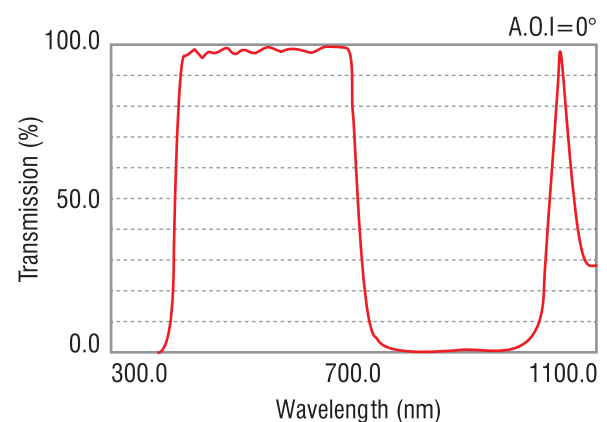
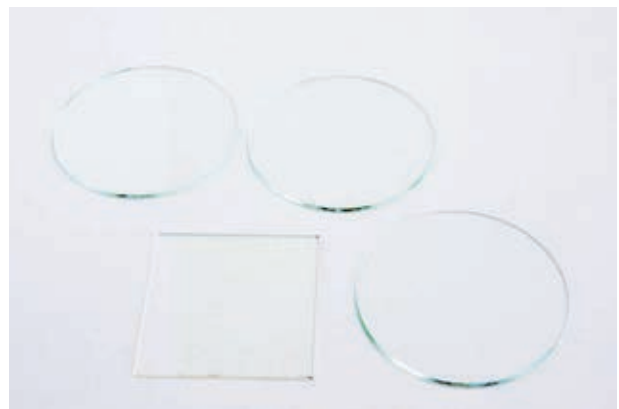
- Projection System
- Illumination System
- Art Gallery
- Photographic and Film Apparatus

General Specification

- Spectral Tolerance: $\pm 10\text{nm}$ at designated wavelength
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

- 300~390nm $T_{\text{avg}} < 0.2\%$
- $T_{50\%} = 418 \pm 5\text{nm}$
- 450~680nm $T_{\text{avg}} > 96\%$; $T_{\text{min}} > 91\%$
- $T_{50\%} = 715 \pm 10\text{nm}$
- 750~900nm $T_{\text{avg}} < 1\%$; $T_{\text{abs}} < 5\%$



COLD MIRRORS

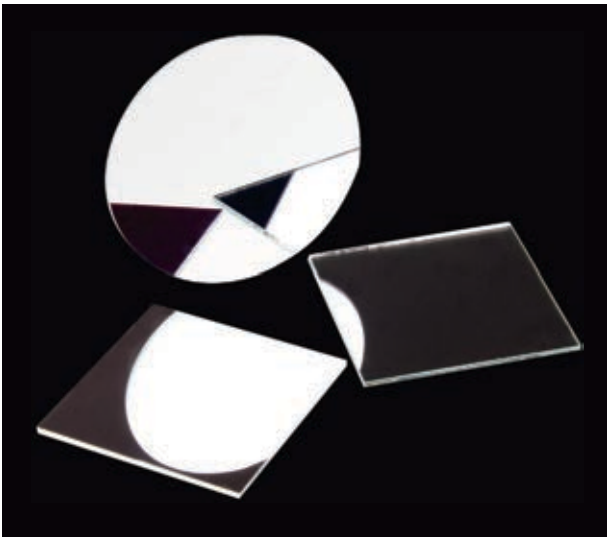
KUPO Optics provides cold mirror that is a multi-layer coating able to separate visible light and near infrared. It reflects great amount of visible light and effectively transmit near infrared.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent near infrared light transmission
- Visible light reflection

Examples of Application

- Medical Illumination
- Surveillance Camera
- Reflector
- Scanner

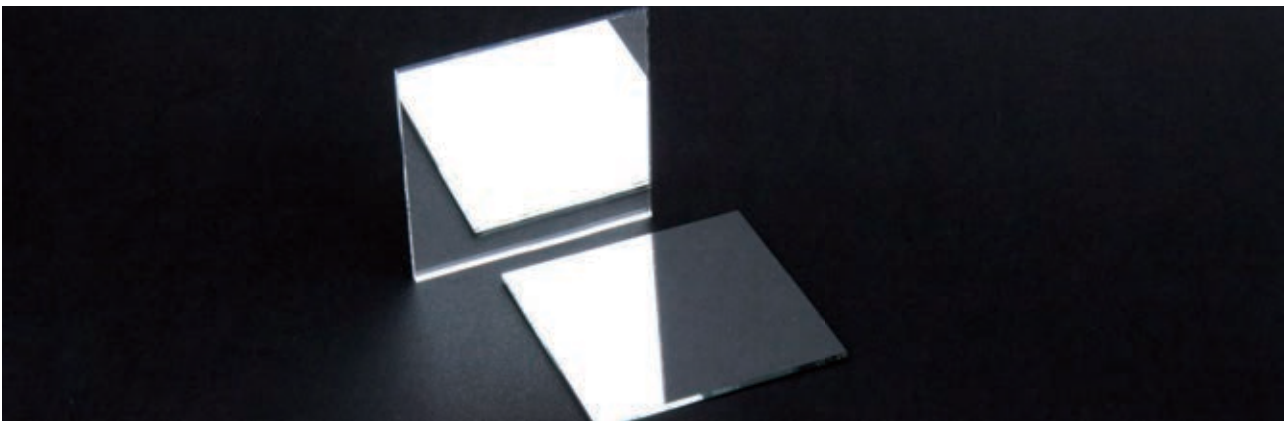
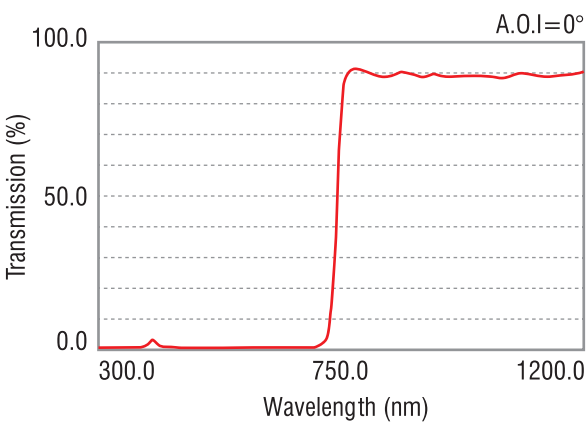


General Specification

- Spectral Tolerance: +/- 10nm at designated wavelength
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

- 400~700nm $T_{avg} < 0.5\%$
- $T_{50\%} = 740 \pm 10\text{nm}$
- 780~1200nm $T_{avg} > 88\%$



IR CUT OFF FILTERS

KUPO Optics provides IR Cut-off filters that effectively block infrared and transmit much of the visible light. It cuts off infrared so that the imaging will not be affected by infrared while presenting natural and accurate coloration in modern camera system.

Though we cannot see it, infrared exists in common light sources and can be detected by CCD or CMOS sensor. As those machine eyes can see infrared up to around 1000nm which will cause inaccurate coloration. Therefore, in order to assure image quality, infrared must be blocked. That is why IR cut-off filter is needed.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent visible light transmission
- Reflect IR and block UV

Examples of Application

- Projection System
- Illumination System
- Art Gallery
- Photographic and Film Apparatus

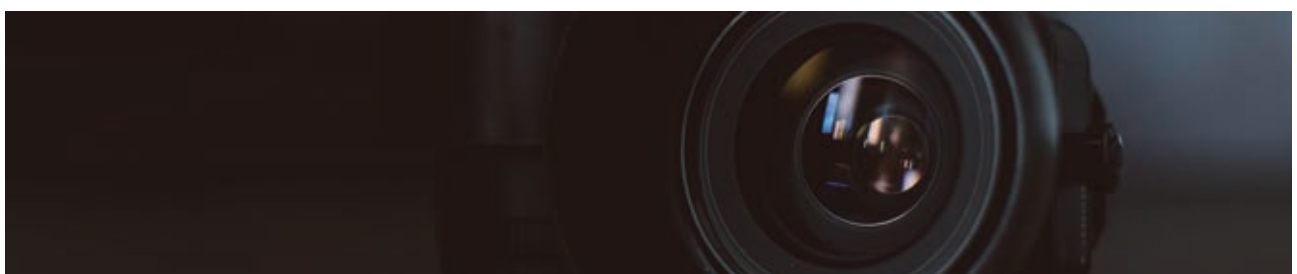
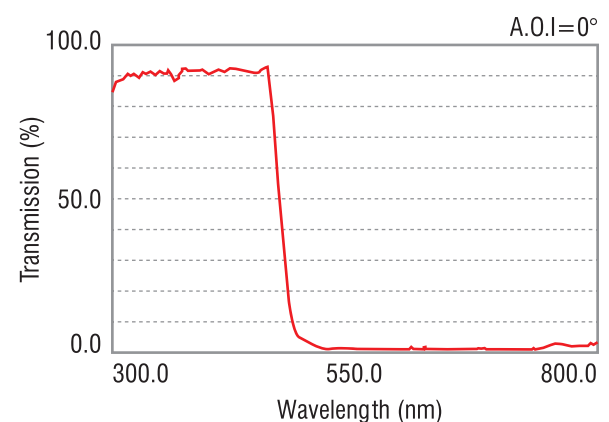


General Specification

- Spectral Tolerance: $\pm 10\text{nm}$ at designated wavelength
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

- 420~620nm $T_{\text{avg}} > 85\%$, $T_{\text{min}} > 80\%$
- $T_{50\%} = 645 \pm 10\text{nm}$
- 700~1000nm $T_{\text{max}} < 3\%$
- 1000~1100nm $T_{\text{max}} < 5\%$



UV BLOCKING FILTERS

KUPO Optics provides UV blocking filters that are good at blocking unneeded UV and greatly transmitting visible light.

UV is found in a various light sources like sunlight, halogen lamp, fluorescent lamp, and so on. Because of the characteristic of high energy, it will damage the object that is exposed to UV continuously, like the art works illuminated by the light source, or the coating of the camera lens exposed to sunlight.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Blocking and Absorbing UV
- Excellent visible light transmission

Examples of Application

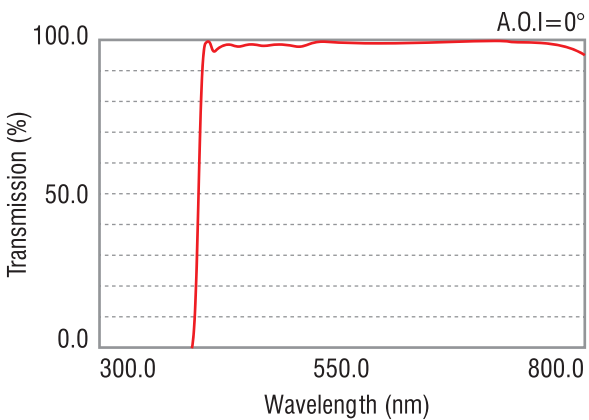
- Art Gallery
- Museum Lighting
- Photography

General Specification

- Optical Tolerance: T50% +/-5nm
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

- 300 - 410nm Tavg. < 0.5%
- T50% at 420 ± 5nm
- 445 - 690nm Tavg > 97%
- With AR coating on the other side



UV TRANSMISSION FILTERS

With rapid development of technology, the usage of light has expanded to invisible region. For example, with the characteristic of high energy, the numbers of UV application are growing up fast.

From time to time the UV LED emits wide range of UV, but this may not be suitable for your application as the UV range is too wide. Therefore, adding a UV filter is able to narrow the range of the UV LED by filtering out the unwanted UV range.

KUPO Optics provides different types of UV transmission filters with high transmitting rate on designated and commonly used UV. While transmitting the UV, our filter also reflects visible light that can be utilized in coaxial light source.

Features

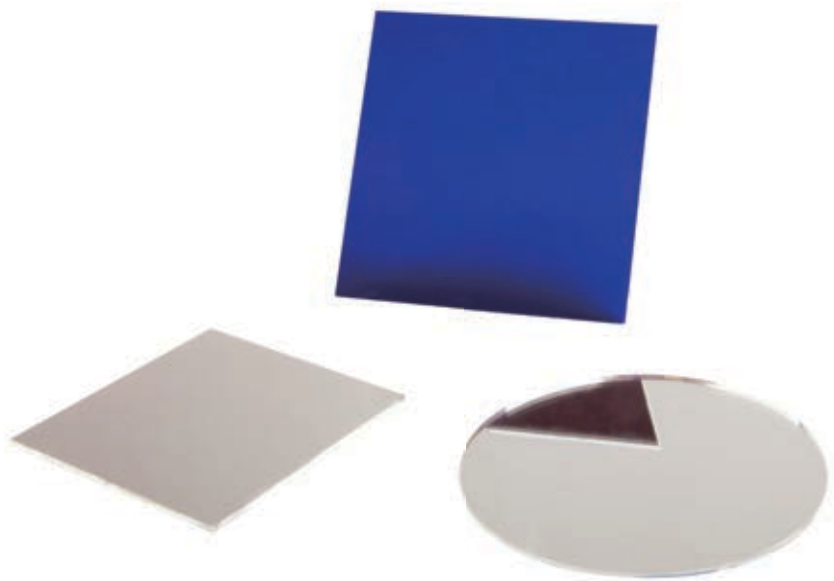
- Perfect piece-to-piece, batch-to-batch consistency
- High UV transmission
- Visible light reflection

Examples of Application

- Fluorescent Effect (Stage Lighting)
- Medical
- Tanning Bed

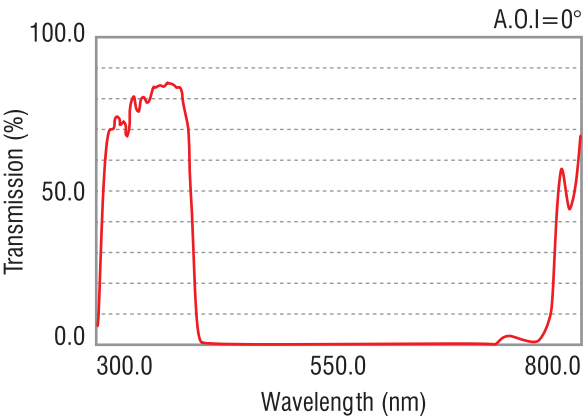
General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



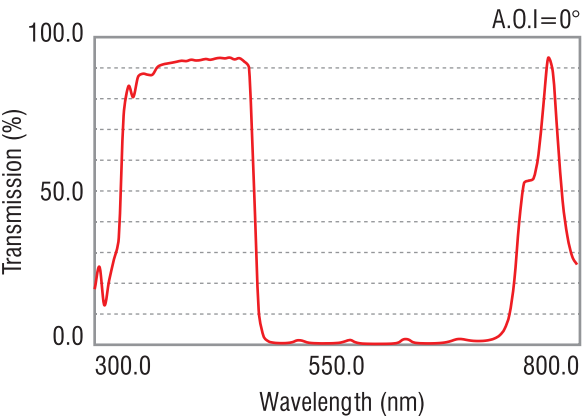
UV Transmission Filter (Type 4)

315 - 390nm Tavg>80%
T50% at 400+/-5nm
410 - 700nm Tavg<0.5%



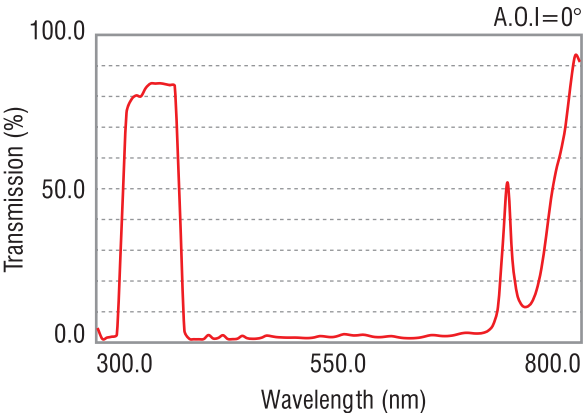
UV Transmission Filter (Type 5)

355 - 440nm Tavg>90%
T50% at 460+/-10nm
500 - 700nm Tavg<1.0%



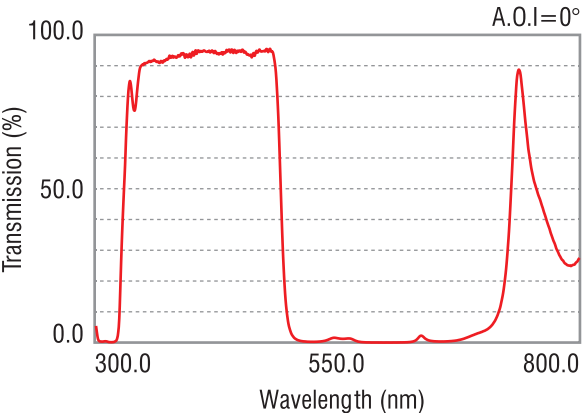
UV Transmission Filter (330380)

300 - 320nm Tavg<1.0%
340 - 370nm Tavg>80%
400 - 700nm Tavg<1.0%
T50% at 330/380 +/-10nm



UV Transmission Filter (330490)

300 - 320nm Tavg<1.0%
340 - 480nm Tavg>80%
520 - 700nm Tavg<1.0%
T50% at 330/490 +/-10nm



BEAM SPLITTERS

KUPO Optics provides beam splitters that split input light into two separate beams with specified ratio of transmission and reflection. The ratio of transmission and reflection is customizable.

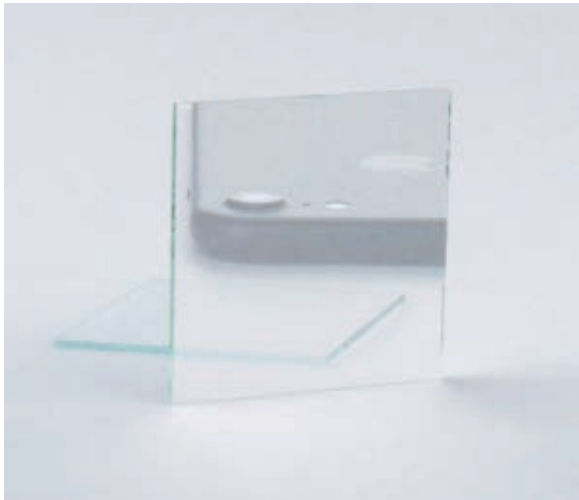
Our beam splitter features anti-reflection on the second surface in order to reduce the reflection at a discrete interface (Fresnel reflection).

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Even transmission of visible light
- Customizable ratio of transmission and reflection

Examples of Application

- Laser
- Optical Instruments
- Autocue

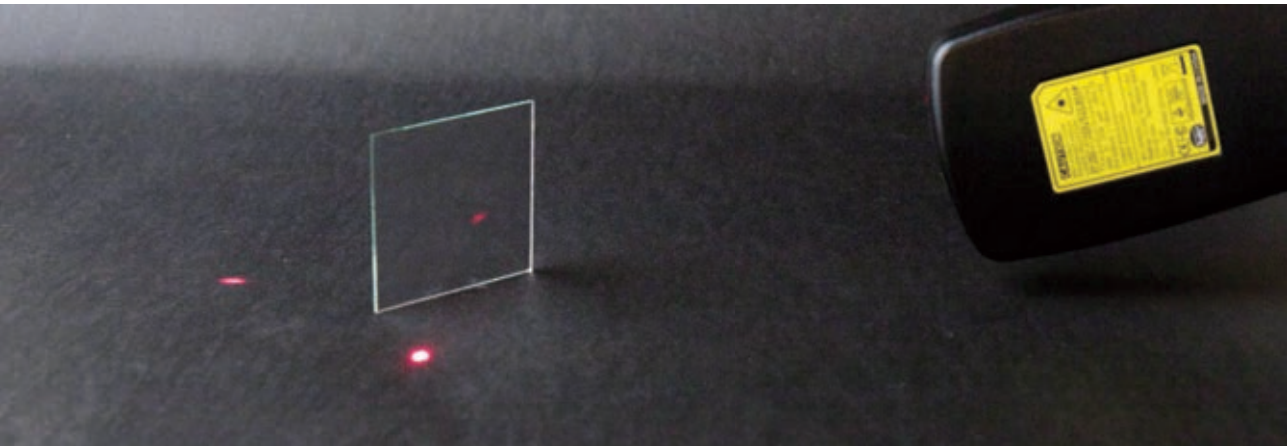
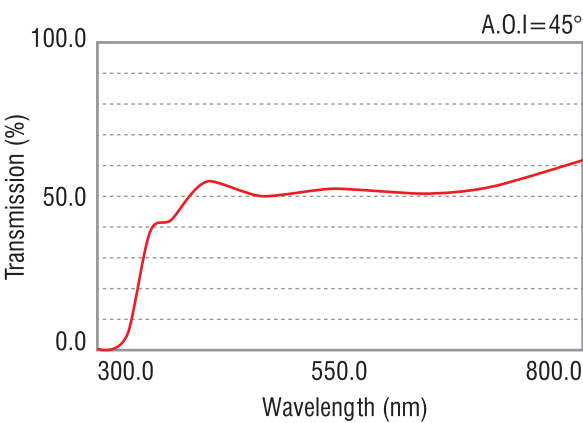


General Specification

- Spectral Tolerance: Designated average transmission $\pm 3\%$ in 420~680nm
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Standard Optical Specification

- T50/R50: 420-680nm $T_{avg}=50\% \pm 3\%$



ANTI REFLECTION COATINGS

KUPO Optics provides anti-reflection (AR) coating that effectively reduces glare and reflection by enhancing the transmission of visible light.

We supply single side and both side AR coating. With single side coating, except for being an economical option, it can be an enhancer of certain filter as well. For example adding AR coating on UV cut filter to improve the transmission of visible light, or on a beam splitter to avoid Fresnel reflection.

With both side AR coating, it maximizes the performance of AR coating with average transmission rate over 98%.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent visible light transmission
- Greatly reduce visible light reflection

General Specification

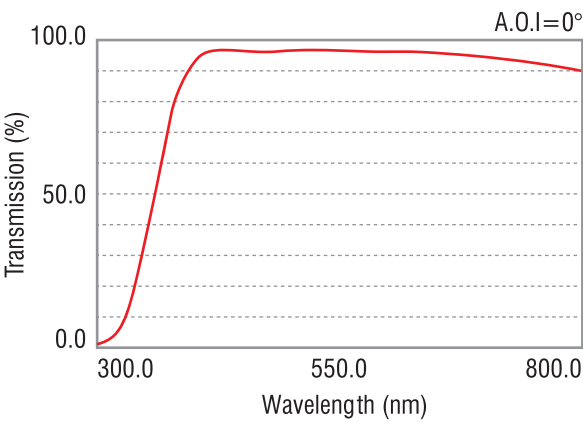
- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Examples of Application

- Camera
- Binocular
- Microscope
- Telescope
- LCD Module
- Display Panel
- Gauge
- Smartphone

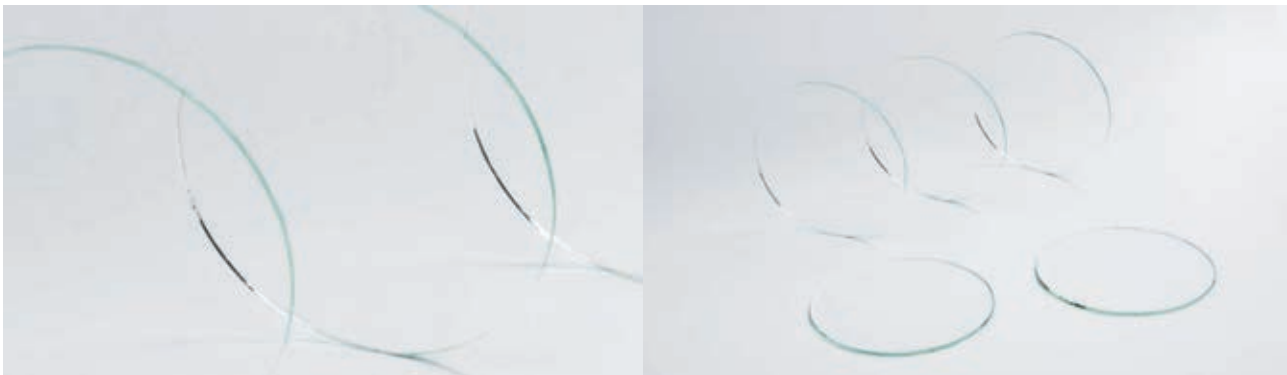
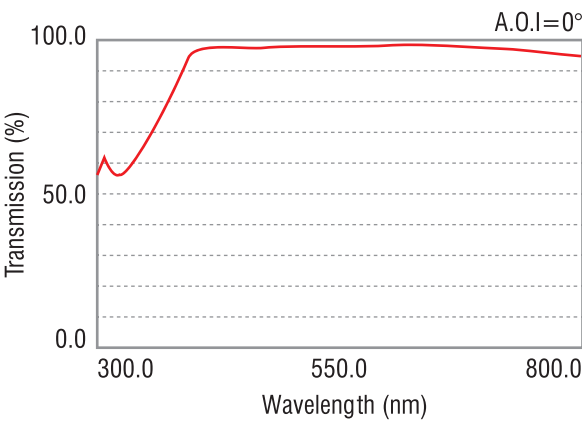
Optical Specification(Single Side Coated)

420~680nm Tavg>94% ; Tmin>93%



Optical Specification (Both Side Coated)

420~680nm Tavg>98% ; Tmin>97%



ALUMINUM MIRRORS

KUPO Optics provides protected aluminum mirror, our popular mirror products for visible light reflection. A SiO₂ layer is applied on the aluminum layer, forming a protective mirror. This treatment makes the surface resistive to abrasion.

Features

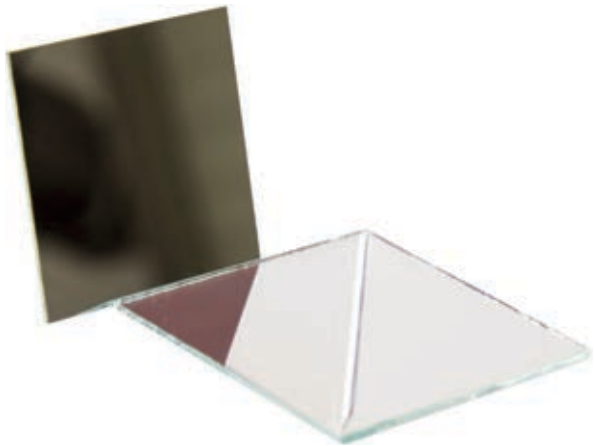
- Perfect piece-to-piece, batch-to-batch consistency
- Great visible light reflection
- Protected by SiO₂ protective layer

Examples of Application

- Bar-code Reader
- Projector System
- Laser Scanner

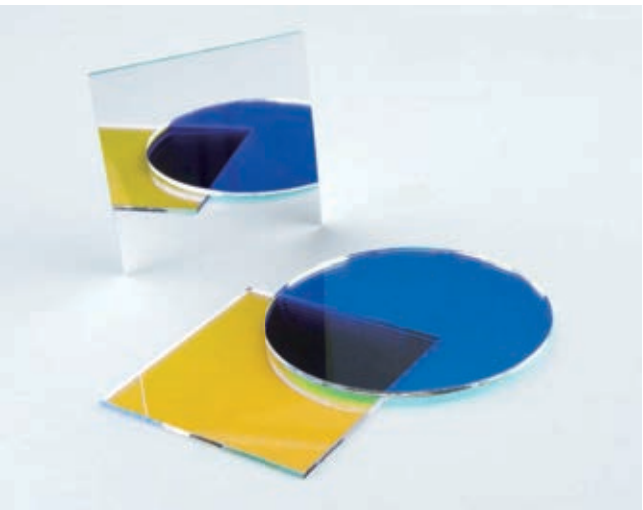
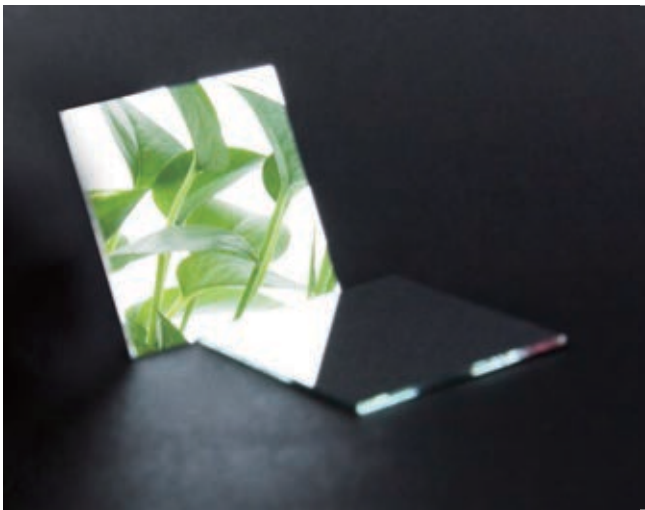
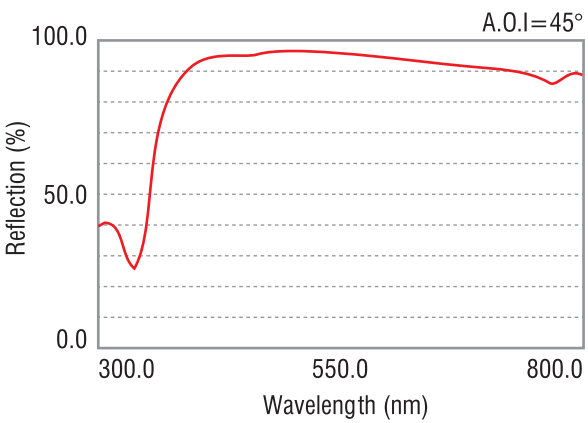
General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



Optical Specification

400-700nm Ravg > 92%, Rmin > 89%



DIELECTRIC MIRRORS

KUPO Optics provides dielectric mirror that is a type of mirror composed of multiple thin layers of dielectric material. Compared to aluminum mirror, dielectric mirror has better heat resistance and reflective performance. The average reflection rate in visible light region is up to 98%.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Excellent visible light reflection

Examples of Application

- Bar-code Reader
- Projector System
- Laser Scanner

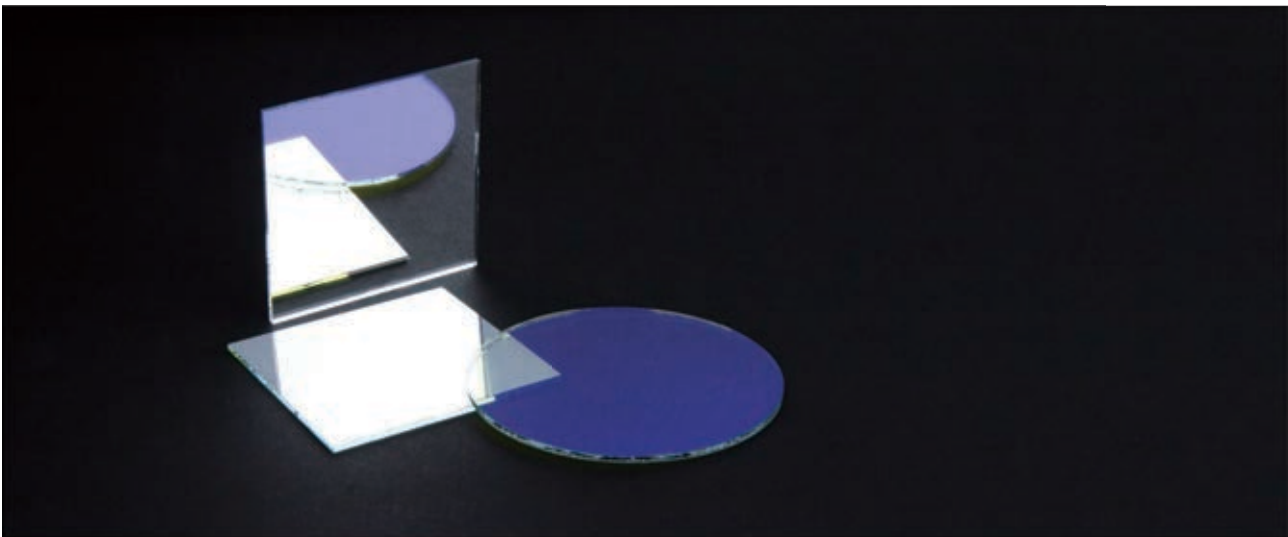
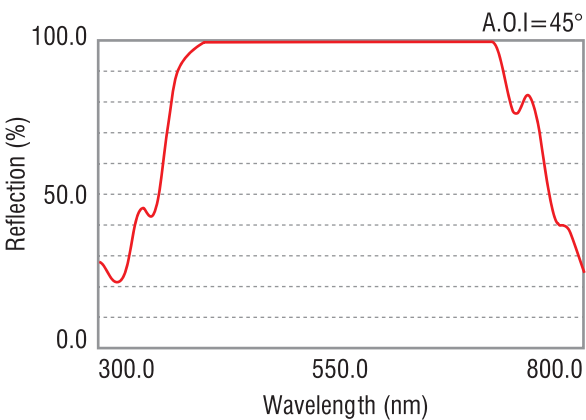
General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



Optical Specification

420 - 680nm Ravg > 98%
420 - 680nm Rmin > 96%



BANDPASS FILTERS

The usage of the bandpass filters is a simplest yet and the most economical way to transmit the light with certain wavelength while block the unwanted radiation.

KUPO optics provides bandpass filters coated with dielectric thin films that interfere the transmission of the light. Currently we have bandpass filter that transmit 365 / 650 / 780 / 850 / 940nm radiation that are popular in optical inspection and detection.

If other type of bandpass filter is required, please contact us for more detail.

Features

- Perfect piece-to-piece, batch-to-batch consistency
- Great transmission of the required radiation
- Great blocking of unwanted radiation

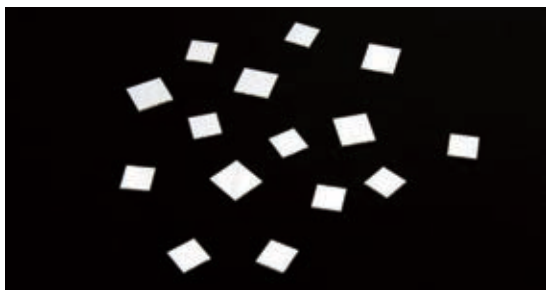
Examples of Application

- Machine Vision
- Image Sensor
- Automated Optical Inspection



General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



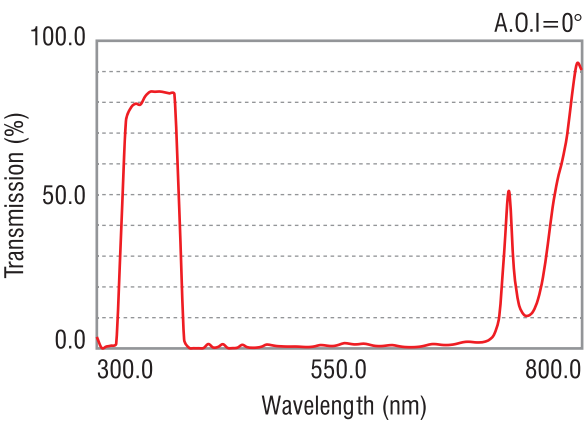
Optical Specification

Bandpass 365nm:

300~320nm Tavg<1%

340~370nm Tavg>80%

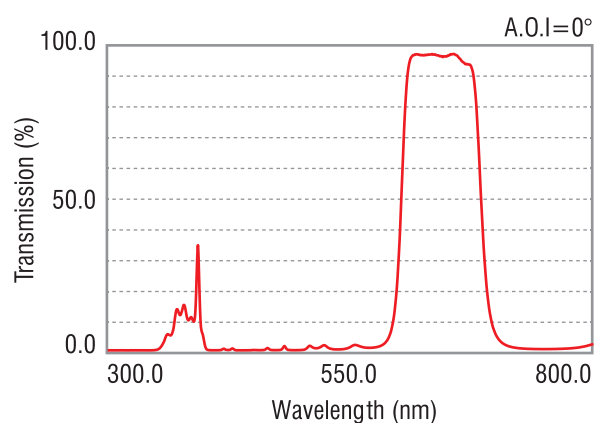
400~700nm Tavg<1%



Optical Specification

Bandpass 650nm:

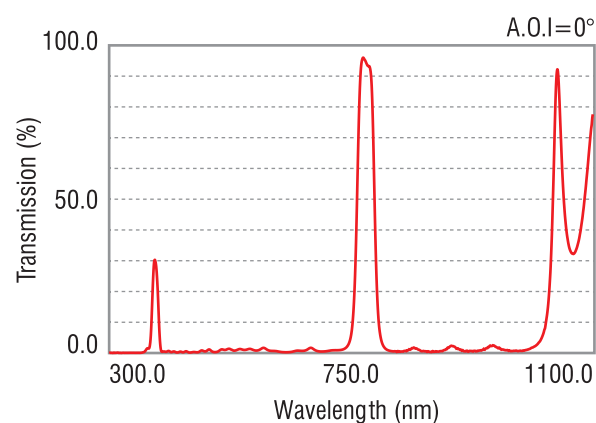
400~550nm Tavg<3%
620~670nm Tavg>90%
710~800nm Tavg<3%



Optical Specification

Bandpass 780nm:

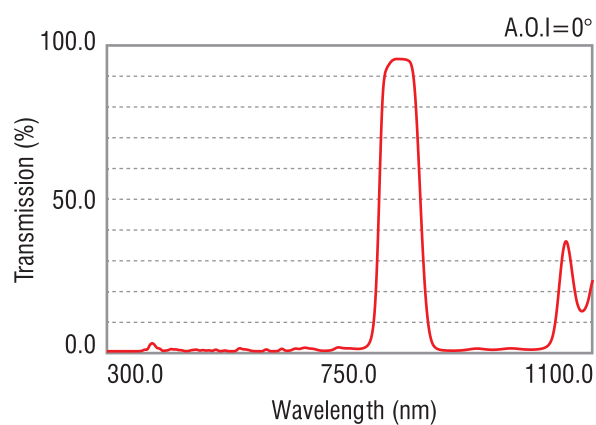
400~740nm Tavg<1%
775~785nm Tavg>85%
820~1100nm Tavg<1.5%



Optical Specification

Bandpass 850nm:

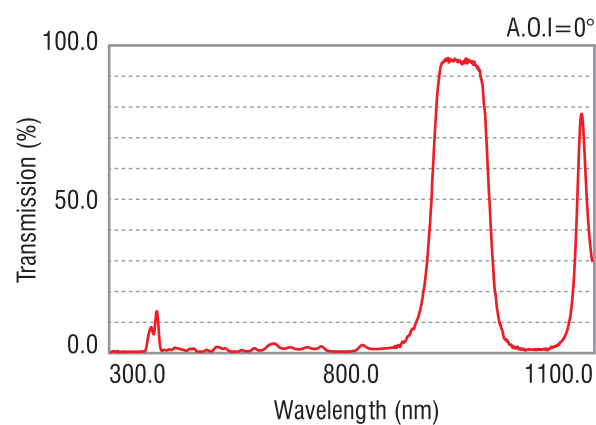
400~760nm Tavg<2%
840~860nm Tavg>90%
920~1100nm Tavg<2%



Optical Specification

Bandpass 940nm:

400~830nm Tavg<1%
930~950nm Tavg>90%
1050~1100nm Tavg<2%



BLACK ALUMINUM COATINGS

KUPO Optics provides black coating features incredibly low transmission rate of visible light. It is mostly used for black and white gobos. After removing the coating layers to form a certain pattern and put in front of a projector, the pattern will be projected to the object you like.

Glass gobo is a perfect substitution for steel gobo. It produces image with higher sharpness and clearness while keeping the feature of great heat resistance.

Features

- Great visible light rejection
- Excellent heat resistance

Examples of Application

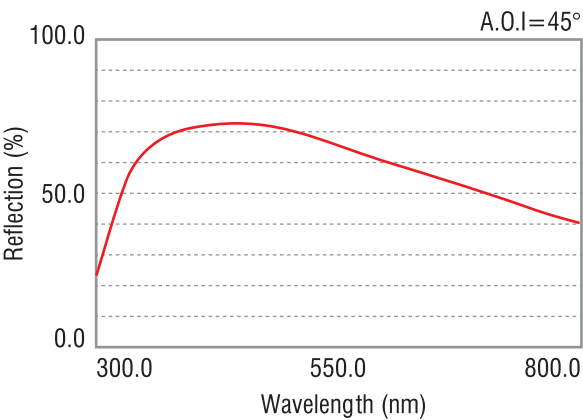
- Glass Gobos

General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Optical Specification

400-700nm Tavg <0.1%



BLACK CHROME COATINGS

KUPO Optics provides black chrome coating that has very stable chemical properties. With very low transmission and reflection rate, it can be used as a mask in integrated circuit manufacturing process, or the shade of an image sensor.

Features

- Shade blaze
- Low transmission of light
- Low reflection of light

Optical Specification

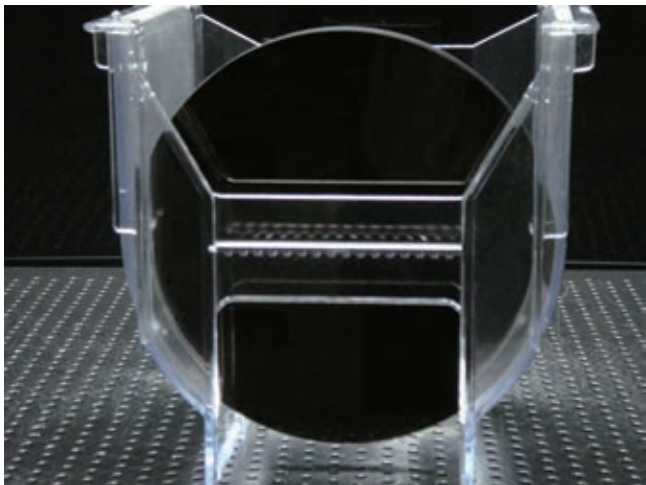
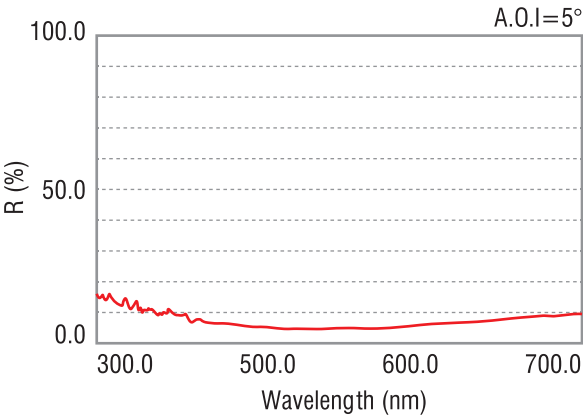
400 – 470nm Rmax < 25% (A.O.I. = 5°)
470 – 700nm Rmax < 15%
510 – 590nm Rmax < 10%
400 – 700nm Tmax < 0.5% (A.O.I. = 0°)

Examples of Application

- Lens Masking
- Wafer Masking
- LCD Masking
- Integrated Circuit

General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



RGB FILTERS & MIRRORS

KUPO Optics provides R/G/B filter that is able to divide those primary colors from the light source. For some specific optical instruments that require dividing R/G/B light, using this kind of filter is a very common and efficient solution.

On the other hand, the R/G/B reflection mirrors are designed for specific requirement of reflecting certain primary colors and let other colors go through.

Features

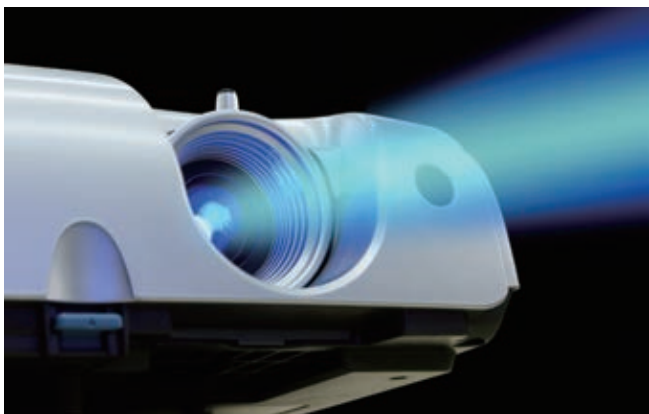
- Divide / Reflect R.G.B Light
-

Examples of Application

- Optical Instrument
 - Projector System
-

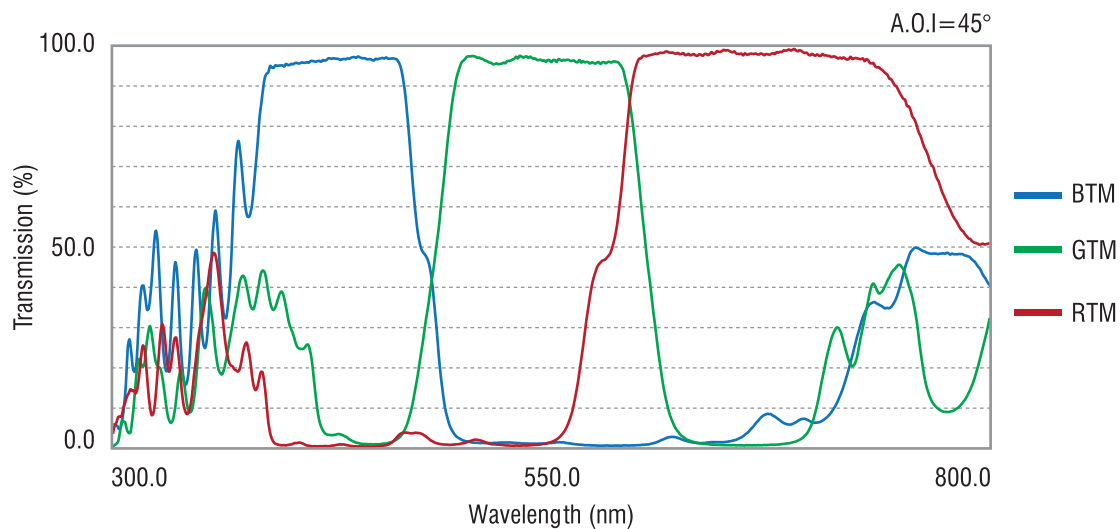
General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C



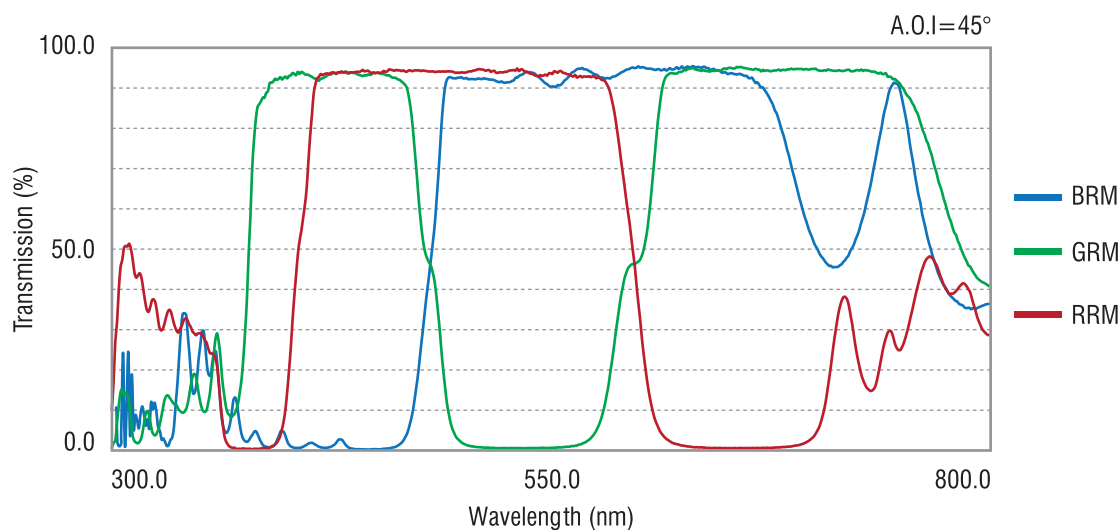
Optical Specification (Transmission Filter AOI 45°):

Blue Transmission Filter	Green Transmission Filter	Red Transmission Filter
400~465nm Tavgt > 94.5%	420~470nm Tavgt < 2.5%	420~560nm Tavgt < 3%
505~670nm Tavgt < 1.5%	500~585nm Tavgt > 95%	600~680nm Tavgt > 95%
	625~680nm Tavgt < 1.0%	



Optical Specification (Reflection Filter AOI 45°):

Blue Reflection Filter	Green Reflection Filter	Red Reflection Filter
420~470nm Tavgt < 2%	420~460nm Tavgt > 94.5%	420~560nm Tavgt > 95%
500~670nm Tavgt > 95%	500~580nm Tavgt < 1%	610~680nm Tavgt < 1%
	625~670nm Tavgt > 95%	



CMY COLOR MIXING WHEELS

With an innovative technology, Kupo develops advanced patterns of CMY filters to mix the graduated color in applications of intelligent lighting. The perfect CMY patterns provide the system with maximum efficiency and make the colors full of variety.

By the sophisticated process, Kupo color mixing wheels guarantee the consistency of precise colors from batch to batch and keep the extreme permeability. Our stable facilities also enable the mass production of CMY within +/-5nm cut-on wavelength tolerance.

Features

- Mix the graduated color
- Make the colors full of variety

General Specification

- Available Substrate: See page 4
- Humidity, Adhesion, and Abrasion: MIL-M-13508C

Advantages

- Planetary vacuum deposition coating
- Controlled precisely within +/-5nm
- Excellent color uniformity and purity
- Excellent resistance to environmental degradation
- Mass production capability
- Fast delivery
- Custom design flexibility



PATTERN GLASS WINDOWS

KUPO Optics provides pattern glass that is widely used for architectural purposes in commercial buildings or residential settings to separate space while sharing light. On lighting applications, pattern glass is also an essential element to design and create special lighting effects.

Features

- Separate space while sharing light
- Create special lighting effects

Examples of Application

- Building Windows
- Lighting Fixture

General Specification

- Tempered Glass / Non-tempered Glass

Available Thickness:

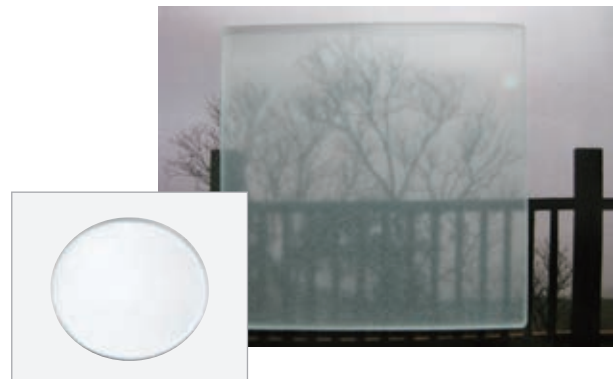
FF-1F: 1.10mm, 2mm, 3mm, 5mm

FF-3L: 4mm, 5mm

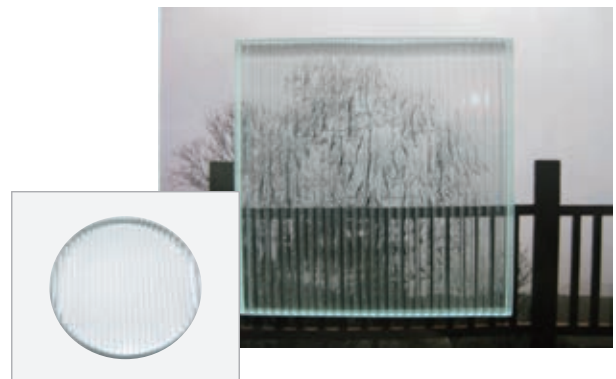
FF-4N: 3mm, 5mm

FF-5C: 3mm, 4mm

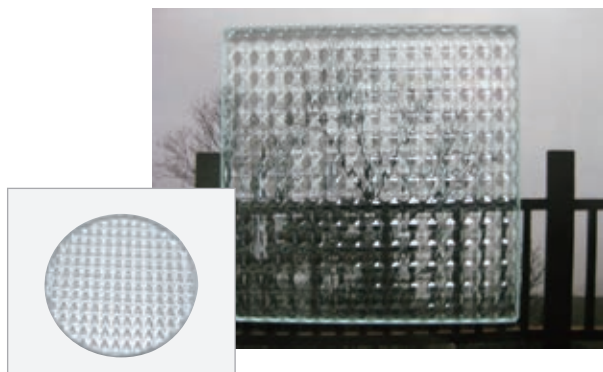
FF-1F (Frosted Glass)



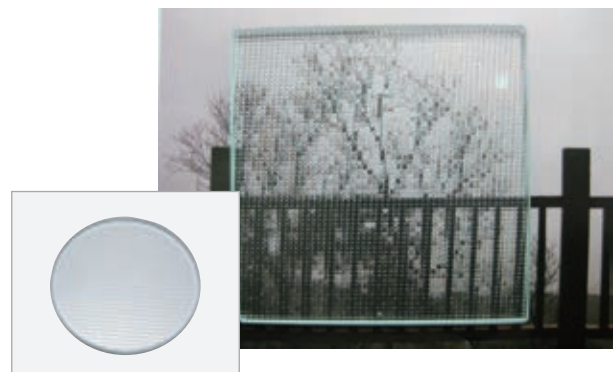
FF-3L (Linear Spread Glass)



FF-5C (Crystal Glass)



FF-4N (Narrow Block Glass)



KUPO光学主要产品及特性应用

Color Filters / 彩色滤光片	Gobos / 图案片
特性: 色彩逼真、高穿透率、耐高温	特性: 耐高温、图案表现完美清晰
应用: 建筑照明、娱乐和舞台灯光、电子和工业应用	应用: 电脑灯、光束灯、成像灯、投影灯等舞台灯光
CMY Mixing Filters / CMY 混色滤光片	Color Correction Filters / 色温转换片
特性: 优异的色彩一致性和饱和度, 透光率高	特性: 调节不同光源的色温
应用: 舞台电脑灯	应用: 舞台、娱乐、时尚照明等
Cold Mirrors / 冷镜 (热穿透)	Hot Mirrors / 热镜 (热反射) Diffusion Hot Mirrors / 雾化热镜
特性: 红外线穿透、可见光反射	特性: 红外线高度反射、阻隔UV 光、可见光高度穿透
应用: 医疗照明、监控摄像机、反射罩、扫描仪	应用: 医疗照明、艺术画廊、建筑照明、光纤照明、探测器
UV Transmmission Filters / UV 穿透滤光片	UV Blocking Filters / UV 阻隔滤光片
特性: UV 穿透、可见光反射	特性: 反射UV 光、可见光高度穿透
应用: 荧光效果、皮肤沙龙曝晒机、UV 探测器、牙齿美白仪器	应用: 博物馆照明、艺术画廊、光学仪器、科学应用
IR Transmission Filters / IR 穿透滤光片	IR CUT-OFF Filters / IR 截止片
特性: IR 穿透、高反射可见光(可见光反射)	特性: IR 反射、可见光穿透
应用: 夜间监视系统	应用: 数码相机、CCD 相机、彩色扫描仪
RGB Filters / RGB 滤光片	RGB Mirror / RGB 反光镜
特性: 分离R/G/B 三种光、维持高度透光性	特性: 特定波长的高度反射
应用: 光学仪器、投影系统、照明、摄影	应用: 投影系统
Black Chrome / 黑铬片	Reflective Mirror Red / 红反射镜
特性: 遮蔽效果佳、低穿透、低反射	特性: 特定波长的高度反射
应用: 晶圆影像遮蔽、LCD 影像遮蔽	应用: 条形码阅读器
Black Coating / 黑膜	Welding Notch Filter / 焊接护目滤光片
特性: 可见光波段的低穿透、良好的耐热性	特性: 有效阻隔红外光、紫外光; 可见光高度穿透
应用: 玻璃图案片	应用: 自动变光焊接护目镜
Aluminum Coating / 铝镀膜 Dielectric Mirror / 介电镜	Anti-Reflective Filter / 抗反射滤光片
特性: 介电制程、高质量图像	特性: 可见光高度穿透、减少可见光反射
应用: 条形码阅读器、投影系统、激光扫描仪	应用: 天文仪器、如照相机、望远镜、显微镜等, 其它应用如LCD 模块、显示器面板、仪表、军事和医疗领域等行动电话和掌上型计算机上的应用也越来越多
Neutral Density Filter / 中性密度镜 (减光镜)	Pattern Glass Windows / 效果片
特性: 不改变光谱, 但可均匀降低可见光的强度	特性: 营造不同的特殊光线效果
应用: 摄影、显微摄影、机器视觉系统	应用: 建筑、舞台灯光



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