YAMAMOTO

Please contact us for further information.

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201907 : 500

YAMAMOTO

L-005E

LASER EYE PROTECTOR & FILTER

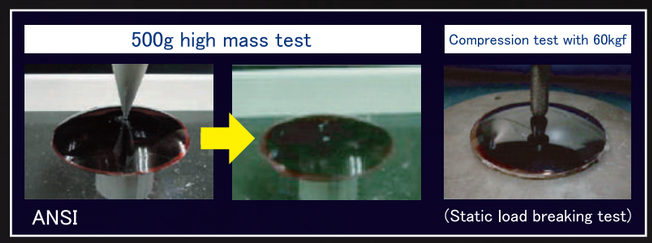
MEDICAL , OPTICAL FILTER , OTHERS

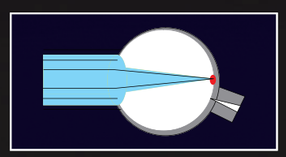
YAMAMOTO KOGAKU CO.,LTD.

Protecting for you

Yamamoto's motto is "Protecting for you" and we have been developing Petroid(*1) lens, which makes safe and comfort "vision" using core technology of light safety glasses and various protective products.
And based on the filtering technology that we established over the last 20 years, we have developed dust respirators and PAPR(powered air purified respirator) as a pioneer of the market. As for Laser protective glasses, we have developed broad range of products for various laser wavelengths with the developments in Laser technologies.
We make every effort to contribute to create safe, healthy, rich and pleasant life for working peoples.

(*1)
"Petroid" lens is best suited for the use in sports and occupational safety, which Yamamoto can be proud of. It is made of polycarbonate which has tens times of toughness than mineral glass. It was developed with taking advantage of the material characteristic of polycarbonate. It has been the best quality optical product with superior clarity and distortion-free high definition, which is the basis of our safety glasses.



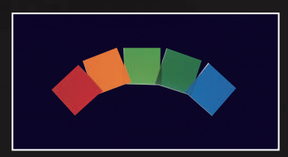

LASER SAFETY

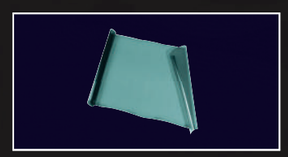

GOGGLES


INNER FRAME & OVER GLASSES


OVER GLASSES


GLASSES

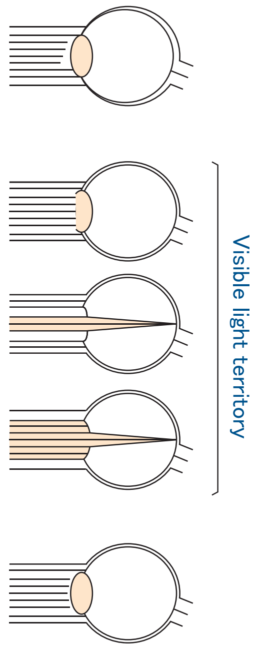

WINDOW


CURTAIN

Hazards of Laser

Laser is artificially made and particular kind of light, and it has completely different from natural light. It has directional characteristics, and the monochromatic behavior focuses all of energy on one point. It may become high power enough to melt the metal in a moment.
According to such characteristics of the laser, although the laser related workers know well about it, the failure of prevention measures as risk management may increase the possibility of accidents.
Especially against eyes, it is told that the focusing behavior of the crystalline makes the damage of retina bigger than expected. It is recognized that eye damages will be problematic on a permanent basis.

Table 1 Influence on the eyes according to wavelength



Absorption overview on an eyeball	Wavelength(nm) by CIE standard		Effect and damage to the eyes
UV	UV-C	200–280	Inflammation causes an acute pain to cornea and conjunctiva due to photochemical action and thermal effect.
	UV-B	280–315	
	UV-A	315–400	Clouds of crystalline lens due to thermal effect(cataract)
Visible		400–780	Retinal damage due to photo-chemical action by visible light.
IR	IR-A	780–1,400	Retinal damage due to photo-chemical action, thermal effect and impact wave.
	IR-B	1,400–3,000	Cornea burns and cataract due to thermal effect
	IR-C	3,000–10^6	

CIE is an abbreviation of Commission Internationale de Enluminure.
Diagram: Influences to the eyes in case of exposure to excess laser irradiation

It is specified (JIS C 6802) that eyes must be protected from Laser between wavelength of 180nm and 1mm. As described on the table 1, the damaging part of the eyes depends on the wavelength.

In UV area (below 400nm), most of Laser is absorbed at the surface of cornea and the rest is absorbed by crystalline. The irradiation of high power UV Laser makes inflammation (burns) on cornea due to photochemical action in the short term and it may form the cataract in case of the long exposure.

As for visible light area (400-700nm), when people senses the glare, blinking protective response is brought, however, it is too late to protect eyes in terms of time.
Laser comes into the eyes before the 0.25 sec. of protective response after catching a scent of danger. It is given an indication that Laser below 1mW power is safe even if Laser comes into the eyes in such 0.25 sec. However, due to thermal effect and focusing behavior of the eye lens, the higher power than 1mW may give damages on the part of retina on a permanent basis.

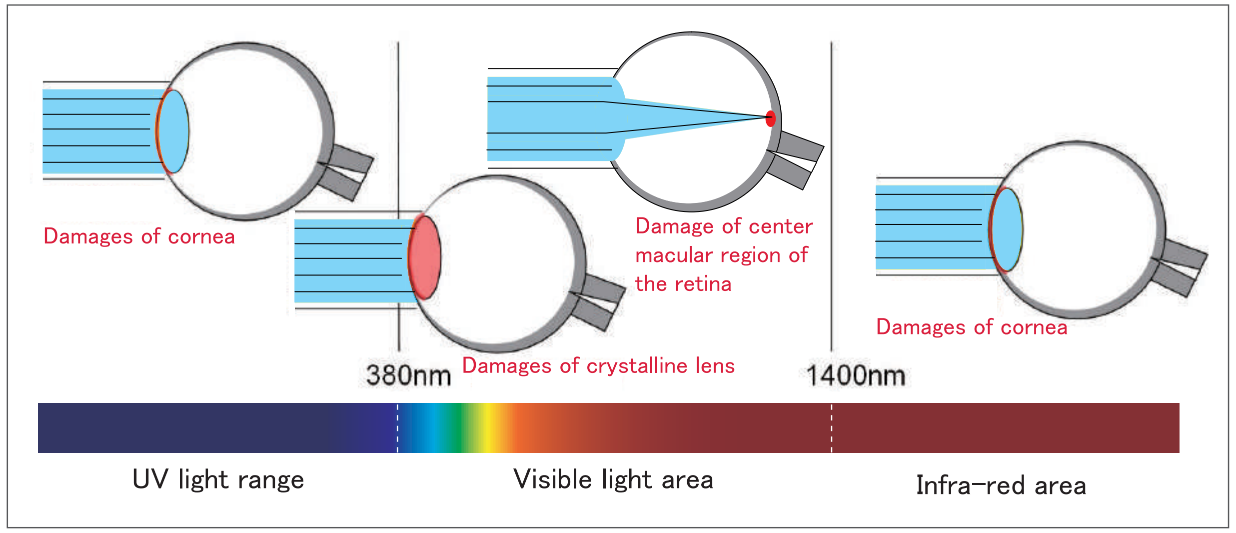
As for near-infrared area (700-1400nm), Laser reaches to the retina in the same way as visible light area. Since it is the invisible area, people can not recognize the damages, that is the reason why it is called as the most dangerous wavelength ranges.

The problems of after effects (low vision)

Most of the recorded accident examples by the Laser were occurred in the area of near-infrared. It is not the indication that the protection measures shall be only against near-infrared, which should be considered as the popularity of certain Laser devices.
The most important point on the reported accidents is that the damages on retina may lead to the low vision. In this case, it is big problem that no visual recovery is expected basically.

The influence of Laser on eyes

Table 2



*The damaged parts depend on the Laser wavelength.

Classification of Laser(IEC60825-1)

Each class is defined with AEL(Accessible Emission Limit):

Table 3 classification of Laser

Class 1	Low power level Laser: A class 1 laser is safe under all conditions of normal use. Built-in Laser: No access in normal use, however, it may be dangerous if the interlock system is not working.
Class 1M	Low power level Laser, parallel and large diameter beam: A Class 1M laser is safe for all conditions of use except when passed through magnifying optics such as microscopes and telescopes.
Class 2	Low power level Visible Laser; A Class 2 laser is safe because the blink reflex will limit the exposure. It may cause damage to the eyes in case of long time exposure against blue light, which is especially dangerous.
Class 2M	Low power level Visible Laser, parallel and large diameter beam; A Class 2M laser is safe because of the blink reflex if not viewed through optical instruments.
Class 3R	A Class 3R laser is considered safe for 100 seconds against invisible Laser and 0.25 seconds against visible Laser even if the MPE be exceeded, but with a low risk of injury, although beam viewing is restricted. The max power is 5 x AEL's of Class 1(invisible Laser) or 5 x AEL's Class 2(visible Laser).
Class 3B	A Class 3B laser is hazardous if the eye is exposed directly, but diffuse reflections such as from paper or other matte surfaces are not harmful.
Class 4	Class 4 lasers include all lasers with beam power greater than class 3B. A direct or diffuse beam viewing is dangerous.

It is important to check the class of your Laser so that you can take measures of prevention from radiation hazards.

Use of Laser protective eyewear

Notices of Health, Labour and Welfare Ministry "The protection measures for the hazard of Laser beam" requests users of 3R laser device to wear an appropriate protective eyewear according to the wavelength of Laser as safety precaution for working management

CE marking

European Norm(EN207, EN208)
Laser protective eyewear must protect eyes for 10 seconds against CW Laser and for 100 pulses against pulse Laser.
Both filter and frame must be fulfilled the requirement of European Norm.

Example of CE marking performance indication on lens:
"DIR 925-1065 L5"
The protection level is inscribed on the lens along with CE marking.
● DIR means the emission type of laser which is used when testing(D stands for Continuous Wave laser, I = Pulse laser and R= Q switched laser.).
● The numbers of 925-1065 stands for the testing range from 925nm to 1065nm.
● The rightmost L5 stands for protection level of the tested protective eyewear(Classification of 10 grades of protection levels). EN207 includes EN208 which standardizes the protective eyewear for the alignment works with visible lasers, which are classified in 5 grades using R instead of L although the same laser emission test is performed.

Following tables are the reference of power level (testing level) against wavelength ranges:

Table 4 EN207

Scale number	Maximum spectral transmittance for laser wavelength τ(λ)	Power(E) and energy density(H) for testing the protective effect and stability to laser radiation in the wavelength range								
		180nm to 315nm			>315nm to 1400nm			>1400nm to 1000μm		
		For test condition								
		D	I,R	M	D	I,R	M	D	I,R	M
		>$3\cdot10^{4}$	$10^{-9}$to	<10^{-9}	>$5\cdot10^{-4}$	$10^{-9}$to	<10^{-9}	>0.1	$10^{-9}$to	<10^{-9}
			$3\cdot10^{4}$			$5\cdot10^{-4}$			0.1	
		E_D	$H_{I,R}$	E_M	E_D	$H_{I,R}$	H_M	E_D	$H_{I,R}$	E_M
		W/m²	J/m²	W/m²	W/m²	J/m²	J/m²	W/m²	J/m²	W/m²
LB1	10^{-1}	0.01	$3\cdot10^{2}$	$3\cdot10^{11}$	10^{2}	0,05	$1,5\cdot10^{-3}$	10^{4}	10^{3}	10^{12}
LB2	10^{-2}	0.1	$3\cdot10^{3}$	$3\cdot10^{12}$	10^{3}	0,5	$1,5\cdot10^{-2}$	10^{5}	10^{4}	10^{13}
LB3	10^{-3}	1	$3\cdot10^{4}$	$3\cdot10^{13}$	10^{4}	5	0,15	10^{6}	10^{5}	10^{14}
LB4	10^{-4}	10	$3\cdot10^{5}$	$3\cdot10^{14}$	10^{5}	50	1,5	10^{7}	10^{6}	10^{15}
LB5	10^{-5}	100	$3\cdot10^{6}$	$3\cdot10^{15}$	10^{6}	$5\cdot10^{2}$	15	10^{8}	10^{7}	10^{16}
LB6	10^{-6}	10^{3}	$3\cdot10^{7}$	$3\cdot10^{16}$	10^{7}	$5\cdot10^{3}$	$1,5\cdot10^{2}$	10^{9}	10^{8}	10^{17}
LB7	10^{-7}	10^{4}	$3\cdot10^{8}$	$3\cdot10^{17}$	10^{8}	$5\cdot10^{4}$	$1,5\cdot10^{3}$	10^{10}	10^{9}	10^{18}
LB8	10^{-8}	10^{5}	$3\cdot10^{9}$	$3\cdot10^{18}$	10^{9}	$5\cdot10^{5}$	$1,5\cdot10^{4}$	10^{11}	10^{10}	10^{19}
LB9	10^{-9}	10^{6}	$3\cdot10^{10}$	$3\cdot10^{19}$	10^{10}	$5\cdot10^{6}$	$1,5\cdot10^{5}$	10^{12}	10^{11}	10^{20}
LB10	10^{-10}	10^{7}	$3\cdot10^{11}$	$3\cdot10^{20}$	10^{11}	$5\cdot10^{7}$	$1,5\cdot10^{6}$	10^{13}	10^{12}	10^{21}

D=continuous wave laser, I=pulsed laser, R=Q switch pulsed laser(short pulses), M=mode-coupled pulsed laser(ultra short pulses). Reference:E207

testing conditions for laser type	typical laser type	pulse length(s)	number of pulses
D	continuous wave laser	5	1
I	pulsed laser	>10^{-6} to 0.25	100
R	Q switch pulsed laser	>10^{-9} to 10^{-6}	100
M	mode-coupled pulsed laser	>10^{-9}	100

(EN208)

Scale Number	Max. transmittance	Max. laser power in W (1)	Max. pulse energy in J (2)
RB1	10^{-1}	0.01	2×10^{-6}
RB2	10^{-2}	0.1	2×10^{-5}
RB3	10^{-3}	1	2×10^{-4}
RB4	10^{-4}	10	2×10^{-3}
RB5	10^{-5}	100	2×10^{-2}

(1) CW lasers and pulsed lasers with a pulsed length of $>2\times10^{-4}$S
(2) pulsed lasers with a pulse length >10-9 to 2×10^{-4}S

Selection of laser protective eyewear

(1) Wavelength of the laser (nm)
(2) Power of the laser
CW laser: power (W)
Pulse laser: Power / pulse (J) and Frequency (Hz)
(3) MPE(Maximum Permitted Exposure)
(4) Exposure time (min)
(5) Maximum radiation exposure
(6) Required OD(Optical Density)

MPE(Maximum Permitted Exposure)
MPE is defined as 1/10 of amount of exposure with injury probability of the 50%
in case of direct laser hitting.
It stands for one of the safety level against human body, which is calculated with wavelength and exposure time.
MPE by direct hitting laser and diffused laser are calculated separately.
Please be aware that MPE is used as the barometer of managing exposure amount but as thresholds medically against human body.

Calculation of OD
●Relations among laser, protective equipment and eyes
When selecting protective eyewear, basically it is needed that lasers of Class 3B and 4 should be attenuated to below MPE by the protection filters.

How to select laser protective eyewear.

1 Check the type of laser, wavelength and power of your laser.

Even if the same name of the laser, the wavelength might differ.
Even if the different laser type, the wavelength might be same. Please check the characteristic graphs on each page.

2 Choose the filter type

D Laser absorption type
Optical density(OD) is high and you can not see the laser.

C Laser absorption type and Application for Multi band laser
One goggle is available for multiple laser wavelengths.

M Type attenuation to 1/100 for alignment work
Alignment for the laser power less than 100mW.(OD1 to 2)
Please use this type for checking the laser path and optical axis alignment.

A Type attenuation to 1/10,000 for alignment work
Alignment for the laser power less than 10W.(OD4)
Please use this type for checking the laser path and optical axis alignment.

H High power laser absorption type
High OD and good damage threshold.

G Tempered glass laser absorption type
Tempered glass provides high visibility.

3 Choose the frame type

YL-130 GOGGLE
Very good fit with face and can be worn over the prescription glasses.

YL-717 OVERGLASS1
Can be worn over the bigger prescription glasses.

YL-290 GLASS
Light & compact glasses with easy wearing semi-straight temples.

YL-250 OVERGLASS
Tempered glasses give high visible transmittance

YL-760 OVERGLASS
Inner frame with prescription lenses can be attached inside of this glass. In case of no inner frame, it is used as over glass type.

YL-335 OVERGLASS2
Can be worn over the normal sized prescription glasses.

YL-120 GOGGLE
Laminated glasses provide very high threshold against high power laser.
* Threshold stands for the limit that the laser radiation starts to give damages.

The other products:

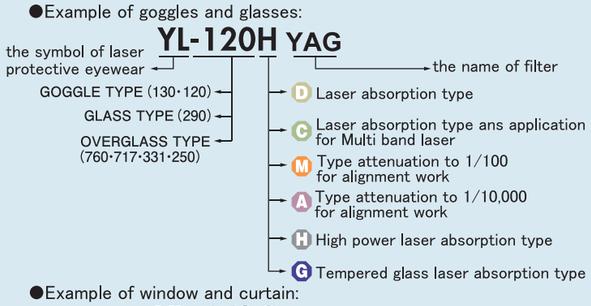
YL-500・YL-550
Laser shield window

YL-600・YLC-1・YLC-2A
Laser shield curtain

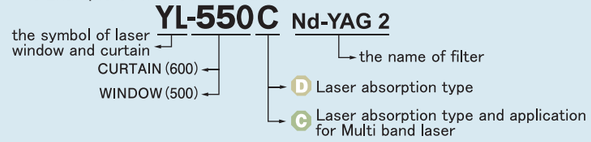
YL-2200・YL-2300
Laser barrier curtain

4 Check the item numbers

●Example of goggles and glasses:



●Example of window and curtain:



What is Optical Density(OD)?

OD stands for the attenuation rate of the incoming laser beam through lens.
OD shall be calculated as following math formula:

$OD(\lambda) = \log10(PI(\lambda)/PT(\lambda)) = -\log10T(\lambda)$

PI stands for incoming angle, PT is the power which passed the lens, T stands for the transmittance of the specific wavelength.
The bigger the number of OD gets, the attenuation rate gets higher, which stands for better protection.
On the contrary, the bigger the number of OD gets, the transmittance rate gets lower.
Please check the following table:

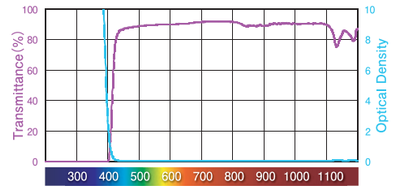
Optical Density (OD)	Transmittance	Attenuation rate
0	100%	0
1	10%	1/10
2	1%	1/100
3	0.1%	1/1000
4	0.01%	1/10000
↓	↓	↓
10	0.00000001%	1/10000000000

D Laser absorption type

Filter Code	D-001
Filter Name	Excimer
Color	CLEAR
Luminous Transmittance	85%

Optical Density		
EXCIMER	190-380nm	10<
ArF (193nm), KrF (248nm), XeCl (308nm)		
Ne-N2 (334,337nm), He-Cd (325nm)		
Nd-YAG (FHG)	266nm	10<
Nd-YAG (THG)	355nm	10<

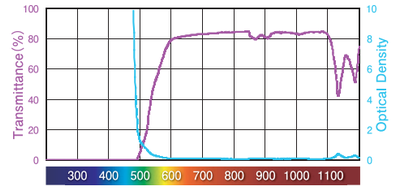
Frame Type: YL-130 YL-717



Filter Code	D-002
Filter Name	Excimer He/Cd
Color	YELLOW
Luminous Transmittance	75%

Optical Density		
He-Cd	441.6nm	10<

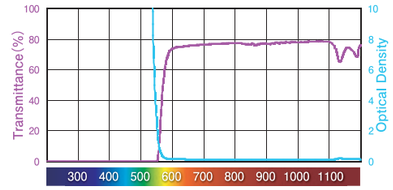
Frame Type: YL-335 YL-290



Filter Code	D-003
Filter Name	Argon
Color	ORANGE
Luminous Transmittance	45%

Optical Density		
ARGON	457.9nm	10<
	488.0nm	
	514.5nm	
He-Cd	441.6nm	10<

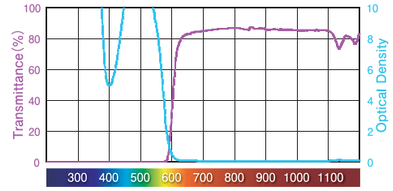
Frame Type: YL-717



Filter Code	D-004
Filter Name	NdYag(SHG)
Color	RED
Luminous Transmittance	16%

Optical Density		
Nd-YAG (SHG)	532nm	10<

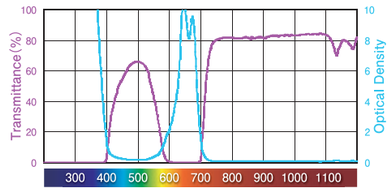
Frame Type: YL-130 YL-717 YL-335 YL-290



Filter Code	D-005
Filter Name	HeNe
Color	BLUE
Luminous Transmittance	25%

Optical Density		
GOLD-VAPOR	627.8nm	5<
He-Ne	632.8nm	5<
KRYPTON	647.1nm	5<
	676.4nm	8<
LASER DIODE	635～680nm	5<

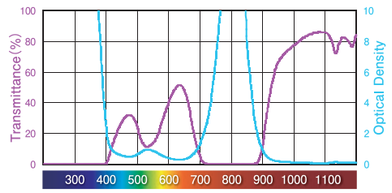
Frame Type: YL-717



Filter Code	D-006
Filter Name	Alexandrite
Color	PINK
Luminous Transmittance	30%

Optical Density		
ALEXANDRITE	755nm	6<
LASER DIODE	750～850nm	4～10<
	800nm	10<
Ti-Sapphire	441.6nm	4<

Frame Type: YL-130 YL-760 YL-717 YL-335 YL-290

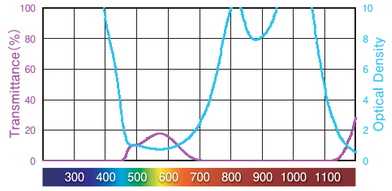


Laser absorption type

Filter Code	D-008
Filter Name	LD-YAG
Color	GREEN
Luminous Transmittance	30%

Optical Density		
FIBER LASER	800~1080nm	6<
Nd-YAG	1064nm	7<
LASER DIODE	800~810nm	7<
	940nm	7<

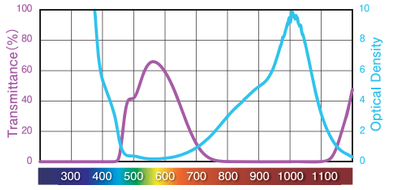
Frame Type: YL-335 YL-760



Filter Code	D-009
Filter Name	NdYag
Color	GREEN
Luminous Transmittance	50%

Optical Density		
Nd-YLF	1047,1053nm	6<
Nd-YAG,Nd-YVO$_4$	1064nm	6<

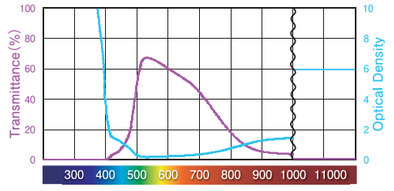
Frame Type: YL-130 YL-760 YL-335 YL-290



Filter Code	D-010
Filter Name	CO2
Color	GREEN
Luminous Transmittance	60%

Optical Density		
CO_2	10600nm	5~6<

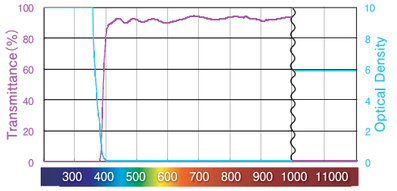
Frame Type: YL-717



Filter Code	D-011
Filter Name	CO2 clear
Color	CLEAR
Luminous Transmittance	85%

Optical Density		
CO_2	10600nm	6<

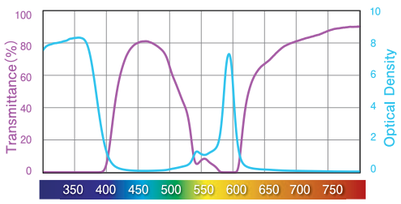
Frame Type: YL-335



Filter Code	D-031
Filter Name	DYE
Color	BLUE
Luminous Transmittance	23%

Optical Density		
DYE	591–598nm	5<

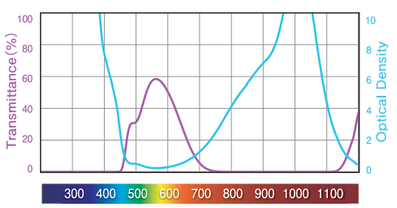
Frame Type: YL-130



Filter Code	D-032
Filter Name	NdYag (OD7)
Color	GREEN
Luminous Transmittance	50%

Optical Density		
Nd-YLF	1047,1053nm	7<
Nd-YAG,Nd-YVO$_4$	1064nm	7<

Frame Type: YL-717

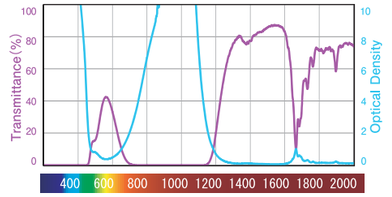


Laser absorption type

Filter Code	D-033
Filter Name	Fiber LASER
Color	GREEN
Luminous Transmittance	25%

Optical Density		
Fiber LASER	800~1080nm	7<

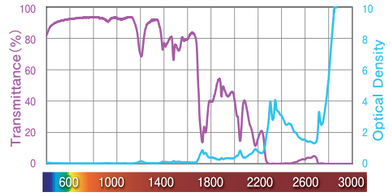
Frame Type: YL-717



Filter Code	D-034
Filter Name	ErYag
Color	CLEAR
Luminous Transmittance	85%

Optical Density		
ErYag	2940 nm	3<

Frame Type: YL 717

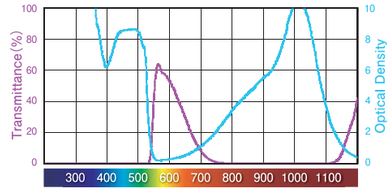


Laser absorption type and Application for Multi band laser

Filter Code	C-013
Filter Name	C NdYag1
Color	AMBER
Luminous Transmittance	35%

Optical Density		
YAG(FHG)	226nm	10<
YAG(THG)	355nm	10<
YAG(SHG)	532nm	2<
Nd-YAG	1064nm	6<

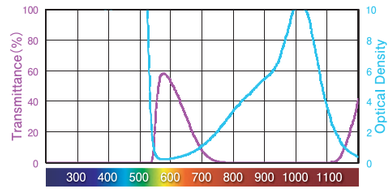
Frame Type: YL-717



Filter Code	C-014
Filter Name	C NdYag2
Color	AMBER
Luminous Transmittance	30%

Optical Density		
YAG(FHG)	226nm	10<
YAG(THG)	355nm	10<
YAG(SHG)	532nm	4<
Nd-YAG	1064nm	6<

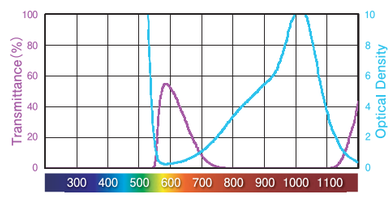
Frame Type: YL-130 YL-760 YL-717 YL-331 YL-290



Filter Code	C-015
Filter Name	C NdYag3
Color	AMBER
Luminous Transmittance	25%

Optical Density		
YAG(FHG)	226nm	10<
YAG(THG)	355nm	10<
YAG(SHG)	532nm	7<
Nd-YAG	1064nm	6<

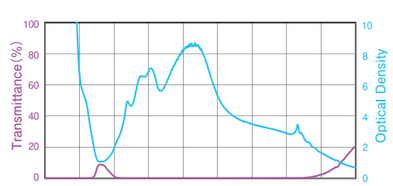
Frame Type: YL-717



Filter Code	C-035
Filter Name	C LASER Diode 2
Color	GREEN
Luminous Transmittance	4 %

Optical Density		
LASER DIODE	740~840nm	6<
	920~1160nm	6<

Frame Type: YL-717

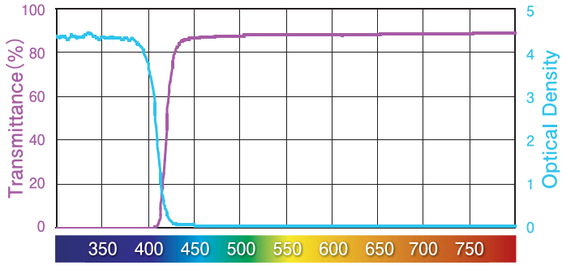


M Type attenuation to 1/100 for alignment work

Filter Code	M-016
Filter Name	M Blue Laser Diode
Color	CLEAR
Luminous Transmittance	85%

Optical Density		
BLUE LASER DIODE	405nm	3<

Frame Type: YL-335

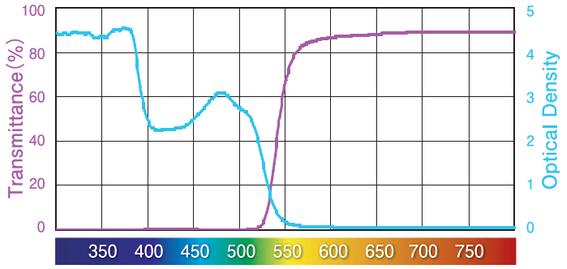


BLUE LASE DIODE

Filter Code	M-017
Filter Name	M Argon
Color	ORANGE
Luminous Transmittance	57%

Optical Density		
ARGON	488nm	3<
	514.5nm	2<

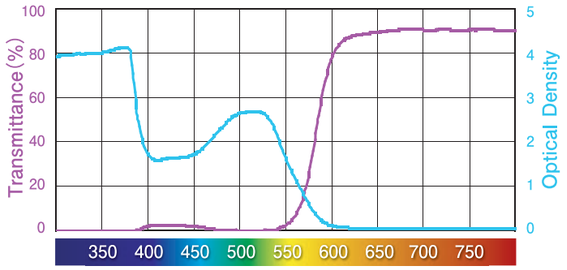
Frame Type: YL-717 YL-335



Filter Code	M-018
Filter Name	M NdYag(SHG)
Color	RED
Luminous Transmittance	30%

Optical Density		
YAG(SHG)	532nm	2<

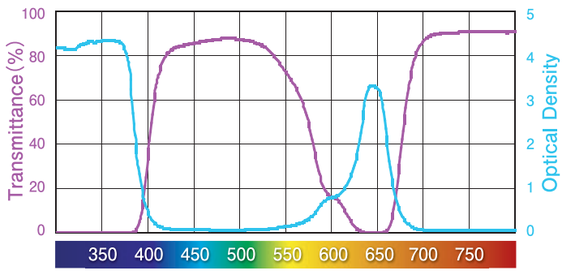
Frame Type: YL-130 YL-760 YL-717 YL-290 YL-335



Filter Code	M-019
Filter Name	M HeNe
Color	BLUE
Luminous Transmittance	47%

Optical Density		
GOLD-VAPOR	627.8nm	2<
He-Ne	632.8nm	2<
VISIBLE LASER DIODE	635nm	2<

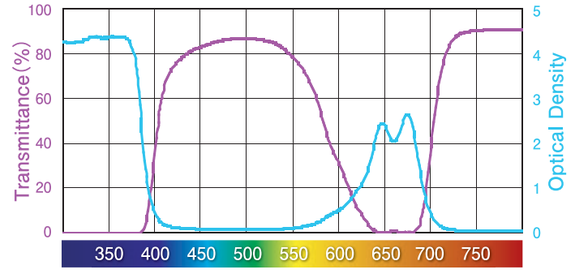
Frame Type: YL-717 YL-335



Filter Code	M-020
Filter Name	M Visible Laser Diode
Color	BLUE
Luminous Transmittance	55%

Optical Density		
VISIBLE LASER DIODE	660~680nm	2<
KRYPTON	647.1nm	2<
	676.4nm	2<

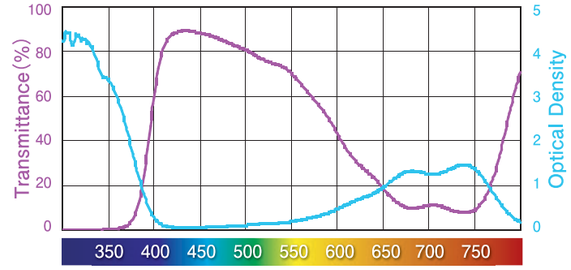
Frame Type: YL-130 YL-760 YL-717 YL-335 YL-290



Filter Code	M-022
Filter Name	M Laser Diode2
Color	BLUE
Luminous Transmittance	58%

Optical Density		
LASER DIODE	635nm	0.7<
	650nm	0.9<
	680nm	1<
	780nm	0.5<

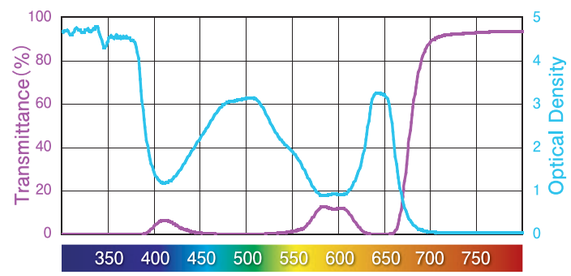
Frame Type: YL-335



Filter Code	M-023
Filter Name	M RGB
Color	PURPLE
Luminous Transmittance	8%

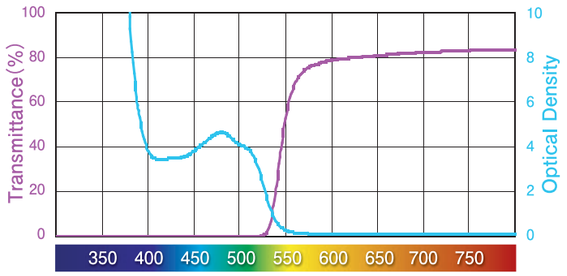
Optical Density		
BLUE LED	457nm	2<
GREEN LED	532nm	2<
RED LED	633nm	2<

Frame Type: YL-335

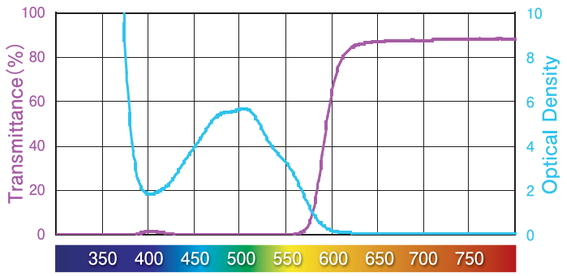


A Type attenuation to 1/10,000 for alignment work

Filter Code	A-024	
Filter Name	A Argon	
Color	ORANGE	
Luminous Transmittance	50%	
Optical Density		
ARGON	457.9nm	4<
	488nm	4<
	514.5nm	4<
Frame Type	YL-717	

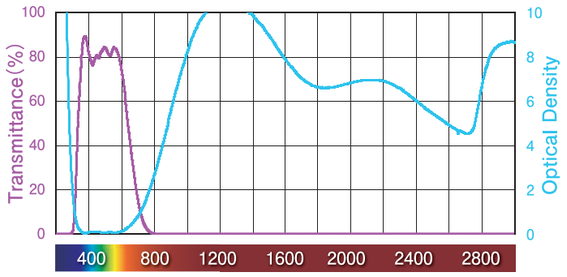


Filter Code	A-025	
Filter Name	A NdYag(SHG)	
Color	RED	
Luminous Transmittance	25%	
Optical Density		
YAG(SHG)	532nm	4<
Frame Type	YL-717	



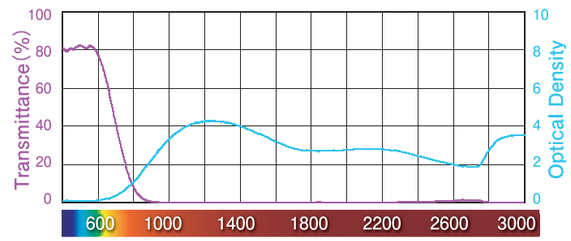
H High power laser absorption type

Filter Code	H-026	
Filter Name	H NdYag	
Color	GREEN	
Luminous Transmittance	67%	
Optical Density		
Nd-YAG	1064nm	7<
Nd-YAG	1319.5nm	7<
Nd GLASS	1060nm	7<
Nd-YLF	1047,1053nm	7<
Er YAG	2940nm	7<
Frame Type	YL-120	

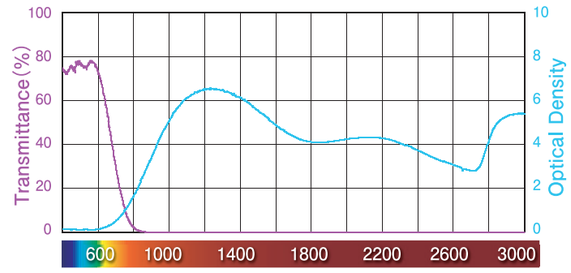


G Tempered glass laser absorption type

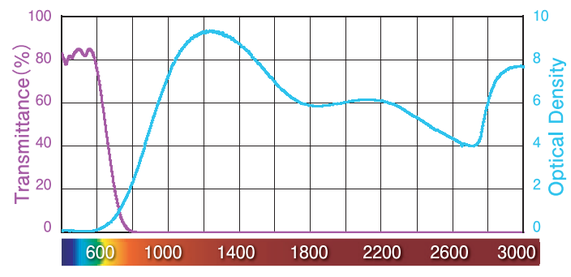
Filter Code	G-028	
Filter Name	G NdYag(OD3)	
Color	GREEN	
Luminous Transmittance	80%	
Optical Density		
Nd-YAG	1064nm	3<
Ho-YAG	2100nm	2<
Er- YAG	2940nm	2<
LASER DIODE	780nm	0.8<
TELECOM	980nm	3<
TELECOM	1310,1550nm	2<
Frame Type	YL-250	



Filter Code	G-029	
Filter Name	G NdYag(OD5)	
Color	GREEN	
Luminous Transmittance	74%	
Optical Density		
Nd-YAG	1064nm	5<
Ho-YAG	2100nm	3.5<
Er -YAG	2940nm	3.5<
Frame Type	YL-250	



Filter Code	G-030	
Filter Name	G NdYag(OD7)	
Color	GREEN	
Luminous Transmittance	69%	
Optical Density		
Nd-YAG	1064nm	7<
Ho-YAG	2100nm	5<
Er -YAG	2940nm	5<
Frame Type	YL-250	



model type YL-130

- Frame / PP & Elastomer
- Lens / Polycarbonate with hard & anti-fogging coating
- Specification / Can be worn over the prescription glasses (excluding some bigger glasses)
- Size / W192 x H83 x D92
- Weight / 92g

ANSI Z136.7

Ergonomic elastomer cushion gives good fitting.

Integrated spherical lens enables wide view.

Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL130 Excimer	CLEAR	85%	190-380	10<	D-001	–
YL130 NdYag(SHG)	RED	16%	532	10<	D-004	–
YL130 Alexandrite	PINK	30%	755-800-850	6-10-4<	D-006	–
YL130 NdYag	GREEN	50%	1064	6<	D-009	–
YL130 DYE CE	BLUE	23%	591–598	5<	D-031	DIR 591 - 598 LB5 DI 5000 - 11000 LB3 YL S CE

Laser absorption type and Application for Multi band laser

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL130C NdYag2	AMBER	30%	266,355 532 1064	10< 4< 6<	C-0104	–

Type attenuation to 1/100 for alignment work

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL130M NdYag(SHG)	RED	30%	532	2<	M-018	–
YL130M Visible Laser Diode	BLUE	55%	660-680 647 676	2<	M-020	–

model type YL-760

- Frame / Nylon & Elastomer
- Lens / Polycarbonate with hard coating
- Specification / Can be worn over the prescription glasses
  Frame angle can be changed
  Soft rubber temples(adjustable bending temples)
- Size / W160 x H58 x D170
- Weight / 147g

ANSI Z136.7

Good cushioned soft nose pads & bar

Flexible temples are angle adjustable

Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL760 Alexandrite	PINK	30%	755-800-850	6-10-4<	D-006	–
YL760 LD-YAG	GREEN	30%	800-810 940,1064	7<	D-008	–
YL760 NdYag	GREEN	50%	1064	6<	D-009	–

Laser absorption type and Application for Multi band laser

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL760C NdYag2	AMBER	40%	266,355 532 1064	10< 4< 6<	C-014	–

Type attenuation to 1/100 for alignment work

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL760M NdYag(SHG)	RED	30%	532	2<	M-018	–
YL760M Visible Laser Diode	BLUE	55%	660-680 647 676	2<	M-020	–

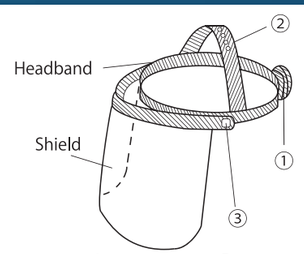
model type YL-700S Excimer

YL-700S Excimer is made to protect eyes and face from accidental exposure to scattered light from excimer lasers.

LASER SHIELD

Material: Acrylic(Lens)、Plastic(Headband)
Wavelength: 180-315、315-360nm
Optical Density (OD): 6<
Visible light transmittance (%): 90 %

CE EN207
180–315 D LB8 +IR LB4
>315–380 DIR LB4 YL S CE



◆You can change the headband size easily!

【How to adjust a headband】

First, you put a headband on your head after you loosen an adjust screw of the headband(①).Second, you align ② to tie up on your head. If you would like to tighten the headband, ② should be short.On the other hand,if you would like to loosen it, ② should be long. After you aligned it, you fix with the screw(①)on the head in order not to move the headband. You can change the place of shield, which is easily moved up and down by loosening ③. Therefore, please adjust ③ to protect your face from laser radition.

model type YL-717

- Frame / Nylon & Elastomer
- Lens / Polycarbonate with hard coating
- Specification / Can be worn over the prescription glasses
  Soft elastomer cushion bar
  Frame angle can be changed
- Size / W163 x H65 x D167
- Weight / 49g

ANSI Z136.7

New straight and angle adjustable temples which has three adjustable angle positions.

New movable ear hook gives better fitting

Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL717 Excimer CE	CLEAR	85%	190-380	10<	D-001	180 - 315 D LB8 + IR LB4, >315 - 380 D LB6 + IR LB7 >380 - 395 DIR LB5, 5000 - 11000 DI LB4 YL S CE
YL717 Argon	ORANGE	45%	442,488,515	10<	D-003	–
YL717 NdYag(SHG) CE	RED	16%	532	10<	D-004	180 - 315 D LB8 + IR LB4, >315 - 375 D LB6 + IR LB7 >375 - 380 DIR LB5, 440 -455 DIR LB3, >455 - 465 DIR LB4 >465 - 475 DIR LB5, >475 - 485 DIR LB6, >485 - 495 D LB6 + IR LB7 >495 - 550 D LB6 + IR LB8 + M LB8Y, >550 - 565 DIR LB5 >565 - 570 DIR LB4, 5000 -11000 DI LB4 YL S CE
YL717 HeNe CE	BLUE	25%	633	5<	D-005	180 - 315 D LB8 + IR LB4, >315 - 380 D LB6 + IR LB7, 620 - 640 DIR LB3 >640 - 680 D LB5 + IR LB7, >680 - 690 DIR LB3 5000 - 11000 DI LB4 YL S CE
YL717 Alexandrite CE	PINK	30%	755-800-850	6-10-4<	D-006	180 -315 D LB8 + IR LB4, >315 -380 D LB6 + IR LB7, 740 - 760 DIR LB4 >760 -850 D LB5 + IR LB7, >850 -870 DIR LB4, 800 -810 M LB8Y 5000 -11000 DI LB4 YL S CE
YL717 NdYag(OD7) CE	GREEN	50%	1064	7<	D-032	315 -415 DIR LB6 + M LB6Y, >415 - 420 DIR LB5 + M LB5Y 870 - 885 DIR LB6, >870 - 925 D LB6 + IR LB7 >925 - 1065 D LB6 + IR LB8 + M LB8Y, >1065 - 1090 DIR LB5 9000 - 11000 DI LB3 YL S CE
YL717 CO2	GREEN	60%	10600	5<	D-010	–
YL717 Fiber LASER CE	GREEN	25%	810-1100	7<	D-033	315 - 420 DIR LB6 + M LB6Y, 810 - 925 D LB6 + IR LB7 >925 - 1065 D LB6 + IR LB8 + M LB8Y, >1065 - 1100 DIR LB5 9000 -11000 DI LB3 YL S CE
YL717 ErYAG CE	CLEAR	85%	2940	3<	D-034	2940 DI LB3 YL S CE
YL717 DYE	BLUE	20%	585-602 590-598	4< 6<	D-031	–

Laser absorption type and Application for Multi band laser

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL717C NdYag1	AMBER	35%	266,355 532 1064	10< 2< 6<	C-013	–
YL717C NdYag2 CE	AMBER	30%	266,355 532 1064	10< 4< 6<	C-014	180 - 315 D LB8 + IR LB4, >315 - 380 D LB6 + I LB7+ R LB6 >380 - 520 D LB6 + I LB8 + R LB6, >520 - 530 DIR LB5 >530 - 532 DIR LB4 + M LB4Y, 800 -880 DIR LB3, >880 - 960 DIR LB5 >960 - 1065 D LB6 + IR LB7+ M LB7Y >1065 -1100 DIR LB3, 5000 -11 000 DI LB4 YL S CE
YL717C NdYag3	AMBER	25%	266,355 532,1064	10< 7<,6<	C-015	–
YL717C Laser Diode2 CE	GREEN	4%	740-840 920-1160	6<	C-035	180 - 315 D LB7 + IR LB3, >315 - 400 DIR LB6, 635 - 650 DIR LB3 >650 - 670 DIR LB4, >670 - 715 DIR LB5, >715 - 750 DIR LB6 >750 - 1150 D LB6 + IR LB7, 1064 D LB6 + IR LB8, >1150 -1250 DIR LB6 >1250 - 1400 DIR LB5, >1400 - 1600 DIR LB4 YL S CE

Type attenuation to 1/100 for alignment work

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL717M Argon	ORANGE	57%	488,515	3<,2<	M-017	–
YL717M NdYag(SHG) CE	RED	30%	532	2<	M-018	180 - 315 D LB8 + IR LB4, >315 - 380 D LB6 + IR LB7 5000 - 11000 DI LB4, 0.01W 2*10⁻⁶J 400-485 RB1 0.1W 2*10⁻⁶J >485 - 535 RB2, 0.01W 2*10⁻⁶J >535 - 560 RB1 YL S CE
YL717M HeNe	BLUE	47%	628,633,635	2<	M-019	–
YL717M Visible Laser Diode CE	BLUE	55%	660-680 648 677	2<	M-020	180 - 315 D LB8 + IR LB4, >315 - 375 D LB6 + IR LB7 >375 - 380 DIR LB6, 5000 -11000 DI LB4 0.01W 2*10⁻⁶J 630 - 640 RB1, 0.1W 2*10⁻⁶J >640 - 655 RB2 0.01W 2*10⁻⁶J >655 - 670 RB1, 0.1W 2*10⁻⁶J >670 - 685 RB2 0.01W 2*10⁻⁶J >685 - 690 RB1 YL S CE

Type attenuation to 1/10000 for alignment work

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL717A Argon	ORANGE	50%	488,515	4<	A-024	–
YL717A NdYag(SHG) CE	RED	25%	532	4<	A-025	180 - 315 D LB8+ IR LB4, >315 - 375 D LB6 + IR LB7, >375 - 380 DIR LB4 5000 - 11000 DI LB4 0.01W 2*10⁻⁶J 425 - 460 RB1, 0.1W 2*10⁻⁶J >460 - 485 RB2, 1W 2*10⁻⁶J >485 - 510 RB3, 10W 2*10⁻⁶J >510 - 545 RB4, 1W 2*10⁻⁶J >545 - 560 RB3 0.1W 2*10⁻⁶J >560 - 570 RB2, 0.01W 2*10⁻⁶J >570 - 580 RB1 YL S CE

model type YL-335

- Frame / Polycarbonate & Elastomer
- Lens / Polycarbonate with hard coating
- Specification / Can be worn over the prescription glasses
  Wide temples
  Soft nose pad
- Size / W158 x H65 x D168
- weight / 49g

ANSI Z136.7

Soft nose pad with cushion

Wide temples give better protection.

Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL335 Excimer/HeCd	YELLOW	75%	193-442	10<	D-002	–
YL335 NdYag(SHG)	RED	16%	532	10<	D-004	–
YL335 Alexandrite	PINK	30%	755-800-850	6-10-4<	D-006	–
YL335 LD-YAG	GREEN	30%	800-810 940,1064	7<	D-008	–
YL335 NdYag	GREEN	50%	1064	6<	D-009	–
YL335 CO2 clear	CLEAR	85%	10600	6<	D-011	–

Laser absorption type and Application for Multi band laser

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL335C NdYag2	AMBER	30%	266,355 532 1064	10< 4< 6<	C-014	–

Type attenuation to 1/100 for alignment work

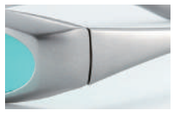
ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL335M Blue Laser Diode	CLEAR	85%	405	3<	M-016	–
YL335M NdYag(SHG)	RED	30%	532	2<	M-018	–
YL335M Argon	ORANGE	57%	515	2<	M-017	–
YL335M HeNe	BLUE	47%	633	2<	M-019	–
YL335M Visible Laser Diode	BLUE	55%	660-680	2<	M-020	–
YL335M Laser Diode2	BLUE	58%	635-780	0.5~1<	M-022	–
YL335M RGB	PURPLE	8%	457,532,633	2<	M-023	–

model type YL-290

- Frame / Nylon
- Lens / Polycarbonate with hard coating
- Specification / Wrap-round frame
  Wide temples
- Size / W138 x H39 x D155
- Weight / 33g

ANSI Z136.7

High curve frame covers face with high protection.



Wide temples achieves good protection.

D Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL290 EX HeCd	YELLOW	75%	193-441.7	10<	D-002	–
YL290 NdYag(SHG)	RED	16%	532	10<	D-004	–
YL290 Alexandrite	PINK	30%	750-800-850	4-10-4<	D-006	–
YL290 NdYag	GREEN	50%	1064	6<	D-009	–

C Laser absorption type and Application for Multi band laser

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL290C NdYag2	AMBER	30%	266,355 532 1064	10< 4< 6<	C-014	–

M Type attenuation to 1/100 for alignment work

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL290M NdYag(SHG)	RED	30%	532	2<	M-018	–
YL290M Visible Laser Diode	BLUE	55%	660-680 647.1 676.4	2<	M-020	–

model type YL-120

- Frame / Laminated plastic and metal
- Lens / Laminated glasses
- Specification / Can be worn over prescription eyewear
- Size / W160 x H80 x D73
- Protection from a direct laser beam for three seconds(Conditional laser power)
- High Optical Density
- Both frame & lens has high damage threshold against laser.
- Laminated glasses provide high impact resistance
- High visible transmittance
- Weight / 162 g

※ Threshold stands for the value of laser power when the lenses and frame start to have damages in case of receiving direct laser beam.

ANSI Z136.7

H High-Powered Laser (Laser absorption type)

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	Remarks
YL120H NdYag	GREEN	67%	1064,1319.5 1060 1047,1053	7<	H-026	No penetration by a laser of power density 10+8W/m2 at 1064nm for three seconds.(※1) This lens provides over OD7 between 1000 and 1600nm

※1 This data comes from the radiation testing by NdYag Laser with 40W power.

model type YL-250

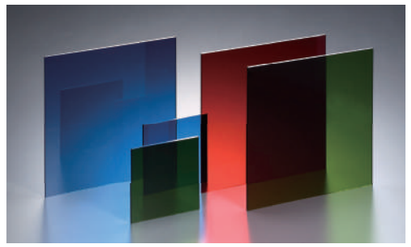
- Frame / Nylon
- Lens / Tempered glasses
- Specification / Can be worn over prescription eyewear
- Size / W155 x H57 x D141
- High visible transmittance
- High color recognition
- Lens performs high chemical-resistant.
- Weight / 76 g

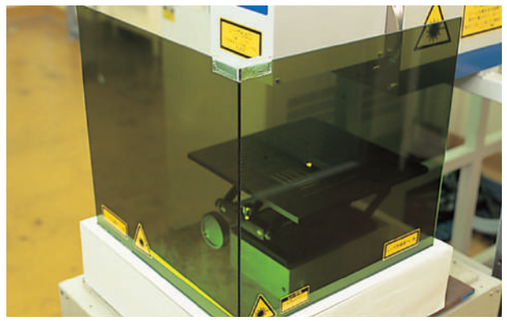
ANSI Z136.7

G Tempered glass type(Laser absorption type)

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL250G NdYag(OD3)	GREEN	80%	1064 2100,2940 980 1310,1550 780	3< 2< 3< 2< 0.8<	G-028	–
YL250G NdYag(OD5) CE	GREEN	74%	1064 2100,2940	5< 3.5<	G-029	1064 DIR LB5, 2100 DI LB4 2940 DI LB4 YL CE
YL250G NdYag(OD7)	GREEN	69%	1064 2100,2940	7< 5<	G-030	–

model type YL-500 YL-550





Outline of product:

- Due to the acrylic material, accurate measurement processing is available.
  (We do any customized measurement processing including perforation processing.)
- Maximum size : 40 x 40cm except for NdYag(120 x 100cm)
- Sales unit: Any size within above mentioned.
- Thickness 3mm except for CO2 (4mm) and NdYag(3.5mm)
- Material / Polymethyl Meta Acrylate

D Laser absorption type

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	Maximum size: within the following size
YL500 Argon	ORANGE	60%	200-514.5	4<	W-001	400×400mm,t≒3.0
YL500 NdYag(SHG)	RED	15%	480-540	6<	W-002	400×400mm,t≒3.0
YL500 Laser Diode	BLUE	7%	632.8,760-850	5<	W-003	400×400mm,t≒3.0
YL500 NdYag	GREEN	25%	900-1200	5<	W-004	1200×1000mm,t≒3.5
YL500 CO2	GREEN	60%	10600	10<	W-005	400×400mm,t≒4.0
YL500 Fiber CE	GREEN	40%	920-1150	7<	W-009	1200×1000mm,t≒3.5 CE mark EN207, EN12254 180 - 315 D LB8 + IR LB4, >315 - 380 D LB4 + IR LB6 + M LB6Y 915 - 1180 D LB6 + IR LB7, 2720 - 2940 DI LB4 5000 - 11000 DI LB3 YL S CE D AB8 + IR AB3 180 - 315, D AB5 + IR AB6 + M AB6Y >315 - 380 D AB5 + IR AB7 915 - 1180, DI AB2 2720 - 2940 D AB2 + I AB3 5000 - 11000 YL

C Laser absorption type and Application for Multi band laser

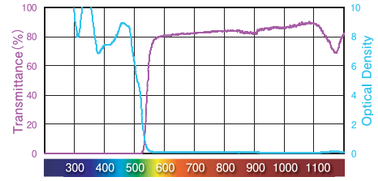
ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	Maximum size: within the following size
YL550C NdYag2	AMBER	30%	266,355 532 1064	10< 4< 6<	W-008	850×550mm,t≒3.0

YL-500

D Laser absorption type

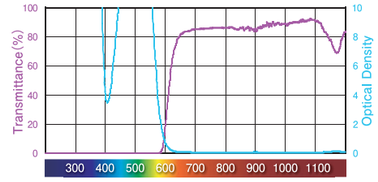
Filter Code	W-001
Filter Name	YL500 Argon
Color	ORANGE
Luminous Transmittance	60%

Optical Density		
EXCIMER ARGON He-Cd	200~514.6nm	4<



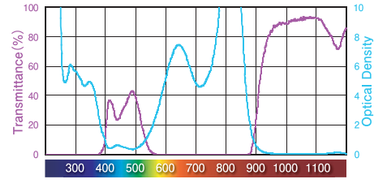
Filter Code	W-002
Filter Name	YL500 NdYag(SHG)
Color	RED
Luminous Transmittance	15%

Optical Density		
ARGON Nd-YAG (SHG)	480~540nm	6<



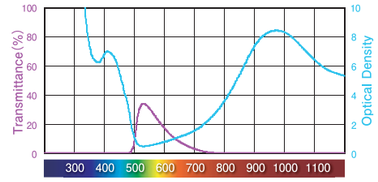
Filter Code	W-003
Filter Name	YL500 Laser Diode
Color	BLUE
Luminous Transmittance	7%

Optical Density		
LASER DIODE He-Ne	760~850nm 632.8nm	5<



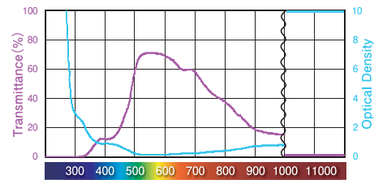
Filter Code	W-004
Filter Name	YL500 NdYag
Color	GREEN
Luminous Transmittance	25%

Optical Density		
Nd-YAG Nd-YUO4	1064nm	5<



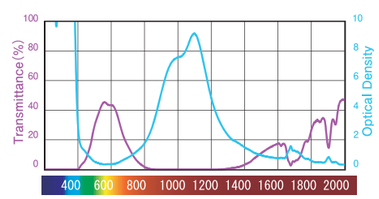
Filter Code	W-005
Filter Name	YL500 CO2
Color	GREEN
Luminous Transmittance	60%

Optical Density		
CO_2	10600nm	10<



Filter Code	W-009
Filter Name	YL500 Fiber
Color	GREEN
Luminous Transmittance	40%

Optical Density		
Fiber	950-1150nm	7<

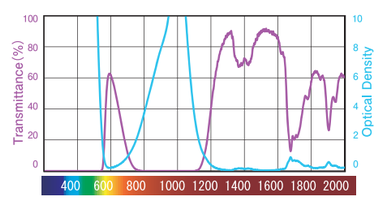


YL-550

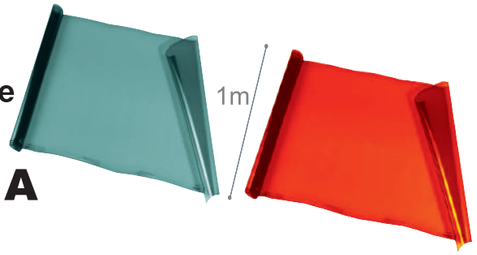
C Laser absorption type and Application for Multi band laser

Filter Code	W-008
Filter Name	YL550C NdYag2
Color	AMBER
Luminous Transmittance	30%

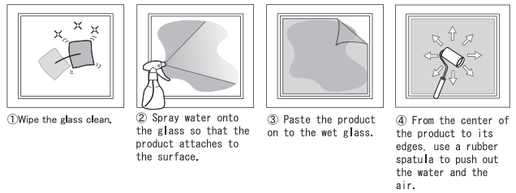
Optical Density		
YAG (FHG)	266nm	10<
YAG (THG)	355nm	10<
YAG (SHG)	532nm	4<
Nd-YAG	1064nm	6<



model type
YLC-1
YLC-2A



The 1m wide curtain enables protection for a large area.



①Wipe the glass clean.

② Spray water onto the glass so that the product attaches to the surface.

③ Paste the product on to the wet glass.

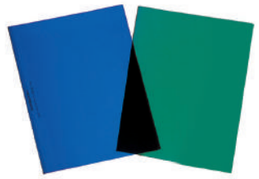
④ From the center of the product to its edges, use a rubber spatula to push out the water and the air.

YLC-1 YLC-2A

- Size : 1m x 0.5m, 1m x 1m to 1m x 10m(unit of 1m) / Thickness 0.5mm
- Material / Polyvinyl chloride(PVC)
- Color / YLC-1 : Clear Gray , YLC-2A : Clear Orange
- Optical Density / over OD3
- Visible Light Transmittance / YLC-1 : 40% , YLC-2A : 30%
- Antistatic Performance (Surface resistivity value) / 1.1 x 10+13(JIS K-6911)
- Flame proof / Oxygen index 25<(JIS K-7201-A)

EN12254 YLC-1 : R AB2 266 R AB3 355 DIR AB3 1064 DI AB2 10600 CE
YLC-2A : R AB3 266 R AB7 355 R AB4 532 D AB5 532 CE

model type
YL-600



Outline of product:

- YL600 is made of soft PVC and it is easy to cut by scissors and fit to the required area of the facility.
- Size : Effective width 33cm x 0.5m to 33cm x 10m(unit of 0.5m) / Thickness 0.7mm
- Material / Polyvinyl cholide(PVC)

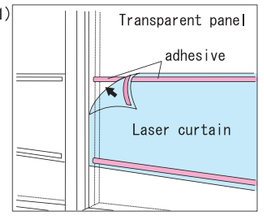
How to install the Laser Shield Curtain YL600

YL600 is made of PVC, due to its softness and flexibility, it is easy to cut according to the required size. Please draw attention to the following information in order to maximize the performance of the product.

Installation of the Laser Curtain to transparent panels

The surface of the Laser Curtain is slightly adhesive. Firstly place the Laser Curtain onto the panels and then push out any air bubbles which may exist between the curtain and the panel. Even if any air bubbles still remain, the effectiveness of the curtain will not be reduced. After that, apply 3M multi-purpose adhesive(approx 1cm in width) to the upper and lower edges of both the curtain and panel to fix.(table 1)

(table 1)



YLC-1 YLC-2A

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YLC-1 CE	CLEAR GRAY	40%	266,355,1064 2100,10600	3<	YLC-1	R AB2 266 R AB3 355 DIR AB3 1064 DI AB2 10600
YLC-2A CE	CLEAR ORANGE	30%	190 -540	4<	YLC-2A	R AB3 266 R AB7 355 R AB4 532 D AB5 532

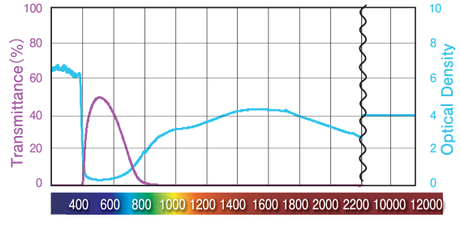
YL-600

ORDER NAME	COLOR	Visible light transmittance(%)	Wavelength (nm)	Optical Density(OD)	FILTER CODE	CE mark
YL600 HeNe	BLUE	12%	632.8 570-700	2<	CU-002	–
YL600 Laser Diode	GREEN	12%	740-910 700-1000	3< 1-3<	CU-003	–

YLC-1

Filter Code	YLC-1
Filter Name	YLC-1
Color	CLEAR GRAY
Luminous Transmittance	40%

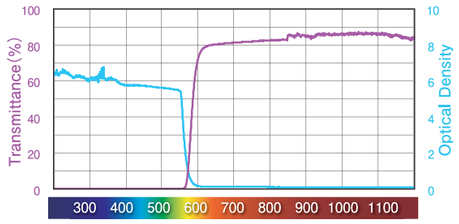
Optical Density		
YAG(FHG)	266nm	3<
YAG(THG)	355nm	
Nd-YAG	1064nm	
CO_2	10600nm	



YLC-2A

Filter Code	YLC-2A
Filter Name	YLC-2A
Color	CLEAR ORANGE
Luminous Transmittance	30%

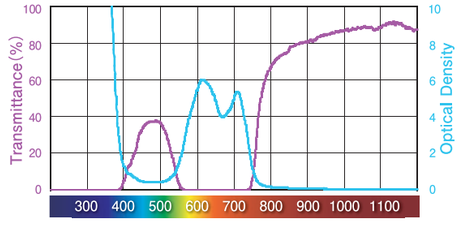
Optical Density		
EXCIMER	190-380nm	4<
ARGON	488,514.8nm	
He-Cd	441.6nm	
Nd-YAG(SHG)	532nm	



YL-600

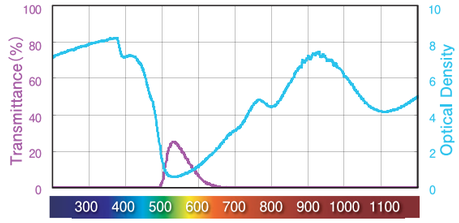
Filter Code	CU-002
Filter Name	YL600 HeNe
Color	BLUE
Luminous Transmittance	12%

Optical Density		
He-Ne	632.8nm	2<
Dye	570~630nm	
GOLD-VAPOR	627.8nm	
KRYPTON	647.1nm	
	676.4nm	
ルビー	694.3nm	



Filter Code	CU-003
Filter Name	YL600 Laser Diode
Color	GREEN
Luminous Transmittance	12%

Optical Density		
LASER DIODE	740~910nm	3<
ALEXANDRITE	740~820nm	
Ti-Sapphire	700~1000nm	1~3<



Laser Safety Modular Enclosure

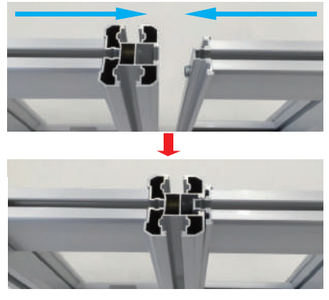
Free design

- Combination is freely selected from linup such as fixed leg and caster type
- We offer one stop service such as design to quotation according to your shielding area

Special frame structures for laser safety

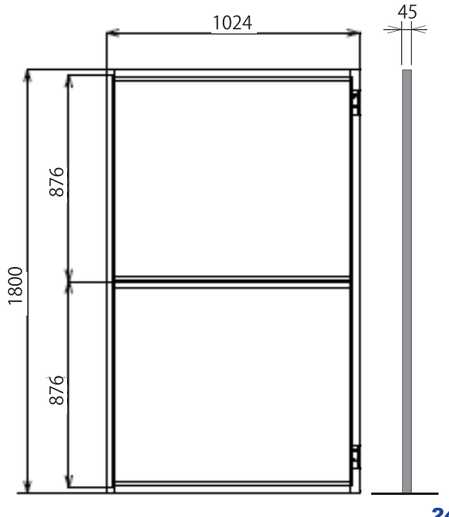
Adopted of special fit structure for enclosure frame connection
The enclosure does not have a gap between frames, so the frames do not need the sealing for connecting with frames.
By connecting with dedicated parts, assembling is easy because of simple structures.

Connection of Modular Enclosure



Dedicated connection part

Standard Size



LCG-750 CE 3/11 BL 1/1/1/379 CE

We developed a revolutionary product which closes LCD shutters automatically just after sensing the intensive light.

Protection not only for visible light but also UV & IR

Adjustable fitting angle and temple length

Soft rubber prevents scattered light from entering into the goggle through all possible angles.

Image of the vision

Shutter open:
Clear view through open LCD shutter

Shutter closed:
Perfect protection from IPL light expoasure

- High sensitivity sensor : shutter speed of 0.0002 sec
  *Faster than the human blinking reflex (0.25 sec)
- Maintenance-free (Solar battery back-ups) ●Weight : 95g
- Shutter speed : 0.0002 sec. ●Shade number : #11(Closed)
- Visible light transmittance : 0.005%(Closed), 16%(Open)
- Standard : EN379 CE

LASER Barrier Curtain

This Barrier curtain provides good protection from the direct laser beam and is available at the sites of Laser processing machines and laboratories where Fire Service Act requires flameproof products.

YL-2200 CE D AB4 YL 1064, I AB7 YL 1064 CE

◇**Blackout curtain which is available for high power laser**
- This curtain has protection performance against Class 4 laser.
- Surface reflectivity is less than 0.1%.

◇**Flame-retardant materials makes this flameproof blackout curtain.**
- Certified by Japan Fire Retardant Association.

Specification (standard size)
- Standard size : 1800x900mm
- Custom size : negotiable
- Weight : 3.0 kgs
- Materials : Aluminum film laminated carbon-fiber (flame-retardant)
- Comes with grommets for curtain rail
- Velcro tapes are attached on both side of the curtain edges.

Test Data

NdYAG laser(1064nm) Irradiation test (100 sec by CW laser, 1000 pulses by Pulse laser.) According to EN12254:2010

	Laser irradiation	Penetration	Protection level	Note:
CW Laser 1	$3.2x10^6$ W/m^2	No penetration	AB5 (Remark 1)	Output 10W
CW Laser 2	$3.2x10^5$ W/m^2	No penetration	AB4 (Remark 2)	Output 100W
Pulsed Laser	$9.3x10^4$ J/m^2	No penetration	AB7	Pulse energy 7.3J Frequency 40Hz

Remark 1 : The diameter of test beam should not be 2mm according to EN12254.
Remark : The diameter of test beam is 20mm.

YL-2300 CE D AB4 YL 1064 CE

- **Easy to carry because of lightweight**
- **Available to customized size accoring to your requirements**
- **Protection perfprmance against all of wavelengths**
- **Suitable for laser safety in place where scattered light is generated**
- **EN12254 (To be Certificated soon)**
- **To be Certified by Japan Fire Retardant Association**

Specification
- Standard size : 1800×900mm
- Weight : 2.5kg (Standard size)
- Material : Flame proof fiber
- Come with gromments for curtain rail
- Velcro tapes are attached on both side of the curtain edges

TEST DATA

NdYAG laser(1064nm) Irradiation test . According to EN12254:2010

	Laser irradiaton	Penetration	Protection level	Note:
CW Laser 1	$7.9x10^5$ W / m^2	No Penetration after 600 sec	AB4	Output 10W
CW Laser 2	$1.1x10^6$ W / m^2	No Penetration after 100 sec		Output 10W
CW Laser 3	$3.1x10^6$ W / m^2	Penetration in 90 sec		Output 10W
CW Laser 4	$1.2x10^7$ W / m^2	Penetration in 28 sec		Output 10W

LPL-717 Glasses for the protection from Flash Lamp

- Frame / Nylon & elastomer
- Lens / Polycarbonate
- Specification / Can be worn over the prescription glasses / Elastomer cushion / Adjustable temple angle
- size / W163 x H70 x D167

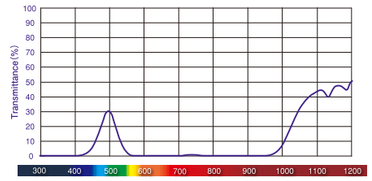
IPL-717SC Higher protection glasses from Flash Lamp

- Frame / Nylon & elastomer
- Lens / Polycarbonate
- Specification / Can be worn over the prescription glasses / Upper & lower elastomer cushion covers / Adjustable temple angle
- size / W163 x H70 x D167

New movable ear hook gives better fitting

New straight and angle adjustable temples which have three adjustable angle positions.

LPL-717 , IPL-717

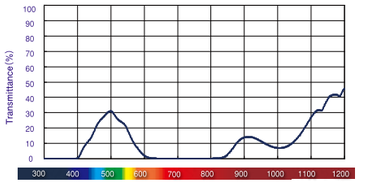


LPLF-302 Glasses for the protection from Flash Lamp

- Lens / Polycarbonate
- Specification / Elastomer nose pad
- size / W145 x H41 x D155

CE 2-3 YL 1 S -166 S CE

LPLF-302



SAFETY EYEGUARD

We have a variety of products which protect from many kinds of light source such as for rejuvenation(removing wrinkles and speckles) laser, medical laser and flash lamp treatment.

YL-800

- Color of eyecups / black
- Rubber strap with adjuster (detachable)
- Nose bridge sizes : S/1, M/1, L/1
- One spare strap
- Comes with stowage box

YL-800W1CE

- Color of eyecups / white
- Rubber strap with adjuster (detachable)
- Comes with M sized nose bridge (Spare nose parts of S, L and XL)
- One spare strap
- Comes with stowage box

CE 180 - 315 D LB7 IR LB4
>315 - 1400 D LB5 + IR LB7
>1400 - 11000 D LB3 YL S CE

YL-800BK

- Color of eyecups / black
- Rubber strap with adjuster (detachable)
- Comes with M sized nose bridge (Spare nose parts of S, L and XL)
- One spare strap
- Comes with stowage box

YL-800 ErYAG

wavelength ErYAG laser (2940nm)
CE certified product

CE 2940 DI LB3 YL S CE

- Color of eyecups / clear
- Rubber strap with adjuster (detachable)
- Comes with M sized nose bridge (Spare nose parts of S, L and XL)
- One spare strap
- Comes with stowage box