



Laservision

WE PROTECT YOUR EYES

Laser Safety Products

Edition 20

Joined Forces

LASERVISION Germany and LASERVISION•USA serve the global market

W E S T E R N H E M I S P H E R E

laser

laservision and **LASERVISION•USA**

Under the roof of the UVEX SAFETY GROUP advanced technology and a comprehensive portfolio of products have positioned LASERVISION and the American sister company LASERVISION•USA among the leading global manufacturers of laser safety eyewear.

Customers in the Eastern hemisphere with markets requiring CE certification will be served by LASERVISION (Germany), whereas LASERVISION•USA supports laser users in the Western hemisphere which recognises the ANSI Standards for the Safe Use of Lasers.

EASTERN HEMISPHERE

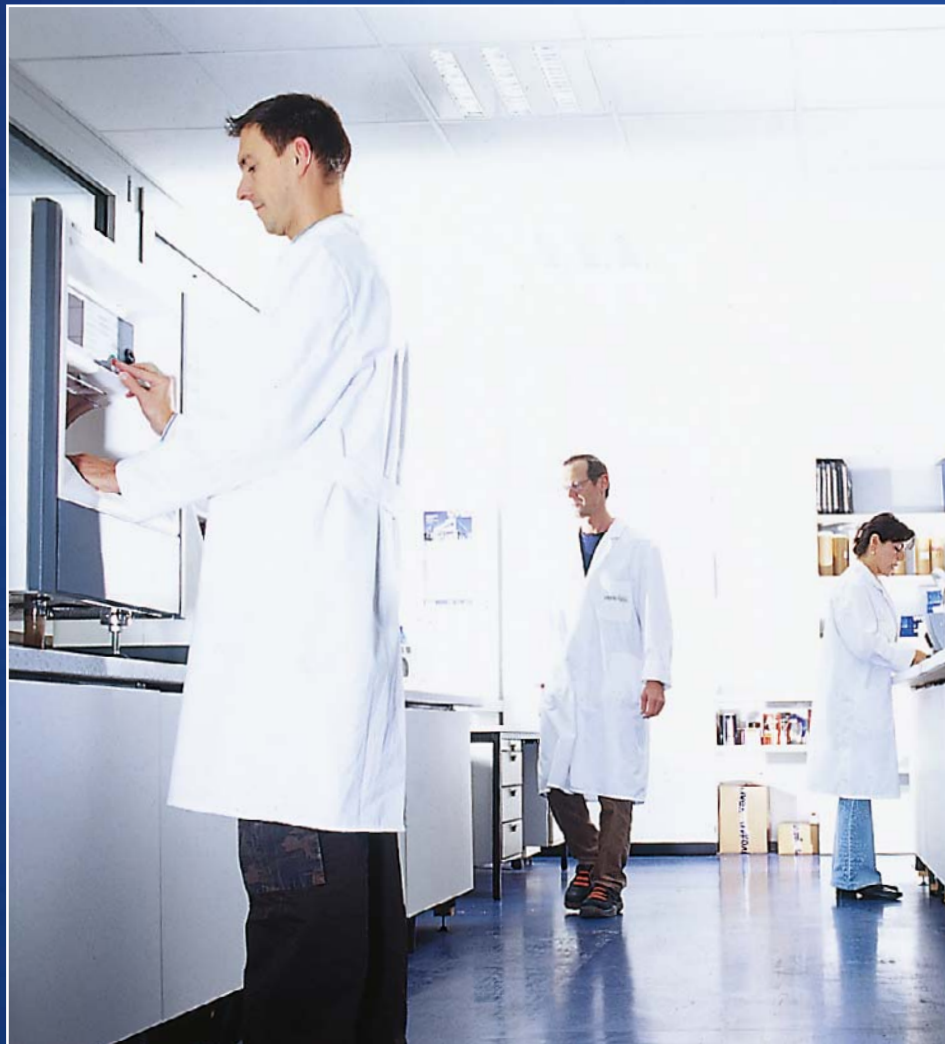
vision

WE PROTECT YOUR EYES

Under the logo “laservision” and the claim „WE PROTECT YOUR EYES“ leading edge laser protection technology for all laser safety product ranges and accessories is being globally developed, produced and distributed according to the relevant standards.

LASERVISION

More than 30 Years Experience in Laser Safety



Already 30 years ago the company Rupp+Hubrach has built safety goggles against laser radiation. In 1987, LASERVISION was founded as a joint venture between UVEX ARBEITSSCHUTZ GMBH and Rupp+Hubrach and became with more than 30 employees a wholly-owned subsidiary of the UVEX ARBEITSSCHUTZ GMBH in 2004. Today LASERVISION and LASERVISION•USA are worldwide well positioned among the leading manufacturers of laser safety eyewear and related safety products. The synergy inherent in a partnership between the protective work equipment manufacturer and the laser safety eyewear specialist brings significant benefit to all laser safety customers.

By actively engaging with various national and international standardisation institutes for laser safety regulations (international level: ISO/TC94/SC6 – Occupational Eye-Protection; European level: TC85 – Eye-Protection Equipment; national level: Normenausschuss Feinmechanik und Optik NaFuO/AA Augenschutz), LASERVISION has become a competent partner in laser safety. In addition LASERVISION participates in international research projects for laser safety (e.g. SAFEST, VELP). A close cooperation with scientific research institutes in Germany and Europe has been established and allows the transfer of knowledge gained in this work to LASERVISION's own products. Due to this cooperation customers of LASERVISION always benefit from the state of the art in science and technology.



LASERVISION

Advanced Laser Protection Technology



Rapid advancement of laser technology across a broad spectrum of applications is making laser safety more important now than ever before. New laser applications in medicine, defence, research and industry present unique safety challenges for safety and personal protection.

Target and claim of LASERVISION is to offer worldwide the best laser protection for each laser application according to the standards. Our own product and market focussed research and development ensures in close cooperation with leading glass suppliers, plastic and absorbing dye producers a continuously improved product development.

Based on our long lasting experience LASERVISION is able to offer all users of laser technology tailor-made top products for personal and large area laser protection. We therefore make an important contribution to the personal working protection in the century of optics and lasers.

Quality philosophy

LASERVISION glasses are manufactured, tested and approved according to the European regulations. Legal requirements for laser safety eyewear as part of personal protection do require a single laser test for CE certification. CE marked LASERVISION glasses do not only guarantee the required minimum optical density, but also guarantee a defined 'lifetime'

of the filter of at least 10 seconds (cw) or 100 pulses (pulsed lasers) under standardised test conditions for the specified laser.

In addition to the mandatory CE marking LASERVISION voluntarily makes most of its standard products subject to the repeated inspection process "tested safety - GS" by an independent institute (for example DIN CERTCO in cooperation with the Bayerisches Laserzentrum BLZ) in order to be able to guarantee a permanent quality. In these tests of frames and filters the test house always applies the latest knowledge in laser technology. Only products that are tested and certified according to these rules carry the logo of the test house, i.e. the "DIN" logo, for compliance in the marking. Additionally the test house includes the production process and LASERVISION's local quality management system into their testing.

In addition to the ISO 9001:2000 certification LASERVISION owns therefore an additional certificate for its Quality Management System (QS-System) based on the DIN CERTCO certification programme for eye protection. This programme focuses on subjects especially important for the legally regulated area of laser safety. The QS-certificate is based on the requirements of the EU-directive 89/686/EWG, the 8. Verordnung zum Gerätesicherheitsgesetz (8. GSGV) and the DIN CERTCO certification programme.

In addition LASERVISION is constantly monitoring its production and product quality according to strongest internal standards. For this purpose, LASERVISION runs an internal test lab with a great variety of different measurement systems and optical metrology devices like spectral photometers, laser measuring stations and additional equipment to test the optical effects or the dispersion of optical filters and many more. So LASERVISION is able to ensure its high quality even between the legally required official tests.

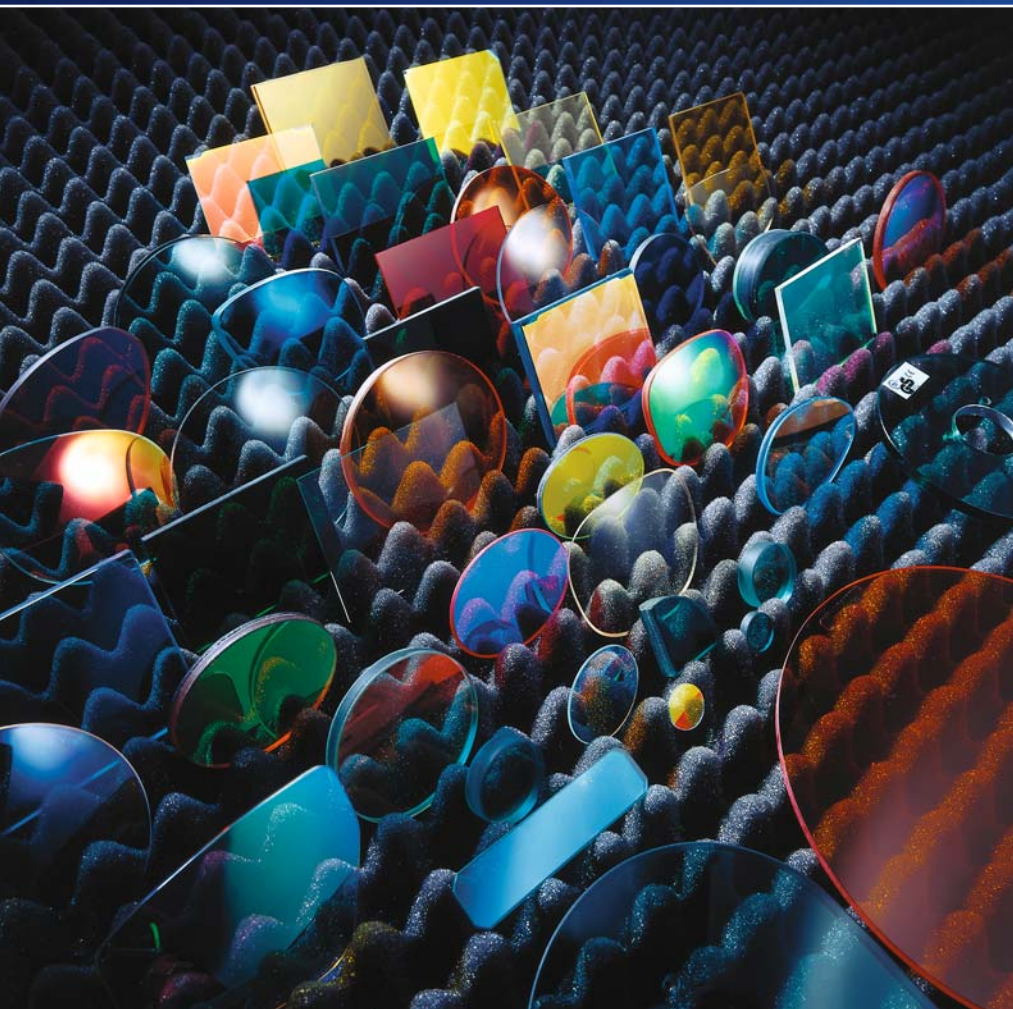
LASERVISION is able to trace back the fabrication of its products. Since several years LASERVISION glass products are marked with serial numbers. Therefore the company can trace back information on each product from the date of sale, to production and even back to the glass melt batch for the glasses. From 2004 onward even plastic glasses can be traced back to production lots.

LASERVISION – Business is people

The key to the success of LASERVISION is people. For us the solution of your laser safety problem is the daily focus of our work. Our dedicated and motivated employees are responsible for achieving the exceptional levels of innovation, service and quality for which LASERVISION is well known. With effective teamwork and committed leadership we will continue to provide effective laser safety solutions for our customers worldwide. In partnership with our customers the people of LASERVISION will continue to lead the world in laser protection – this is what you can rely on.

Technology

Competence in Laser Safety



Laser safety goggles based on coated or absorptive plastic or glass filters are the core business of LASERVISION. We have long lasting experience in all relevant fields of laser safety technology. Our internal quality management ensures the compliance with all safety rules and standards. Additionally LASERVISION undergoes regular inspections by independent certification institutes.

Plastic Absorption Filters

Absorbing materials are the common standard in order to block light of a defined wavelength area from the spectrum. As basic material amorphous polymers with special absorber dyes are mostly used. Absorption means that the light energy of the wavelength for which the filter is designed for is transformed to heat, when the beam hits the filter. Therefore it is necessary to select the filter material carefully for thermal stability.

In order to meet the requirements of its customers from all fields and to be able to offer high quality and norm consistent acrylic laser safety products even for new applications LASERVISION is in close cooperation with its partners continuously developing, produc-

ing and testing new materials and absorber colours. Raw materials for several products are processed in house and produced in the appropriate manner. An extensive quality control ensures the compliance of our high standards. At the same time an intensive design development takes place in order to continuously improve wearing comfort and features of our eyewear.

Absorbing plastic filters are available as plan and in most cases also as curved filters or shields with different base curves in order to improve the field of view. In addition to the use as laser safety eyewear plastic absorbing filters are also used as large area cabin windows.

Highlights

- Different wavelength and wavelength ranges
- High protection levels with pulsed lasers
- Economical
- Lightweight
- Different frames and shields
- Available as cabin window

Glass Absorption Filters

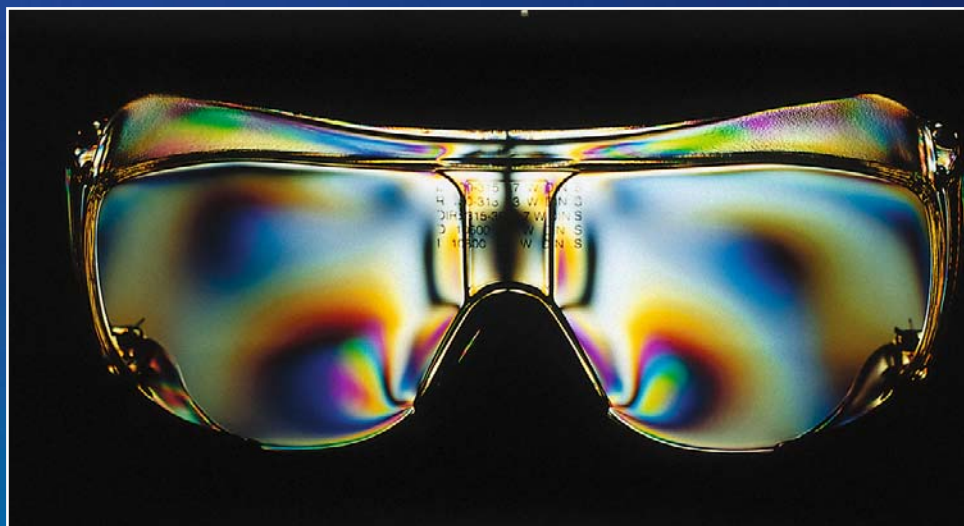
Each of the different materials used for absorption filters, plastics and glass, does have advantages and disadvantages with respect to protection and comfort. Glass filters are clearly superior to plastic filters in terms of thermal stability of the filter material itself. Therefore they are especially suitable for continuous lasers (cw operation) of medium to high power.

A large number of LASERVISION glass filters are available also in a curved shape (base curve 2 or 6). These particular laborious filters provide a very good field of view and high wearing comfort, whereas lamination with neutral glass ensures increased thermal stability and break resistance as especially needed with larger cabin windows.

Based on its 20 years of history LASERVISION has broad experience in the field of glass processing for laser safety eyewear since many years. Our worldwide partners are well known suppliers of raw glass and specialists in glass processing since years. Lamination of different glass types or filter materials allows LASERVISION to produce and to offer customised protection filters with individually designed protection ranges for different wavelength with short lead times. We manufacture several hundred custom filters each year.

Highlights

- Highest optical densities
- Combination filters for different wavelength
- More than 6000 custom filter records
- Different frame styles
- Only filter approved for ultrafast protection
- Splinter protection by lamination
- Available as cabin windows



Reflective or Interference filter

The much more advanced but technically more complicated technology used from LASERVISION to create filters of high optical density is the coating of the substrate with dielectric interference layers. By special design of the layer sequences and by suitable choice of the coating materials, multiple coating layers are applied to a substrate. The layers are vapour deposited in high vacuum condition and have to be applied with an accuracy of a few nanometers. Depending on the wavelength of the light, radiation is partly reflected on each single layer and interferes. For the so called blocking laser wavelength, a constructive multiple reflection is achieved and the filter reflects nearly the entire laser light.

Compared to absorbing filters reflective coatings have many advantages. Because in case of a laser hit most of the laser energy is reflected from the filter, the protection is highly independent from the chosen substrate. Therefore it is possible to achieve with this technology even with plastic filters high protection levels, which have been available in the past only with glass filter technology. Due to the long standing experience and research in the field of coating technology LASERVISION is able to produce these coatings on glass as well as on acrylic substrate in its own coating facility.

Whereas the blocking range of commonly used absorption filters depends on the characteristics of the substrate, the blocking range of interference filters depends mostly on the design of the layer structure. As a result nearly all light (with exception of the blocked wavelength) passes the filter without attenuation. Therefore, compared to any absorbing filter in the visible, LASERVISION's coated filters have a much better colour vision and higher visible light transmission. This is especially important for medical applications.

In combination with absorbing filters this offers LASERVISION a nearly unlimited number of variations to protect for all possible wavelengths.

Highlights

- Highest optical densities
- Combination with plastic and glass substrates
- Best colour vision and highest daylight transmission
- Available with different frame styles
- Break-proof though special substrates
- Scratch resistant through special coatings
- Low weight and high comfort



Frames



In order to ensure a long time wearing comfort even with such thick filters, LASERVISION is offering different wearing options. Due to the universal DU-OFLEX adapter the ALL STAR can be combined with a flexible head strap, cold malleable temples or the unique head support system. In addition the ALL STAR allows to flip-in a Rx insert for prescription lenses.

ALL STAR (L-02K)

The ALL STAR laser safety goggle is characterised by an unique versatility and flexibility and is the new top-model. Designed as the follower of the ECO-goggle it has been significantly improved in all points. The development of the All STAR reflects the long lasting experience and history of LASERVISION with laser safety eyewear.

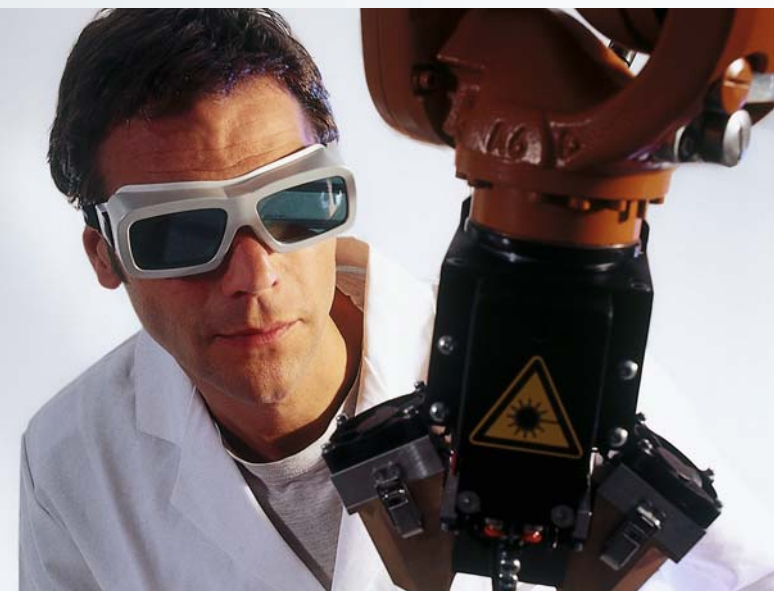
The All STAR features a highly efficient outside reinforcement, as primarily shown on the SPLIT SHIELD frame. This guarantees highest protection levels as well as additional mechanical protection, when put face forward on the table. The reinforcement is available in two colours – blue and silver.

Special designed reinforcement frames allow factory mounting of welding flaps for industrial laser welding or cutting applications or of binocular magnifiers for medical applications. The design of the mounting adapter ensures a stable fit and optimal behaviour of these extensions. The mounting principle of the reinforcement allows the integration of standard and custom filters of up to 12 mm thickness.



Highlights

- Absorbing and reflecting glass and plastic flat filters up to 12mm thickness
- Protection levels up to DI L8/R L9 315-1400nm
- Shade-Flip and Binocular magnifier as factory option
- Rx insert for prescription glasses
- Multi adjustable DUOFLEX temples as standard
- Head strap, Head support system or temple set as option



Frames



VISION (L-05)

The VISION frame with curved filters (base curve 6) is the most popular LASERVISION spectacle for glass and plastic filters. The frame features a very good fit and lots of individual adjustments. The internal metal lamination (enforced version) guarantees long life time and high protection levels without any restriction of wearing comfort.

Highlights

- Filter with base curve 6 for good field of view
- Highest protection levels as DIR L9 315–1400 nm
- Absorbing and reflecting glass filters
- Absorbing and reflecting plastic filters
- Multiple adjustable Duoflex temples
- Standard (L-05) and enforced version (L-05K)
- Head strap or malleable temples as option

PROTECTOR (L-08)

The PROTECTOR goggle from LASERVISION can be worn over corrective glasses and is characterised by highest protection levels and a stress-free wearing comfort. Through the broad flexible head strap and an effective air ventilation the goggle is usable for longer periods also.

Highlights

- Highest protection levels as DIR L8 315–1400/ML10 (700–900 nm)
- Absorbing and coated flat glass or custom filters
- Broad adjustable head strap
- Standard (L-08) and enforced version (L-08K)
- Suitable as OTG (over the glasses)
- Additional Anti-Fog insert as option



ECO (L-07)

The ECO spectacle from LASERVISION is a very small frame with high protection levels. The frame offers the opportunity to use a “snap-in” corrective Rx insert. The DUOFLEX temples offer a lot of individual adjustments to the user.

Highlights

- Highest protection levels such as DI L8/R L9 315–1400nm/ M L10 (700–900 nm)
- Absorbing and coated flat glass or custom filters
- Multiple adjustable Duoflex temples
- Standard (L-07) and enforced version (L-07K)
- Head strap or malleable temples as option
- Combination with Rx insert for corrective glasses



Frames



EXCITE (880/881)

The brand new EXCITE frame has been designed as an alternative solution to the best selling LAMBDA ONE for users demanding even more comfort, much better fit and more adjustments and options. This is the right frame if impressive visual appearance paired with highest wearing comfort and large cover area is of highest priority.

In contrast to the LAMBDA ONE the EXCITE frame features two discrete plastic laser protection filters. The large base curve of factor 8 (BC 8) of these filters provides an impressive large field of view without any restrictions. The filter-frame technology offers the possibility of two basically different wearing options. As the main alternative the EXCITE frame is even available in a temple-free version. This modification is especially suitable for certain medical applications or harsh environments. If the EXCITE frame is ordered with the elastic strap (part # 881.) the temples are factory replaced by the strap. To preserve the exceptional high wearing comfort in this case the EXCITE frame is upgraded with a special sub

frame which is soft padded on the inner side of the spectacle. Integrated air vents care for a fog free function. Both frames will be available with nearly all plastic absorber filters from LASERVISION. Please inquire.

EXCITE is the right choice for all users expecting more than laser safety!

Highlights

- Lightweight frame with two discrete filters
- Filters with base curve 8 (BC 8) for perfect, unrestricted view
- EXCITE with adjustable temples (inclination)
- With flexible strap and cushion sub frame as option
- Absorbing plastic filters for many wavelength and wavelength combinations
- Economical all plastic frame



Frames



SPLIT SHIELD (L-09)

The SPLIT SHIELD frame is characterised by a patent pending and extreme light weight and robust external reinforcement. Due to the slightly curved filters (base curve 2) the SPLIT SHIELD has a broad field of view. In combination with coated, transparent plastic filters the spectacle features a unique colour view and highest daylight transmission. The special design of the frame protects the coating against scratches when put down face forward. The SPLIT SHIELD can be worn over corrective glasses.

Highlights

- Filter with base curve 2 for broad field of view
- Reflecting and absorbing plastic filters
- Multiple adjustable Duoflex temples
- Head strap or malleable temples as option
- Patent pending external reinforcement
- Especially suitable for corrective glasses

LAMBDA ONE (700)

Designed especially for plastic laser protection, the full-wrap style of the LAMBDA ONE shield provides an unobstructed field of vision. It is available with a great variety of LASERVISION's absorbing filters. The LAMBDA ONE is characterised by low weight and a very good fit for nearly every user.

Highlights

- Low weight with very good fit
- Absorbing plastic filters for many wavelength and wavelength combinations
- Suitable as patient and children goggle in medical applications
- Economical all plastic frame



SKYLINE (620)

The SKYLINE frame from LASERVISION is an all plastic OTG laser protection goggle and therefore the alternative solution to the LAMBDA ONE for all wearer of corrective glasses. As with the LAMBDA ONE the single shield offers a broad field of vision. All absorbing filters from the LAMBDA ONE are available in the SKYLINE frame also. The low weight of the nearly nonbreakable goggle ensures a comfortable fit.

Highlights

- OTG for nearly all corrective glasses
- Absorbing plastic filters for many wavelength and wavelength combinations
- Very good field of vision
- Low weight
- Cord for fixation included
- Economical all plastic frame



Special Frames



ATHLETIC

The ATHLETIC spectacle is available with two different filters and is intended to be used with high power LEDs and other high brightness, non-coherent light sources. The smooth, nearly flat characteristic of the transmission curve ensures a pleasant work. Additionally both filters feature blocking of the infrared and the ultraviolet spectral range.

Highlights

- Filters with base curve 8
- Available with two attenuation levels: 16 % transmission (Shade 3) and 2 % (Shade 5) resp.
- Comfortable, light fit
- Low weight
- Good coverage reduces exposure to stray light

PG ONE (00P)

Especially for medical laser applications LASERVISION offers a new, unique patients goggle. The PG ONE is characterised by a comfortable fit and the ability to sterilisation. Therefore it is possible to remove the filters without any tool from the soft frame. We offer a lot of different glass and plastic absorbing filters and an additional metal version. The frame has been designed in close cooperation with medical laser manufacturers. The patent pending frame material possesses very high protection levels.

Highlights

- High protection levels as D L6 IR L7 315–1400 nm
- Flat absorbing glass or plastic filters
- Metal plate/insert as option
- Adjustable flexible head strap
- Sterilisable through removable filters
- Suitable for children



EYEBALL Goggle (00A)

The eyeball goggle consists of two hemispherical aluminium covers connected by a small bar of the same material. The adaptation mechanism ensures a fast adjustment to any face geometry. The EYEBALL goggle is a pure patient goggle and has been developed in cooperation with medical scientists for laser treatment in close proximity to the eyes. The goggle is certified for all laser wavelength.

Highlights

- Highest protection levels as D L6/IR L8 315–1400 nm
- Low weight of only 15 g
- Cord for fixation included



Frame Options



DUOFLEX temples

All frames for glass filters and the SPLIT SHIELD frame are equipped with the proven Duoflex temples. These temples are adjustable in length as well as in inclination. This feature provides an individual adjustment to nearly every head shape. The soft temple ends ensure a stress less wearing comfort.

Highlights

- Adjustable in length and inclination
- Soft ends
- Exchangeable temple ends
- Cord for fixation included
- Exchangeable against head strap, head support system or malleable ends



Head Support System (part no. 040)

For all users which need to carry heavy glass filters for longer periods of time LASERVISION offers the perfect innovative solution. The Head Support System takes over the complete pressure from the nose, the ears and the head caused by conventional holding systems like temples or straps in combination with heavy filters. The secret is the unique design of the Head Support System which spreads the weight of the glasses over a much larger contact area on top and backside of the head. Two rotary adjustment knobs allow an easy fitting to nearly every head shape. The Head Support System fits into all DUOFLEX coupling adapters.

Highlights

- Best ever solution for heavy filters
- Compatible to all DUOFLEX temples
- Comfortable wearing by individual adjustment

Malleable temples and Flexible head strap (part no. 030 and 036)

As an alternative solution for all spectacles equipped with standard DUOFLEX temples LASERVISION offers an elastic head strap or cold malleable temples. The strap is adjustable in length whereas the temples can be bent to match different head sizes. Users who require heavy weight or thick customised glass filters benefit significantly from these options. The closer fit afforded by the flexible head strap gives the user a better feeling of safety and is comfortable to use even over extended periods of time.

Highlights

- Compatible to all DUOFLEX temples
- Exchangeable without tools
- Individual fit and adjustment (#030)
- Adjustable length (#036)



Frame Options



Anti-Fog Insert (part no. 018.AFS)

Under extreme circumstances, such as hard work in humid environments or working for long periods, the air ventilation of a goggle could not be enough to prevent fogging. The easy to fit Anti-Fog insert is available as an option for all enforced PROTECTOR frames and prevents from fogging. A highly transparent plastic sheet is coated with nanoparticles which absorb humidity and avoid saturation of the air with water vapour. Consequently a deposition of water and therefore fogging of the goggle is impossible. So the insert provides a permanent clear view and ensures a visibly safe and secure feeling for the user.

Highlights

- Usable for all PROTECTOR frames with metal enforcement (L-o8K)
- Reliable protection against fogging through nanotechnology
- Long life time
- Easy to mount and virtually no weight
- No restriction of field of view
- No influence on protection levels



Rx Insert for ECO and ALL STAR (part no. Rx7)

For all users which are not able to work with an OTG frame for several reasons LASERVISION offers a Rx insert for prescription glasses. The Rx insert consists of a small metal frame without arms, which can be fitted with corrective lenses by an optician. The insert can be easily clipped in and out. Delivery includes two screws for the frame and a shape model for lens grinding.

Highlights

- Alternative solution for OTG frames
- Individual fit from an optician
- High wearing comfort without "double" temples



Welding Protection Flip / Clip

The flip is factory mounted on a special ALL STAR frame and protects the user from the glare of a laser welding plasma. In dependence of the used laser it is therefore possible to use a laser protection filter with high VLT and to darken the glasses only when needed.

Highlights

- Factory option with ALL STAR
- Stable and reliable flip mechanism
- Available with two transmissions (shade 3 and shade 5)

Frame Options



Filters and Protection Levels for continuous wave operation

Filters and Protection Levels for continuous wave operation (flat/flat)

Protection Level	Wavelength					
	180–315	315–400	400–700 nm	700–1400 nm	1400–3000 nm	3000–10600 nm
D L10	T27 T37					
D L9	T60 T01 T13 T12 T66					
D L8	T28	T37 315–532 nm		T35 1030–1064 nm		
D L7		P12 180–360 nm		T07 1050–1400 nm T62 990–1064 nm T27 1045–1100 nm T37 1045–1100 nm T93 1048–1064 nm T26 1000–1400 nm		
D L6	P2009	T01 315–515 nm T13 315–532 nm T27 315–532 nm T12 315–578 nm T24 532 nm P25 457–515 nm T83 530–535 nm T48 690 nm–1320 nm T58 690 nm–755 nm		T23 750–840 nm T85 780–815 nm T73 1050–1400 nm T07 900–1050 nm T87 1020–1100 nm T06 1000–1400 nm		
D L5	P1205	T60 –380 nm	P1004 P1205 755–840 nm T43 970–1000 nm T44 800–840 nm T92 1040–1084 nm T68 750–1100 nm P1000–315–532 nm P1001 660–710 nm P1001 730–790 nm T 28 315–532, 750–1100 nm T62 808–990 nm P1002 800–1100 nm P1010 585–605 nm P1011 690–710 nm P2009 315–420, 850–1065 nm T84 680–710 nm		T73 2780–3000 nm T07 1400–3000 nm	T08 9000–11000 nm T73 10600 nm T96 3200–11000 nm
D L4		P1205 315–375 nm T66 315–515 nm	P1001 630–660 nm P04 665–685 nm	P1001 710–730 / 790–800 nm P1205 730–755 / 840–855 nm P02 > 830–905 nm P1002 770–800 nm T44 790–800, 840–860 nm T23 840–850 nm P1000 > 830–890 nm T06 950–1000 nm T96 950–1030 nm T73 950–1000 nm T43 960–970 nm T04 960–1400 nm T26 950–1000 nm	T96 1400–2200 nm T96 2800–3200 nm P2009, 820–850, 1065–1080 nm T26 2100–2800 nm	T08 5400 nm A2 9000–11000 nm A2 5400 nm T26 10600 nm
D L3			P1001 610–630 nm T47 610–800 nm P25 >515–530 nm P1011 630–690 nm	P1001 800–820 nm P2009 790–820 nm T43 925–960 nm T43 1000–1010 nm T44 780–790 nm P1000 > 790–830/1065–1100 nm T96 900–950 nm	T06 1400–2200, 2780–3000 nm T48 1320–1550 nm T70 2900–3000 nm P1009 2750–3000 nm P2009 2750–3000 nm T96 2400–2800 nm	T06 5400+10600 nm T48 10600 nm T35 5400 nm T35 9000–10600 nm P1007 9000–11000 nm T68 10600 nm
D L2			T47 580–610 nm P1001 600–610 nm T58 620–690 nm	P02 780–800 nm T04 1400–1700 nm T96 850–900 nm	T35 2000–2200 nm	P1009 9000–11000 nm
DL1		P1005 315–520 nm, 700–1000 nm				

Filters and Protection Levels for pulsed operation

Filters and Protection Levels for pulsed operation > 100 ns (flat/flat)

Protection Level	Wavelength					
	180-315	315-400	400-700 nm	700-1400 nm	1400-3000 nm	3000-10600 nm
IL8		T60 -380 nm		T35 1030-1064 nm		
			T37 315-532 nm	T37 1030-1100 nm		
				T73 1050-1400 nm		
		T01 315-515 nm		T06 1050-1400 nm		
				T26 1050-1400 nm		
			T13 315-532 nm	T07 1050-1400 nm		
			T12 315-575 nm	T68 750-1100 nm		
				T62 808-1064 nm		
				T72 1064 nm		
				T58 690 nm-755 nm		
IL7		P12 -360 nm		T23 750-840 nm		
			T12 515-578 nm	P1002 980-1065 nm		
				T06 1000-1050 nm		
				T26 1000-1050 nm		
			T27 315-532 nm	T27 1030-1100 nm		
			T25 580-590 nm	T73 1000-1050 nm		
			P1011 690-710 nm	P1000 >1025-1065 nm		
				T48 690-1320 nm		
				P1205 755-840 nm		
			T28 315-532, 750-1100 nm			
				T93 1048-1064 nm		
				T58 755-1050 nm		
	IL6				P1002 800-980 nm	
			P1000 315-532 nm	P1000 >935-1025 nm		
				T07 900-1050 nm		
			P25 457-515 nm	P2009 940-1065 nm		
			P1010 600-605 nm			
			T83 530-535 nm	T85 780-815 nm		
			P1008 190-532 nm	T87 1020-1100 nm		
IL5	T60		T34 627-650 nm	P1001 730-790 nm	T07 1400-3000 nm	T96 3200-11000 nm
	T01		T01 528 nm	T43 970-1000 nm	T26 1400-2100 nm	T08 9000-11000 nm
				T44 800-840 nm	T26 2800-3000 nm	
	T13			P1000 >890-935 nm		
	T12		P1001 660-710 nm	T92 1040-1080 nm		
	T37		P1010 585-600 nm	T58 1050-1320 nm		
	T27			T96 1030-1400 nm		
	T28		P2009 315-420, 850-940 nm			
				P1004 700-820 nm		
				P1002 1065-1100 nm		
IL4			P04 665-685 nm	P1001 710-730 / 790-800 nm	T70 2900-3000 nm	T08 5400 nm
			P1001 630-660 nm	T44 790-800, 840-860 nm		
				P1000 >830-890 nm		
	T66	T66 315-515 nm		P2009 820-850, 1065-1080 nm	T73 2780-3000 nm	A2 9000-11000 nm
				P16 790-910 nm	T06 2780-3000 nm	A2 5400 nm
				T73 950-1000 nm	T26 2100-2800 nm	T35 5400 nm
				T23 840-850 nm		T35 9000-11000 nm
				T26 950-1000 nm	T96 1400-2200 nm	T73 10600 nm
				T06 950-1000 nm	T96 2800-3200 nm	T06 5400, 10600 nm
				T43 960-970 nm		T68 10600 nm
				T04 960-1400 nm		T48 10600 nm
				P1205 730-755, 840-855 nm		
				T96 950-1030 nm		T26 10600 nm
IL3	P2009		P25 515-530 nm	P1000 790-830/1065-1100 nm	T06 1400-2200 nm	P12 10600 nm
			P1011 630-690 nm	T43 925-960 nm	P2009 2750-3000 nm	
				T43 1000-1010 nm	P1009 2750-3000 nm	
				T48 1320-1550 nm		
			T47 610-800 nm	P2009 790-820 nm		
IL2			P1001 610-630 nm	T96 900-950 nm	T96 2400-2800 nm	
			T47 580-610 nm	T96 850-900 nm	T04 1400-1800 nm	P1007 9000-11000 nm
			P1001 600-610 nm	P1001 800-820 nm	T35 2000-2200 nm	P1009 9000-11000 nm
IL1		P1005 315-520, 700-1000 nm				

Filters and Protection Levels

Filters and Protection Levels for mode-locked lasers < 1ns (flat/flat)

Protection Level	Wavelength					
	180–315	315–400	400–700 nm	700–1400 nm	1400–3000 nm	3000–10600 nm
L10				T48 795–805 nm T58 755–805 nm		
L9				T23 795–805 nm		
L8				T48 720–795 nm T48 805–900 nm T58 700–755 nm T58 805–900 nm		
L7				T58 755–1050 nm		
L6		T37 315–532 nm		T37 1030–1100 nm T35 1030–1100 nm		
L5		T27 315–532 nm		T27 1045–1100 nm		

Filters and Protection Levels for alignment protection (flat/flat)

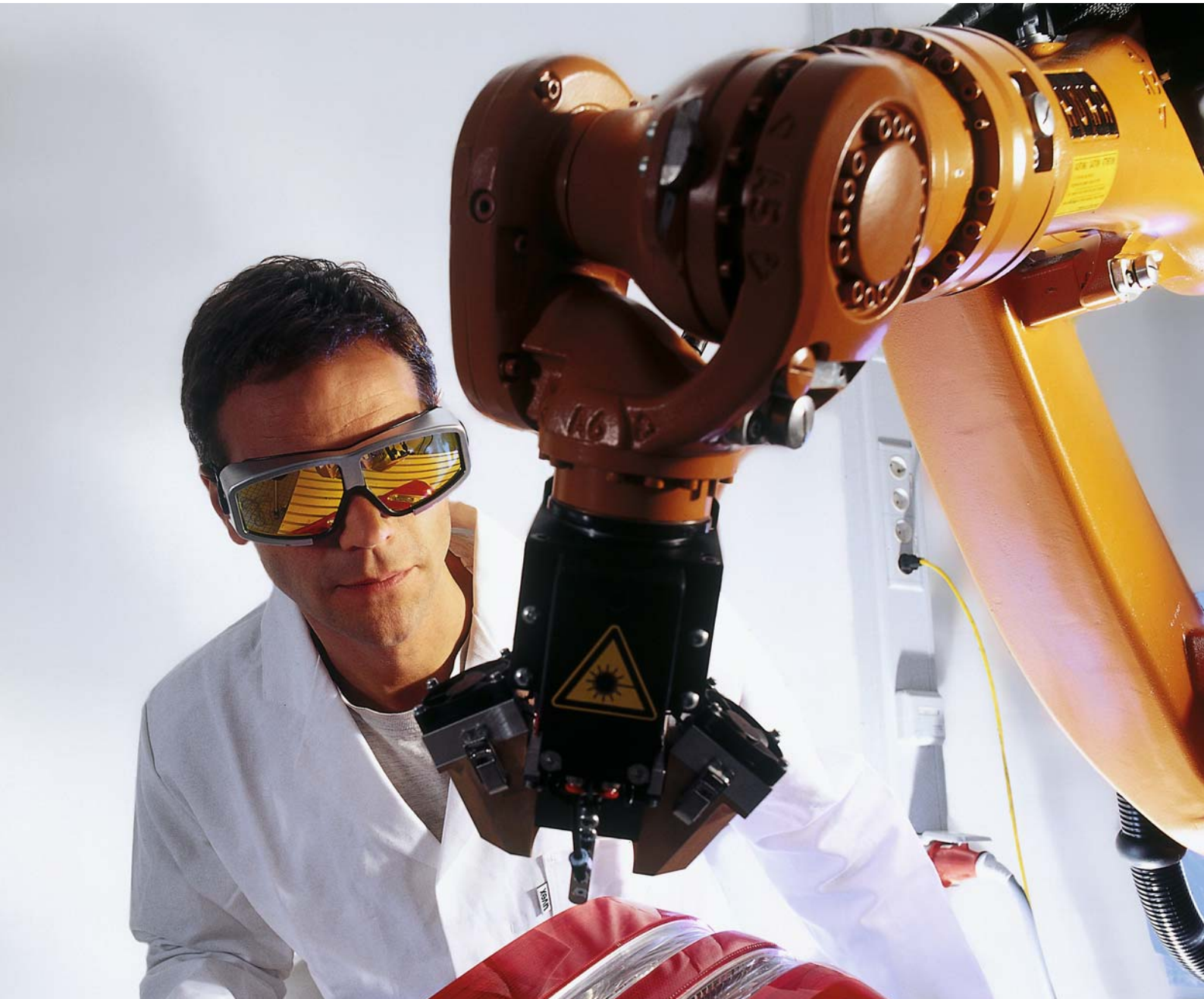
Protection Level	Wavelength							
	442 nm	488 nm	515 nm	532 nm	620–644 nm	633 nm	630–690 nm	
R4		T15	T15					
R3			T556	T564		T58		
R2	T549		P07 500–520 nm	T74	P04	T48	T82 P1004 660–675 nm	
R1			T536	P2005	P03	T68	T81 P08 670 nm P1002 650–680 nm P1004 625–650 nm	
							P1005 520–700 nm	

Additional filters are available on request. Please contact your local representative!

IMPORTANT: Please note, that the marked protection level of the glasses depend also on the scale number of the frame.

Easy selection according to the standard is provided by the EYEPRO Software from LASERVISION.

Standard filter

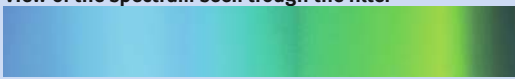



General statements with respect to filter specifications

- * Filter thickness is subject to variations in dependence of the natural properties of the glass melt. Indicated thickness is an average value only, which may be different between production lots.
- ** Transmission curves are typical curves only. Given values and curves are not guaranteed. LASERVISION only specifies protection levels and optical densities.
- *** Due to the printing process the view through the real filter may differ from the shown transmitted spectral colours.

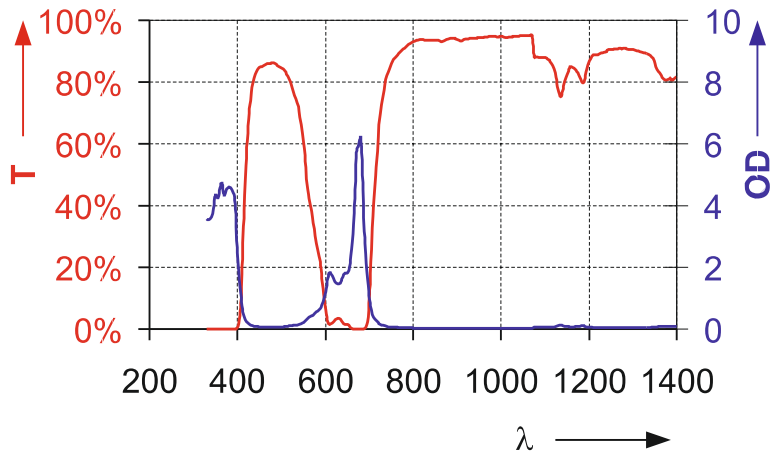
and Transmission Curves

Filter P03

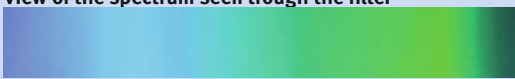

Filter	P03
	Alignment Protection
Colour	aqua
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	50 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P0003.00	-
620 - 644	R1	-

Transmission Curve P03**

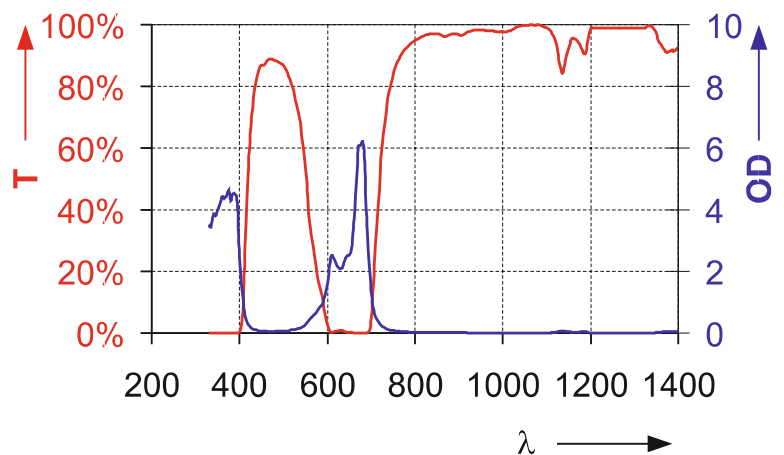


Filter P04

Filter	P04
	Alignment and Full Protection
Colour	aqua
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	40 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

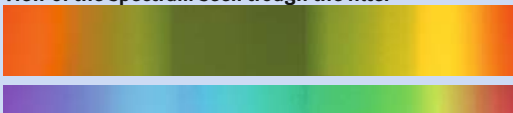
Frame	SKYLINE	LAMBDA ONE
Part number	620.P0004.00	-
DIR 665-685	L4	-
620-644 R2		-

Transmission Curve P04**



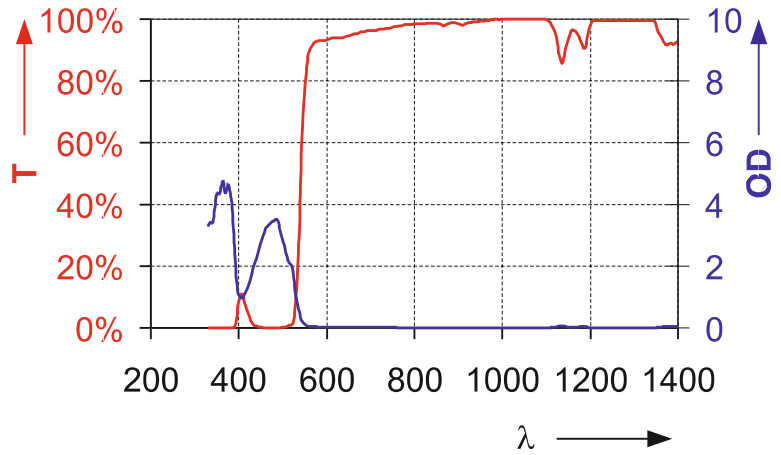
Plastic Filters for Laser Safety Eyewear

Filter Po7

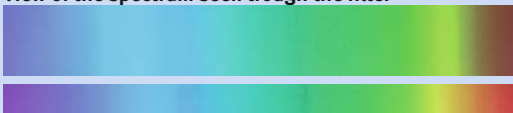
Filter	P07
	Alignment Protection
Colour	orange
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	60 %
Visual Brightness	very good
Colour View	good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P0007.00	-
500-520 R2		-

Transmission Curve Filter Po7**

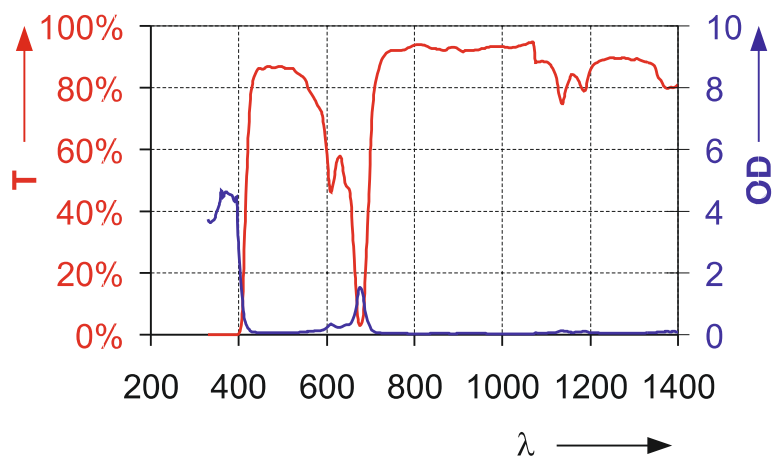


Filter Po8

Filter	P08
	Alignment Protection
Colour	aqua
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	very good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	



Frame	SKYLINE	LAMBDA ONE
Part number	620.P0008.00	-
670 R1		-

Transmission Curve Filter Po8**



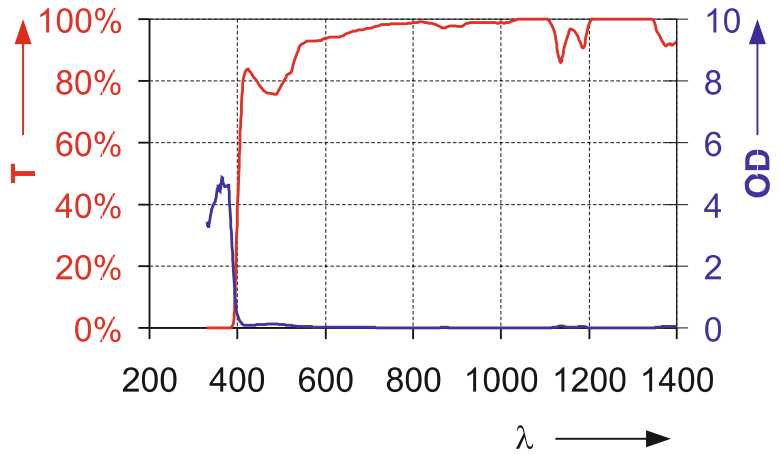
Plastic Filters for Laser Safety Eyewear

Filter P12

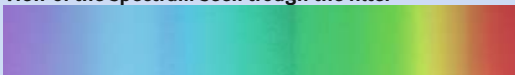

Filter	P12
	Full protection
Colour	yellow
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	very good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P0012.00	-
D 180-315	L7	-
R 180-315	L3	-
DIR >315-360	L7	-
D 10600	L2	-
I 10600	L3	-

Transmission Curve Filter P12**

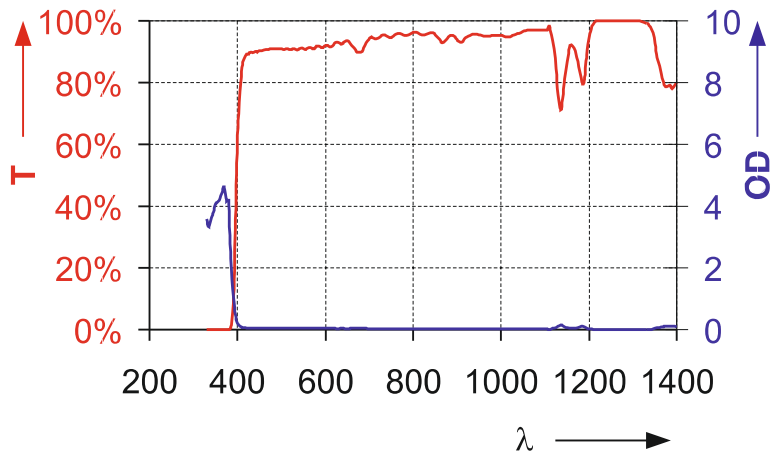


Filter PA2

Filter	PA2
	Full protection
Colour	clear
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	90 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 5 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	reinforced Frame		
	VISION	ALL STAR	PROTECTOR
Part number	015.P00A2.00	012.P00A2.00	018.P00A2.00
DIR 5400	L4	L4	L4
DIR 9000-11000	L4	L4	L4

Transmission Curve Filter PA2**




Plastic Filters for Laser Safety Eyewear

Filter P1000

Filter	P1000
	Full protection
Colour	orange-brown
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	20 %
Visual Brightness	good
Colour View	restricted
Filter Thickness	approx. 3 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

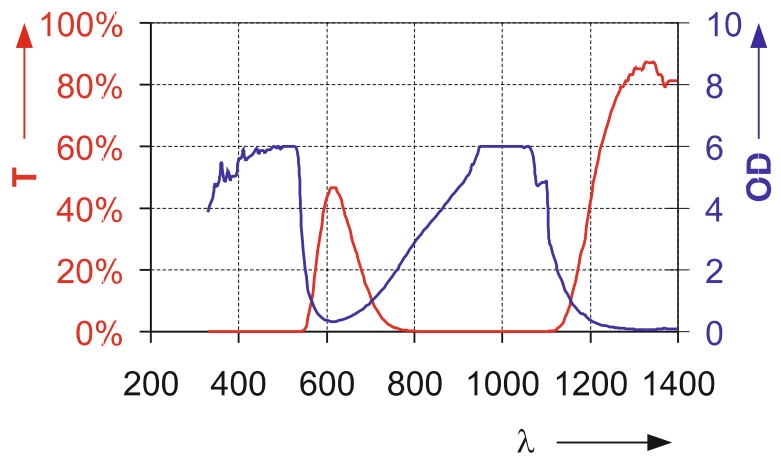
Frame	SKYLINE	LAMBDA ONE
Part number	620.P1000.00	700.P1000.00
D 315-532	L5	L5
IR 315-532	L6	L6
DIR 790-830	L3	L3
DIR >830-890	L4	L4
DIR >890-935	L5	L5
D >935-1065	L5	L5
IR >935-1025	L6	L6
IR >1025-1065	L7	L7
DIR >1065-1100	L3	L3

Filter P1001

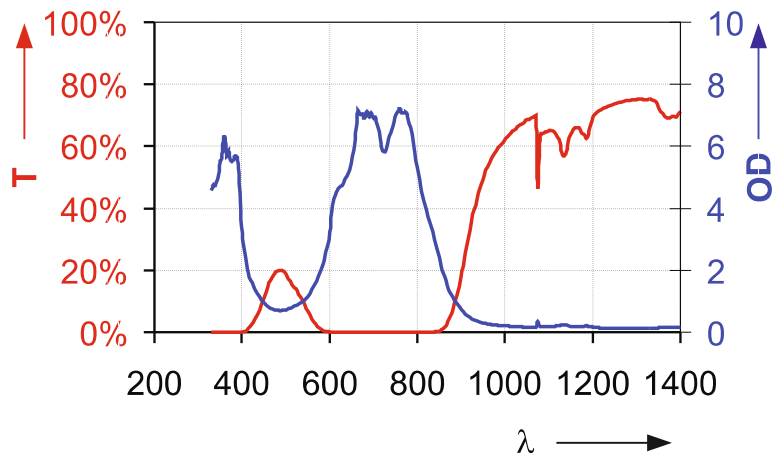
Filter	P1001
	Full protection
Colour	blue-green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	10 %
Visual Brightness	sufficient
Colour View	restricted
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P1001.00	700.P1001.00
DIR 600 – <610	L2	L2
DIR 610 – <630	L3	L3
DIR 630 – <660	L4	L4
DIR 660 – <710	L5	L5
DIR 710 – <730	L4	L4
DIR 730 – <790	L5	L5
DIR 790 – <800	L4	L4
DIR 800 – 820	L3	L3

Transmission Curve Filter P1000**




Transmission Curve Filter P1001**



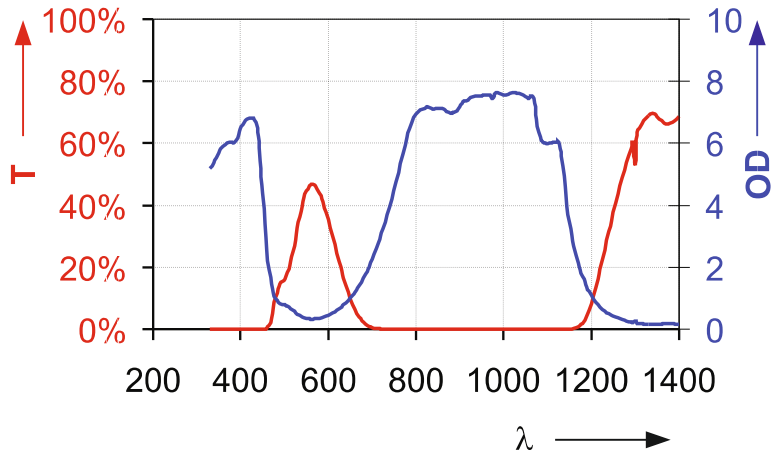
Plastic Filters for Laser Safety Eyewear

Filter P1002



Filter	P1002
	Alignment and Full Protection
Colour	bright green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	35 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	SKYLINE	LAMBDA ONE	SPLIT SHIELD
Part number	620.P1002.00	700.P1002.00	019.P1002.00
DIR 770 – <800	L4	L4	L4
D 800 – 1100	L5	L5	L5
IR 800 – 980	L6	L6	L6
IR >980 – 1065	L7	L7	L7
IR >1065 – 1100	L5	L5	L5
650 – 680	R1	R1	R1

Transmission Curve Filter P1002**

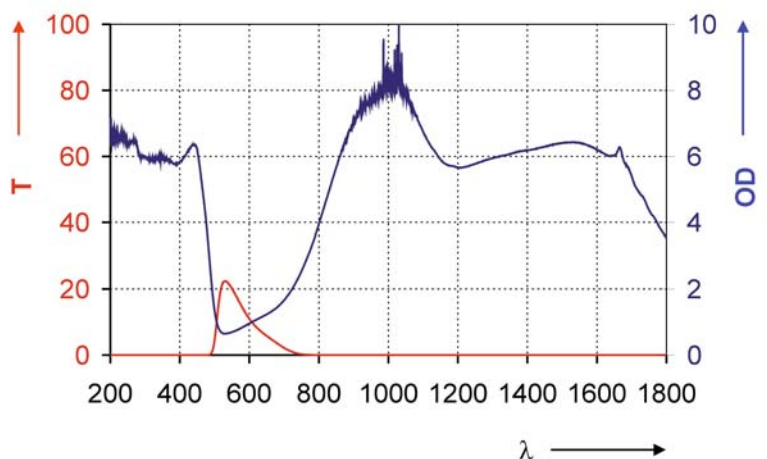


Filter P1003

Filter	P1003
	Full Protection
Colour	dark green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	CE
VLT (approx.)	10 %
Visual Brightness	restricted
Colour View	limited
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	reinforced Frame		
	VISION	SKYLINE	LAMBDA ONE
Part number	015.P1003.00	620.P1003.00	700.P1003.00
DIR 900 – <1060	L5	L5	L5
D >1060 – <1400	L5	L5	L5
IR 1060 – 1090	L7	L7	L7
IR >1090 – <1400	L6	L6	L6
DIR 1400 – 1650	L3	L3	L3

Transmission Curve Filter P1003**

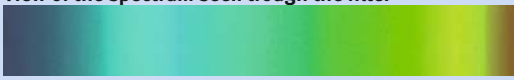


Plastic Filters for Laser Safety Eyewear

Filter P1004

Filter	P1004
	Alignment and Full Protection
Colour	bright green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	42 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*

View of the spectrum seen trough the filter ***

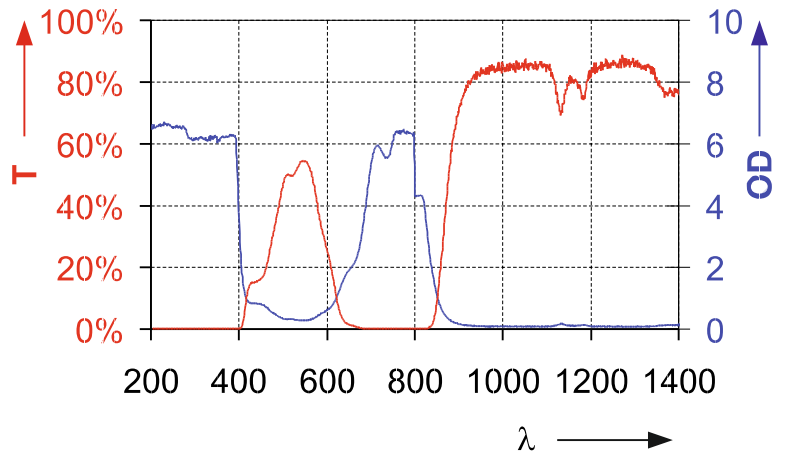


View of the spectrum without filter



Frame	SKYLINE	LAMBDA ONE
Part number	620.P1004.00	700.P1004.00
DIR 700–820	L5	L5
625–650	R1	R1
660–675	R2	R2

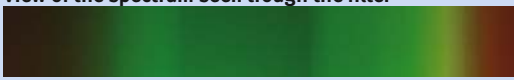
Transmission Curve Filter P1004**



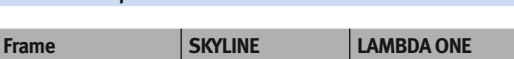
Filter P1005

Filter	P1005
	Alignment and Full Protection
Colour	green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	5 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 2 mm*

View of the spectrum seen trough the filter ***

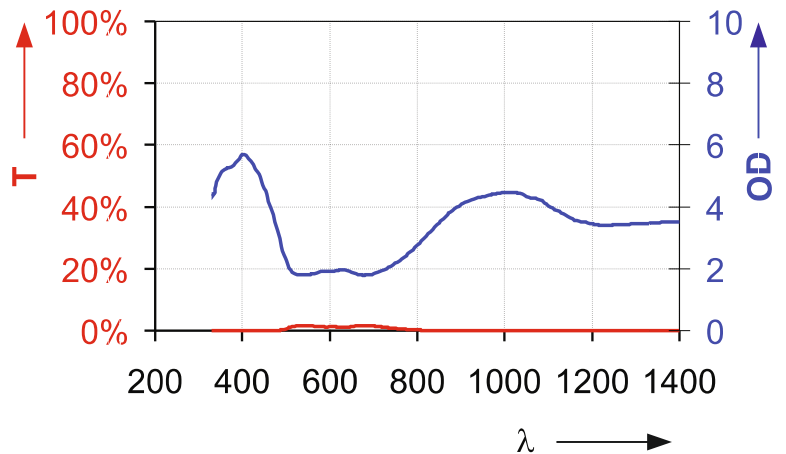


View of the spectrum without filter



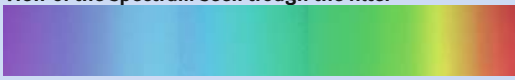

Frame	SKYLINE	LAMBDA ONE
Part number	620.P1005.00	–
DIR >315 – <520	L1	–
DIR >700 – 1000	L1	–
520 – 700	R1	–

Transmission Curve Filter P1005**



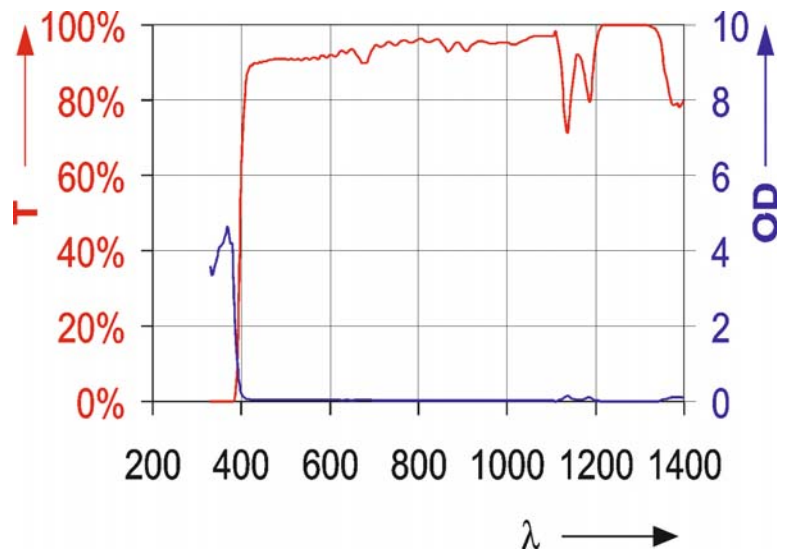
Plastic Filters for Laser Safety Eyewear

Filter P1007

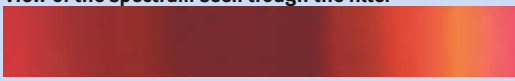

Filter	P1007	
	Full Protection	
Colour	clear	
Filter Material	Plastic	
Filter Technology	Absorption Filter	
Certification	DIN GS	
VLT (approx.)	80 %	
Visual Brightness	excellent	
Colour View	unrestricted	
Filter Thickness	approx. 2 mm*	
View of the spectrum seen trough the filter ***		
View of the spectrum without filter		

Frame	SKYLINE	LAMBDA ONE
Part number	620.P1007.00	700.P1007.00
D 9000 – 11000	L3	L3
IR 9000 – 11000	L2	L2

Transmission Curve Filter P1007**

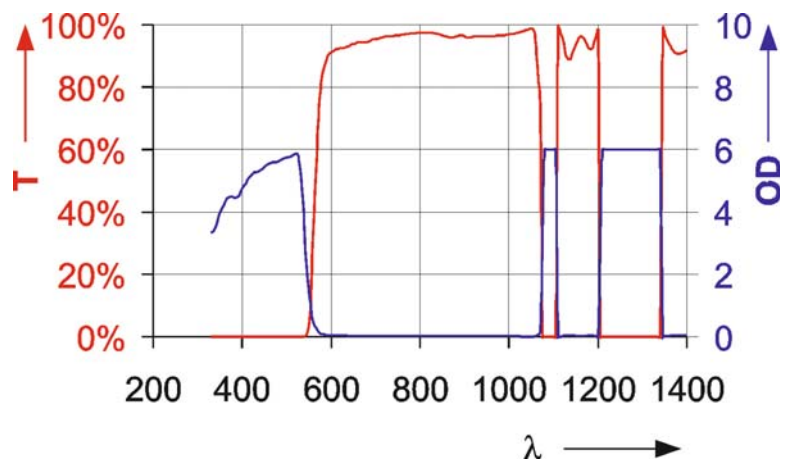


Filter P1008

Filter	P1008	
	Full Protection	
Colour	orange	
Filter Material	Plastic	
Filter Technology	Absorption Filter	
Certification	DIN GS	
VLT (approx.)	40 %	
Visual Brightness	good	
Colour View	sufficient	
Filter Thickness	approx. 2 mm*	
View of the spectrum seen trough the filter ***		
View of the spectrum without filter		

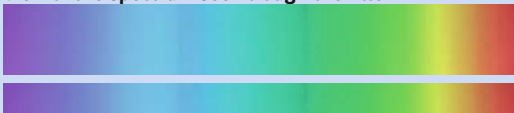
Frame	SKYLINE	LAMBDA ONE
Part number	620.P1008.00	700.P1008.00
D 190 – 532	L5	L5
IR 190 – 532	L6	L6

Transmission Curve Filter P1008**



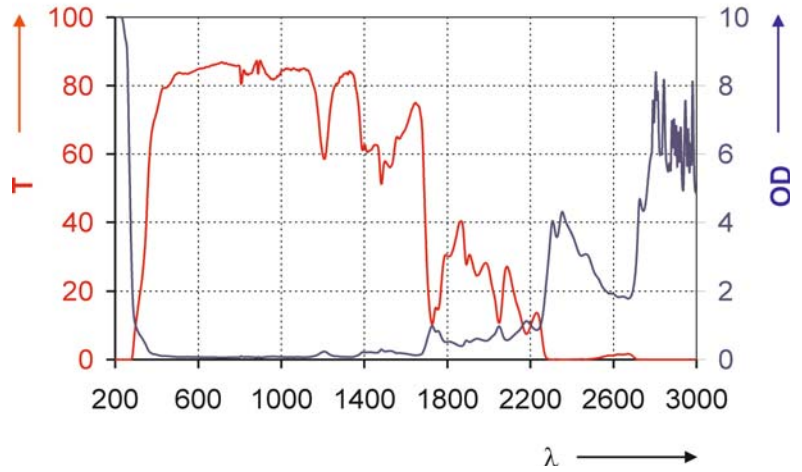
Plastic Filters for Laser Safety Eyewear

Filter P1009


Filter	P1009
	Full Protection
Colour	clear
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	unrestricted
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P1009.00	700.P1009.00
DIR 2750 – 3000	L3	L3
DIR 9000 – 11000	L2	L2

Transmission Curve Filter P1009**

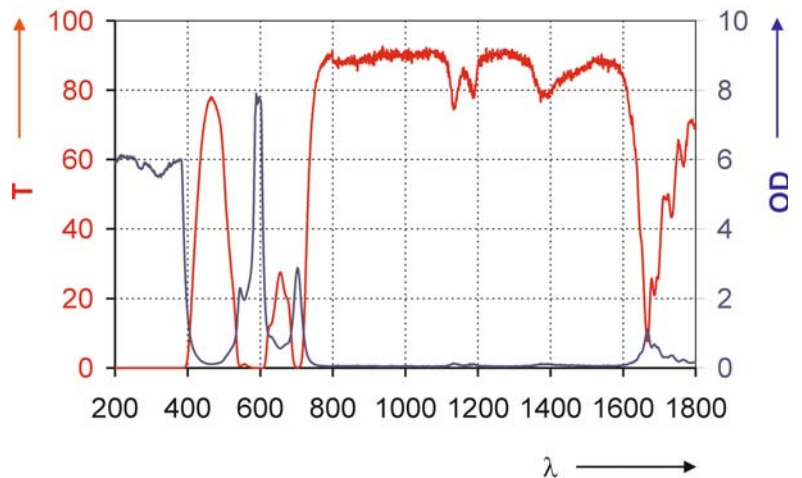


Filter P1010

Filter	P1010
	Full Protection
Colour	Royal blue
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	15 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

Frame	SKYLINE	LAMBDA ONE
Part number	620.P1010.00	700.P1010.00
D 585 – 605	L5	L5
IR 585 – 600	L5	L5
IR 600 – 605	L6	L6

Transmission Curve Filter P1010**

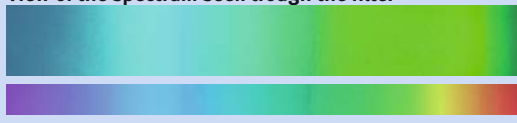


Plastic Filters for Laser Safety Eyewear

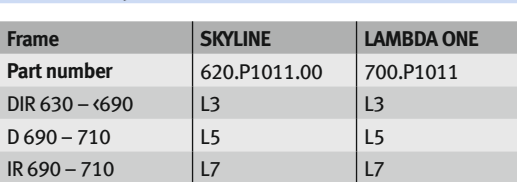
Filter P1011

Filter	P1011
	Full Protection
Colour	mint green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	52 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 2 mm*

View of the spectrum seen trough the filter ***

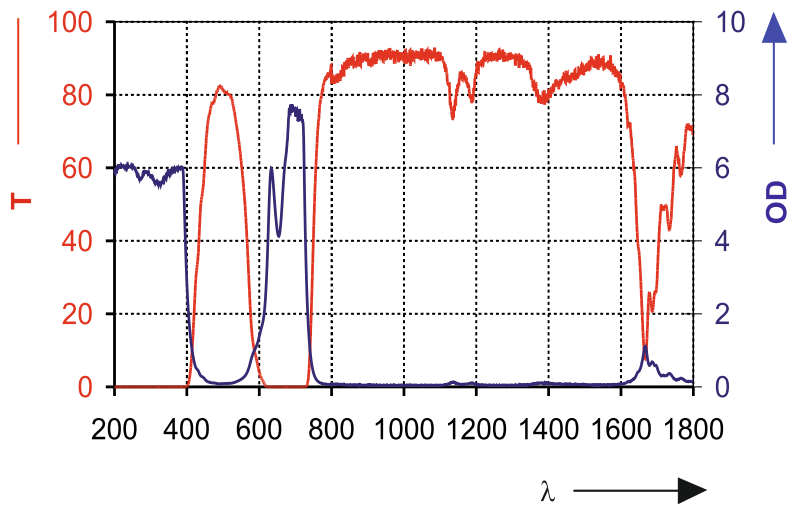


View of the spectrum without filter



Frame	SKYLINE	LAMBDA ONE
Part number	620.P1011.00	700.P1011
DIR 630 – <690	L3	L3
D 690 – 710	L5	L5
IR 690 – 710	L7	L7

Transmission Curve Filter P1011**



Filter P1205

Filter	P1205
	Full protection
Colour	Magenta
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	35 %
Visual Brightness	good
Colour View	very good
Filter Thickness	approx. 2 mm*

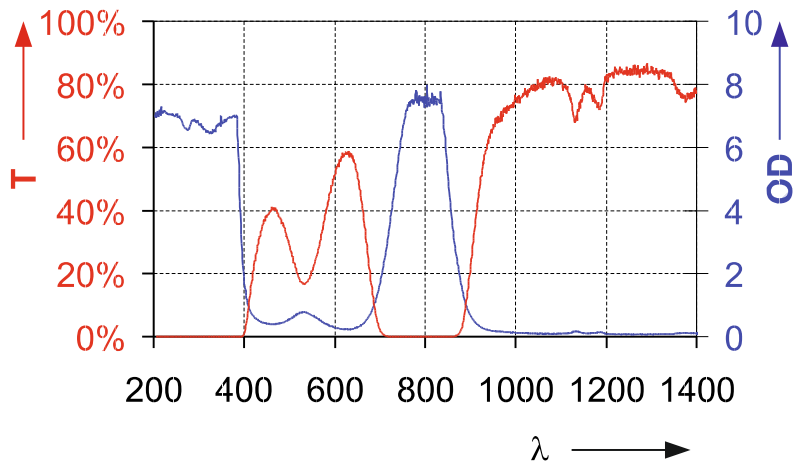
View of the spectrum seen trough the filter ***



View of the spectrum without filter


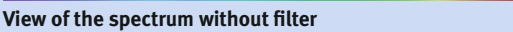
Frame	standard Frame			reinforced Frame
	SKYLINE	LAMBDA ONE	VISION	VISION
Part number	620.P1205.00	700.P1205.00	005.P1205.00	015.P1205.00
D 190–315	L5	L5	L5	L5
R 190–315	L4	L4	L4	L4
D >315–375	L4	L4	L4	L4
R >315–375	L5	L5	L5	L5
DIR 730–<755	L4	L4	L4	L4
DR 755–840	L5	L5	L5	L5
I 755–840	L7	L7	L6	L7
DIR >840–855	L4	L4	L4	L4

Transmission Curve Filter P1205**



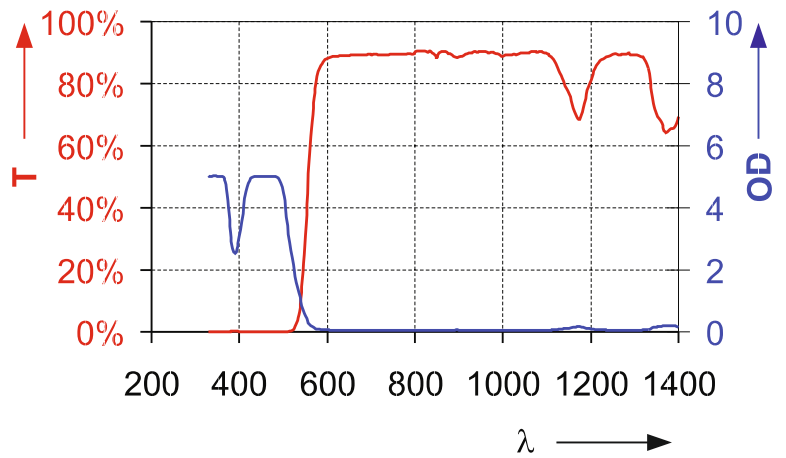
Plastic Filters for Laser Safety Eyewear

Filter P2005



Filter	P2005
	Alignment Protection
Colour	orange
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	45 %
Visual Brightness	good
Colour View	restricted
Filter Thickness	approx. 3 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Frame	ALL STAR
Part number	012.P2005.00
532	R1

Transmission Curve Filter P2005**

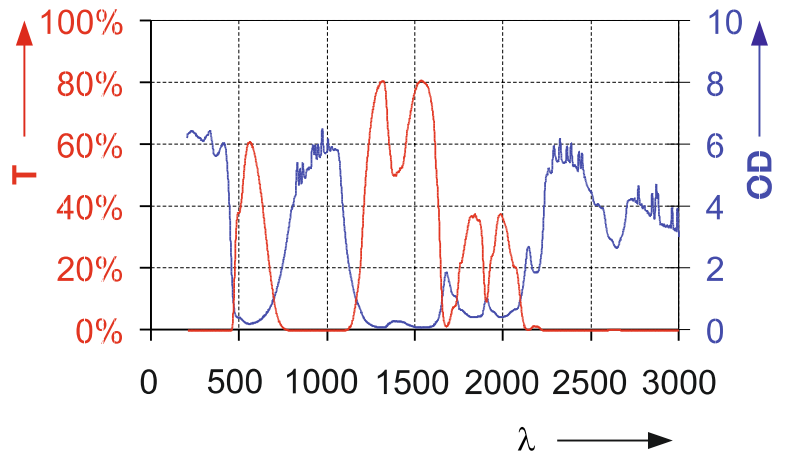


Filter P2009

Filter	P2009
Colour	bright green
Filter Material	Plastic
Filter Technology	Absorption
Certification	CE
VLT (approx.)	65 %
Visual Brightness	very good
Colour View	good
Filter Thickness	approx. 3 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

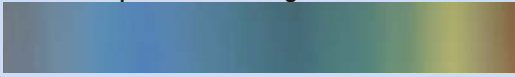
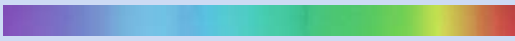
Frame	ALL STAR
Part number	012.P2009.00
D 180–315	L6
IR 180–315	L3
DIR >315–420	L5
DIR 790–<820	L3
DIR 820–<850	L4
D 850–1065	L5
IR 850–<940	L5
IR 940–<1065	L6
DIR 1065–1080	L4
DIR 2750–3000	L3

Transmission Curve Filter P2009**



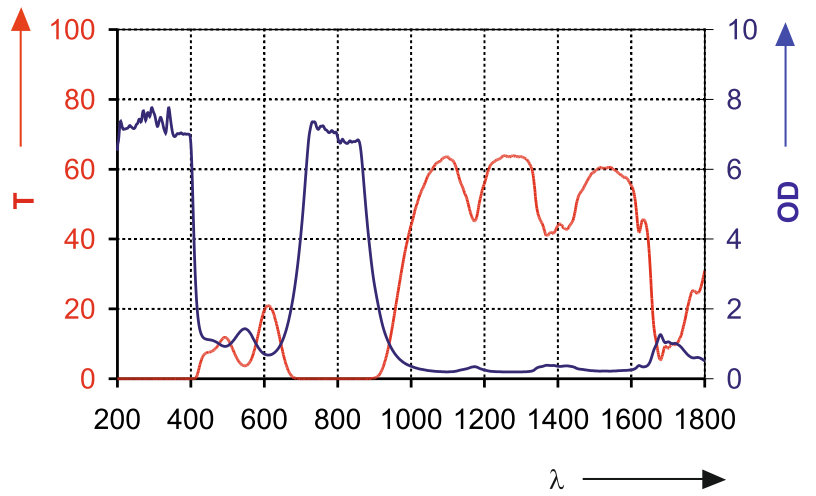
Plastic Filters for Laser Safety Eyewear

Filter P2010

Filter	P2010
	Full Protection
Colour	dark magenta
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	10 %
Visual Brightness	sufficient
Colour View	restricted
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	



Frame	ALL STAR	PG ONE
Part number	012.P2010.00	00P.P2010.00
DIR 730-<750	L5	L5
D 750-855	L5	L5
IR 750-840	L7	L7
IR >840-855	L5	L5
DIR <2750-3000	L3	L3
DIR 9000-10600	L2	L2
DIR >10600-11200	-	L2

Transmission Curve Filter P2010**

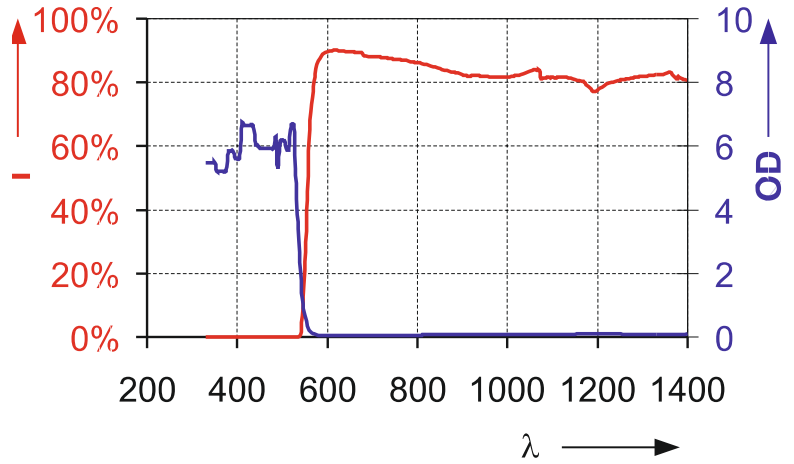


Glass Filters for Laser Safety Eyewear

Filter T01

Filter	T01
	Full protection
Colour	orange
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	50 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 5 mm *
View of the spectrum seen through the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T01**

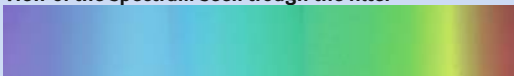



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALLSTAR	PROTECTOR
Part number	-	007.T0001.00	008.T0001.00	-	012.T0001.00	018.T0001.00
D 180-315	-	L8	L8	-	L9	L9
IR 180-315	-	L4	L5	-	L5	L5
D >315-515	-	L4	L5	-	L6	L6
IR >315-515	-	L6	L7	-	L8	L8
D 528	-	L4	L5	-	L5	L5
I 528	-	L5	L5	-	L5	L5
R 528	-	L4	L4	-	L4	L4

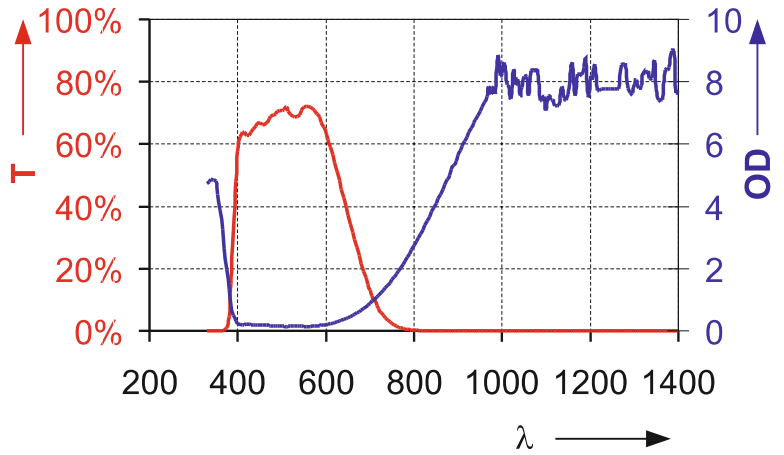


Glass Filters for Laser Safety Eyewear

Filter To6

Filter	To6
	Full protection
Colour	light grey
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	70 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

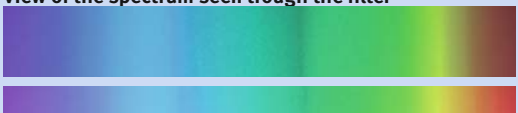
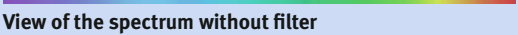
Transmission Curve Filter To6**



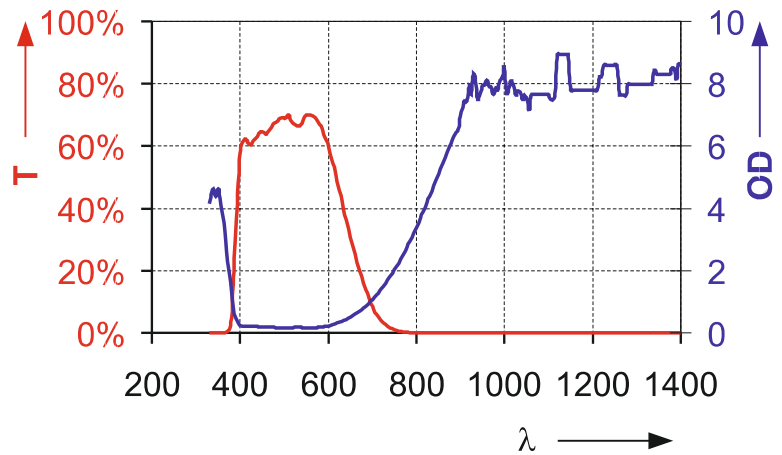
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0006.00	007.T0006.00	008.T0006.00	015.T0006.00	012.T0006.00	018.T0006.00
DIR 950–1000	L4	L4	L5	L4	L5	L5
D >1000–1400	L5	L4	L5	L7	L6	L6
IR >1000–1050	L6	L6	L7	L7	L7	L7
IR >1050–1400	L6	L6	L7	L8	L8	L8
D >1400–2200	L2	L2	L2	L5	L3	L3
IR >1400–2200	L2	L2	L2	L3	L3	L3
D 2780–3000	L2	L2	L2	L4	L3	L3
I 2780–3000	L2	L2	L2	L4	L4	L4
R 2780–3000	L2	–	–	L4	–	–
D 5400	L2	L2	L2	L4	L3	L4
I 5400	L2	L2	L2	L4	L4	L4
R 5400	L2	–	–	L4	–	–
D 10600	L2	L2	L2	L4	L4	L3
I 10600	L2	L2	L2	L4	L4	L4
R 10600	L2	–	–	L4	–	–
D 9000–11000	L2	–	–	L4	–	–
I 9000–11000	L2	–	–	L4	–	–
R 9000–11000	L2	–	–	L4	–	–

Glass Filters for Laser Safety Eyewear

Filter T07

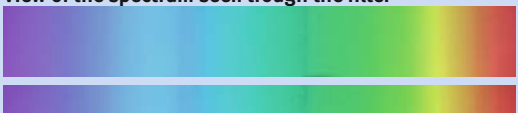
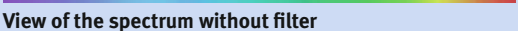
Filter	T07
	Full protection
Colour	light grey
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	60 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 7 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T07**

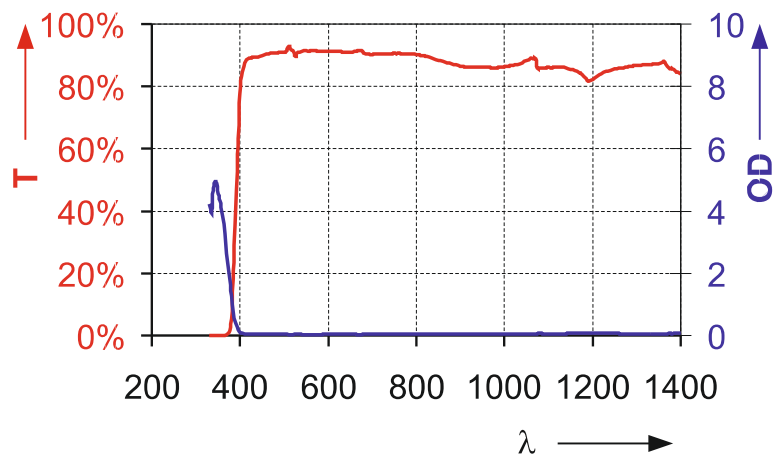


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0007.00	008.T0007.00	-	012.T0007.00	018.T0007.00
D 900-1050	-	L4	L5	-	L6	L6
IR 900-1050	-	L6	L6	-	L6	L6
D >1050-1400	-	L4	L5	-	L7	L7
IR >1050-1400	-	L6	L7	-	L8	L8
D >1400-2200	-	L2	L2	-	L5	L5
IR >1400-2200	-	L2	L2	-	L6	L6
DIR >2200-3000	-	L2	L2	-	L5	L5
DIR >3000-<9000	-	L2	L2	-	L4	L4
D 9000-11000	-	L2	L2	-	L5	L5
I 9000-11000	-	L2	L2	-	L5	L5
R 9000-11000	-	L2	L2	-	L4	L4

Filter T08

Filter	T08
	Full protection
Colour	clear
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	90 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

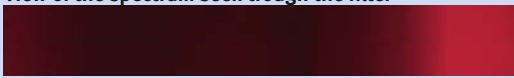

Transmission Curve Filter T08**



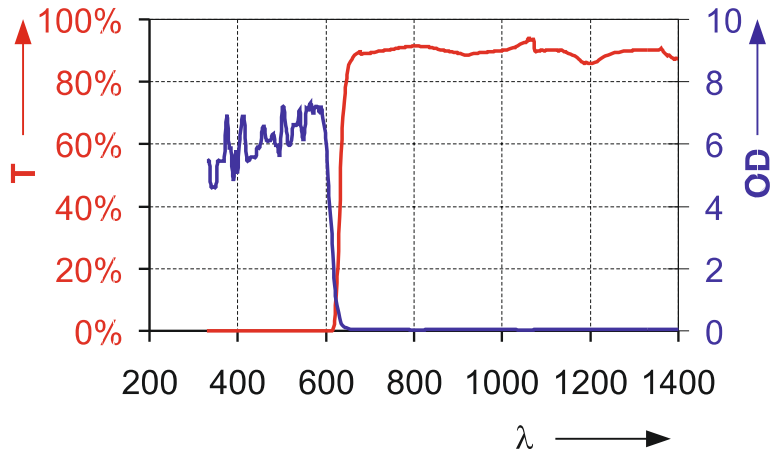
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0008.00	007.T0008.00	008.T0008.00	015.T0008.00	012.T0008.00	018.T0008.00
DI 5400	L2	L2	L2	L5	L4	L4
R 5400	L2	L2	L2	L4	L5	L5
D 9000-11000	L2	L2	L2	L5	L5	L5
I 9000-11000	L2	L2	L2	L5	L5	L5
R 9000-11000	L2	L2	L2	L4	L5	L5

Glass Filters for Laser Safety Eyewear

Filter T12

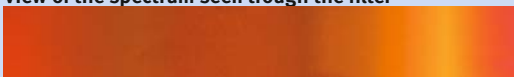
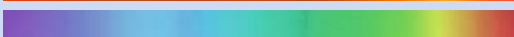
Filter	T12
	Full protection
Colour	red
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	10 %
Visual Brightness	sufficient
Colour View	restricted
Filter Thickness	approx. 3 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T12**

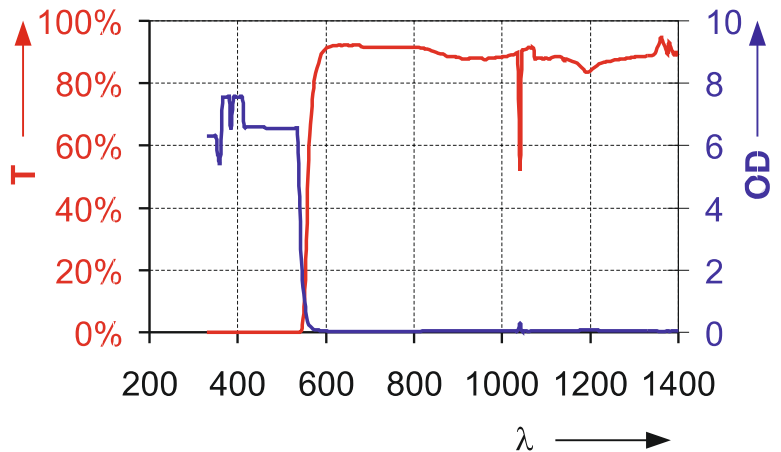


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	–	007.T0012.00	008.T0012.00	–	012.T0012.00	018.T0012.00
D 180–315	–	L8	L8	–	L9	L9
IR 180–315	–	L4	L5	–	L5	L5
IR >315–515	–	L6	L7	–	L8	L8
D >315–578	–	L4	L5	–	L6	L6
IR >515–578	–	L6	L7	–	L7	L7

Filter T13

Filter	T13
	Full protection
Colour	orange
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	40 %
Visual Brightness	good
Colour View	restricted
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

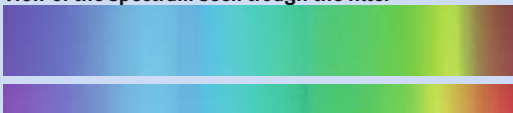
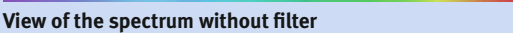
Transmission Curve Filter T13**



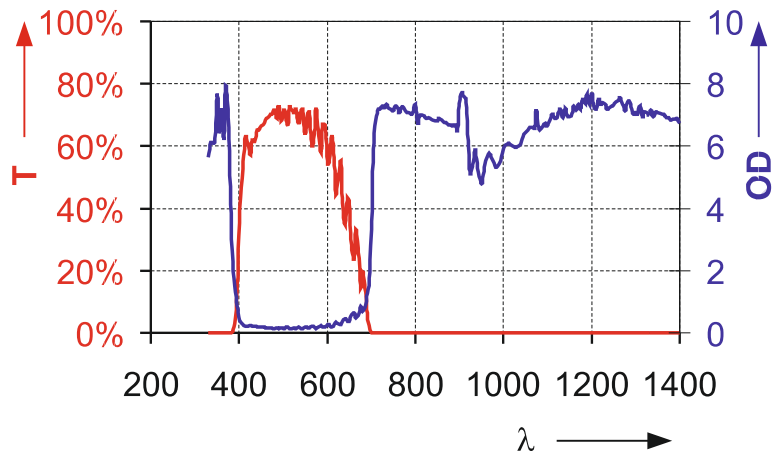
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0013.00	007.T0013.00	008.T0013.00	015.T0013.00	012.T0013.00	018.T0013.00
D 180–315	L8	L8	L8	L9	L9	L9
IR 180–315	L4	L4	L5	L4	L5	L5
D >315–380	L4	L4	L5	L7	L6	L6
I >315–532	L6	L6	L7	L8	L8	L8
R >315–532	L4	L4	L4	L4	L4	L4
D >380–532	L5	L4	L5	L7	L6	L6

Glass Filters for Laser Safety Eyewear

Filter T23


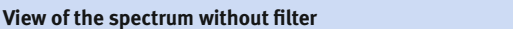
Filter	T23
	Full protection
Colour	light grey
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption Filter
Certification	DIN GS
VLT (approx.)	62 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T23**

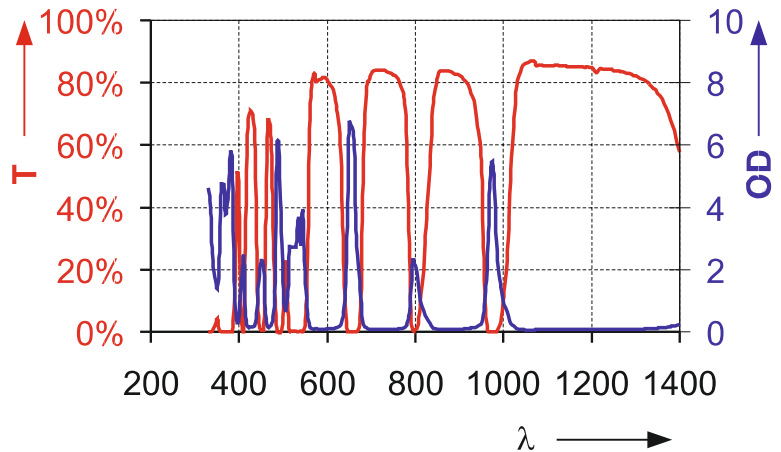


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0023.00	008.T0023.00	-	012.T0023.00	018.T0023.00
D 750-840	-	L4	L5	-	L6	L6
I 750-840	-	L6	L7	-	L7	L7
M 795-805	-	-	-	-	L9	L9
DI >840-850	-	L4	L4	-	L4	L4

Filter T24

Filter	T24
	Full protection
Colour	pink
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	48 %
Visual Brightness	good
Colour View	excellent
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

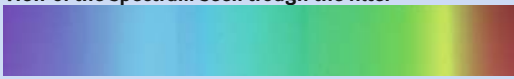

Transmission Curve Filter T24**



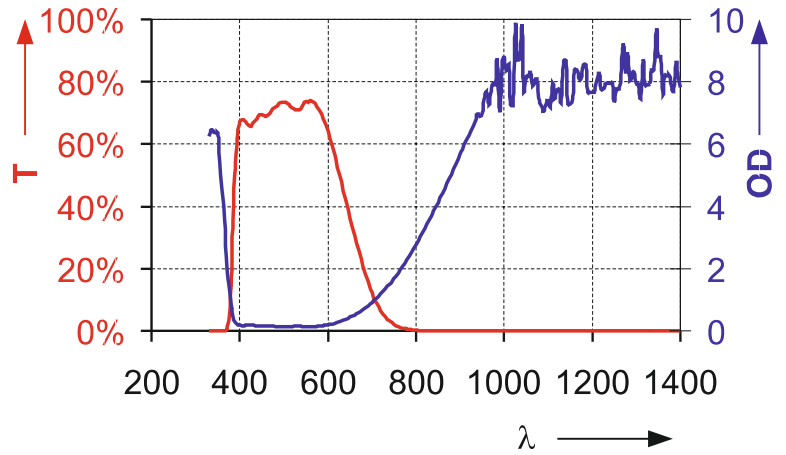
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0024.00	008.T0024.00	-	012.T0024.00	018.T0024.00
D 532	-	L4	L5	-	L6	L6
IR 532	-	L6	L6	-	L6	L6

Glass Filters for Laser Safety Eyewear

Filter T26

Filter	T26
	Full protection
Colour	light grey
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	66 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 6 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T26**

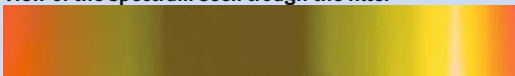



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0026.00	008.T0026.00	-	012.T0026.00	018.T0026.00
DIR 950-1000	-	L4	L4	-	L4	L4
D >1000-1050	-	L4	L5	-	L7	L7
IR >1000-1050	-	L6	L7	-	L7	L7
D >1050-1400	-	L4	L5	-	L7	L7
IR >1050-1400	-	L6	L7	-	L8	L8
DI >1400-2100	-	L2	L2	-	L5	L5
DI >2100-2800	-	L2	L2	-	L4	L4
DI >2800-3000	-	L2	L2	-	L5	L5
DI 10600	-	L2	L2	-	L4	L4

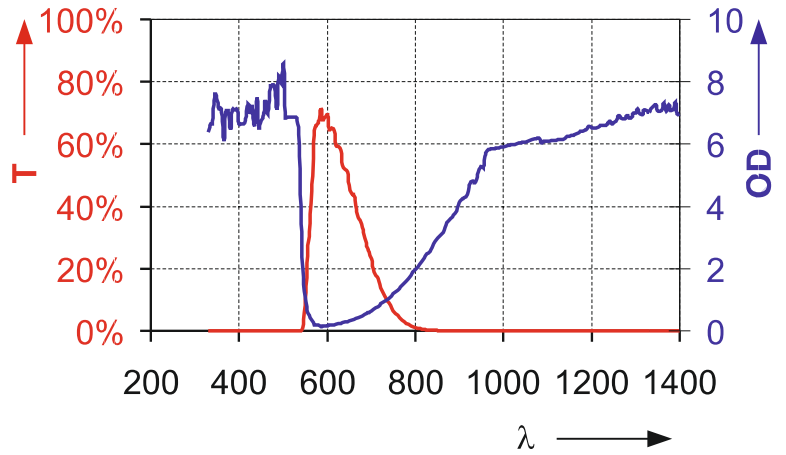


Glass Filters for Laser Safety Eyewear

Filter T27

Filter	T27
	Full protection
Colour	orange
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption Filter
Certification	DIN GS
VLT (approx.)	30 %
Visual Brightness	good
Colour View	sufficient
Filter Thickness	approx. 6 mm *
View of the spectrum seen through the filter ***	
	
View of the spectrum without filter	
	

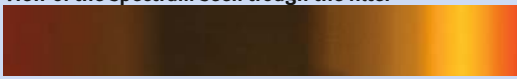

Transmission Curve Filter T27**



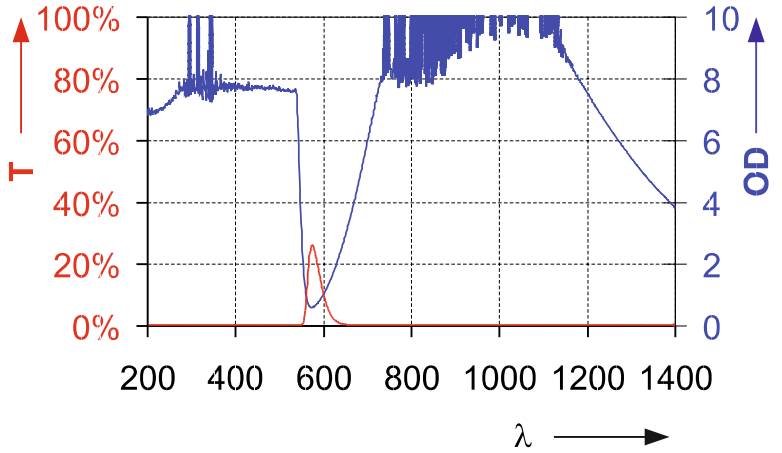
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALLSTAR	PROTECTOR
Part number	005.T0027.00	007.T0027.00	008.T0027.00	015.T0027.00	012.T0027.00	018.T0027.00
D 180-315	L8	L8	L8	L9	L9	L10
IR 180-315	L4	L4	L5	L4	L5	L5
D >315-380	L4	L4	L5	L6	L6	L6
I >315-532	L6	L6	L7	L8	L7	L7
R >315-532	L5	L5	L5	L5	L5	L5
M >315-532	-	-	-	L5	L5	L5
D >380-532	L5	L4	L5	L6	L6	L6
D 1030-1045	-	L4	L5	-	L7	L7
IR 1030-1045	-	L6	L7	-	L7	L7
M 1030-1045	-	-	-	-	L5	L5
D 1045-1064	L5	L4	L5	L6	L7	L7
IR 1045-1064	L6	L6	L7	L6	L7	L7
M 1045-1064	-	-	-	L5	L5	L5
D >1064-1100	-	L4	L5	-	L7	L7
IR >1064-1100	-	L6	L7	-	L7	L7
M >1064-1100	-	-	-	-	L5	L5

Glass Filters for Laser Safety Eyewear

Filter T28

Filter	T28
	Alignment and Full Protection
Colour	brown
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	CE
VLT (approx.)	10 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 6-7 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T28**

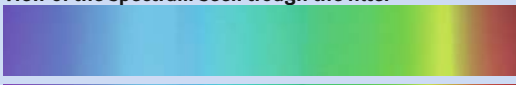



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number					012.T0028.00	018.T0028.00
D 180-315	-	-	-	-	L8	L8
IR 180-315	-	-	-	-	L5	L5
D >315-532	-	-	-	-	L5	L5
I >315-532	-	-	-	-	L7	L7
R >315-532	-	-	-	-	L4	L4
D 750-1100	-	-	-	-	L5	L5
IR 750-1100	-	-	-	-	L7	L7
633					R1	R1

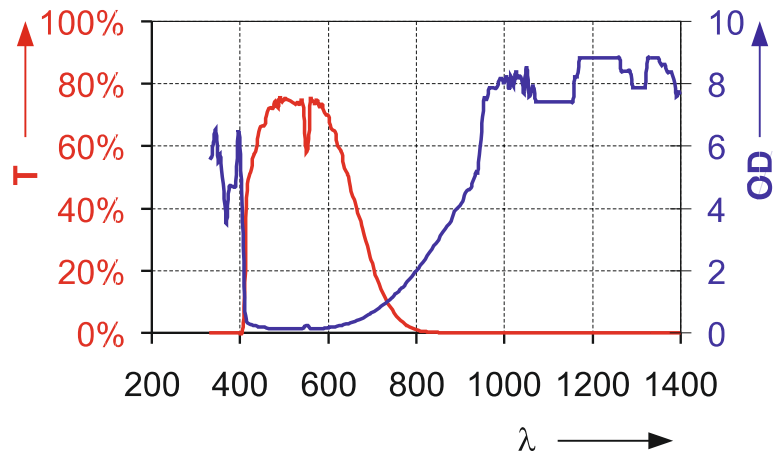


Glass Filters for Laser Safety Eyewear

Filter T35

Filter	T35
	Full protection
Colour	light grey
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption Filter
Certification	DIN GS
VLT (approx.)	77 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 4 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T35**



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0035.00	007.T0035.00	008.T0035.00	015.T0035.00	012.T0035.00	018.T0035.00
D 1030-1064	L5	L4	L5	L8	L8	L8
I 1030-1064	L6	L6	L7	L8	L8	L8
R 1030-1064	L6	L6	L6	L6	L6	L6
M 1030-1100	-	-	-	-	L6	L6
D >1064-1100	-	L4	L5	-	L8	L8
I >1064-1100	-	L6	L7	-	L9	L9
R >1064-1100	-	L6	L6	-	L6	L6
DI 2000-2200	L2	L2	L2	L2	L2	L2
R 2000-2200	L2	L1	L1	L2	L1	L1
D 5400	L2	L2	L2	L3	L3	L3
I 5400	L2	L2	L2	L4	L4	L4
R 5400	L2	L2	L2	L2	L2	L2
D 9000-11000	L2	L2	L2	L3	L3	L3
I 9000-11000	L2	L2	L2	L4	L4	L4
R 9000-11000	L2	L2	L2	L2	L2	L2

Note: Filter no. T35

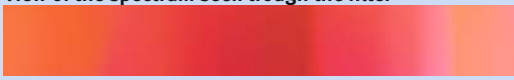

For this filter absorption and interference technologies are used. Absorption filters can be edge filters or bandpass filters.

The only solution for complex requirements of certain laser applications is the combination of such filters. This combination of absorbing and reflecting filters can cause colour reflections in the filter structure. These colour reflections vary in intensity from batch to batch. They are slightly stronger with curved filters and are perceived quite differently by each person.

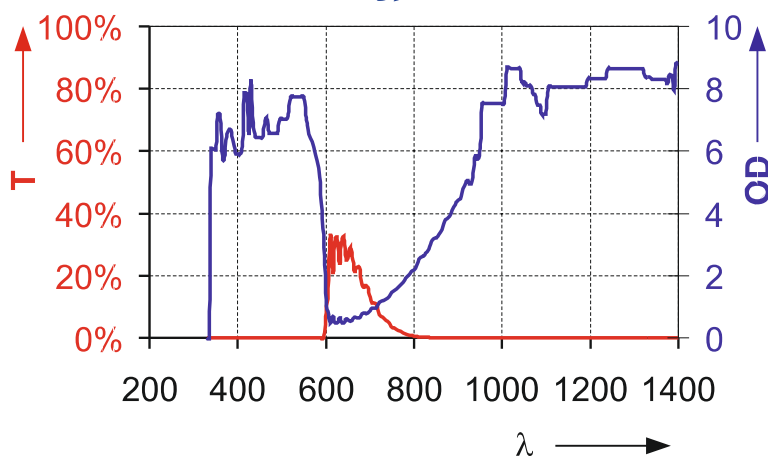
These reflections also depend on ambient light conditions: in a darker room they can be perceived more clearly, and they can hardly be noticed in a brighter room. Such colour reflections are part of the optical behaviour of this combination technology. They are a physical phenomenon and not a manufacturing error. Because T35 is a multiple bandpass filter, the optical impression in reality is significantly better than with a comparable edge filter with similar VLT.

Glass Filters for Laser Safety Eyewear

Filter T37

Filter	T37
	Full protection
Colour	orange
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption Filter
Certification	DIN GS
VLT (approx.)	15 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 9 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T37**



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	–	007.T0037.00	008.T0037.00	015.T0037.00	012.T0037.00	018.T0037.00
D 180–315	–	L8	L8	L8	L9	L10
IR 180–315	–	L4	L5	L4	L5	L5
D >315–532	–	L4	L5	L7	L8	L8
I >315–532	–	L6	L7	L8	L8	L8
R >315–532	–	L6	L7	L7	L7	L7
M >315–532	–	–	–	L6	L6	L6
D 1030 – <1045	–	L4	L5	–	L7	L7
I 1030 – <1045	–	L6	L7	–	L8	L8
R 1030 – <1045	–	L6	L7	–	L7	L7
M 1030 – <1045	–	–	–	–	L6	L6
D 1045–1064	–	L4	L5	L6	L7	L7
I 1045–1064	–	L6	L7	L7	L8	L8
R 1045–1064	–	L6	L7	L6	L7	L7
M 1045–1064	–	–	–	L6	L6	L6
D >1064–1100	–	L4	L5	–	L7	L7
I >1064–1100	–	L6	L7	–	L8	L8
R >1064–1100	–	L6	L7	–	L7	L7
M >1064–1100	–	–	–	–	L6	L6

Note: Filter no. T37

For this filter absorption and interference technologies are used. Absorption filters can be edge filters as well as bandpass filters.

The only solution for complex requirements of certain laser applications is the combination of such filters. This combination of absorbing and reflecting filters can cause colour reflections in the filter structure. These colour reflections vary in intensity from batch to batch. They are slightly stronger with curved filters and are perceived quite differently by each person.



These reflections also depend on ambient light conditions: in a darker room they can be perceived more clearly, and they can hardly be noticed in a brighter room. Such colour reflections are part of the optical behaviour of this combination technology. They are a physical phenomenon and not a manufacturing error.

Glass Filters for Laser Safety Eyewear

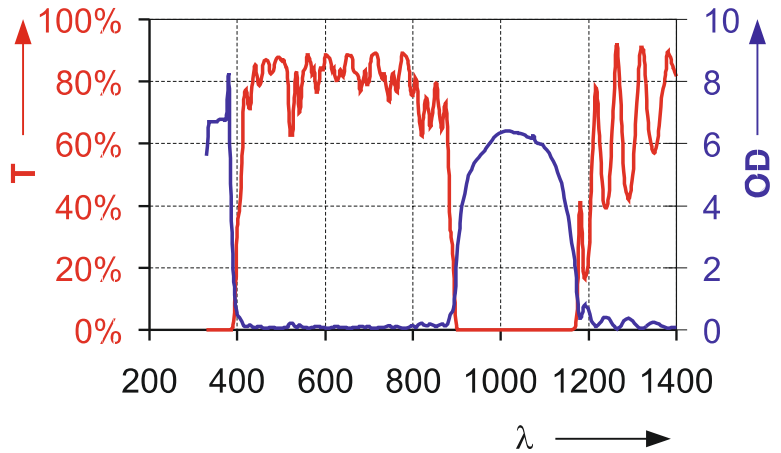


Coated Plastic Filters for Laser Safety Eyewear

Filter T43

Filter	T43
	Full protection
Colour	clear
Filter Material	Coating on Plastic
Filter Technology	Reflective Filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

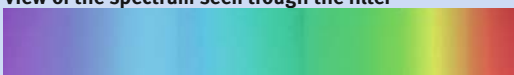

Transmission Curve Filter T43**



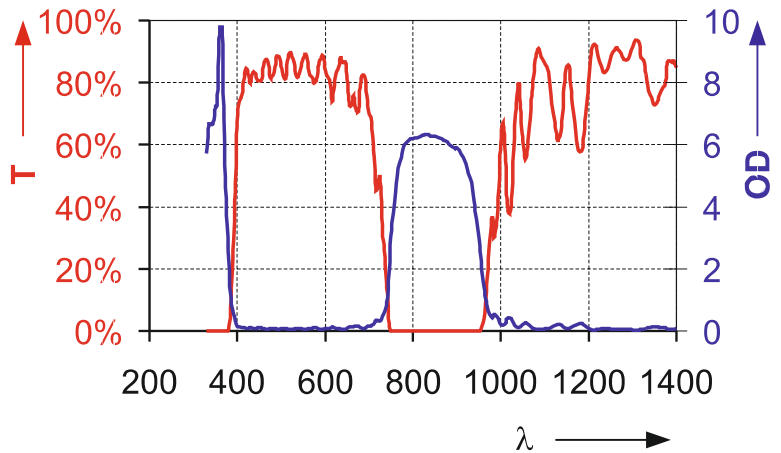
Frame	standard Frame			reinforced Frame			
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR	SPLIT SHIELD
Part number	005.T0043.00	-	-	-	-	-	019.T0043.00 ¹
DIR 925-960	L3	-	-	-	-	-	L3
DIR >960-970	L4	-	-	-	-	-	L4
DIR >970-1000	L5	-	-	-	-	-	L5
DIR >1000-1010	L3	-	-	-	-	-	L3

¹Extention 00: white frame; 01: black frame

Filter T44

Filter	T44
	Full protection
Colour	clear
Filter Material	Coating on Plastic
Filter Technology	Reflective Filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 2 mm*
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T44**





Frame	standard Frame			reinforced Frame			
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR	SPLIT SHIELD
Part number	005.T0044.00	-	-	-	-	-	019.T0044.00 ¹
DIR 780-790	L3	-	-	-	-	-	L3
DIR >790-800	L4	-	-	-	-	-	L4
DIR >800-840	L5	-	-	-	-	-	L5
DIR >840-860	L4	-	-	-	-	-	L4

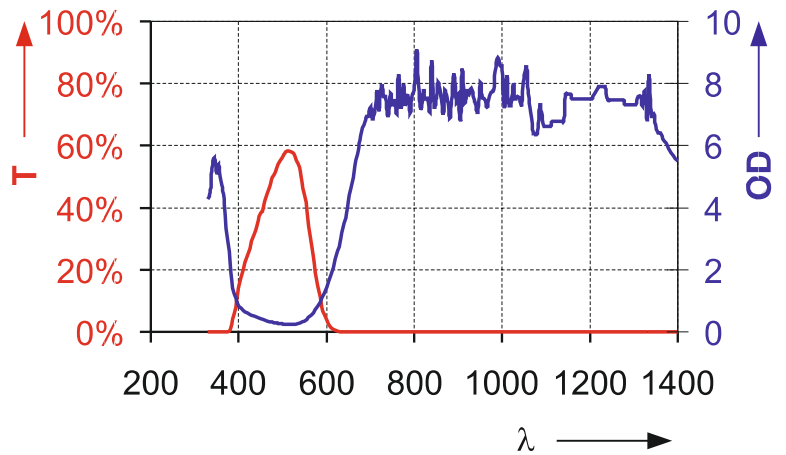
¹Extention 00: white frame; 01: black frame

Glass Filters for Laser Safety Eyewear

Filter T48

Filter	T48
	Alignment and Full Protection
Colour	green
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLТ (approx.)	35 %
Visual Brightness	sufficient
Colour View	good
Filter Thickness	5,5 - 6,5 mm *
View of the spectrum seen trough the filter ***	
	
	
View of the spectrum without filter	



Transmission Curve Filter T48**



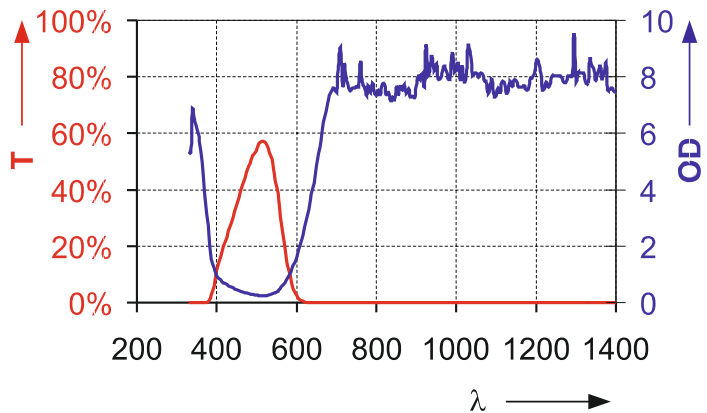
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0048.00	007.T0048.00	008.T0048.00	015.T0048.00	012.T0048.00	018.T0048.00
D 690 – 1040	L5	L4	L5	L7	L6	L6
IR 690 – 1040	L6	L6	L7	L7	L7	L7
D >1040 – 1070	L5	L4	L5	L7	L6	L6
IR >1040 – 1070	L6	L6	L7	L8	L7	L7
D >1070 – 1320	L5	L4	L5	L6	L6	L6
IR >1070 – 1320	L6	L6	L7	L6	L7	L7
M 720 – <795	–	–	–	–	L8	L8
M 795–805	–	–	–	–	L10	L10
M >805 – 900	–	–	–	–	L8	L8
DIR >1320–1400	–	L3	L3	–	L3	L3
DIR >1400 – 1550	–	L2	L2	–	L3	L3
DIR 1550	L2	L2	L2	L2	L3	L3
D 10600	L2	L2	L2	L4	L3	L3
I 10600	–	L2	L2	–	L4	L4
633 R2		R2	R2	R2	R2	R2

Glass Filters for Laser Safety Eyewear

Filter T58



Filter	T58
	Alignment and Full Protection
Colour	green
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	32 %
Visual Brightness	sufficient
Colour View	good
Filter Thickness	approx. 6.5–7 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T58**

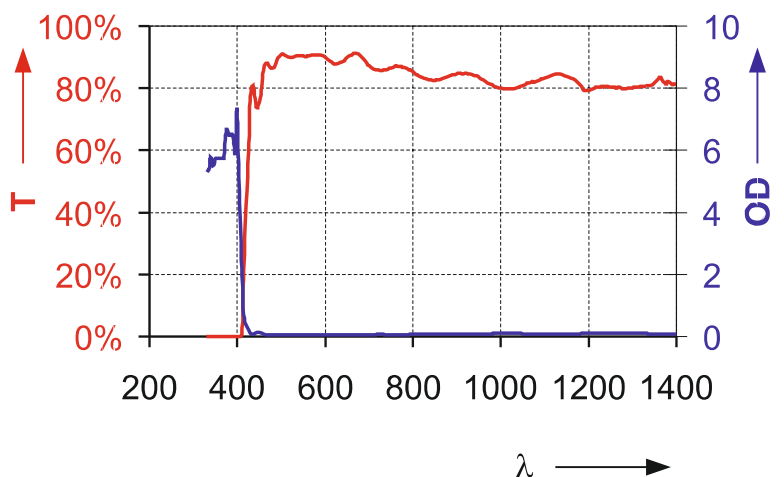


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	–	007.T0058.00	008.T0058.00	–	012.T0058.00	018.T0058.00
DIR 620 – 690	–	L2	L2	–	L2	L2
D >690 – 755	–	L4	L5	–	L6	L6
IR >690 – 755	–	L6	L7	–	L8	L8
M 700 – <795	–	–	–	–	L8	L8
D >755 – 1320	–	L4	L5	–	L5	L5
IR >755 – 1320	–	L6	L7	–	L7	L7
M 795 – 805	–	–	–	–	L10	L10
M >805 – 900	–	–	–	–	L8	L8
633 –	–	R3	R3	–	R3	R3

Filter T60

Filter	T60
	Full protection
Colour	light yellow
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption filter
Certification	DIN GS
VLT (approx.)	85 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 3 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

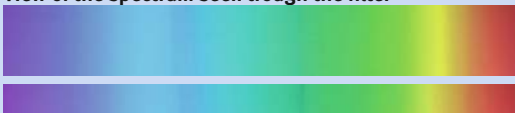
Transmission Curve Filter T60**



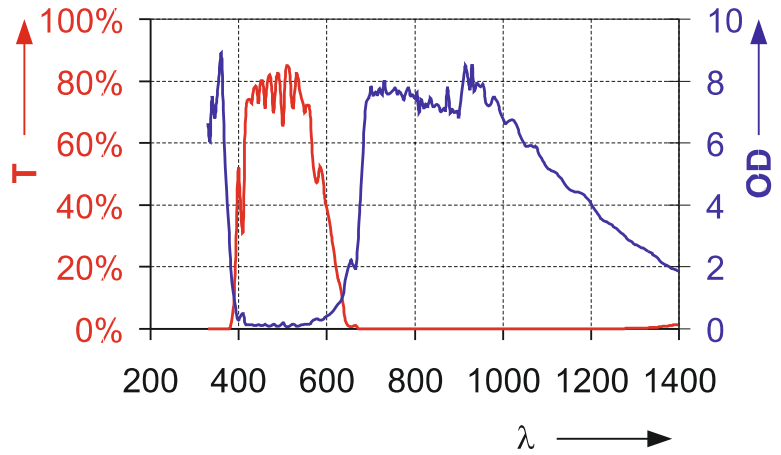
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0060.00	007.T0060.00	008.T0060.00	015.T0060.00	012.T0060.00	018.T0060.00
D 180–315	L8	L8	L8	L9	L9	L9
IR 180–315	L4	L4	L5	L4	L5	L5
D >315–380	L4	L4	L5	L5	L5	L5
IR >315–380	L6	L6	L7	L8	L8	L8

Glass Filters for Laser Safety Eyewear

Filter T62

Filter	T62
	Full protection
Colour	teal
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption filter
Certification	DIN GS
VLT (approx.)	50 %
Visual Brightness	good
Colour View	excellent
Filter Thickness	approx. 5 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

Transmission Curve Filter T62**

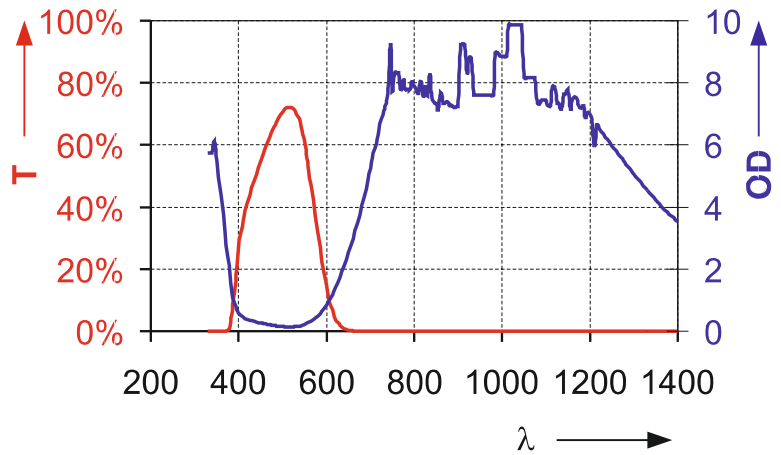


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	-	-	-	012.T0062.00	018.T0062.00
D 808-990	-	-	-	-	L6	L6
IR 808-1064	-	-	-	-	L8	L8
D >990-1064	-	-	-	-	L7	L7

Filter T68

Filter	T68
	Alignment and Full Protection
Colour	light green
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	45 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 4 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	

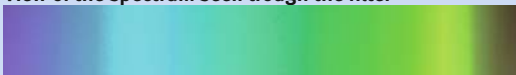

Transmission Curve Filter T68**



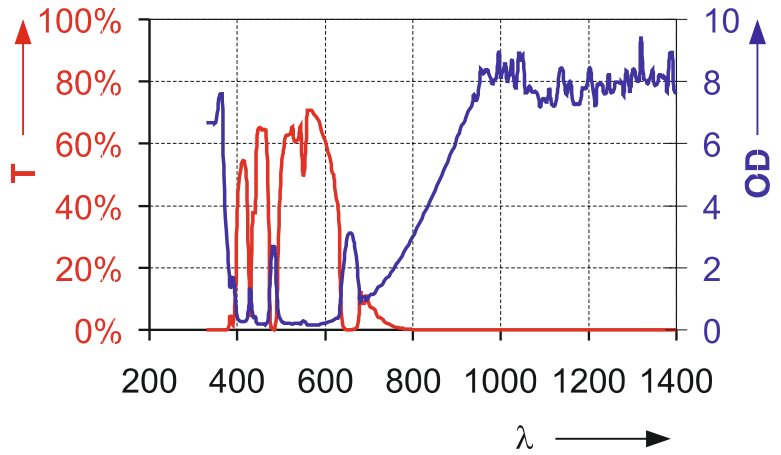
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0068.00	007.T0068.00	008.T0068.00	015.T0068.00	012.T0068.00	018.T0068.00
D 750-1100	L5	L4	L5	L6	L6	L6
IR 750-1100	L6	L6	L7	L8	L8	L8
D 10600	L2	L2	L2	L4	L3	L3
I 10600	L2	L2	L2	L4	L4	L4
633	R1	R1	R1	R1	R1	R1
670	R3	-	-	R3	-	-

Glass Filters for Laser Safety Eyewear

Filter T73

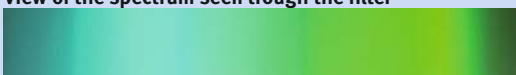
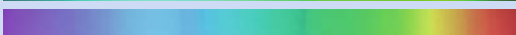
Filter	T73
	Full protection
Colour	light green
Filter Material	Coating on Mineral glass
Filter Technology	Reflective and Absorption filter
Certification	DIN GS
VLT (approx.)	55 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 8 mm *
View of the spectrum seen trough the filter ***	
	
	
View of the spectrum without filter	

Transmission Curve Filter T73**

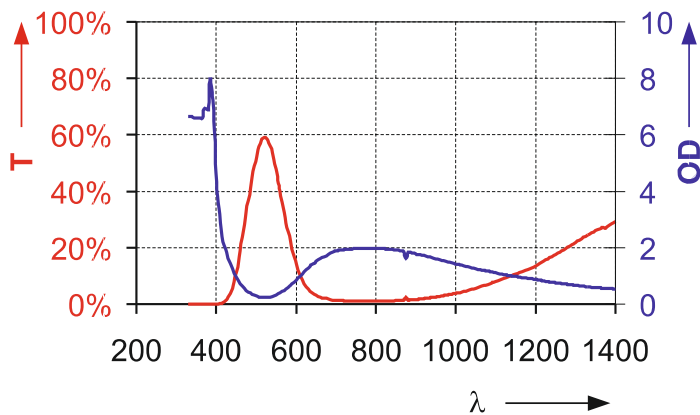


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	-	-	-	012.T0073.00	018.T0073.00
DIR 950-1000	-	-	-	-	L4	L4
IR >1000-1050	-	-	-	-	L7	L7
D >1000-1400	-	-	-	-	L6	L6
IR >1050-1400	-	-	-	-	L8	L8
D 2780-3000	-	-	-	-	L5	L5
I 2780-3000	-	-	-	-	L4	L4
D 10600	-	-	-	-	L5	L5
I 10600	-	-	-	-	L4	L4

Filter T81

Filter	T81
	Alignment Protection
Colour	green
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	35 %
Visual Brightness	sufficient
Colour View	good
Filter Thickness	approx. 4 mm *
View of the spectrum seen trough the filter ***	
	
	
View of the spectrum without filter	

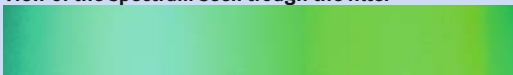
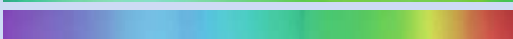
Transmission Curve Filter T81**



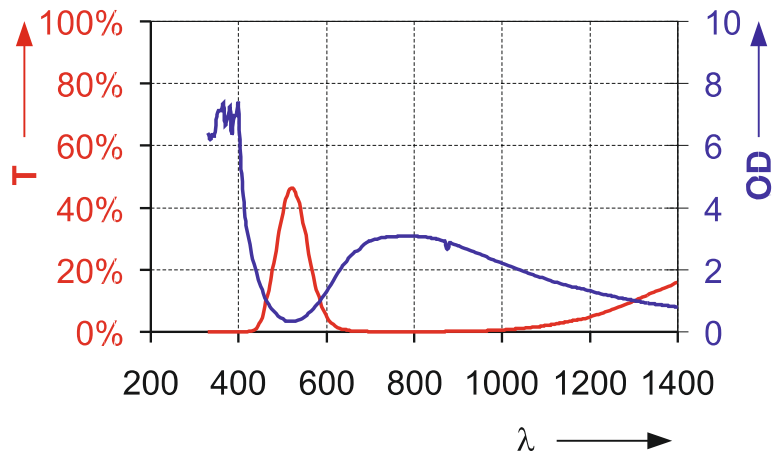
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0081.00	008.T0081.00	-	-	-
630-690 -	-	R1	R1	-	-	-

Glass Filters for Laser Safety Eyewear

Filter T82

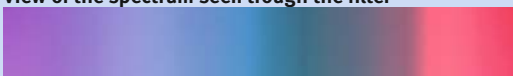

Filter	T82
	Alignment Protection
Colour	green
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	25 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 4 mm *
View of the spectrum seen trough the filter ***	
	
	
View of the spectrum without filter	

Transmission Curve Filter T82**

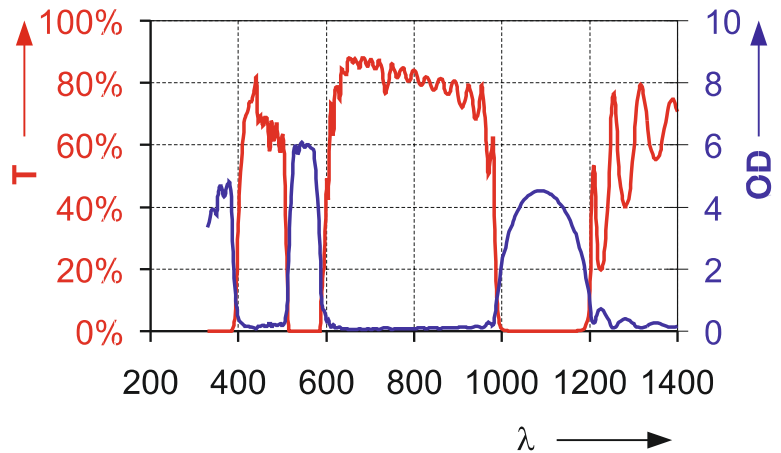


Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0082.00	008.T0082.00	-	-	-
630-690 -	-	R2	R2	-	-	-

Filter T83

Filter	T83
	Full protection
Colour	green
Filter Material	Coating on Mineral glass
Filter Technology	Reflective filter
Certification	DIN GS
VLT (approx.)	20 %
Visual Brightness	good
Colour View	good
Filter Thickness	approx. 3,5 mm *
View of the spectrum seen trough the filter ***	
	
	
View of the spectrum without filter	

Transmission Curve Filter T83**



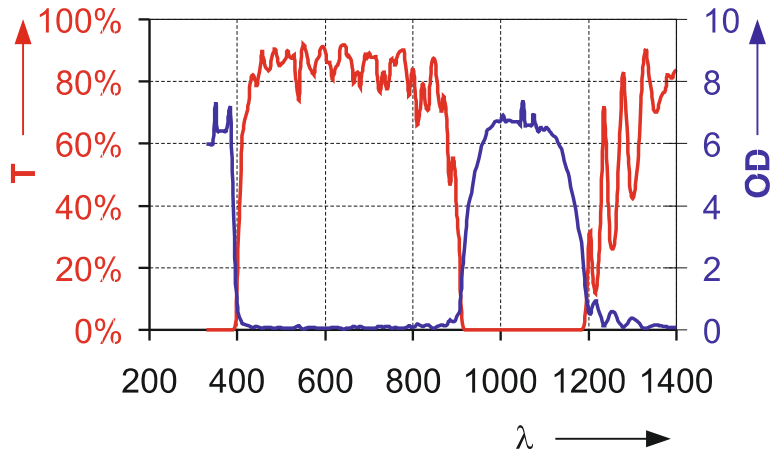
Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	-	007.T0083.00	-	-	012.T0083.00	018.T0083.00
D 530-535	-	L4	-	-	L6	L6
I 530-535	-	L6	-	-	L6	L6
R 530-535	-	L5	-	-	L5	L5

Coated Plastic Filters for Laser Safety Eyewear

Filter T92

Filter	T92
	Full protection
Colour	clear
Filter Material	Coating on Plastics
Filter Technology	Reflective filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 2 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

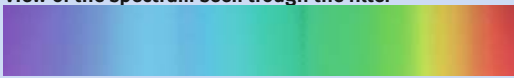

Transmission Curve Filter T92**



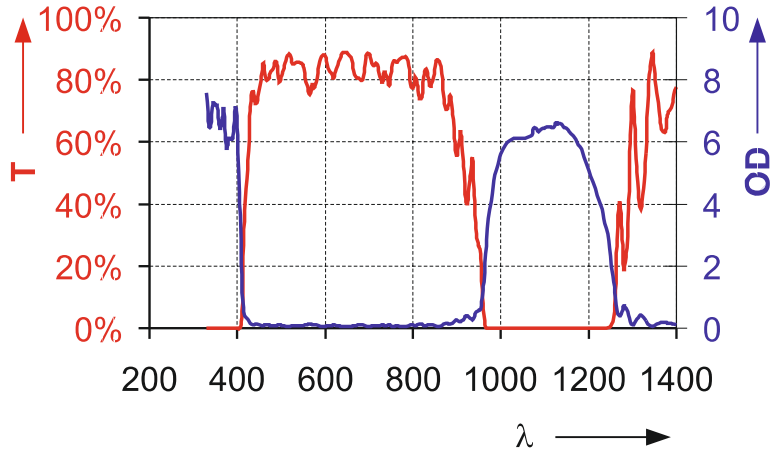
Frame	standard Frame			reinforced Frame			
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR	SPLIT SHIELD
Part number	005.T0092.00	–	–	–	–	–	019.T0092.00 ¹
DIR 1040–1080	L5	–	–	–	–	–	L5
D 9000–11000	L2	–	–	–	–	–	L2
I 9000–11000	L2	–	–	–	–	–	L2

¹Extention 00: white frame; 01: black frame

Filter T93

Filter	T93
	Full protection
Colour	clear
Filter Material	Coating on Plastics
Filter Technology	Reflective filter
Certification	DIN GS
VLT (approx.)	80 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 2 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T93**


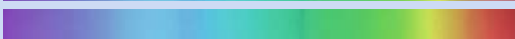


Frame	standard Frame			reinforced Frame			
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR	SPLIT SHIELD
Part number	005.T0093.00	–	–	015.T0093.00	–	–	019.T0093.00 ¹
D 1048–1064	L5	–	–	L7	–	–	L7
IR 1048–1064	L6	–	–	L7	–	–	L7
D 9000–11000	L2	–	–	L2	–	–	L2
IR 9000–11000	L2	–	–	L3	–	–	L3

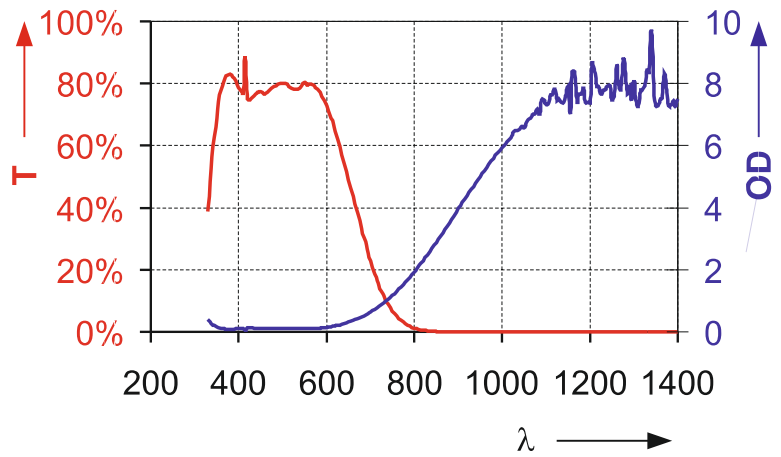
¹Extention 00: white frame; 01: black frame

Glass Filters for Laser Safety Eyewear

Filter T96

Filter	T96
	Full protection
Colour	light grey
Filter Material	Mineral glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	75 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 3-4 mm *
View of the spectrum seen trough the filter ***	
	
View of the spectrum without filter	
	

Transmission Curve Filter T96**



Frame	standard Frame			reinforced Frame		
	VISION	ECO	PROTECTOR	VISION	ALL STAR	PROTECTOR
Part number	005.T0096.00	007.T0096.00	008.T0096.00	015.T0096.00	012.T0096.00	018.T0096.00
DIR 850–900	L2	L2	L2	L2	L2	L2
DIR >900–950	L3	L3	L3	L3	L3	L3
DIR >950–1030	L4	L4	L4	L4	L4	L4
D >1030–1400	L5	L4	L5	L5	L5	L5
IR >1030–1400	L5	L5	L5	L5	L5	L5
DIR >1400–2200	L2	L2	L2	L4	L4	L4
DIR 2400–2800	L2	L2	L2	L3	L3	L3
DIR >2800–3200	L2	L2	L2	L4	L4	L4
DI >3200–10600	L2	L2	L2	L5	L5	L5
DI >10600–11000	L2	L2	L2	L5	L5	L5
R 3900	L2	L2	L2	L3	L3	L3

Laser Safety Windows



Laser Protection Windows

made from mineral glass and plastics

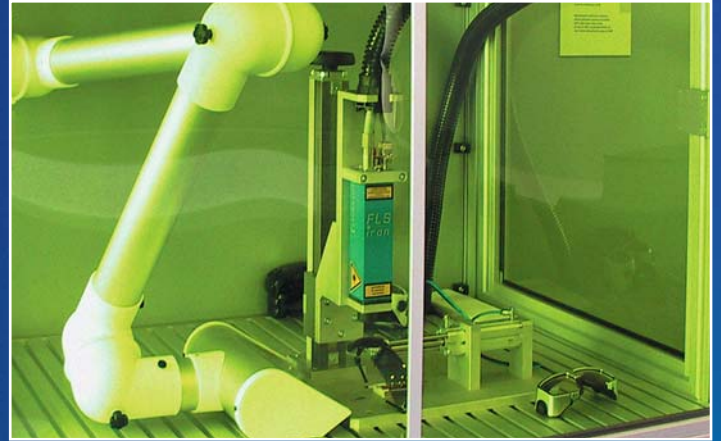
Based on available technologies LASERVISION offers laser safety windows and special filters. Independent from the applications, such as large area windows for the laser lab, cabin windows for automated laser work stations or customised filters for special set-ups – LASERVISION offers a safe solution for every application according to the standards.

Mineral Glass Cabin Window

Laser safety cabin windows from LASERVISION consist of a composite structure of a highly absorbing mineral glass and a thin neutral carrier glass. In case of a laser induced thermal break or any other accident, this lamination prevents the window from falling apart completely which would leave the user exposed to the laser; and secondly it prevents from any injuries caused by glass splinters. The protection even of such a “cracked” filter remains nearly stable and as high as before.

Laser safety windows are used as inspection windows in automated or manual laser material processing systems (welding, cutting, drilling) and allow supervision and handling by the user without the need of a laser safety goggle. LASERVISION also offers windows for integration into large area protection systems such as barrier plates or curtains.

All mineral glass laser protection windows are CE and in most cases also GS certified and are subject to continuous quality monitoring by our own quality control as well as by independent testing houses.



Highlights

- Different filter materials available
- Certified according EN207 and EN208 respectively
- Lamination is the standard technology
- Maximum standard dimension of most windows: 297x210mm
- Customised dimension as option
- Window frames for two standard dimensions as option
- Combination with curtains and barriers

Filters and protection levels for CE certified windows – only D (continuous wave)

Protection Level	Wavelength					
	180 – 315	315 – 400	400 – 700nm	700 – 1400nm	1400 – 3000nm	3000 – 10600nm
L10	T27					
L9	T13					
L8						
L7				T07 >1050 – 1400nm T26 >1000 – 1400nm		
L6	P2009	T13 316 – 532nm T27 316 – 532nm	T48 690 – 1320nm	T06 >1000 – 1400nm T27 1030 – 1100nm		
L5				T06 950 – 1000nm	T07 1400 – 3000nm T26 1401 – 2100;2801 – 3000nm	T07 9000 – 11000nm T08 9000 – 11000nm
L4				T26 950 – 1000nm P2009 820 – 850nm	T06 2780 – 3000nm T26 2100 – 2800nm	T06 5400, 10600 nm T08 5400 nm T07 3000 – 9000nm T26 10600 nm P2008 9000–11000 nm
L3					T06 >1400 – 2200nm	T68 10600 nm T48 10600 nm
L2					P2009 790 – 820,2750 – 3000nm	T48 1320–1550 nm

Laser Protection Windows

made from mineral glass and plastics

Optical densities for plastic windows

OD	Wavelength					
	180 – 315 nm	315 – 400 nm	400 – 700 nm	700 – 1400 nm	1400 – 3000 nm	3000 – 10600 nm
OD 6+			P2002 430 – 532 nm	P2001 1064 nm		
		P2004 200 – 330 nm	P2004 471 – 560 nm	P2003 1064 nm		P2008 9000 – 11000 nm
OD 5+		P2000 200 – 532 nm		P2000 880 – 1064 nm		
			P2004 401 – 470; 561 – 570 nm			
OD 4+		P2005 200 – 360 nm		P2001 860 – 1070 nm		
		P2004 330 – 400 nm		P2003 830 – 1700 nm		
OD 3+		P2005 360 – 380 nm	P2006 671 – 690 nm	P2000 808 nm		
				P2001 808 nm		
				P2003 808 nm		
OD 2+			P2006 691 – 710 nm			
			P2006 633 nm OD 2 – 3			
OD 1+			P2006 580 – 670 nm			
			P2005 532 nm OD 1 – 2			

Large Plastic Laser Protection Windows

For lasers with low power density of the beam or if it is possible to exclude a direct or reflected laser hit of the window, the installation of plastic laser safety windows in laser housings is possible, if the optical density is high enough.

For all applications requiring protection according to the EN 207, LASERVISION offers with L-protection levels certified plastic laser safety windows. In all other cases plastic laser safety windows are specified and marked by their optical density only.

The biggest advantage of plastic laser safety windows is the availability of much larger sheets and of course their lower weight compared to glass filters.

Highlights:

- Different filter materials available
- Certification according EN207 on selected materials
- OD marking as standard
- Maximum dimension: 1220mm x 915mm (P2001/P2009)
- Customised dimensions as option
- Usable as laser enclosure or large inspection window
- Mountable in frames or in combination with barrier plates
- CE certification as option

Filters and Special Products

Project related and for OEM customers LASERVISION offers all filters also as special or small filter version. For that purpose the complete range of filters and manufacturing technologies from LASERVISION is available. The Composite and coating technology from LASERVISION provides laser safety for nearly all applications and working conditions.

Plastic Filters for Cabin Windows

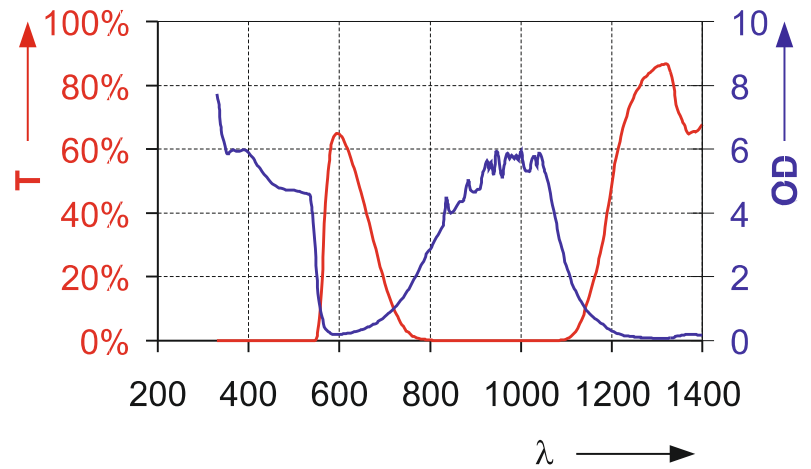
Filter P2000

Filter	P2000
Colour	red-brown
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	26 %
Visual Brightness	sufficient
Colour View	slightly limited
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2000.01
297 x 210	000.P2000.09
610 x 915	000.P2000.02
450 x 300	000.P2000.03
450 x 600	000.P2000.04
1219 x 915	000.P2000.16

Wavelength (nm)	Optical density (OD)
200-532	5+
880-1064	5+
808	3+

Transmission Curve Filter P2000**



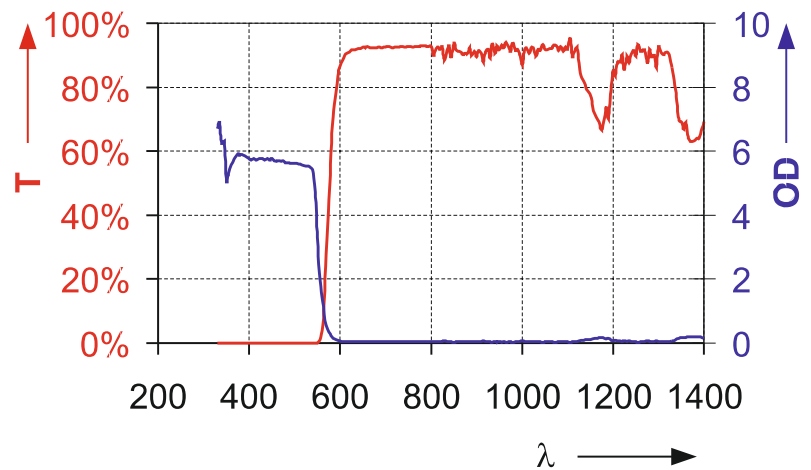
Filter P2002

Filter	P2002
Colour	orange-red
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	38 %
Visual Brightness	sufficient
Colour View	slightly limited
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2002.01
297 x 210	000.P2002.09
610 x 915	000.P2002.02
450 x 300	000.P2002.03
450 x 600	000.P2002.04

Wavelength (nm)	Optical density (OD)
532	6+

Transmission Curve Filter P2002**



Plastic Filters for Cabin Windows

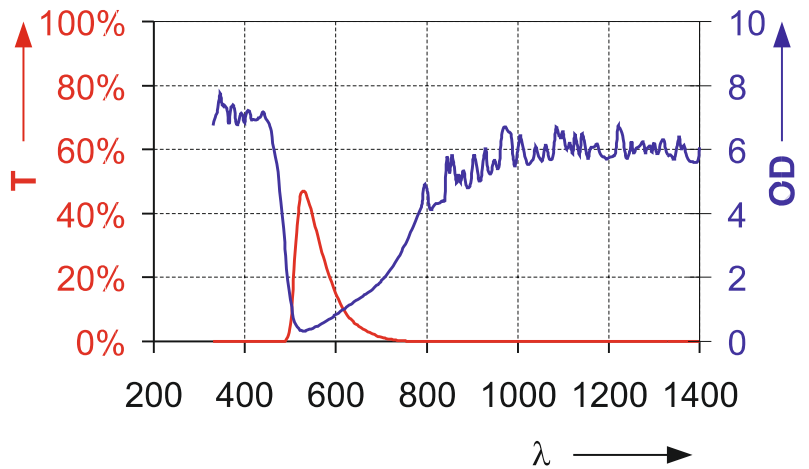
Filter P2003

Filter	P2003
Colour	green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	24 %
Visual Brightness	sufficient
Colour View	good
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2003.01
297 x 210	000.P2003.09
610 x 915	000.P2003.02
450 x 300	000.P2003.03
450 x 600	000.P2003.04

Wavelength (nm)	Optical density (OD)
830 – 1700	4+
1064	6+
808	3+

Transmission Curve Filter P2003**



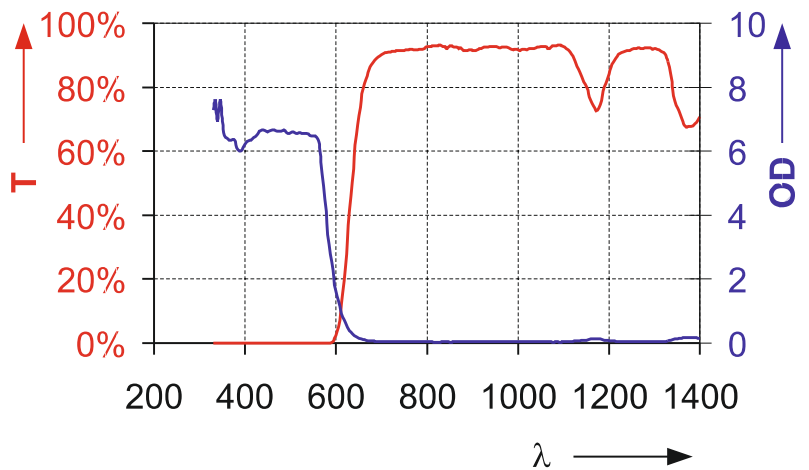
Filter P2004

Filter	P2004
Colour	red-brown
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	6 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2004.01
297 x 210	000.P2004.09
610 x 915	000.P2004.02
450 x 300	000.P2004.03
450 x 600	000.P2004.04

Wavelength (nm)	Optical density (OD)
200 – 330	6+
330 – 400	4+
400 – 470	5+
470 – 560	6+
560 – 570	5+

Transmission Curve Filter P2004**



Plastic Filters for Cabin Windows

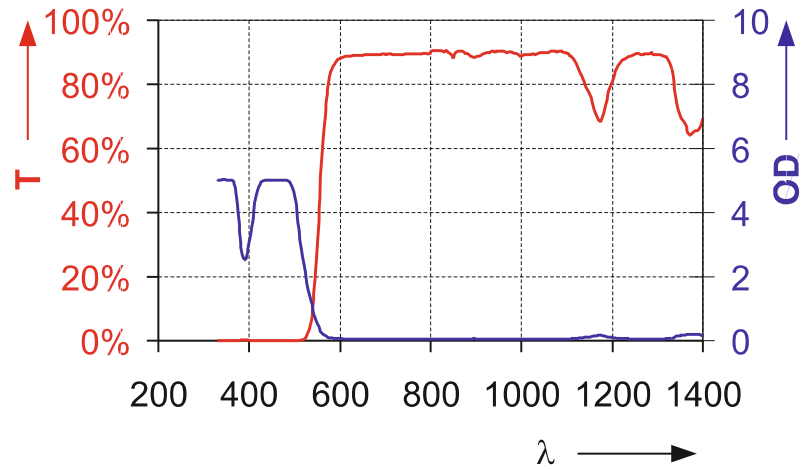
Filter P2005

Filter	P2005
Colour	orange
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	45 %
Visual Brightness	good
Colour View	slightly limited
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2005.01
297 x 210	000.P2005.09
610 x 915	000.P2005.02
450 x 300	000.P2005.03
450 x 600	000.P2005.04

Wavelength (nm)	Optical density (OD)
200–360	4+
360–380	3+
532	1–2

Transmission Curve Filter P2005**



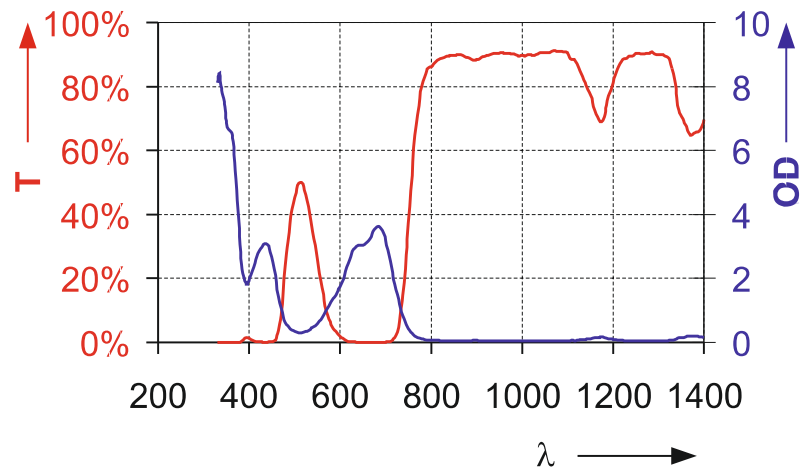
Filter P2006

Filter	P2006
Colour	green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	-
VLT (approx.)	20 %
Visual Brightness	sufficient
Colour View	slightly limited
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2006.01
297 x 210	000.P2006.09
610 x 915	000.P2006.02
450 x 300	000.P2006.03
450 x 600	000.P2006.04

Wavelength (nm)	Optical density (OD)
580–670	1+
670–690	3+
690–710	2+
633	2–3

Transmission Curve Filter P2006**



CE marked Plastic Filters for Cabin Windows

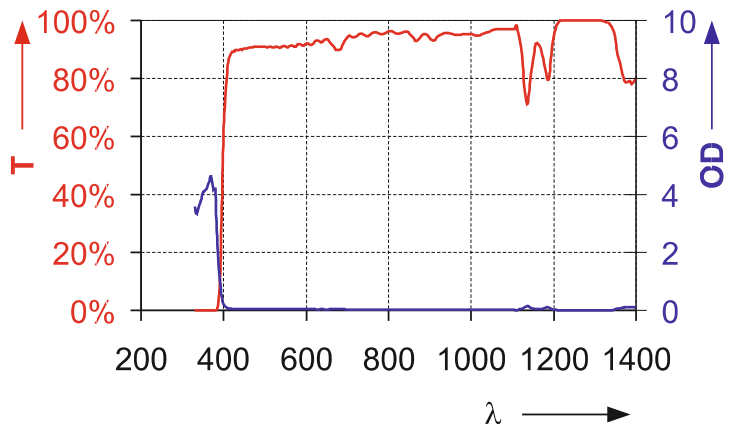
Filter P2008

Filter	P2008
Colour	clear
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	83 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 6 mm*

Dimension (mm)	Part number
100 x 200	000.P2008.01
297 x 210	000.P2008.09
610 x 915	000.P2008.02
297 x 420	000.P2008.05
450 x 300	000.P2008.03
450 x 600	000.P2008.04
1940 x 940 for #098	000.P2008.12

Wavelength (nm)	Certified Protection Level		
	D	I	
9000–11000	L4	L4	OD 6+

Transmission Curve Filter P2008**



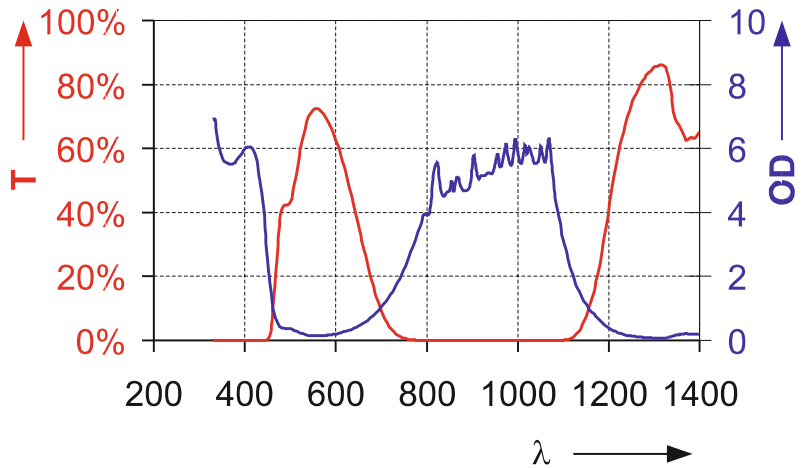
Filter P2009

Filter	P2009
Colour	Light green
Filter Material	Plastic
Filter Technology	Absorption Filter
Certification	CE
VLT (approx.)	65 %
Visual Brightness	very good
Colour View	good
Filter Thickness	approx. 3 mm*

Dimension (mm)	Part number
100 x 200	000.P2009.01
297 x 210	000.P2009.09
610 x 915	000.P2009.02
450 x 300	000.P2009.03
450 x 600	000.P2009.04
1219 x 915	000.P2009.16

Wavelength (nm)	Certified Protection Level		
	D	I	R
180–315	L6	L3	L3
>315–420	L5	L5	L5
790–820	L3	L3	L3
820–850	L4	L4	L4
850–940	L5	L5	L5
940–1065	L5	L6	L6
1065–1080	L4	L4	L4
2750–3000	L3	L3	L3

Transmission Curve Filter P2009**



Glass Filters for Cabin Windows

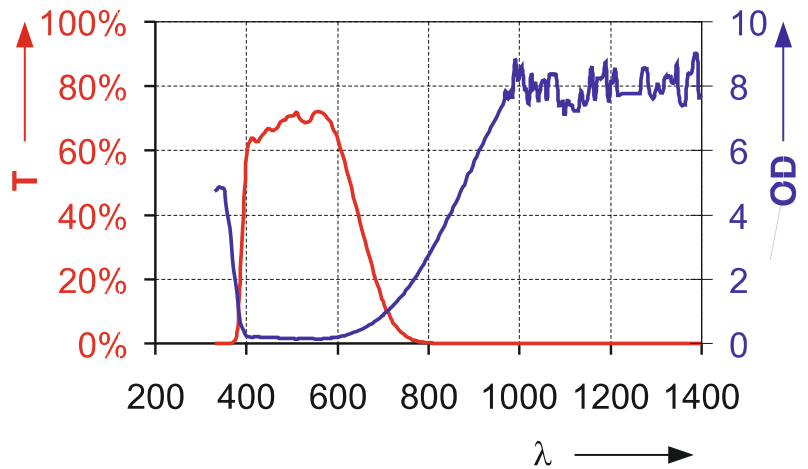
Filter To6

Filter	T06
Colour	light gray
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	70 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 5-6 mm*

Dimension (mm)	Part number
100 x 200	000.T0006.01

Wavelength (nm)	Certified Protection Level		
	D	I	R
950 – 1000	L5	L5	L5
>1000 – 1050	L6	L7	L7
>1050 – 1400	L6	L8	L8
>1400 – 2200	L3	L3	L3
2780 – 3000	L3	L3	–
5400	L4	L4	–
10600	L4	L4	–

Transmission Curve Filter To6**



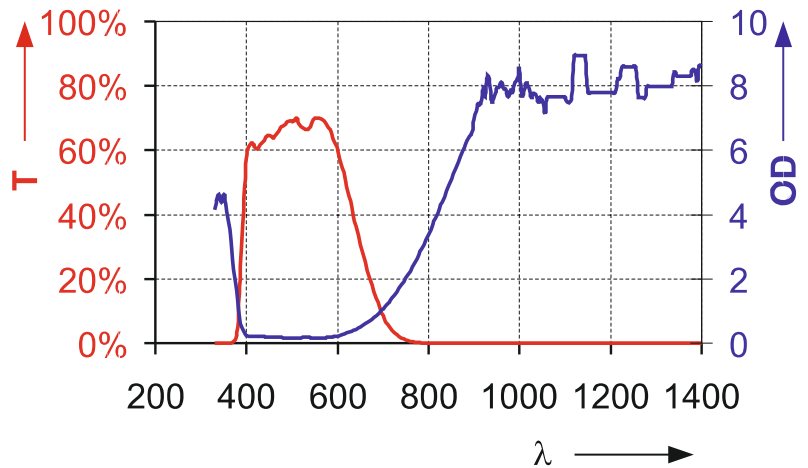
Filter To7

Filter	T07
Colour	light grey
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	60 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 7-8 mm*

Dimension (mm)	Part number
100 x 200	000.T0007.01

Wavelength (nm)	Certified Protection Level		
	D	I	R
900 – 1050	L6	L6	L6
>1050 – 1400	L7	L8	L8
>1400 – 2200	L5	L6	L6
>2200 – 3000	L5	L5	L5
>3000 – <9000	L4	L4	L4
9000 – 11000	L5	L5	L4

Transmission Curve Filter To7**



Glass Filters for Cabin Windows

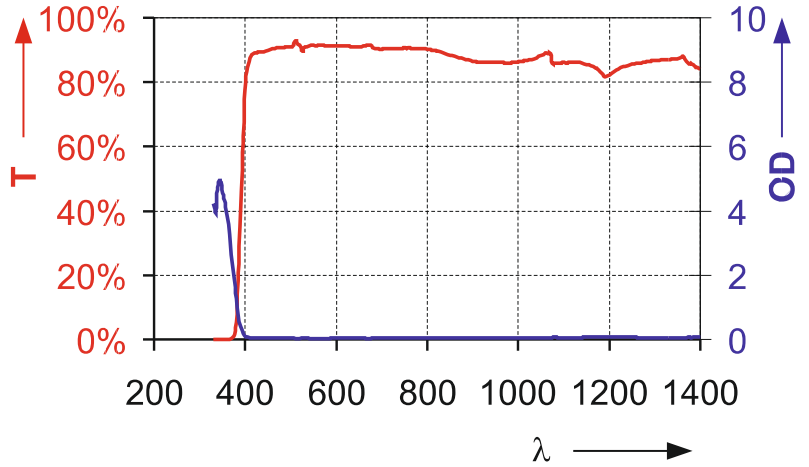
Filter To8

Filter	To8
Colour	clear
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	90 %
Visual Brightness	excellent
Colour View	excellent
Filter Thickness	approx. 5 mm*

Dimension (in mm)	Part number
100 x 200	000.T0008.01
297 x 210	000.T0008.09

Wavelength (nm)	Certified Protection Level		
	D	I	R
5400	L4	L4	L5
9000 – 11500	L5	L5	L5

Transmission Curve Filter To8**



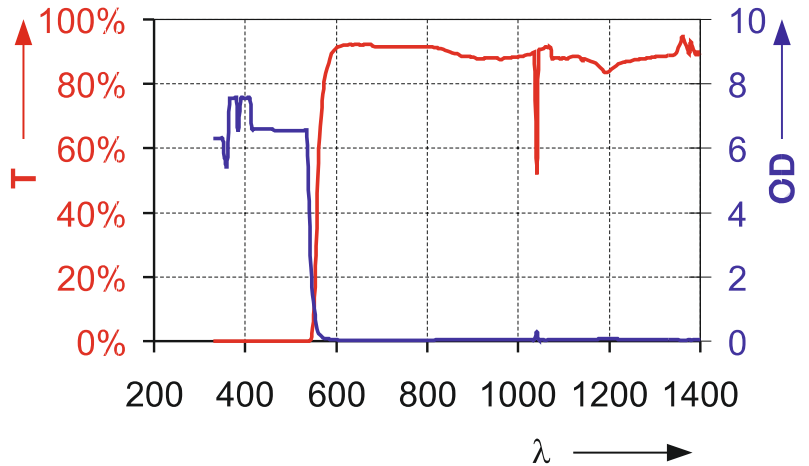
Filter T13

Filter	T13
Colour	orange
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	40 %
Visual Brightness	good
Colour View	limited
Filter Thickness	approx. 5-6 mm*

Dimension (mm)	Part number
100 x 200	000.T0013.01
297 x 210	000.T0013.09

Wavelength (nm)	Certified Protection Level		
	D	I	R
180 – 315	L9	L5	L5
315 – 532	L6	L8	L4

Transmission Curve Filter T13**



Glass Filters for Cabin Windows

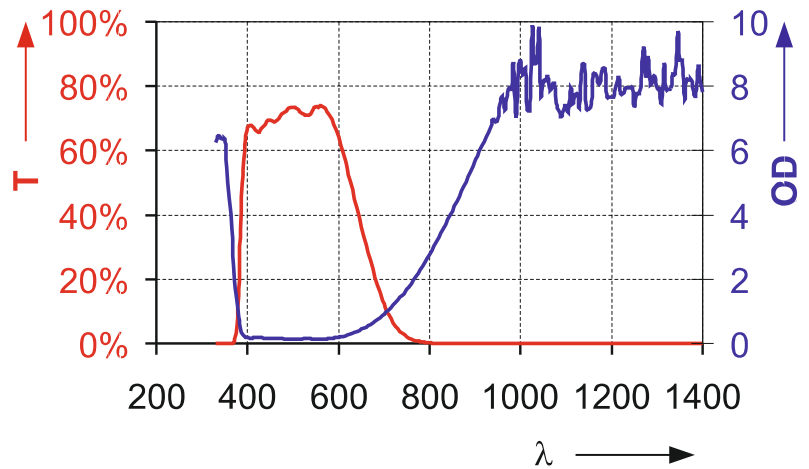
Filter T26

Filter	T26
Colour	light grey
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	70 %
Visual Brightness	very good
Colour View	excellent
Filter Thickness	approx. 7 mm*

Dimension (mm)	Part number
100 x 200	000.T0026.01
297 x 210	000.T0026.09

Wavelength (nm)	Certified Protection Level		
	D	I	R
950 – 1000	L4	L4	L4
1000 – 1050	L7	L7	L7
1050 – 1400	L7	L8	L8
1400 – 2100	L5	L5	–
2100 – 2800	L4	L4	–
2800 – 3000	L5	L5	–
10600	L4	L4	–

Transmission Curve Filter T26**



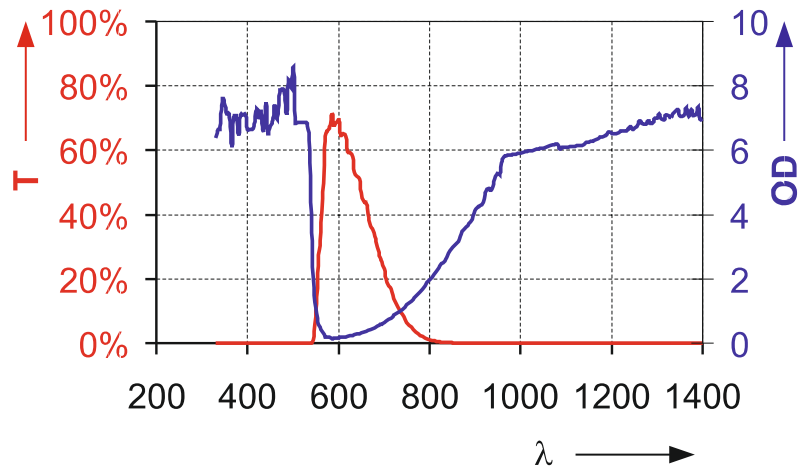
Filter T27

Filter	T27
Colour	orange
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	30 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 8-10 mm*

Dimension (mm)	Part number
100 x 200	000.T0027.01

Wavelength (nm)	Certified Protection Level		
	D	I	R
180 – 315	L10	L5	L5
315 – 532	L6	L8	L4
1045 – 1100	L6	L8	L8

Transmission Curve Filter T27**



Glass Filters for Cabin Windows

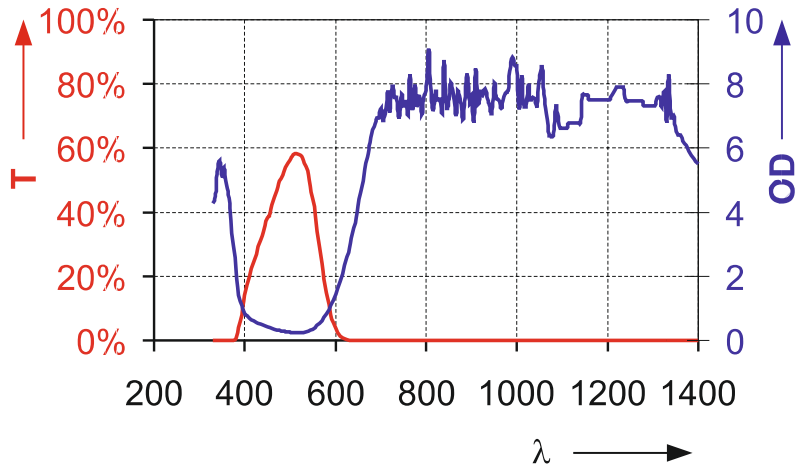
Filter T48

Filter	T48
Colour	green
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	35 %
Visual Brightness	sufficient
Colour View	slightly limited
Filter Thickness	approx. 6-7 mm*

Dimension (mm)	Part number
100 x 200	000.T0048.01

Wavelength (nm)	Certified Protection Level			
	D	I	R	M
690 – <720	L6	L7	L7	–
720 – <795	L6	L7	L7	L8
795 – 805	L6	L7	L7	L10
>805 – 900	L6	L7	L7	L8
>900 – 1320	L6	L7	L7	–
>1320 – 1550	L2	L2	L2	–
10600	L3	L4	–	–
633	R2	–	–	–

Transmission Curve Filter T48**



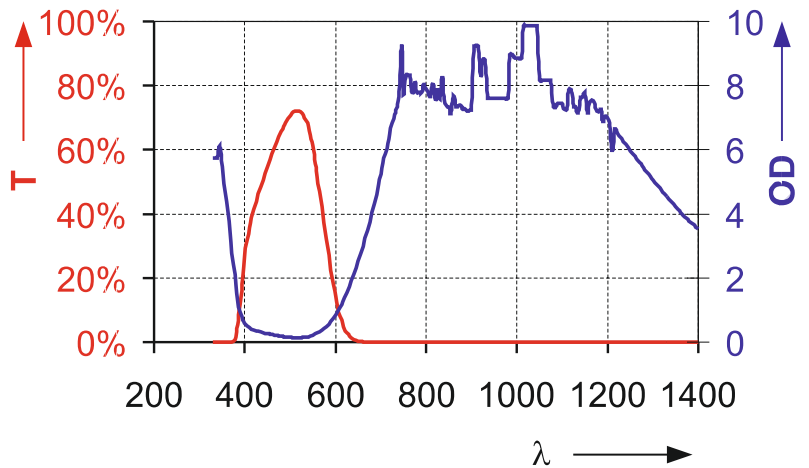
Filter T68

Filter	T68
Colour	green
Filter Material	Glass
Filter Technology	Absorption Filter
Certification	DIN GS
VLT (approx.)	35 %
Visual Brightness	sufficient
Colour View	limited
Filter Thickness	approx. 4-5 mm*

Dimension (mm)	Part number
100 x 200	000.T0068.01

Wavelength (nm)	Certified Protection Level		
	D	I	R
750 – 1064	L6	L8	L8
10600	L3	–	–
633	R1	–	–

Transmission Curve Filter T68**



Large Area Laser Protection

LASERVISION has developed a complete line of large area laser protection systems with well adapted accessories. By means of these systems it is possible to create laser safe solutions for all applications requiring shielding of laser working spaces or public areas.

The protection products differ from each other with respect to laser resistance, certification, mechanical characteristics and flexibility. Some of these systems can be combined with glass or acrylic laser safety windows. Therefore it is under certain conditions even possible to abstain from the obligation to wear laser safety eyewear in that areas.

Laser Safety Curtains

LASERVISION offers DIN EN 12254 tested and certified laser safety curtains. Compared to conventional welding curtains the patent pending multi layer structure of the laser safety curtain leads to a significantly increased laser resistance time for direct or scatted laser light. The multilayer structure consists of high absorbing and non flammable textiles and metal interlayers. Delivery includes an eyelets tape on top of the curtain, which allows the curtain to be fixed on a steel rope or round curtain rod.

Consisting of light-proof material the curtain is suitable for all wavelength: from 180 nm (UV laser), for all visible lasers, for 1064 nm (Nd:YAG laser) up to CO₂ lasers at 10600nm. The certified protection level for Nd:YAG laser is D A₅/I A₇ for example and for CO₂-lasers DI A₄ respectively.

As an option the curtain can be equipped in combination with a suitable frame with a DIN A₄ or 100 x 200 mm large laser safety window.

Highlights

- Certified according EN 12254
- Available in standard sizes with frames
- Custom dimensions available on request
- Two colours: Olive or natural white
- Combination with laser safety windows possible
- Different mounting options
- Clean room version as option



Large Area Laser Protection

Laser Safety Barriers

With the new Laser barrier system LASERVISION offers a versatile material, which fits the changing needs and requirements of laser users. The special designed surface structure (free of dust, disinfection possible) makes the new laser barrier ideally suitable for all applications in the industry and research (even in clean room environments).

The patent pending protection material combines very low weight with highest protection against laser radiation in the UV-/VIS- and IR-range. The barrier protects for example against CO₂- (10600 nm) and Nd:YAG-lasers (1064 nm) up to a power density of 10 MW/cm². The achieved protection level equals AL6 at 1064 nm and AL4 at 10600 nm respectively at 100s direct illumination according to DIN EN 12254.

The material is available in two standard dimensions and can be tailored by the user himself according to his needs. The material can be mounted into all standard frame systems with an accessible slit width of 13 mm. In order to protect the edges we recommend tape or slip-on U-shaped profiles (metal or plastic) in dependence of the place and type of use.

Highlights

- High laser resistance
- Custom dimension by user
- Maximum single sheet size: 1350 mm x 3000 mm
- Easy to clean, disinfectable surface
- Combination with laser safety windows possible
- Usable as flexible and moveable room divider



Laser Safety Slats

LASERVISION's unique laser safety slat curtain is characterised by a very high resistance against aging, bases, acids also in combination with very low or high temperatures. Its stability against mechanical stress is very good as well. Protection and stability of our patent pending laser safety slat curtain is subject to regular internal tests.

The lamella slat curtain is light-proof and suitable for all laser wavelength. The curtain consists of single 300 mm broad silicon based lamellas. There are nearly no manufacturing restrictions concerning height and width (number of lamellas) of the curtain. There is one mount needed for each slat, which needs to be fixed on a suitable rod. As an alternative solution the slat curtain can be mounted into a movable frame system.

Highlights

- Very high mechanical robustness
- High temperature stability
- High resistance against aging, bases and acids
- Customised dimensions through length and number of slats
- Tested laser resistance

Large Area Laser Protection

Laser Safety Curtains and Frames

LASERVISION's laser safety curtain offers a flexible screening of laser working areas and can be combined with a suitable laser protection window. Standard dimensions of the windows are 297 x 210 mm (DIN A4) or 100 x 200 mm. An additional mounting frame is needed for the window integration. Compared to conventional welding curtains the patent pending multi layer structure of the laser safety curtain leads to a significantly increased laser resistance time for direct or scatted laser light. The multilayer structure consists of high absorbing and non flammable textiles and metal interlayers. The curtain can be mounted without problems on a steel cable or rod through the eyelets on top of the curtain.



Operation mode	Wavelength	Protection level
D	180 – 315 nm	A9
R	180 – 315 nm	A2
D	> 315 – 1050 nm	A7
D	> 1050 – 1400 nm	A5
I,R	> 315 – 1400 nm	A6
D	> 1400 – 10600 nm	A3
I	> 1400 – 10600 nm	A4

Curtain:	Part number
Dimension: 2100 mm x 1800 mm (frame #097)	VG.000.000.45
Dimension: 2850 mm x 1800 mm (frame #095)	VG.000.000.40
Dimension: 3250 mm x 1800 mm (frame #094)	VG.000.000.46
Dimension: 3600 mm x 1800 mm (frame #096)	VG.000.000.26
Dimension: 4000 mm x 1800 mm (frame #110)	VG.000.000.47
Dimension: 4400 mm x 1800 mm (frame #093)	VG.000.000.41

Frames:	Part number
Basic system 2100 mm x 2100 mm	097
Basic system + 700 mm swivel arm	095
Basic system + 1100 mm swivel arm	094
Basic system + 2pc 700 mm swivel arms	096
Basic system + 700 mm and 1100 mm swivel arm	110
Basic system + 2pc 1100 mm swivel arms	093



Mobile laser protection screen for CO₂ lasers (part no. 098)

For large, transparent screens, LASERVISION offers a movable Laser protection screen. The dimension is approximately 2 x 1 m (Height x Width). By combination of several modules a complete shielding of laser working places can be easily realised.

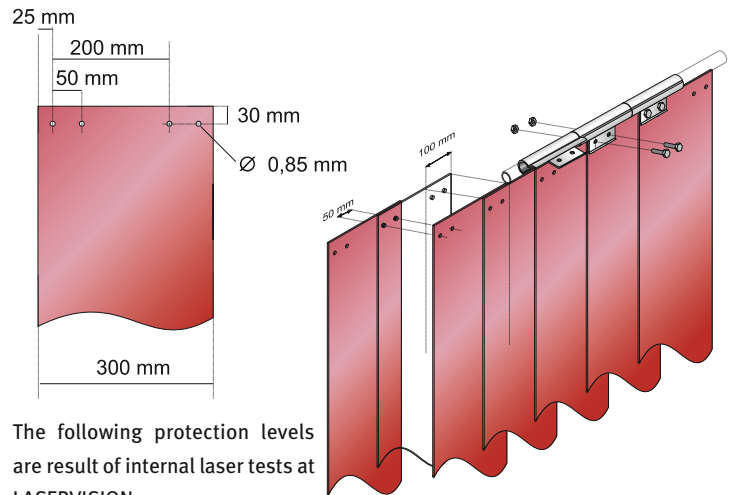
The mobile protection screen is equipped with an EN 207 certified laser safety window against CO₂-laser radiation (DI L4). The frame can be equipped alternative also with a laser safety curtain or lamellas

Large Area Laser Protection

Laser Safety Slats

For assembling the slat-mounts are fitted onto a rod (diameter 35 mm, not included). There is one mount needed for each slat plus one in addition. This allows to create a nearly unrestricted individual length of the slat curtain. The lamellas can be mounted into the movable frame as an alternative solution (part no. 097). In this case 10 slats of 1800 mm height are needed.

	Part number
Mount	099
Slat length 1600 mm	VL.000.000.01
Slat length 1800 mm	VL.000.000.02
Slat length 2000 mm	VL.000.000.03
Slat length 2200 mm	VL.000.000.04
Slat length 2400 mm	VL.000.000.05
Slat length 10000 mm (full role)	VL.000.000.06



The following protection levels are result of internal laser tests at LASERVISION.

D	1064	A5	LV
I	1064	A7	LV
D	10600	A3	LV

Covered width	900	1100	1300	1500	1700	1900	2100	2300	2500	2700	2900	3100	3300	3500	3700	3900	4100
Slats required	4	5	6	7	8	9	10 11	12	13	14	15	16	17	18	19	20	
Mounts required	5	6	7	8	9	10 11	12	13	14	15	16	17	18	19	20	21	

Laser safety slats come in signal red colour. Weight is 1.17 kg per meter without mount.



Laser Barrier System

With the new Laser barrier material LASERVISION offers the first time a versatile material, which fits the changing needs and requirements of laser users. It offers highly effective protection against CO₂ (10600 nm) and Nd:YAG (1064 nm) laser radiation up to a power density of 10 MW/m².

The material is available in three standard dimensions: 1350 mm x 1000 mm and 1350 mm x 2000 mm (maximum size 1350 x 3000 mm) and can be tailored by the user himself according to his needs. The material can be mounted into all standard frame systems with an accessible slit width of 13 mm. In order to protect the edges we recommend tape or slip-on U-shaped profiles (metal or plastic) in dependence of the place and type of use.

	Part number
Barrier 1350 mm x 1000 mm x 13 mm	VB.000.000.01
Barrier 1350 mm x 3000 mm x 13 mm	VB.000.000.02
Barrier 1350 mm x 2000 mm x 13 mm	VB.000.000.04

Medical Laser Protection



Laser applications in the medical field are mainly based on the excellent focusability and the high power density of the beam. Additionally most of the laser light can be delivered through optical fibers, which makes endoscopic laser surgery possible.

Examples for medical laser applications are:

- Diode lasers for hair removal, skin rejuvenation and acne therapy
- Erbium lasers for treatment of skin problems like lesions (epidermal, dermal), cicatrices, skin resurfing (skin-deep or deep), removal of pigmented moles or couperose up to the therapy of hemangioma or virus caused skin mutation
- Q-switched Nd:YAG- or Ruby-lasers for tattoo removal or permanent make-up or for treatment of benign pigmented lesions
- Infrared and frequency doubled Nd:YAG lasers in otolaryngology or for therapy of pigmented lesions, vascular or intravascular treatment
- CO₂ lasers for broad use in urology, gynaecology, otolaryngology or plastic surgery
- Other applications are in lithotripsy
- Ophthalmology – correction of short- or long-sightedness through defined ablation of the cornea
- Surgery – as scalpel and for faster coagulation and haemostasis
- For photodynamic therapy – where laser light is combined with photo sensitisers. These photo sensitisers increase the photo sensitivity of certain tissue so that it can be destroyed selectively by the laser light without affecting the surrounding areas.
- Dental applications for identification and ablation of caries and morbid tooth material and coagulation as well



Rapid advancement of medical laser technology is making laser safety more important now than ever before. LASERVISION keeps pace with advances in laser technology through an aggressive programme of new product and technology innovation. Doing this LASERVISION is able to offer an increasing broad range of customised solutions for medical laser protection. This includes laser safety eyewear for doctors, assistances and patients as well as large area protection systems and a well balanced range of accessories.

IPL – Intensed Pulsed Light

In addition to the already nearly conventional therapy with different lasers, treatments with high brightness LED and flash lamps become more and more popular. High intensity flash lamp therapy – also designated as IPL technology – is mainly used for of large area treatments, such as hair removal or treatment of liver or sun spots and telangiectasia. The technology is non ablative and acts, compared to lasers, more uniform on larger areas. Safety eyewear for IPL systems does not require a certification according to the laser safety norms but needs to be certified according to working protection standards. Of course it should protect the user against the bright light flash.

Medical Laser Protection



Medical laser safety eyewear

Laser safety eyewear for medical applications does have very special requirements. In either case a large field of view (FOV) – may be also in combination with corrective glasses – a high wearing comfort and of course laser protection conforming to standards is needed. Additionally undistorted or unrestricted colour recognition is becoming more and more important for a growing number of applications.

LASERVISION is staying abreast of changes and offers a broad range of laser safety eyewear and filters which fulfil these requirements and which offer a lot of additional options tailored for medical applications.

Highlights

- Clear reflective filters for unrestricted colour recognition
- SPLIT SHIELD frame as OTG (Over The Glass) frame with curved filters for excellent FOV
- ALL STAR frame with Rx insert also in combination with binocular magnifier and IPL-flip
- VISION frame for glass, plastic and reflective filters with broad FOV
- Sterilisable patients goggle PG ONE with exchangeable filters
- Lightweight and full-wrap style LAMBDA-ONE with absorbing plastic filters
- Metal eyeball protector for all wavelength and lasers
- Shade goggles for IPL applications

Medical Laser Protection

Area protection

For fast and flexible or stationary screening of treatment rooms into a laser safe working area LASERVISION is offering different solutions. The dust free and disinfectable laser barrier material can be individually tailored and mounted into a metal frame system. Due to the low weight it is easy to move. A stationary separation is also possible by means of the certified laser safety curtain from LASERVISION. The curtain is available also in a white version and is manufactured according to the customer specification. Both systems offer the option to integrate a laser protection window for observation.

Highlights

- Disinfectable material in custom dimensions
- Barrier system in combination with laser safety window
- Certified white laser protection curtain
- Standard dimensions with frames or customised solutions
- Curtain available with movable frame



Accessories

An comprehensive range of accessories complements the portfolio of LASERVISION's products for the medical range. This includes one way products like eye caps or mouth guards as well as binocular magnifiers and IPL-flips for laser safety goggles.

Highlights

- Binocular magnifier with different magnification for ALL STAR frame
- Integrated IPL-flip for ALL STAR
- Eye caps and cover plates
- Alternative holders like straps, malleable temples, support system

Medical Laser Protection

SPLIT SHIELD – medical laser protection goggle (L-09)

OTG (Over The Glass) frame with highly efficient external reinforcement
Especially for medical applications, where excellent colour view, high wearing comfort and high protection levels are an important issue, LASERVISION has developed the frame model SPLIT SHIELD.

Designed as an OTG frame the SPLIT SHIELD combines several cutting-edge technologies in one product. Laser protection is mainly realised by means of an innovative, metallised cover frame which provides significantly higher protection levels than without. The special feature of this reinforcement is the internal multilayer structure. The basis of this cover frame, which is responsible for the mechanical stability, is plastic material which is responsible also for keeping the weight low. Laser protection is then realised through a metallisation of this layer structure. Additionally the special design of the cover frame has the advantage of also protecting the front surface of the filter glass from scratches and damage by preventing direct contact to any surface when the glasses are laid face down.

The individually adjustable DUOFLEX temples provide for a high wearing comfort. They can be changed to the cold malleable temples or the elastic head strap.



Filters with reflective coatings

The filters for which the SPLIT SHIELD was originally designed for are coated reflective filters. By using a special, time consuming technique a carefully designed dielectric interference filter structure is created on the clear substrate. The special design of the multilayer structure in combination with carefully selected coating materials creates a reflective coating with very high optical density for the laser wavelength or wavelength combination. The coating acts as a small bandwidth high reflective mirror over the full angular range of $\pm 30^\circ$ (incident angle) as required in the norm EN 207/208. Nevertheless the overall transmission of the filter in the visible range (VLT – visible light transmission) is nearly unaffected.

Due to the small blocking bandwidth of the filter the colour recognition of such filters is significantly improved. The unrestricted recognition of colours is essential for a lot of application, especially in the medical field. In addition to the possibility of explicit discrimination of blood and vessels the clear differentiation of coloured instruments or the unconscious perception of signal or warning lights are important aspects in the selection process for laser safety eyewear. That is what the reflective filters in the SPLIT SHIELD frame provide.

Highlights

- Filter with base curve 2 for broad field of view
- Especially suitable for reflecting filters
- Available also with absorbing plastic filters
- Patent pending external reinforcement
- Especially suitable for corrective glasses
- Multiple adjustable Duoflex temples (standard)
- Head strap or malleable temples as option

Medical Laser Protection

Medical magnifier for ALL STAR goggle

When using binocular magnifiers in laser surgery, it is mandatory to take the increase of power or energy density into consideration. Only the combination of suitable laser safety filters in front of the loupe and a laser safety goggle is considered to be safe.

The new HR 2.5x/420 binocular loupe on the ALL STAR frame from LASERVISION tends to cover most of the medical laser applications. There are only high quality branded magnifiers used, which provide a clear, brilliant view without distortions. The HR 2.5 loupe is the ideal combination of high magnification and large depth of field, broad field of view and easy handling. Therefore the ALL STAR 2.5 loupe combination is ideally suited for dental applications or plastic surgery.

Due to the higher weight of the combination of a laser safety goggle and a binocular magnifier LASERVISION offers the perfect innovative solution. The Head Mount System takes over the complete pressure from the nose, the ears and the head caused by conventional holding systems like temples or straps. The secret is the unique design of the Head Mount System which spreads the weight of the glasses and the loupe over a much larger contact area on top and backside of the head. Two rotary adjustment knobs allow an easy fitting to nearly every head. The ALL STAR with magnifier option always comes with the Head Support System and is delivered in a special storage case.

Highlights

- Factory mounted on the frame
- Individually adjustable pupil spacing
- Reproducible position though integrated flip mechanism
- Available with all LASERVISION laser safety filters
- Standard magnification 2.5, others available on request
- Head Support System for pressure free wearing comfort
- Soft storage box for the entire unit



IPL – flip for ALL STAR

The IPL flip is factory mounted on the ALL STAR frame and protects against the glare of the IPL flash. This allows using a clear laser safety filter with high VLT (visible light transmission) and good colour transmission for the laser application and in addition a high attenuation against the flash only when needed. This combination offers the possibility to use only one goggle for laser and IPL applications. The filter of the IPL flip is available in two different shades and has an additional high protection against infrared (IR) and ultraviolet (UV) radiation.

Highlights

- Factory option for the ALL STAR
- Stable and reliable flip mechanism for secure fixation
- Suppression of the IR and UV spectral range
- Available in two shades (shade 3, shade 5)

Medical Laser Protection



IPL goggles ATHLETIC & SKYLINE – Shade 3 and Shade 5

The ATHLETIC spectacle is solely available with two different filters (Shade 3 and 5) and is intended to be used only with IPL systems or other high brightness, non-coherent light sources. The smooth, nearly flat characteristic of the transmission curve ensures a pleasant work. Additionally both filters feature blocking of the infrared and the ultraviolet spectral range. If these filters are needed in an OTG frame – the SKYLINE is the right solution.

Highlights

- Filters with base curve 8 (ATHLETIC)
- Available with two attenuation levels: 16 % transmission (Shade 3) and 2 % (Shade 5) resp.
- Comfortable, light fit by low weight
- Good coverage reduces exposure to stray light
- Shade 3 and Shade 5 also as SKYLINE available

PG ONE (00P)

Especially for medical laser applications LASERVISION offers a new, unique patients goggle. The PG ONE is characterised by a comfortable fit and the ability to sterilisation. Therefore it is possible to remove the filters without any tool from the soft frame. We offer a lot of different glass and plastic absorbing filters and an additional metal version. The frame has been designed in close cooperation with medical laser manufacturers. The patent pending frame material possesses very high protection levels.

Highlights

- High protection levels as D L6 IR L7 315–1400 nm
- Flat absorbing glass or plastic filters
- Metal plate/insert as option (00P.P000A.00)
- Sterilisable through removable filters
- Adjustable flexible head strap
- Suitable for children



EYEBALL Goggle (00A)

The eyeball goggle consists of two hemispherical aluminium covers connected by a small bar of the same material. The adaptation mechanism ensures a fast adjustment to any face geometry. The EYEBALL goggle is a pure patient goggle and has been developed in cooperation with medical scientists for laser treatment in close proximity to the eyes. The goggle is certified for all laser wavelength.

Operation mode	Wavelength	Protection level
D	180 – 315 nm	L10 LV DIN
R	180 – 315 nm	L5 LV DIN
D	> 315 – 1400 nm	L6 LV DIN
I, R	> 315 – 1400 nm	L8 LV DIN
D, R	> 1400 – 10600 nm	L4 LV DIN
I	> 1400 – 10600 nm	L5 LV DIN



Medical Laser Protection



	Part number
Diameter Ø 22 mm (XS)	0P.912.999.22
Diameter Ø 24 mm (S)	0P.912.999.24
Diameter Ø 25,5 mm (M)	0P.912.999.25
Diameter Ø 26,5 mm (L)	0P.912.999.26
Suction cup	0P.599.999.99

EYECAPS

For laser applications in close proximity to the eye, and where the EYEBALL or PG ONE is too big, LASERVISION offers special EYE CAPS. EYE CAPS are small hemispherical shaped covers made from stainless steel, which are inserted under the eyelid (immediately on the eye bulbus) like contact lenses. They have rounded edges to avoid injuries and the inside is highly polished to assure the patients' comfort and safety. The outside surface is non-reflective to protect the medical personnel from laser reflections. They are provided in pairs and in four different sizes. Each pair is accompanied by a (rubber) suction cup for easy insertion and removal. The caps and the suction cup are autoclavable.

Highlights

- Sterilisable multi use product
- Available in four different sizes
- Polished, smooth inside for good wearing comfort
- Delivery as pairs incl. applicator

Mouth Protection (part no. 063)

The mouth protection from LASERVISION is used as a one way product in laser or IPL applications (like hair removal) to protect teeth, jaws and lips. The mouth protection disperses the energy, minimizes pain and prevents penetration of the radiation. Before the treatment is started, the mouth protection should be tested with the power/energy which is used in treatment. There are test results available for 755 nm and 1064 nm and IPL at 590 nm and 694 nm, where the mouth protection can be used without problems. For single use only!

Highlights

- Sanitary single use only
- Suitable for laser and IPL applications
- Tested with 755 nm and 1064 nm Laser
- Tested with IPL systems at 590 nm and 694 nm



Cover Plate (part no. 062)

The cover plate is used to protect various parts of the face, e.g. eyebrows, upper and lower eyelashes and lips during laser treatment. It is used in surgery as well.

Highlights

- Reusable product
- Sterilisable



Accessories

IR-Viewer (part no 170)

The IR-VIEWER from LASERVISION collects incident, invisible infrared radiation by means of a special lens. An image intensifier converts this radiation into a visible greenish picture. The IR VIEWER is battery powered and therefore suitable for mobile use. The spectral sensitivity of the converter tube is between 400 nm and 1300 nm and therefore suitable for alignment and observation of conventional YAG- or diode lasers.

Highlights

- Simple, easy to use
- Wavelength range between 400nm and 1300nm
- High sensitivity
- Battery powered with long lifetime

Parameter	Specification
Wavelength range	400 nm – 1300nm
Magnification	0.95
Working distance	0.1m to infinity
Ocular	10x +/- 4 diopt.
Lens	C-Mount, F 1.6/16 mm
Operating power	Battery 1.5V AA
Weight	850g
Dimension	150 x 60 x 210 mm
Material	Aluminium, anodised



	Part number
Cleaning station (empty)	201
Refill cleaning tissue (2x 700 pc)	202
Refill cleaning fluid (0.5 l)	203
Pump for cleaning bottle (spare part)	204

Cleaning Station with accessories (part no 200)

Laser safety goggles are high quality optical products to protect the eyes against laser radiation. In order to keep the functionality of the eyewear alive as long as possible, careful cleaning and maintenance is needed. Improper handling or cleaning can cause scratches or can even destroy the goggle or the filter completely. Especially plastic filters are at high risk by solvents and coatings by scratches. Therefore LASERVISION offers a stationary cleaning station for wall mounting. The cleaning station for laser safety filters contains a dispenser with a carefully verified cleaning fluid and suitable woodfree paper towels. The combination of both products ensures a gentle and efficient cleaning and a long life time of the eyewear.

Highlights

- Complete system with fluid and towels
- Wall mounting of the complete station
- Economical use due to pump dispenser
- Refill option for fluid and towels

Accessories

EYEPRO – Software for protection level calculation

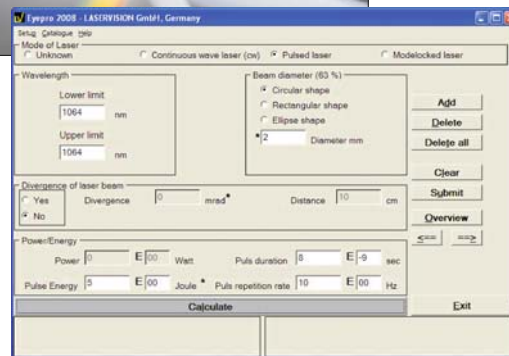
For selection of the right laser safety goggle of the LASERVISION product range we offer a free download of the calculation software EYEPRO.

After the input of all relevant laser data and operation parameters the software suggests different solutions according to the legal protection requirements. The selection out of more than 2500 LASERVISION products is possible under different considerations. Most important are the resistance time according to the EN 207/208 standards, the daylight transmission, the frame style and the price.

Highlights

- Free download with registration
- Free upgrade to each new release
- Calculation of required protection levels for different operation modes
- Combination of different lasers
- Recommendation of windows, filters, goggles out of the product range from LASERVISION

	System requirements
Operating System	WIN 98, WINDOWS 2000, XP



	System requirements
Operating System	WIN 98, WINDOWS 2000, XP ab Mac OS 8.x
CD Drive	4 speed, 16 Bit Sound

LIMITS – Multimedia Education and Training Software (part no CD3)

The totally revised new version of the educational software consists of 9 units in total and a comprehensive cross linked glossary with more than 200 entries to all relevant terms of lasers and laser protection. Covered subjects are basic principles of laser technology, qualities of laser light, different operation modes of lasers, biological effects of laser radiation, differences between laser classes, secondary hazards, protection standards and methods and protection eyewear. Single units contain video sequences for better illustration and understanding. For this reasons LIMITS from LASERVISION is an outstanding electronic tool and reference book for all users of laser technology.

Highlights

- Comprehensive education package for lasers and laser safety
- Structured into 9 units and glossary
- Illustrated by video sequences
- Bilingual (English and German)



Guide to Laser Safety

The presentation starts with a summary of the most important characteristics of laser radiation and related hazard potential. Afterwards the whole range of laser safety is discussed at full length. Laser operation modes, laser classes and related laser safety requirements and standards are presented also. Additionally differences between the American ANSI and the European EN standard, test requirements and norms (CE, GS) are described in detail. A technical section deals with laser safety technology and explains the used terminology (VLT, OD, transmission, attenuation etc) for better understanding. Therefore the “Guide to Laser Safety” from LASERVISION is an excellent reference book for all laser users around lasers and laser safety issues.

Highlights

- Description of laser and laser safety related problems
- Presentation of laser classes and operation modes
- Illustration of laser safety technology
- Comments on differences between ANSI and CE standards

Transport and Storage box

LASERVISION delivers all glass and coated laser safety goggles in robust metal boxes, which protect the filter during transportation and which are also well suited for storage. Therefore each box is individually foam-filled according to the particular frame model. Metal boxes can be ordered separately and are available in two different dimensions.

Highlights

- Shock and dust safe package
- Individually foam-filled
- Easy to clean, scratch resistant surface
- 3 different dimensions



	Part number
Size 1: 21x 12,2x 7,5 mm*(VISION, ECO)	045
Size 2: 24x 13,5x 11,3 mm*(PROTECTOR)	048
	049 Box

Large Storage Box (part no 9K.000.000.05)

This lightweight and robust black plastic suit case is very well suited to store several goggles. It allows protected transportation and stocking. The suit case is foam filled and can be used for goggles and spectacles. Through removable inserts the storage capacity can be adjusted to the number of goggles or spectacles needed.

Highlights

- Variable capacity of
 - 10 spectacles or
 - 7 spectacles and 1 goggle or
 - 4 spectacles and 1 goggle



Accessories



Head Strap and Pad Set for PROTECTOR

Worn out, shredded or dirty head straps of the PROTECTOR laser safety goggle can be replaced from LASERVISION. The elastic head strap is 40mm wide, black and comes with adjustable length, latch and side mount adapter. Because the PROTECTOR is often used by visitors, LASERVISION offers the Pad Set (consisting of 2 pads for front, 2 for jowl and 1 for the nose) in sets of 10 bags as spare parts for reordering.

Highlights

- Replaceable without tools
- Easy to change in case of damage or dirtiness

	Part number
Head strap for L-08 PROTECTOR	9H.999.999.04
Cushion set for L-08 PROTECTOR (set of 10pc)	9P.999.999.10

Retaining Band for DUOFLEX temples (part no 034)

The band consists of a white cord and can be adjusted by means of a lockable loop on each DUOFLEX temple. Therefore a stable fixing is guaranteed and the spectacle can be worn around one's neck. The length is adjustable by a small clamp.

Highlights

- Easy to fix on
- No need to put the goggle on the table - avoids scratches



Storage Bag and Hard Case

For protection and storage of the laser safety eyewear LASERVISION offers soft microfibre bags. Please note, that dry cleaning of coated laser safety filters is not advisable due to the high risk of scratches on the coating. Hard cases for SKYLINE and LAMBDA-ONE can be ordered also separately as spare parts. In order to protect the high-value ALL STAR goggle with magnifiers and the mounted Head Support System (part no. 040) we are offering a special large storage and transportation box (165BOX).

Highlights

- Size matched to the frame style
- Closable with cord or zipper respectively
- Protects against mechanical damage

	Part number
Microfiber bag	027
Hard cover for LAMBDA-ONE	700
Hard cover for SKYLINE	620
Hard cover for ALLSTAR w. Magnifier and HSS	165 BOX

Frequently Asked Questions

How long will my glasses protect me?

There is no simple answer to this question. Some glasses are worn-out after only one year, while others look like new after four years. This depends on several factors such as careful treatment, proper care, and environmental factors. A pair of glasses that are treated with care, cleaned according to instructions and used in a laboratory setting will certainly outlast a pair of glasses that are treated carelessly and perhaps even worn by several different people in a rough production environment.

Glasses that show any damage whatsoever (e.g. a damaged or scratched filter, colour changes in the filter, damaged metal enforcement of the frames) should not be used. If you are in doubt, please contact our technical support for a safety inspection of your glasses.

Can you repair laser safety glasses?

Of course LASERVISION repairs its own frames and replaces damaged filters. Please contact LASERVISION or one of our customer representatives by phone, fax or mail for details.

What is the difference between glasses offered according to EN 207 and glasses offered according to EN 60825?

The difference is in the resistance time of the filter against a direct laser hit in relation to the specified protection level and the energy or power density of the laser. The European legislation (EN 207) requires that a filter must withstand a direct hit from the laser for which it was designed for under defined conditions for 10 seconds (continuous wave mode) or 100 pulses (pulsed mode). If there is no filter available that fulfils these requirements, we quote (based on the EN 60825) a filter that comes as close as possible to these requirements. This means that the Optical Density (OD) is always correct, but the resistance time of 10 seconds/100 pulses cannot be guaranteed.

Why is the beam diameter so important for the calculation of the protection level?

This has to do with the resistance time the filter will withstand a direct hit. It is necessary to calculate the damage threshold – which is the highest value that the material can withstand. The unit is power or energy density, i.e. the power or energy per square metre. For this calculation the pulse energy or average power of the laser and the beam area is needed. Without the diameter it is neither possible to calculate the beam area nor the energy or power density. Therefore it is impossible to know what the filter has to withstand in case of a direct laser hit.

Can I see the laser beam with the glasses?

The laser beam itself cannot be seen; what might be seen by visible laser wavelength is mostly the spot where the laser beam hits an object or some scattered light from dust in the air. Laser safety eyewear is usually designed as full protection eyewear (EN 207). Such filters protect against laser radiation of the specified wavelength or wavelengths ranges and absorb or reflect the beam completely. So the beam spot even of visible laser radiation is not visible anymore. If it is still visible, this would mean that the protection level of the glasses is not high enough, or that secondary radiation (at a different wavelength) is generated. Please check carefully whether the marking of the laser safety eyewear matches the requirements of the laser.

The protection of carefully selected eyewear will remain stable when hit by the laser throughout a minimum period of 10 seconds and 100 pulses under standardised conditions. Nevertheless, it is under no circumstances advisable to look into the beam directly.

What can I do when I have to align my visible laser? Do I have to put down my glasses?

Never put down your laser safety glasses when working with lasers above class II. There are so called alignment glasses available for this purpose, (acc. to EN 208 for 400 – 700 nm only). These filters are suitable for aligning lasers which emit dangerous radiation in the visible spectral range. Alignment filters do not absorb or reflect the laser radiation completely. The radiation is only reduced to values below 1mW for continuous wave lasers (see laser class 2). It must be taken care, that the average power of the laser does not exceed the power (R – protection level) given on the glasses.

Frequently Asked Questions

Can I look right into the laser beam with my laser safety glasses?

Laser safety glasses are designed to protect your eyes against an accidental direct hit of the laser beam. They are not designed for long-term or intra beam laser viewing conditions.

A properly selected pair of glasses will protect you under standardised conditions against a direct look into the laser, but only for minimum 10 seconds/100 pulses.

You have quoted red filters. Can I have the glasses with a different colour?

The colour of absorption filters cannot be chosen at random, but depends on the wavelength the filters protect against. To protect against wavelengths in the UV-region or the lower visible (blue radiation), a yellow or orange filter is usually offered. A red filter is usually used to protect against wavelengths in the green region. Please take into consideration that you may not select glasses by the colour. Always make sure that the quoted or available pair of glasses matches the requirements of your laser.

In most cases coated filters (interference structure on clear substrates), do not affect the colour recognition and possess a high daylight transmission additionally.

I have a pair of glasses (e.g. for a Nd:YAG Laser). Can I use them for my new laser as well?

Before this question can be answered you must determine the specific requirements of your new laser (wavelength, operational parameters, viewing conditions, etc) and calculate the protection level according to the EN 207/208 standard. When these parameters are known, verify that the marking on your existing pair of glasses matches these requirements. If you are not sure, please call us. We will carry out the calculation and check for you.

Please note: The thoughtless use of a pair of laser safety glasses for a different application (different wavelength or different power/energy than calculated before) may cause the loss of your eyesight.

Why is there no pair of glasses covering all my lasers?

The radiation that is visible to humans lies between 380–780 nm (the exact limits are different in each person). In order to cover all lasers you would need a material that does not transmit any radiation for visible radiation, which means it is completely black. When you block all visible radiation, the only wavelengths left are invisible to the human eye. If you have several lasers in this area, then it is necessary to use several pairs of glasses.

But even if you do not want to completely block all wavelengths or have 'just a few wavelengths' to cover, the glasses may be too dark. Usually the protection within a material slowly increases spectrally until it reaches the required protection level at a given wavelength. This means that it not only covers the required wavelength but also areas below and above it (with lower Optical Density). Therefore, if you want to cover several wavelengths in the visible spectrum the Optical Density curves will overlap resulting in dark filters or glasses.

Do you have laser safety glasses with "Class 4"?

The term 'class 4' is the laser classification according to EN 60825-1 and ANSI Z136.1. Class 4 designation means that this is a dangerous laser and emitted radiation is an eye, skin and fire hazard. When you work with this laser, laser protective eyewear is mandatory. This classification, however, does not include any information regarding the wavelengths or the required protection levels that the glasses must protect against.

For these and other laser safety questions please call the laser safety help desk and a representative will assist you. The representative can also help you select the proper protective eyewear for your procedures.

Service and Technical Support

Tracability

LASERVISION is able to keep track of its products in nearly every detail. Years ago LASERVISION introduced serial numbers for all glass products. Serial numbers do not only identify the finished product, but provide information about the production lot and even the glass melt as well.

Since 2004 we can also track our plastic glasses back to the production lot.

Inspection of Safety glasses and Filters/Spectral Measurement

There is no simple answer to the frequently asked question if glasses are still safe or not. Life time depends not only on the age of the glasses, but also on factors such as treatment, care and environment. Therefore LASERVISION recommends regular safety inspections. The time between two inspections can vary according to reasons mentioned above.

A pair of glasses which are treated with care, cleaned according to instructions and used in a laboratory setting will certainly outlast a pair of glasses that are treated carelessly and perhaps even worn by several different people in a rough production environment.

Glasses which show any damage (e.g. a damaged or scratched filter, colour changes in the filter, damaged metal enforcement of the frames) should not be used at all. If you are in doubt, please contact our technical support for a safety inspection of your glasses. LASERVISION offers a safety check against a small fee. This service is offered for all glasses, windows and filters independent from its original manufacturer.

Inspection Includes the Following Services:

- Optical/visual inspection of the relevant parts of the goggle.
- Evaluation of faults/damages with respect to their significance for laser safety
- Spectral measurement of optical density from 330 – 1400nm (damage free only up to OD 6), from 200 – 3000nm on request (with add. costs)
- Visible light transmission (VLT) measurement (on request and with add. costs)
- Special cleaning of frame and filter

Repairs

For LASERVISION products we carry out the following repairs:

- **Plastic glasses:**
It is possible to replace the temples of a spectacle – additional repairs are not possible with plastic glasses if the filter forms a single shield. For spectacles with two filters like SPLIT SHIELD or EXCITE, broken or damaged filters can be replaced from LASERVISION of course.
- **Spectacles/Goggles with glass filters:**
A scratched or broken filter can be replaced. If the frame is damaged, LASERVISION can also replace the frame. In case of both filters being damaged (e.g. one filter broken, the other one scratched), both filters need to be replaced. But because the filters carry most of the costs, the repair for both filters comes close to the price of a new goggle. Therefore LASERVISION's quotation will always contain a new pair of glasses.

Inspection Result and Cost Estimation

In case of any detected damage the customer will always get information about the result of the safety inspection and an estimation of the repair costs. He always has the option to let LASERVISION carry out the repair or not. If the glasses will not be repaired, LASERVISION will invoice only inspection costs, but will also credit a PO against these inspection costs, when a new pair of glasses is ordered instead.

Service and Technical Support

Lead Time for Repairs

LASERVISION is making all efforts to send the inspection report and quotation within 5 working days after receipt of the glasses. From the report the estimated repair time can be seen. Usually only a few days are needed. In case that material which is not on stock is required it may take more time, with customised special filters it could take as long as 6 to 8 weeks.

Important Information (for LASERVISION glasses):

Serial numbers and marking labels

All LASERVISION glasses and windows carry serial numbers for identification and tracing of the product and a label stating the wavelengths and the scale numbers/protection levels (required by law) or a listing of Optical Densities (some plastic windows). Do not remove any of these labels. Glasses without these markings are no longer subject to warranty and liability and cannot be repaired.

Modifications of Laser Safety Products

Any change of glasses, filters or windows will result in the loss of the CE-certification and thus the immediate termination of the warranty as well as of the liability for this product.

Laser safety glasses which are no longer safe

Sometimes the inspection shows that glasses do not meet the legal requirements any longer and are a safety risk for the user. In that case most of our customers permit LASERVISION the disposal of such glasses, which is offered for free.

But if the customer wants to get back these glasses, the situation is as follows: LASERVISION as manufacturer and Service Company is responsible for the safety level of every pair of glasses leaving the factory (product liability). Therefore each pair of glasses which is sent back to a customer can and will be rightfully considered as safe.

For every window and pair of glasses which is considered as to be a safety risk, but is required to be returned, LASERVISION will ask for an official letter which will release LASERVISION from any product liability and any warranty claims in advance of shipment. Because a note only on the bill of delivery about the status of the eyewear is considered as not sufficient, the damaged part (filter or frame) will be clearly indicated with a warning note including the statement, that the glasses are not safe and/or do not meet the current legal requirements. This statement will be contained in the invoice and delivery note as well.

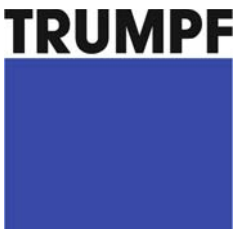
The glasses will be returned by recorded delivery/certified mail without exception. Thank you very much for your understanding.



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Reference Customers



Fax to LASERVISION:

+49 911 / 97368-199 or mail to: info@lvq.com

User Contact

Company

Street

Phone

Email

Contact

City/Area code/Country

Fax

Email

Comments

(laser model ...)

Please quote free of charge for laser safety eyewear acc. to the laser data:	Laser 1		Laser 2		Laser 3		unit	
Laser wavelength							nm	
max. average power with repetition rate							W	Hz
Smallest accessible beam diameter							mm	
Smallest beam divergence							mrad (half angle)	
max. single pulse energy at repetition rate							J	Hz
max. pulse repetition rate with pulse energy							Hz	J
Shortest/longest pulse duration							s	

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Full protection according to DIN EN207. For laser: | <input type="checkbox"/> I want separate glasses for all lasers |
| <input type="checkbox"/> Alignment protection according to DIN EN 208 (Only with lasers in the visible range 400 – 700 nm). For laser: | <input type="checkbox"/> I want to have one pair of glasses for all lasers |

If the laser is equipped with an additional laser in the visible (=alignment laser/target laser) or has several wavelengths, please give us the complete data for all wavelengths. If necessary, please use two or more inquiry forms.

Please send me free information material on

- | | |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Large area laser protection (laser safety curtains/ lamella curtains/barrier plates/safety window) | <input type="checkbox"/> EYEPRO-Software for the calculation of protection scale numbers acc. to EN 207/208/60825 |
| <input type="checkbox"/> LIMITS – Educational Software for Laser Safety | |

Date

Signature



LASERVISION GmbH & Co. KG

Siemensstraße 6
D-90766 Fürth
Germany
Tel. (+49) 0911 97368-100
Fax (+49) 0911 97368-199

www.lvg.com
info@lvg.com

Member of the UVEX GROUP

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