

LASER SAFETY OVERVIEW

Laser Safety – What is required?

All lasers are classified by the hazard they present according to the classifications of EN 60825-1. The highest and most dangerous of these is Class 4. These lasers require any user to have protection from both the beam and diffuse reflections. Class 3B lasers also require safety eyewear to protect from the direct beam. Class 3R, 2M & 1M can also be dangerous, and should be considered on case by case basis.

Most lasers provided by Laser Lines are Class 4 when not run in an enclosure. If in doubt, contact us.

Laser Safety Filters – How do they work?

Laser safety eyewear and windows work by blocking specific wavelength ranges of light. The level of blocking is quantified by the Optical Density (OD) of the filter, but it cannot be considered alone. Absorbing blocked light can cause damage to the filter material or frame. Therefore under European standard EN207:2017 you should look at the LB rating which ensures that a material must last at least 5 seconds for a continuous wave laser, or 50 pulses for a pulsed laser.

The LB rating is on the same scale as OD, but takes precedence over it. The LB rating tells you the maximum OD of the filter that is suitable for the specific type of laser. The code for each type is outlined below:

Laser Type	Code
Continuous Wave	D
Pulsed (> 1 μs – 0.25 s)	I
Pulsed (> 1 ns – 1 μs)	R
Modelocked (< 1 ns)	M

Example: You are using a Synrad v30 CO₂ laser. The laser is continuous wave, so the relevant code is D, and the wavelength is 10600 nm.

If we take the EC2 filter then the relevant LB rating for 9000–11000 nm is DI LB3. This indicates that the filter has an OD of at least 3 and the material will not fail when absorbing power densities up to that scale. The actual OD is 7+ so therefore we can conclude that whilst light would be absorbed up to OD 7, above OD 3 the power density would exceed damage thresholds too quickly to be used for laser protection.

Laser Safety Products – What do Laser Lines offer?

Laser Lines provide CE certified polycarbonate LaserShield laser safety eyewear and small windows from NoIR. LaserShields combine safety and comfort with their lightweight frames ensuring they are user friendly.

To find the right filter for your laser see the table opposite, take a look at our product overview on the following pages, or contact us. All filters are available as eyewear or 102 x 203 mm (4" x 8") windows.

Laser Type	Filter Name
YAG 1064 nm	YG3 or YG5
Fibre 1030-1080 nm	YG4
CO ₂ 10.6μm	EC2 or EC3
Green DPSS/Fibre 532nm	ARG
UV DPSS/Fibre/Excimer	EC2
Diode 790-980 nm	ML1
Blue Diode 450 nm	ARG

LASER SAFETY EYEWEAR PRODUCT OVERVIEW

All of the following are stocked at Laser Lines in frame style #38 (as shown) for next day delivery. To place an order, simply call us on 01295672500 or send a PO referencing the ordering code(s) to orders@laserlines.co.uk. Prices exclude VAT and £20 mainland UK freight per order. For full specifications or for other filters please contact us.

YG3 For IR YAG lasers

The standard for protection from 1064 nm Nd:YAG, and DPSS IR lasers for 950-1080 nm.



Description	YG3 LaserShield #38
LB Rating	D LB6 + IRM LB7 from 950-1080 nm
VLT	59% Green
Price	£135
Ordering Code	5N0I031

YG4 For IR fibre lasers

The standard for protection from 1030-1080 nm fibre lasers.



Description	YG4 LaserShield #38
LB Rating	D LB6 + IR LB7 + M LB7Y from 800-1100 nm
VLT	37% Green
Price	£175
Ordering Code	5N0I063

YG5 For IR YAG lasers

An alternative to YG3 for 1064 nm Nd:YAG, and DPSS IR lasers featuring a colourless filter for less restricted vision.



Description	YG5 LaserShield #38
LB Rating	DIR LB7 + M LB7Y from 1045-1065 nm
VLT	55% Grey
Price	£145
Ordering Code	5N0I056

ARG For green lasers

Ideal protection for green and blue lasers, 532 nm and below.



Description	ARG LaserShield #38
LB Rating	DIRM LB6 from 315-532 nm
VLT	48% Orange
Price	£85
Ordering Code	5N0I050

EC2 For CO₂ and UV lasers

Protection against diffuse reflections from CO₂ lasers and all types of UV laser, e.g. DPSS or Excimer below 400 nm.



Description	EC2 LaserShield #38
LB Rating (CO ₂)	DI LB3 from 9000-11000 nm
LB Rating (UV)	D LB7 + IR LB4 from 190-315 nm
VLT	93% Clear
Price	£70
Ordering Code	5N0I022

ML1 For NIR diode lasers

Protection against diode lasers from 793 nm up to typical IR emission wavelengths such as 1064 nm.



Description	ML1 LaserShield #38
LB Rating	D LB6 + IRM LB7 from 790-1080 nm
VLT	45% Green
Price	£145
Ordering Code	5N0I032