Laser Classification Guidance

The laser safety classifications below follow the current version of the European Standard BS EN 60825-1 Laser Radiation: Safety Advice.

Class of Laser	Hazard Information	Summary of Control Measures
Class 1	**No risk to eyes or skin.** • Beam radiation can be visible, invisible or both. • Safe for accidental viewing under all operating conditions including use with optical viewing instruments. • Is not safe for deliberate, long term viewing. • Class 1 also includes high power lasers that are fully enclosed so that no radiation is accessible during use.	No control measures required for normal use. **Note** – precautions may be necessary for service work on embedded laser products.
Class 1M	**No risk to the naked eye or skin. Viewing with optical instruments may be dangerous.** • Beam radiation can be visible, invisible or both. • Safe for viewing directly with the naked eye. • Eye injuries may occur if viewed with an optical instrument.	➢ Prevent direct viewing with magnifying optics.
Class 2	**No risk to the naked eye for short time exposure (including use of optical viewing instruments). No risk to skin.** • Lasers where the beam is in the wavelength range of visible radiation (400 – 700nm). • Safe for accidental viewing under all circumstances because of the eye's natural aversion response to bright light. • Not safe for intentional long term viewing where this involves overcoming the natural aversion response. • Safe for viewing with optical instruments.	➢ Do not stare into the beam. ➢ Do not direct the beam at people or into public areas.
Class 2M	**No risk to the naked eye for short time exposure. Viewing with optical instruments may be hazardous even for a short or accidental exposure. No risk to skin.** • Lasers where the beam is in the wavelength range of visible radiation (400 – 700nm). There is a possibility that the radiation may contain an invisible element.	➢ Do not stare into the beam. ➢ Do not direct the beam at people or into public areas. ➢ Terminate beam at the end of useful path with a non-specular beam stop.

	• Safe for accidental viewing with the naked eye because of the eye's natural aversion response to bright light. • May be hazardous for viewing with optical instruments, even when the time exposure is short or accidental.	
Class 3R	**Low risk to eyes. No risk to skin.** • Lasers where the wavelength of the beam is greater than 302.5nm emitting between 1 and 5mW. • Eye injuries could result from intentional beam viewing.	➢ Do not stare into the beam. ➢ Do not direct the beam at people or into public areas. ➢ Must be recorded on the University's Laser Register.
Class 3B	**Medium to high risk to eyes. Low risk to skin.** • Diffuse reflections likely to be safe. • Intentional and short exposure accidental beam viewing will result in eye injury.	➢ Where reasonably practicable engineering means should be used to reduce the laser class to a totally enclosed Class 1 laser product. ➢ The use of any Class 3B or Class 4 laser without interlocked enclosure will require a written Scheme of Work. Even with an enclosure written procedures will be necessary if the user is involved in any alignment procedure that require over-ride of interlocks. ➢ Class 3B and Class 4 laser products require the control of access to the area where the laser is operated by the use of a remote interlock, the use of key control, emission indicators, beam shutter, removal of reflective surfaces that could be struck by an errant beam, beam enclosures wherever practical. ➢ The use of eye protection and protective clothing as appropriate, training of staff and the appointment of a Laser Safety Officer. ➢ Must be recorded on the University's Laser Register.
Class 4	**VERY DANGEROUS** • Highest Power class of laser with no upper limit. • Includes both visible and invisible beams with no upper limit. • Eye and skin hazard at all wavelengths. • Diffuse reflections likely to be dangerous. • Capable of setting fire to materials onto which the beam is directed.	

Notes:

1. When purchasing a new Class 3B and Class 4 laser or laser product departments must complete a Laser Registration Form. This needs to be sent to the University Laser Safety Officer, who will record the details on the laser register.
2. Risk assessments should be carried out before using a laser. Class 3B and Class 4 products must not be used without carrying out a risk assessment to determine the control measures necessary to ensure safe operation.
3. Fitting external optics that decrease beam divergence may affect classification.
4. The BS EN 60825-1 standards apply equally to lasers and light emitting diodes (LED). LEDs are usually in the lower classes and are not normally very hazardous, although there are exceptions.
5. Classes 1M and 2m broadly replace the old class 3A and certain 3B laser classifications.