

Appendix 14. Laser safety documentation

The following table summarises laser safety documentation that may be required for different classes of laser:

Class	1C, 1M, 2 & 2M (coll)	3R	3B & 4	Embedded
Generic risk assessment	√			√
Optical radiation-specific risk assessment		√	√	
Standing orders		√	√	√
Laser registration form	√	√	√	√
Equipment maintenance and service documents			√	√
Permit to Work on laser equipment			√	√
Letter of appointment of OLRO, LRO, LNP etc	√	√	√	√
Training records	√	√	√	√

A14.1 Risk Assessments

Generic risk assessments (meeting the requirements of the Management of Health and Safety at Work Regulations 1999) are required for all class 1 (embedded), class 1C, class 1M, class 2 and class 2M lasers.

Optical radiation-specific risk assessments (meeting the requirements of the Control of Artificial Optical Radiation at Work Regulations 2010) are required for all class 3R, class 3B, and class 4 lasers. Details are provided in Appendix 4.

A14.2 Standing Orders

- 14.2.1 Standing Orders are required for all class 3R, class 3B and class 4 laser products. The Orders must include the following information:
- A signature and date of issue.
 - A brief description of the area and/or equipment to which they apply.
 - An laser-centric overview of the area, highlighting any important instructions (e.g. 'the use of personal protective equipment during normal operation is always required'):
 - The type, maximum and typical power or energy, wavelength and classification of lasers involved.
 - Identification of laser hazard area(s).
 - Basic engineering and administrative controls.
 - Need and form of PPE.
 - Non-beam hazards.
 - Contact details of the LRO and deputies.
 - A table of beam and non-beam hazards, listing the source of the hazard and reference to any relevant SHE safety codes.

- Emergency procedures, identifying isolation valves and switches, E-stops, etc., procedure for summoning assistance (with names and numbers), making safe prior to evacuation of the building.
- Laser accident procedures, identifying the most appropriate ophthalmic Accident and Emergency Department which deals with eye injuries.
- Procedures for normal operations. Include checks of engineering controls, the use of PPE, if required, and, together with general descriptions of what is involved in normal operation, a note of any departures from the guidance in this code, any restrictions in the use of lasers and any operations that do not conform to the manufacturer's requirements or guidance, or that are otherwise non-standard. Normal shut-down procedure should be described. See Appendices 5 and 6.
- Procedures for alignment. Procedures for alignment should be covered; see Appendix 8.
- Procedures for other maintenance and service activities. Requirements for safety checks (interlocks etc.) should be included under 'maintenance'. Servicing procedures should address the establishment of temporary hazard areas and use of external service engineers; see Appendix 8.

14.2.2 Standing Orders must link with the risk assessment i.e. where a control is specified in the RA it should appear in the Standing Orders and *visa versa*.

A14.3 Registration form

With the exception of class 1 consumer products, all class 1 (embedded), class 1C, class 1M, class 2M, class 3R, class 3B and class 4 devices should be identified and a laser inventory maintained. There may be occasions when this is not practicable because the laser products are in fact just electrical components. In circumstances like this it should be the use of particular types of laser device that should be recorded. It is not necessary to note the use of intrinsic class 1 devices, class 2 laser pointers or the use of embedded lasers in consumer products such as DVD players and laser printers.

The registration document must include the following information:

- The identification of the laser product e.g. the name of the makers of the equipment, serial or asset numbers. Where appropriate, the name can be used to refer to a facility comprising several integrated laser units;
- The location of the laser product (e.g. building and room number).
- The type of laser equipment (e.g. Q-switched diode pumped Nd:YAG).
- The laser output (e.g. wavelength(s) plus maximum average and peak power, pulse energy and duration).
- The beam size and beam divergence
- The assigned class of the laser equipment (for class 1 (embedded) laser equipment, note 'embedded' under 'type of laser equipment' and list the embedded laser characteristics under 'laser output'.

- A note of any engineering features appropriate to the class of the laser product that have been removed, overridden or otherwise not used.
- A note of any limitations imposed in the use of the product.
- The person named as responsible for the laser.

A14.4 Safety systems test and maintenance report

A test and maintenance report should be maintained identifying all the enclosures, interlocks and other engineering controls for laser systems, indicating that they have been tested and actions taken. These should be dated and signed and a note made of the due date for the next test.

A14.5 DLA test and maintenance report

A test and maintenance report should be maintained identifying all the safety interlocks and guards and any other engineering safety controls for the DLA, indicating that they have been tested and actions taken. These should be dated and signed and a note made of the due date for the next test.

A14.6 Equipment maintenance and service reports

For equipment that needs to be kept properly serviced and maintained for safety reasons, separate maintenance and service records need to be kept. The maintenance record should follow the recommendations of the user manual and should simply note the date that maintenance was carried out, what was done, any actions taken and by whom, together with the due date for the next test. The external service engineer should complete the service record provided by the manufacturer after each visit.

A14.7 Permit to Work

The Permit to Work must address all hazards including laser radiation. With regard to the assessment the laser radiation hazard must include consideration of the following:

- a. The use of screens, coupled with laser warning signs and lights to define a temporary laser hazard area;
- b. Control of access to the laser hazard area;
- c. The introduction of a system of work for handing over the equipment (if applicable) and accepting it back when the work is completed;
- d. (For service activities) a check to ensure that tools have been removed, interlocks returned to normal operation and covers replaced.

A14.8 Letters of appointment to laser safety positions

A14.8.1 Persons appointed under the terms of this code must be competent to carry out the duties assigned to them. This means that, with respect to these duties, they must be judged to have sufficient:

- Appreciation of the way in which laser radiation propagates in free space, the effect of optical components on this propagation, and the manner in which laser radiation can be reflected, refracted, scattered, transmitted and/or absorbed;
- Experience of work in connection with lasers;
- Training in the relevant operating procedures;
- Awareness of the hazards to the eyes and skin that may arise during use, and
- Knowledge of this code and experience in the use of appropriate hazard control procedures and in the use of personal protective equipment.

Formal or on-the-job training prior to appointment may be necessary, but is not a prerequisite for persons with adequate experience.

A14.8.2 Letters of appointment must clearly define the scope of duties and must be dated. The recipient must be requested to acknowledge their acceptance clearly in writing.

A14.9 Training records

The requirements for this documentation are specified in SHE Safety Code 10 Provision of Safety, Health and Environmental (SHE) Training.