Laser Hazard Identification Checklist

Laser/Equipment Manufacturer:_____

Laser Model: _____

Laser Serial Number: _____

Location of laser or equipment:
Building: _____ Room Number: _____

Laser emission wavelengths: _____

Identify the laser Class

Examples include:

Class 1 = intrinsically safe (visible, CW < 0.4mW)
Class 2 = Safe for blink response (visible, CW < 1mW)
Class 3a = Safe for blink response, NO viewing aids to be used (visible, CW, < 5mW)
Class 3b = Unsafe for eyes, safe for skin (<0.5W)
Class 4 = Unsafe for eye and skin (>0.5W)

Manufacturer Designated Laser Class:_____

1. IDENTIFIED HAZARD

EYE DAMAGE / SKIN BURN

If the Laser Class is identified as 3B or 4, it MUST be located in a Laser Controlled Area(LCA) loosely defined as:

"An isolated area (i.e. optically enclosed) setup to operate Class 3b and 4 lasers. This area must confine the laser hazard and allow the laser user to control general access. This means that windows, doors and other openings should be covered, filtered or shielded to prevent the beam from leaving the Laser Control Area (LCA) boundaries."

Should this laser be in a Controlled Area Y/N/NA

Controls

The laser/equipment controls shall be located such that the operator is not exposed to the beam during their use.

Are laser/equipment controls suitably located? Y / N

Scanning systems

If laser scanning mechanisms are present, they shall not allow operator exposure even in the case of failure or abnormal operation.

Are beam scanning systems present? Y / N

Signage and indicators

The laser controlled area must be suitably labelled with appropriate warning signs indicating the nature of the hazard. Visible or audible signals should also be provided at the doorway to indicate laser usage. The laser should also include an emission indicator (eg. light) at the beam exit aperture that illuminates during operation. For lasers operated in non-controlled areas (i.e. <Class 3B), appropriate signage should still be clearly visible.

Are suitable signage/indicators present? Y / N

Training and Medical Surveillance

All authorised users of Class 3B and 4 lasers will have undergone the School Laser Safety training, local laboratory induction and have had a baseline eye test (within 30 days of laboratory use). Users of Class 2 and 3a lasers should undergo a laboratory induction (at least).

Have all authorised laser/equipment users undergone training, induction and baseline eye test? Y / N

Authorisation

The area responsible person (e.g. supervisor) should document their approval of laser / equipment use by individuals.

Is there a list of authorised laser/equipment users? Y / N

Beam Stops

All laser beams must be terminated within the Laser Control Area (Class 3B and 4) or working zone (Class 1 – 3A). A survey may be required to establish the location of all beams and reflections. Beam stops should be appropriately chosen to provide non-destructive termination of the beam under all power settings used. They should be mounted in a fixed geometry. Note that for IR lasers, fireproof materials may also be necessary and many surfaces that appear diffuse are excellent IR reflectors making them unsuitable for this application. For Class 3 and 4 lasers, an internal beam stop or shutter

that can prevent the emission of light should be present on the laser itself.

Are appropriate beam stops employed? Y / N

Personal Protective Equipment (PPE)

Appropriate laser eyewear should be used by everyone in the Laser Control Area at all times for Class 3B and 4 lasers where practical. For UV lasers, gloves, long sleeve laboratory coats and face shields may also be necessary. PPE can be stored outside the Laser Control Area (where practical) to allow user entry while wearing the appropriate PPE.

Are all appropriate items of PPE available and used? Y/N/NA

Laser emission control

The laser should be fitted with a key switch and a removable master key. When removed, the system must not operate. This key should be stored to prevent unauthorised laser operation.

Does the laser have a master key switch for operation? Y / N

Laser Emission Interlocks

Interlocks should be present on the laser enclosure to prevent electrical shock or beam exposure during servicing. They must also be present in Laser Controlled Areas for Class 3b and 4 lasers. The interlock system shall preclude laser operation or prevent beam emission when the entry door is opened. Laser barriers or screens may also be used to attenuate laser radiation at the entry.

Are manufacturer interlocks present on the equipment? Y / N

Are interlocks installed on the Laser Control Area? Y/N/NA

Emergency Egress

The Laser Protection Area shall not prevent normal emergency egress.

Is emergency egress from Laser Control Area possible?

Y / N

Laser Beam Path Diagram

Where practical, a sketch the laser beam path (block diagram) can be affixed to the entry of a Laser Controlled Area.

Is there a sketch of the beam path available? Y / N

Laser beam path

The laser should be significantly above or below the standing/seating height for users. Beams pointing upwardly or at eye height (by misalignment etc) should be terminated or readjusted. If a beam goes outside the horizontal plane intentionally (ie up or down), it must be clearly marked/identified or enclosed. Every effort must be made to avoid exposure of bystanders to beams especially during alignment.

Is the beam path suitably identified and controlled? Y / N

Viewing laser beams using optical instruments

All optical instruments used to view the laser should be equipped with suitable filters or interlocks for operator protection under all conditions of maintenance and operation.

Is the beam optically viewed? Y / N

Jewellery and clothing

Users should not wear jewellery (e.g. rings or watches) that may reflect the beam particularly during alignment. In addition, users should be aware of any clothing (e.g. ties) or hair that could fall into and scatter or ignite in the beam.

Are users aware of clothing and jewellery risks? Y / N

2. OTHER IDENTIFIED HAZARDS (NON-LASER)

Optical emissions from discharge tubes or lamps used to pump the laser.

UV and IR emissions from discharge lamps used to optically pump solid state lasers. These lamps also pose a glass hazard during breakage (or implosion).

Are high/low pressure discharge lamps used in the laser? **Y / N**

X-rays and RFI

X-rays may be produced by the high voltage power supplies of the laser or by laser/target interactions. Radio frequency interference (RFI) may also arise from laser power supplies (e.g. during Q switching).

Are X-rays/RFI present during laser/equipment operation? **Y / N**

Laser – Material Interactions

The interaction of a high power laser with matter often generates fumes, vapours or particles. These may be hazardous. In addition, this interaction may give rise to the formation of a plasma with light (UV) emission.

Are there any high power laser-matter interactions present during operation? **Y / N**

Chemical Hazards

Chemicals that may be used with lasers include: dyes (e.g. dye lasers), solvents (e.g. dye solutions and optical cleaning), gases (e.g. excimer lasers) and cryogenic fluids for cooling.

Are any chemicals used with this laser/equipment? **Y / N**

Fibre Optics

Fibre optics are often used with laser systems. They pose an alternative beam viewing hazard and a mechanical hazard (glass).

Are optical fibres used with this laser/equipment?

Y / N

Electrical and water hazards

Lasers usually pose an electrical hazard with some units using kW of power (3 phase) for operation along with water cooling. There is a risk of both electrocution and flooding.

Are high voltages and water cooling used with this laser/equipment? Y/N

Ergonomics

Ergonomic problems arising from awkward postures during alignment or equipment use over prolonged periods.

Is the laser/equipment ergonomically designed?

Y / N

Environmental Aspects

Many lasers are very inefficient at converting electrical energy into light. By-products include heat which must be transferred out to the environment. Environmental resources (i.e. water/electricity/gas) should be considered and minimised when using this laser/equipment.

Have environmental aspects been considered for this laser/equipment? Y / N

Recommendations

Performed By: _____

Signature: _____

Date: ____/____/_____

Performed By: _____

Signature: _____

Date: ____/____/_____

Performed By: _____

Signature: _____

Date: ____/____/_____

DOCUMENT END