Appendix 7. Laser control measures: Designated Laser Areas

A7.1 Containment of the laser hazard

A7.1.1 The Designated Laser area (DLA) must present a robust physical boundary capable of adequately containing the laser radiation generated within it, thereby protecting those outside the boundary from hazardous exposure to laser radiation.

A7.1.2 Any parts of the DLA boundary through which Class 3B or 4 laser radiation could pass (e.g. gaps in doors, windows), and which could then reasonably present a laser hazard to a person outside the DLA must be covered during laser use.

A7.1.3 Warning signs must be displayed at each and every point of entry to the DLA as described in Appendix 8.

A7.1.4 Clearly visible lights or a monitor screen must be installed at each and every point of entry (N.B. in the use of monitor screens a large viewing angle can make it difficult to identify the background colour). The colour displayed must conform with the scheme as set out in A8.5.2;

(i) An amber colour; implying 'restricted access' e.g. a High Risk laser within the DLA is emitting laser radiation, or has the imminent potential to do so. For commercial laser products this would imply that power is provided to the laser and the key switch is activated, whether or not the beam has been released through the laser aperture;

(ii) A red colour; implying 'restricted access: laser ON' i.e. that a High Risk laser within the DLA is energised and the beam has been released;

(iii) A green colour; implying 'SAFE to enter'. This is the default colour to show that the monitor and/or lights are active and that no laser protective eyewear is required.

A7.1.5 If practicable the laser laboratory should have a high level of illumination.

A7.1.6 Windows should be kept to a minimum and may need to be covered or protected. Preferably, the covering should be a rigid fixed panel.

A7.1.7 Walls, ceilings and fittings should be painted with a light coloured matt paint to enhance illumination and minimise specular reflections. Reflecting surfaces such as the use of glass-fronted cupboards should be avoided.

A7.2 Access

A7.2.1 Lasers inside a Designated Laser Area (DLA) must be linked into the external interlock chain provided within the DLA, either using the remote interlock connector on the laser or an external safety shutter (see A5.3.2.1).

A7.2.2 Interlock overrides at access doors are only permitted under the following circumstances:

- Overrides that can be operated only from within the DLA must be located near the door. Controls must be installed to prevent the escape of hazardous levels of laser radiation when the door is opened.
- Overrides that can be operated from outside the DLA must be of a coded or key operated type with access restricted to authorised personnel. Secondary screening (e.g. labyrinth) within the DLA must ensure that the laser hazard zone does not extend outside the door when it is opened. Exceptionally, where space does not permit a labyrinth entrance, then during activities (e.g. beam alignment) when a beam could emerge through the open door:
  - (i) a warning light should be placed above the door to indicate the laser hazard status;
  - (ii) a prominent temporary warning sign should be placed near or on the outside of the door during alignment;
  - (iii) the door should be locked but with a key for emergency access (e.g. a knob to lock the door on the inside and a key behind a break glass cover on the outside).

A7.2.3 Access doors, both those at the DLA boundary and any within the DLA that divide laser hazard areas from one another or that separate laser hazard from hazard-free areas, should be self-closing.

A7.3 Layout

A7.3.1 Lasers should point away from and not towards the DLA entrance.

A7.3.2 If several High Risk lasers and/or laser wavelengths are simultaneously and independently accessible within the DLA:

- the different laser hazard areas should be separated (e.g. by the use of enclosures and partitioning) and access to these areas placed under local control (e.g. by use of an intruder alarm or barrier connected to the external interlock of the laser);
- The risk assessment and Standing Orders must also address procedures for restricting the simultaneous operation of more than one laser and provision of the correct laser safety eyewear within a single partitioned area e.g. by control of the laser keys;

See also Appendix 9 for information on additional marking of laser safety eyewear to avoid wrong selection.

A7.3.3 If different laser control measures and/or laser safety eyewear are employed in different partitioned areas within a DLA, the Standing Orders must provide procedures for persons wishing to move between the different areas.

A7.3.4 SHE Group must be consulted about the provision of suitable fire fighting equipment and adequate means of escape from the DLA.

A7.3.5 Any areas within the DLA in which non-laser (or Low Risk laser) activities take place, such as computer work, clean rooms or sample preparation rooms, must be partitioned off from those involving High Risk lasers so that laser safety eyewear is not required. The use of chairs in a DLA, if essential, must be restricted to screened off areas.

A7.3.6 Where areas are designated laser hazard-free, a laser hazard warning (e.g. 'laser energised' amber lights) should be installed at points of exit into laser hazard areas. Alternatives includes:

(i) instigating a search procedure before activating the laser hazard that includes a search of hazard free areas; or

(ii) arranging for an audible alarm to sound in the lab if the laser hazard is activated from within the lab

A7.3.7 If, in addition to Emergency Stop buttons, Emergency Laser – Off buttons are provided in the DLA, they must be colour coded with a clearly visible black on yellow laser hazard triangle on a green background. Operation of an Emergency Laser – Off button must immediately terminate accessible laser radiation from High-risk lasers in the DLA. This could be achieved, for example, by breaking the laser external interlock circuit or closure of laser safety shutters positioned in the proximity of the laser apertures, as described in A5.3.2.1.

A7.4 Administrative controls

A7.4.1 Standing Orders must be readily available within the DLA.

Visitors

A7.4.2 A combination of engineering controls (e.g. local beam enclosure, barriers to restrict visitors to a region not closer than an arms length and/or the NOHD away from accessible beam components), administrative control (e.g. supervision, explanation of restrictions) and eye protection (e.g. provision of safety eyewear, fixed screens to view through) must be considered to safeguard visitors.

A7.4.3 A maximum numbers of visitors should be established and consideration given to the need for additional persons to be present to help supervise the visitors.