

Brigstock Skin and Laser Centre



22. Laser Safety

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Laser Safety

1. Introduction:

This policy is for the use of all Clinical staff

1.2 The purpose of this policy is to ensure all staff dealing Lasers follow this policy for use of Lasers in a safe way without any harm to Clinicians or Patients.

The Laser equipment employs a high energy, class 4 laser producing pulsed infra-red wave invisible radiation at a wavelength of 810nm to 830nm.

The safety measures detailed here are necessary due to the presence of the high energy laser beam. **This beam constitutes a severe hazard to the unprotected eye.**

1.3 THIS POLICY MUST BE READILY ACCESSIBLE AT ALL TIMES AND AT THE POINT WHERE LASERS ARE USED.

2. Nature of Potential Hazards (Soprano Diode Laser):

2.1 Hazards from the laser beam can be summarised as follows:

- Damage to the eyes

Energy is absorbed at a wavelength of 810-830nm by the eye in the retina. The eye will act to focus the beam onto a small spot on the retina. Intrabeam and diffuse beam viewing will result in a retinal burn.

Direct and indirect viewing of the beam will cause permanent eye injury.

The laser beam constitutes a SEVERE hazard to the unprotected eye

- Skin burns

Interception of the beam by any part of the body will cause damage due to thermal effects. The radiation will penetrate into the tissue, so heating will be diffused and non-localised.

- Material combustion

Any unsuitable material cause fire, emission of toxic gases or explosion if irradiated. Examples of such materials are flammable anaesthetics, plastic instruments, clothing, skin preparation materials etc.

- Smoke plume

The laser beam can incinerate tissue debris from the laser application site and form airborne carbonised particles. The resultant smoke plume forms a minor respiratory hazard.

- Beam reflections

Reflective materials in the vicinity of the beam may deflect the radiation along unexpected paths and reflective curved surfaces may focus the beam beyond the normal focus. It should be appreciated that virtually all materials will cause reflections to a certain degree.

2.2. Personnel Protection:

- Under all circumstances, **all personnel** in the room **and the patient must wear protective laser safety spectacles**

The safety spectacles must meet EN207 and be CE marked and marked

- EN207 805 – 825nm D LB5
- EN207 800 – 830nm D LB4

- **Even with protective spectacles the beam still represents a hazard. NEVER stare directly into the beam.**

- Eye protection must be clearly marked with the above compliance and wavelength information to ensure proper choice of eyewear. The protective eyewear for the Alma diode laser must be stored separately from eyewear associated with any another laser.

- To protect the patient's eyes protective spectacles must be used. Alternatively Laser Aid eye-pads may be used that meet EN 207 315 – 1400nm DIR L6 or metallic eye shields that meet EN 207 D > 315 – 1400nm L6. **Exercise extreme care** to ensure that neither direct or diffuse laser radiation intercepts the patient's eyes.

- Extreme care must be taken to avoid laser radiation straying outside of the operative field. The effects of stray laser radiation to sites outside of the operative area must be minimised.

- The Nominal Ocular Hazard Distance for the laser is more than 5 metres. Therefore within this distance the unprotected eye is at severe risk and must be protected by safety spectacles

2.3 Operation of the Equipment:

It is the **responsibility of the Laser Protection Supervisor** to ensure the following procedure is carried out.

- Ensure the correct warning signs have been hung on the outside of the entrance door. Close and fasten the entrance door. Illuminate the external warning lights.

- Ensure that **all present have eye protection**

- Place the laser diodes on the treatment area and select the appropriate treatment settings.

- Press the Standby/Ready button and issue an audible warning that treatment is about to commence.

- During any pause in the treatment the Standby/Ready button should be pressed to disenable the unit.

- At the end of each session the key must be retained by the Laser Protection Supervisor.

2.4. Procedure in the Case of Accident:

- In the case of a suspected injurious ocular exposure a medical examination by qualified medical specialist must be immediately carried out. The patient must be referred **immediately** to the Moorfields Eye Hospital

- In the case of a skin burn appropriate First Aid must be applied. Where necessary referral to a qualified medical specialist should be sought.

- The Laser Protection Advisor must be informed immediately.

- A full written report detailing the incident should be prepared within 24 hours and the Local Council informed.

- Accidents, injuries or dangerous occurrences may, depending on the severity of the incident, require reporting to the Health and Safety Executive under the RIDDOR 1995. Clarification may be sought from the LPA .

3.0. Nature of the Potential Hazard (Ruby Laser):

The purpose of the Lambda ruby Laser system is to treat various skin conditions and also to remove tattoos by the ablation of the marker inks

The laser produces visible red 694nm coherent optical radiation delivered via an articulated arm to a focussing hand piece. The laser produces a maximum energy of 10 Joules per pulse with a selectable pulse length of either 25ns or 900µs

Hazards from the ruby laser beam can be summarised as follows:

- Damage to the eyes

Energy is absorbed at a wavelength of 694nm by the eye in the retina. The eye will act to focus the beam onto a small spot on the retina. Intrabeam and diffuse beam viewing will result in a retinal burn.

Direct and indirect viewing of the beam will cause permanent eye injury.

The laser beam constitutes a SEVERE hazard to the unprotected eye

3.1 Personnel Protection

- Under all circumstances, **all personnel in the room and the patient must wear protective laser safety spectacles**

The safety spectacles must meet EN207 and be CE marked and marked

- EN207 688-717nm DIR L4
- EN207 688-717nm I L5

3.2 Procedure in the Case of Accident:

- In the case of a suspected injurious ocular exposure a medical examination by qualified medical specialist must be immediately carried out. The patient must be referred **immediately** to the Moorfields Eye Hospital
- In the case of a skin burn appropriate First Aid must be applied. Where necessary referral to a qualified medical specialist should be sought.
- The Laser Protection Advisor must be informed immediately.
- A full written report detailing the incident should be prepared within 24 hours.
- Accidents, injuries or dangerous occurrences may, depending on the severity of the incident, require reporting to the Health and Safety Executive under the RIDDOR 1995. Clarification may be sought from the LPA.

4.0 Nature of the Potential Hazard (IPL)

The IPL treatment head produces a pulsed broadband beam of optical and infrared radiation in the range 450nm to 950nm with a selectable pulse energy of between 5-22J and a selectable pulse length between 15-100ms

Radiation is delivered via one of two treatment heads containing high pass filters at 580nm and 635nm via an 6.4 cm² aperture

Hazards from the IPL therapeutic beam can be summarised as follows:

- Damage to the eyes

Energy is absorbed in the visible (IPL) wavelengths by the eye in the retina. Intrabeam viewing of the beam may result in retinal damage.

**Direct viewing of the beam can cause permanent eye injury.
The IPL beam constitutes a hazard to the unprotected eye**

- Skin damage

Prolonged interception of the beam by any part of the body will cause damage due to thermal effects. The radiation will penetrate into the tissue, so heating will be diffused and non-localised.

- Material combustion

Any unsuitable material can cause fire, emission of toxic gases or explosion if irradiated. Examples of such materials are flammable anaesthetics, plastic instruments, clothing, skin preparation materials etc.

- Beam reflections

Reflective materials in the vicinity of the beam may deflect the radiation along unexpected paths and reflective curved surfaces may focus the beam beyond the normal focus. It should be appreciated that virtually all materials will cause reflections to a certain degree.

4.1 Personnel Protection

- Under all circumstances, **all personnel** in the room **must wear protective glasses** and the patient **must wear protective goggles**.

The glasses or goggles must have a minimum optical density (OD) of;

Operator: Shade 4 for wavelength range 550nm – 950nm.

Patient: Shade 5 for wavelength range 550nm – 950nm.

Eyewear must be CE marked and meet specification EN166

4.2 Children

- Children are not allowed in Laser room, without exception.

