Laser Lab Design Guide

The Georgia Tech Laser Safety Program encompasses Class 3B, Class 4, and Embedded laser systems containing Class 3B and 4 lasers. This guide is meant to be just that, since each laser lab can be unique and require slight variations to the items herein. The Laser Safety Officer must be given the opportunity to provide input on lab renovations or new construction for locations that will contain the referenced type of devices. There are three primary sections to this document: “All Labs Containing Class 3B or Class 4 Laser”, “Labs Containing Class 4 Lasers”, and “Labs Containing Embedded Lasers.”

All Labs Containing Class 3B or Class 4 Lasers

1. Entry/Egress
   All laser labs should be designed such that proper entry/egress clearances can be maintained after installation of the optical benches, support equipment, etc.

2. Eyewear Storage
   Consider including wall-mountable eyewear storage during renovations/new construction. This storage should be placed either outside the lab entry (not likely to be done in most cases) or just inside the lab entry so that eyewear can be accessed prior to going near the laser setup. If the lab requires laser curtains to enclose the entry, the eyewear storage should fall within this curtain enclosure.

3. Windows
   Avoid windows either in the walls or doors of the lab. If windows cannot be avoided they must either be blocked with laser filtering material or laser blocking material (usually the same material used for laser curtains). The LSO will provide guidance.

4. Barriers
   Ensure neither the laser aperture nor any optics that are part of the beam path can be seen from the open entryway. Laser curtains are often commonly used to achieve this but are not required for all laser labs. Beam blocks and barriers mounted around or on the optical bench are to be considered as well. Need can vary greatly from one laser lab to the next. Consult with the LSO.

5. Dangerous Gas Monitoring
   Excimer lasers specifically use compressed gases that are often subject to the Georgia Tech Dangerous Gas Monitoring Program. Provide the laser manufacturer specs for the compressed gas(es) to the LSO. The LSO will coordinate with the Lab and Chemical Safety Manager to determine the applicability of the Dangerous Gas Monitoring Program.

6. Electrical Grounding of Optical Bench
   Ensure the optical bench itself is electrically grounded.
Labs Containing Class 4 Lasers

1. Controlled access to lab (key or BuzzCard)
2. Laser Area Warning Sign (provided by Georgia Tech Laser Safety Officer)
3. Warning light at exterior of lab entry(ies)
   a. Operation
      i. Turned on by manual light switch from within the lab OR
      ii. Automatically turned on by interface to remote interlock circuit from laser controller
   b. Appearance
      i. Typically a light box with a backlit sign insert; preferred sign insert is red background with white lettering stating “LASER IN USE”
      ii. Other warning lights are also available with “LASER IN USE” being comprised of red LEDs or similar with a black background or are backlit with black opaque background and red semitransparent lettering.
   c. Location
      i. Ideal location is to the side of the doorway, on the side with the door handle
      ii. Make all efforts to keep the top of the lighted sign no higher than 6’ above the ground. This enhances visibility of the sign and is very much preferred over placing the sign above the door.
   d. Vendors
      i. Kentek
         http://www.kenteklaserstore.com
         Illuminated sign boxes

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<tr>
<th>Item</th>
<th>Qty</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>SIGN-C-1S</td>
<td>1</td>
<td>Illuminated Laser Warning Sign, CUSTOM, 1 side steady, Voltage: 12VDC, Reference: 12.25&quot; x 7.5&quot;, custom wording &quot;Laser In Use&quot; with red background and white lettering.</td>
<td>196.00</td>
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<td>SIGN-C-2S</td>
<td>1</td>
<td>Illuminated Laser Warning Sign, CUSTOM, 2 side steady, Voltage: 12VDC, Reference: 12.25&quot; x 7.5&quot;, custom wording &quot;Laser In Use&quot; with red background and white lettering.</td>
<td>235.00</td>
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Replacement inserts for Kentek illuminated sign boxes meeting 3.b.i above

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<tr>
<td>SIGN-C-PX</td>
<td>1</td>
<td>Laser Warning Sign, CUSTOM text and size, plastic. Reference: &quot;Laser in Use&quot; sign insert. Red background with white lettering. Customer specify size.</td>
<td>35.00</td>
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ii. Laser Safety Industries
http://www.lasersafetyindustries.com/Class_4_Lit_Laser_Safety_Sign_p/100-70-262.htm - ask to provide customized insert as stated in 3.b.i. above.
iii. Rockwell Laser Industries
https://www.rli.com/
Illuminated sign box

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<tr>
<td>LSL-ILM-RM</td>
<td>Rear Mounted Illuminated Sign</td>
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<td>148.75</td>
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Side mounted illuminated sign is item LSL-ILM-SM

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<td>C-LSS-S10154</td>
<td>10 X 14 Plastic sign with Red Background and White Letters &quot;Laser In Use&quot;</td>
<td>30</td>
<td>20.75</td>
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iv. Thorlabs

4. Laser barrier vendors (curtains, metal panels, etc.)
   a. Kentek
   b. Lasermet Inc.
   c. Laservision
   d. Laser Safety Industries
   e. Rockwell Laser Industries
   f. Thorlabs

Labs Containing Embedded Lasers

1. Embedded lasers are Class 1 laser systems that contain Class 3B or Class 4 lasers embedded in the laser system. The control measures required are reduced from those for open beam Class 3B or Class 4 laser labs.
2. Examples of embedded lasers are laser cutters, laser engravers, some 3D printers, stereo lithography devices, and flow cytometers.
3. Labs with only Class 1 embedded laser systems do not require laser warning signs, laser warning lights, laser curtains, etc.
4. Laser cutters, laser engravers, stereo lithography, and many 3D printers will have a manufacturer specified requirement for proper ventilation. While ventilation to the building exterior is typically the preferred ventilation mechanism; some vendors have air filtration systems available to connect to the laser system. EHS will need to evaluate any air filtration system prior to purchase if this is chosen.