

# 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. Dual Lite  
[http://cdn.dual-lite.com/content/products/specs/specs\\_files/0601835\\_se\\_spec\\_sheet.pdf](http://cdn.dual-lite.com/content/products/specs/specs_files/0601835_se_spec_sheet.pdf)  
 SE Series Die Cast Sign with Special Wording

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MODEL	FACES	LETTER COLOR	FINISH	OPERATION	SELF-DIAGNOSTIC	OPTIONS
	S Single D Double*	R Red G Green	W White B Black WN White with brushed face BN Black with brushed face	BLANK AC only E Emergency	Blank None I Spectron+ self-testing/self-diagnostic electronics*	SW Special Wording? 2C 2 Circuit Operation FAP Fire alarm panel interface FM Flasher module AF Audible flasher module DC Remote DC operation

- ii. Kentek  
<http://www.kenteklaserstore.com>

### Illuminated sign boxes

Item	Qty.	Description	Price
SIGN-C-1S	1	Illuminated Laser Warning Sign, CUSTOM, 1 side steady Voltage: 12VDC Reference: 12.25" x 7.5" - custom wording "Laser in Use" with red background and white lettering.	190.00
SIGN-C-2S	1	Illuminated Laser Warning Sign, CUSTOM, 2 side steady Voltage: 12VDC Reference: 12.25" x 7.5" - custom wording "Laser in Use" with red background and white lettering.	235.00

Replacement inserts for Kentek illuminated sign boxes meeting 3.b.i above

Item	Qty.	Description	Price
SIGN-C-PX	1	Laser Warning Sign, CUSTOM text and size, plastic Reference: "Laser in Use" sign insert. Red background with white lettering. Customer specify size.	35.00

iii. Laser Safety Industries

[http://www.lasersafetyindustries.com/Class\\_4\\_Lit\\_Laser\\_Safety\\_Sign\\_p/100-70-262.htm](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.

iv. Rockwell Laser Industries

<https://www.rli.com/>

*Illuminated sign box*

Item	Description	Qty	Rate
LSL-ILM-RM	Rear Mounted Illuminated Sign	1	148.75

Side mounted illuminated sign is item LSL-ILM-SM

Item	Description	Qty	Rate
C-LSS-S10154	10 X 14 Plastic sign with Red Background and White Letters "Laser In Use"	30	20.75

v. Thorlabs

[https://www.thorlabs.com/NewGroupPage9.cfm?ObjectGroup\\_ID=1573](https://www.thorlabs.com/NewGroupPage9.cfm?ObjectGroup_ID=1573) - ask to provide customized insert as stated in 3.b.i. above.

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.