

January 2016

The Remaining Eye

LBNL Newsletter on
Laser Safety

Available Items from the LSO:

Portable flashing warning lights



Laser protective eyewear holders



In This Issue

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- New laser controlled area entryway warning signs
- Changes in laser safety program –
Pub 3000 Chapter 16

ANSI Z136.1 – 2014 *Safe Use of Lasers*

The Berkeley lab laser safety program has adopted the newest 2014 revision of ANSI Z136.1 *Safe use of Lasers*. The implementation of this regulatory document presented a great opportunity to revise the current lasers safety program, Chapter 16 Pub 3000, and bring it up to date with the most current ANSI requirements and laser safety practices and recommendations. The new revised program closes the previously identified gaps in the written program and is also necessary to update and align the program with the new WPC system.

There are no major changes in laser use practices and requirements, but some changes to make the program more efficient and compliant are imminent.

New Laser Controlled Area Entryway Warning Signs

The purpose of a laser area warning sign is to convey a rapid visual hazard-alerting message that:

- Warns of the presence of a laser hazard in the area
- Indicates specific policy in effect relative to laser controls
- Indicates the severity of the hazard (e.g., class of laser, NHZ extent)
- Instructs appropriate action(s) to take to avoid the hazard (e.g., eyewear requirements)

Design of Signs

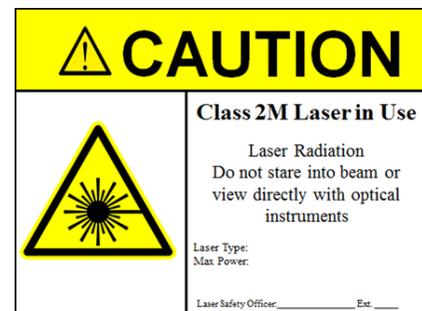
Sign dimensions, letter size, font, layout, color, etc., will be in accordance with the ANSI Z535 series (e.g., ANSI Z535.2 *Environmental and Facility Safety Signs*). Laser controlled area warning signs will be of the three panel format unless additional panels are needed for a second language. The top panel will contain the safety alert symbol as well as the signal word. The other two panels will contain the laser radiation hazard safety symbol and the message panel.

The laser controlled area warning signs shall utilize signal words as defined:

- **Danger.** The signal word "Danger" indicates that death or serious injury will occur if necessary control measures are not implemented to mitigate the hazards within the laser controlled area. This signal word shall be restricted to those Class 4 lasers with high (e.g., multi-kilowatt) output power or pulse energies with exposed beams.
- **Warning.** The signal word "Warning" shall be used on laser area warning signs associated with lasers and laser systems whose output exceeds the applicable MPE for irradiance, including all Class 3B and most Class 4 lasers and laser systems.
- **Caution.** The signal word "Caution" shall be used with all signs and labels associated with Class 2, 2M and Class 3R lasers and laser systems that do not exceed the applicable MPE for irradiance.
- **Notice.** The signal word "Notice" is the preferred signal word to address practices not related to personal injury. This signal word shall not be associated directly with a hazard or hazardous situation and shall not be used in place of "Danger", "Warning", or "Caution".

The message panel information may be included during the printing of the sign or may be handwritten in a legible manner, and shall include the following:

- The hazard class of the laser controlled area.
- Special precautionary instructions or protective action that may be applicable.
- The highest hazard class of the laser or lasers within the laser controlled area. Additional information such as type of laser, pulse duration (as appropriate), and maximum output may be included.
- The optical density of laser eye protection to be worn within the area.



Points to keep in mind:

- The existing entryway signs are grandfathered
- Entryway warning signs will be replaced during the renewal of the activities
- The LSO must approve the warning signs before posting. The posting of Danger sign will be determined by the LSO with activity lead input.

Optical Density (OD) Calculations

ANSI 2014 has introduced new correction factors in OD calculations (multi-pulse correction factor, head and eye restrain corr. factor, new limits for retinal radiant exposure).

- This may affect some of our laser users using wavelengths in near IR – 1064nm to 1150nm – the OD may increase slightly; e.g. OD 5.3 vs. OD 5.48
- All ODs will be recalculated and the laser hazard tables updated during the renewal of the activities.



Other Minor Changes

Requirement	Old	New
Interlock test frequency	Every 6 months	Annually
Laser lab audit	Annually	At the time of WPC activity renewal
Temporary Work Authorization (TWA)	3 times 2 weeks each per year	Issued for the shortest and most practical time with the maximum duration of six weeks in a calendar year for the same activity
Outside LBNL service technicians	Laser safety training and qualification letter	Laser safety training
Laser Registration Form	NA	New - recommended
Fiber optics training EHS 300	One time only	Refresher training every 3 years
Non-beam hazards	NA	Posted on the laser safety webpage
Outdoor laser use, demonstration involving general public	NA	Shall meet the requirements in ANSI Z136.6
Open beam in navigable airspace	NA	Shall coordinate with the FAA and FDA prior to use
Measurements of Laser Output Power used for laser classification or reclassification	NA	Instruments shall be calibrated within accuracies of $\pm 20\%$ wherever possible; the uncertainty of the instrumentation should be traceable to national standards (NIST) or to other transfer standards traceable to NIST.
Baseline eye exam – same policy	Users who will be using lasers at LBNL for more than 60 days must complete a baseline laser eye examination	
Posting warning signs for non-beam hazards	Required by ANSI	Not required, other programs may require them
Key control	Should for Class 3B/ Shall for Class 4	Should
Master switch	Should/Shall	Should
Emission delay	Should/Shall	Removed
Remote interlock connector and beam stop or attenuator	Should/Shall	Removed, but required by FLPPS if manufacturing lasers