



Laser Safety Protocol # 007

TO: Laser users
FROM: Laser Safety Program
SUBJECT: Emergency Stop
VERSION DATE: May 2008

Goal

Specifications of LBNL standard protocol for laser panic-button requirements (ANSI Z136.1 Class-4 indoor control area item, “Panic button”).

LBNL Protocol

When applicable or requested by the user, a laser emergency “crash” button (panic button or E-stop) will be installed as part of an interlocked laser-room access system.

In some cases, the indication of the location of electrical circuit breakers or laser cutoff switches will be sufficient to act as a replacement for this device.

An evaluation by the LSO may determine that the panic button is not required.

ANSI Z136.1 / CDRH Specification

The ANSI Z136.1 standard for the safe use of lasers is the Laser Safety Program’s general guidance document.

The Center for Devices and Radiological Health (CDRH) is the Food and Drug Administration body tasked with developing laser-light-product performance safety standards for lasers sold

in the United States.

Laser use at LBNL is also guided by LBNL PUB-3000, Chapter 16 (Lasers).

The ANSI Z136.1-2000 standard for the safe use of lasers lists controls for a Class-4 indoor control area.

Section 4.3.10.2 states: “For emergency conditions there shall be a clearly marked ‘panic button’ (remote controlled connector or equivalent device) available for deactivating the laser or reducing the output to levels at or below the applicable MPE [maximum permissible exposure]. This ‘panic button’ should be of the red mushroom type.” See note in the Rationale section on new wording in ANSI Z136.1-2007.

The panic button is not a CDRH laser-product requirement.

The LSO has the authority to recommend or approve substitute or alternate control measures when the primary ones are not feasible or practical (ANSI Z136.1, Section 1.3.2.3).

Rationale

The original intention for the panic button, emergency crash button, or E-

stop was for use with lasers in the industrial setting (i.e., robotic laser use) or with the previous generation of Class-4 lasers that required capacitor-based power supplies or high-voltage power input (3-phase 408 systems). Changes in laser technology have significantly reduced the electrical hazards presented by laser systems. Many lasers today run on 110 wall current, and it is common to have laser power supplies right under the table or near the laser system. Furthermore, the LBNL laser safety philosophy is to ensure all laser beams and reflections are contained, so they do not present a hazard to anyone just entering the laser-use area.

Therefore, in many laser-use areas at LBNL, requiring an E-stop would generate an economic burden with little safety return. Consider the Advanced Light Source, where some laser systems travel back and forth between the experimental floor and development laboratories; the portability of laser diodes and some fiber-based systems make the electrical panel the only constant emergency cutoff source. Our Fire Department receives an orientation to laser use at LBNL and has not requested the use of an E-stop for all laser-use areas. LBNL appreciates that the CDRH did not require this control of any class of laser product or installation.

The mushroom button requirement is a should item and indication and use of a remote controlled connector or equivalent device is acceptable. NOTE: The ANSI Z136.1-2007, Section 4.3.10.2, now states that "For emergency conditions there shall be a clearly marked 'Emergency Stop' or other appropriately marked device appropriate for the intended purpose available for deactivating the laser or reducing the output to levels at or below the

applicable MPE." The new standard doesn't specifically require a red mushroom button and accepts any appropriately marked device.

Contact Information

In case of questions or comments, contact Ken Barat, Laser Safety Officer (LSO), at ext. 2544, kbarat@lbl.gov.