

SOP for Research and Teaching Use of the Class 3B Laser in the University of Evansville Chemistry Department¹

Scope: This SOP applies to the use of all class 3B lasers in teaching and research activities in the University of Evansville Chemistry Department.

1. **Laser Descriptions:** The class 3B laser in the chemistry department is a nitrogen-pumped dye laser. Both the nitrogen laser (PTI model PL-2300) and the pumped dye laser (PTI model PL-202) are rated as class 3B and have a pulse width of less than 1 nanosecond.

2.4 MW peak power @ 337.1 nm (nitrogen laser)
56 mW average power @ 337.1 nm (nitrogen laser)

440 kW peak power @ 200-1300 nm (dye laser)
10 mW average power @ 200-1300 nm (dye laser)

2. **Hazards**

Laser hazards from class 3B lasers consist of eye hazards from direct or reflected laser beams. Diffuse reflections (scattered light) are not hazardous. There is also a substantial risk of electric shock from the nitrogen laser (18 kV operating voltage).

3. **Control Measures**

- A. Class 3B lasers may be operated with the beam exposed only in laser controlled areas except for specific test procedures approved by the LSO (Laser Safety Officer).
- B. Class 3B lasers may be operated only when mounted in a mount approved by the LSO and with the beam terminated in a manner approved by the LSO. Laser personnel must control the beam path to prevent misdirected or reflected beams and must not allow reflective or shiny objects in or near the beam path.
- C. Laser safety eyewear is required for open beam invisible class 3B lasers. All laser safety eyewear must be approved by the LSO. Eyewear is recommended for visible class 3B lasers for procedures that are not part of the normal test sequence or are not well documented.
- D. To prevent electrical shock, the top cover of the nitrogen laser must be screwed shut with 12 screws.

4. **Required Training:** Laser Safety training is required before personnel will be authorized to operate class 3B lasers with the beam exposed. All research and teaching laser use must be approved by the LSO.

5. **Emergency Procedures:** Report all incidents or safety concerns to the Laser Safety Officer.

¹ Adapted from *Class 3B R&D SOP* provided by Laser-Professionals, Inc.

General Guidelines for Class 3B laser use (eye and specular reflection hazard):²

- **Never aim the laser at a person's eye or stare at the laser from within the beam.**
- **Keep the beam path above or below eye level for one seated or standing.**
- **Laser safety eyewear may be needed if MPE (Maximum Permissible Exposure) is exceeded.**
- **Don't view beam directly with optical instruments unless a protective filter is used.**
- **Only experienced and authorized individuals are permitted to operate the laser.**
- **Secure the laser from operation by unauthorized personnel. A key switch should be used if unauthorized personnel may gain access to the laser.**
- **Always strive to enclose as much of the beam path as practical and to operate the laser in a controlled access area.**
- **During alignment, avoid placing one's eye near the axis of the beam path, where specular reflections are most likely to occur. Alignment eyewear should be considered.**
- **Unnecessary specular (i.e., mirror-like) reflecting objects should be removed from the beam path.**
- **Mount the laser on a firm support to ensure the beam travels along its intended path.**
- **Post laser hazard warning signs at entrances to laser use areas.**

² Adapted from UCSB (University of California, Santa Barbara) Laser Safety Manual