



## **General Safety Regulations for X-Ray Diffraction (XRD)**

1. Diffraction/fluorescence units may only be operated by authorized personnel. All authorized personnel must receive instruction on the unit's safe operation from the Principal Investigator responsible for the unit and demonstrate an understanding of the operation of the machine before starting unsupervised work.
2. An operational fail-safe light shall be visible to the operator indicating when x-rays are being produced.
3. Use interlocks, barriers or administrative controls to ensure no one can gain access to the primary beam or high scatter radiation areas.
4. Area monitoring dosimeter is required when working with diffraction/fluorescence units.
5. To insure your safety, do not attempt any unauthorized repair of the x-ray unit.
6. Safety interlocks should not be used to deactivate the x-ray beam, except in emergencies and when testing the interlock system.
7. Do not override the safety interlock unless there is an approved written procedure.
8. Make sure the machine is OFF before changing samples or the primary tube safety shutter is closed and verify there is no active beam present; always check the current and voltage meters and/or use a survey meter to detect x-rays.
9. Do not operate with removed covers, shielding materials, or tube housings; or with modified shutters, collimators or beam-stops. Verify that the tube is off and remains off until the machine is completely reassembled and any modifications have been approved. Use the main switch to shut the machine off; do not rely on the safety interlock. Individuals may not operate an XRD unit in a manner inconsistent with SOPs and safe operating standards.
10. Check radiation scatter with a survey meter after each realignment. If there are any questions or concerns about the functionality of an XRD unit, it must be taken out of service immediately and reported to the PI or Authorized Person(s) responsible for the unit.
11. Secure unused ports to prevent accidental exposures. Secure diffraction/fluorescence against unauthorized use by using a unit key control or the room lock. Stop the primary beam by secured shielding that cannot be readily displaced.
12. Maintain an operating log that includes date, operator, beam voltage and current, and time on and off (or total exposure time) for each unit use.

13. Notify the RSO immediately if there is a real or perceived abnormal personnel radiation exposure.
14. All XRD units must be registered with EHS and the California Department of Public Health prior to arrival. Contact EHS prior to any acquisition, transfer, relocation, or disposal of XRD units so that the CDPH registration can be updated.
15. In case of emergency or accident, notify the Principal Investigator and EHS immediately at (657) 278-7233. Prevent further use of the unit until a safety evaluation is done.

**Revised:** 11/2018, 02/2022