

Cal Poly

Safety Bulletin- Ultraviolet (UV) Lamps

The purpose of this document is to inform the campus community about the potential hazards associated with ultraviolet (UV) light. Ultraviolet (UV) lamps are used on the Cal Poly campus in a variety of applications. They are found in germicidal lamps, transilluminators, "black lights", mercury vapor lamps, solar simulators, photochemical curing equipment, metal halide lamps, etc. One of the problems in working with UV radiation is that the symptoms of overexposure are not immediately felt so that persons exposed do not realize the hazard until after the damage is done.

UV radiation is that radiation just outside the visible range, or under 400 nanometers (nm). There are three ranges of UV:

- ❖ UV-A radiation (315 nm to 400 nm), which is called "near UV" and "black light", is the least photobiologically-active, but exposure can produce tanning and some burning of the skin, and can lead to the formation of cataracts (opacities in the lens of the eye). It is easily transmitted through air and common glass. [Tanning parlors generally expose patrons to UV-A radiation.]
- ❖ UV-B radiation (280 nm to 315 nm), which is called "middle UV" and "erythemal UV", causes skin tanning and "sunburn", inflammation of the cornea of the eye, inflammation of the mucus membrane which lines the inner surface of the eyelids, and cataracts. It is transmitted through air and quartz, but can be blocked with common glass.
- ❖ UV-C radiation (100 nm to 280 nm), which is called "far UV" and "germicidal UV". It is blocked by common glass and by air (for wavelengths < 200 nm) and in nature, is completely blocked by the ozone layer. It can cause severe skin burns and photokeratitis and photoconjunctivitis, with maximum effects occurring at 270 nm. UV-C in industrial forms such as germicidal lamps is the most dangerous form. It can cause damage to eyes in as little as 3 seconds and DNA damage to all biological surfaces.

The health effects of exposure to UV light are familiar to anyone who has gotten sunburn. However, the UV light levels around some UV equipment greatly exceed the levels found in nature. Acute or short-term effects include redness or ulceration of the skin. At high levels of exposure, these burns can be serious. For chronic exposures, there is also a cumulative risk of harm. This risk depends upon the amount of exposure during your lifetime. The long-term risk for large cumulative exposure includes premature aging of the skin and even skin cancer.

UV exposure is not immediately felt . . . the user may not realize a hazard until after the damage is done.

The eyes are also susceptible to UV damage. Like the skin, the covering of the eye or the cornea, is epithelial tissue, too. The danger to the eye is enhanced by the fact that light can enter from all angles around the eye and not only in the direction you are looking. The lens can also be damaged, but since the cornea acts as a filter, the chances are reduced. This should not lessen the concern over lens damage however, because cataracts are the direct result of lens damage.

Individuals who work with or in areas where UV sources are used are at risk for UV exposure if the appropriate shielding and protective equipment are not used. For more information, please refer to the Code of Safe Practice- Ultraviolet (UV) Light Safety on the EH&S website.

