

# LASER POINTER SAFETY

## INFORMATION



The use of laser pointers has become widespread. The pointers are useful tools for educators in the classroom and at conventions and meetings. However, due to the low cost and ubiquitous supply, these pointers are now being purchased and used by the general public, including children, and used in ways not intended by the manufacturers. As a result, serious concerns about the hazards of laser pointers have surfaced.

While the majority of the laser pointers contain low to moderately powered diode lasers, more powerful lasers are now being imported from China. These pointers present a significant potential for eye injury and are often not properly labeled and are found that the majority of the laser pointers tested did not meet their safety regulations (FDA).

There are currently no restrictions for purchasing laser pointers in the United States. The FDA issued a warning for laser pointers, urging that the pointers be used as intended, not as toys, and not by children unless under adult supervision.

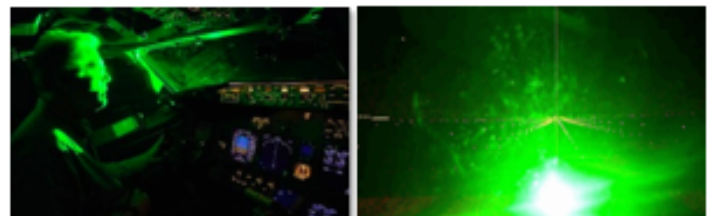
## TYPES OF LASER POINTERS

A laser pointer contains a small diode laser that emits an intense beam of light. Most laser pointers contain

low to moderate powered lasers that do not pose a serious risk of eye injury unless intentionally misused. Some of the newer laser pointers, especially the green light pointers, present a significantly increased risk of eye injury. Laser pointers used in the U.S. use Class 3R diode lasers in the 630-680 nm wavelength (red), with a maximum power output of between 1 and 5 mW. The length of exposure to visible lasers is usually limited by the eye's blink reflex, which normally occurs within a quarter of a second. Theoretically, Class 3R lasers could cause injury to the eye if viewed directly for less than 0.25 seconds.

## ACCIDENTS AND INCIDENTS

Over the years, as laser pointers become more ubiquitous, more and more laser pointer related incidents have been reported worldwide. For example, police officers have reportedly drawn their weapons when the light from laser pointers is mistaken for a gun sight. Laser beams projected into airspace and intercept aircraft have caused distractions and temporary vision impairment to pilots.



*Glare on pilot cockpit windscreen.*

✳️ [Video - FAA & Air Force: Aircraft Laser Illumination](#)

You should **NEVER** aim a laser pointer at or near an airplane or helicopter. It is not safe, you may be arrested or jail sentences – up to 14 years.

Several individuals have reported temporary blindness when targeted by a number of laser pointers. This is becoming more prevalent at sporting events. A few individuals complained of afterimages lasting several days.

## POTENTIAL HAZARDS

The hazards of laser pointers are limited to the eye. Although with most visible lasers, the largest concern is potential damage to the retina, most laser pointers are not likely to cause retinal damage. The possible exception might be the green light lasers described above.

The most likely effects from exposure to viewing the beam from a laser pointer are afterimage, flash blindness and glare. Flash blindness is temporary vision impairment after viewing a bright light. This is similar to looking directly at a flashbulb when having a picture taken. The impairment may last several minutes.

Afterimage is the perception of spots in the field of vision. This can be distracting and may last several minutes, although there have been reports of afterimages lasting several days.

Glare is a reduction or complete loss of visibility in the central field of vision while being exposed to the direct or scattered beam. This is similar to viewing oncoming headlights on a dark night. Once the beam is out of the field of vision, the glare ceases. While this does not pose a hazard to the eye, it can cause serious distraction and outrage. Glare can be exacerbated when the beam is reflected from a mirror-like surface.

## SAFETY CONSIDERATION

Laser pointers are effective tools when used properly. The following considerations should be observed when using laser pointers:

- ✳ Never look directly into the laser beam.

- ✳ Never shine a laser pointer at anyone.
- ✳ Do not aim the laser at reflective surfaces/mirror like surfaces. A reflected beam can act like a direct beam on the eye.
- ✳ Never view a laser pointer using an optical instrument, such as binocular or a microscope.
- ✳ Do not allow children to use laser pointers.
- ✳ Do not purchase a laser pointer if it does not have a caution or danger sticker on it identifying its class.
- ✳ Use only laser pointers meeting the following criteria and warning label:-
  - Labeled with FDA certification stating "DANGER: Laser Radiation" for Class 3R lasers or "CAUTION: Laser Radiation" for Class 2 pointers.
  - Classified as Class 2 or 3R according to the label. Do not use Class 3B or 4 products.
  - Operates at a wavelength between 630 nm and 680 nm.
  - Has a maximum output less than 5 mW.
  - Laser pointers that meet these requirements may be found at:
    - ✓ [Atlas Nova 635 nm Laser Pointer](#)
    - ✓ [Alpec Power Red Laser Pointer](#)



Contact the Radiation Safety Office (206.543.0463) or [radsaf@uw.edu](mailto:radsaf@uw.edu) if you have an unlabeled laser pointer.

Other laser pointer safety information:

- ✳ [Rockwell, R. James, Safety Recommendations of Laser Pointers.](#)
- ✳ [FDA Laser Pointer Safety Video](#) + [Consumer Safety Alert](#)
- ✳ [NIST Tests of Green Laser Pointers](#)
- ✳ [Laser Pointer Usage Tips](#)