

## Laser Pointer Safety



When used appropriately for their intended purposes, such as providing visual aids during presentations, laser pointers can be quite useful and pose minimal hazards. However, the main safety issue with using lasers lies in the possibility of optical hazards, which can result from brief periods of direct exposure. These hazards can include glare, flash blindness, after-images, and startle effects.

You may identify a laser's class by reading the FDA warning label. The label on a Class 1 or 2 laser with a power output less than 1 milliwatt (mW) reads "Caution." The label on a more powerful Class 3R (formerly 3a) laser, such as the 5-mW green (532-nanometer) pointer shown here, reads "Danger." Laser pointers over 5 mW are prohibited outside registered laser labs.



Red laser pointers are mostly categorized as Class 2, which emit less than 1mW of power and are considered safer to use. However, Class 3R lasers can emit up to 5mW of power and can cause harm to the eyes in just a few seconds of direct exposure.

Most common laser pointers are the red diode beam that is produced at wavelengths of about 633-690 nm. On the other hand, green lasers are of particular concern due to the fact that the human eye is much more sensitive to green light at 532 nm, which is 50 times more sensitive than it is to red light at 633 nm, even at the same power level. Green laser pointers should not be used due to the sensitivity and green lasers may also carry a risk of infrared radiation (IR) exposure.

**When used properly, laser pointers are safe to use.**

## How to use a laser pointer safely?

- Never aim laser pointers towards anyone, especially towards eyes. Only aim laser pointers at inanimate objects.
- Never allow minors to use a laser pointer unsupervised. The FDA has issued an advisory warning that laser pointers are not toys and should be used by children only under strict supervision.
- Never purchase laser pointers over 5 mW as they are prohibited outside registered laser labs.
- Purchase only Class 2 or 3R laser pointers that have a caution or danger sign that identifies the Class and output power.
- It is recommended to purchase red laser pointers that operate between 633-690 nm. Avoid the use of green laser pointers due to the eye's increased sensitivity at 532 nm.
- Never point laser pointers at shiny or mirror-like surfaces, including flat TV screens and glass tabletops. A reflected beam is as hazardous as a direct beam on the eye.
- Only use laser pointers that have clear warning labels (caution or danger sticker). If you have any laser pointers that do not have warning labels, they may have not had a hazard analysis performed and may be more powerful than expected. You may also report suspicious devices to the FDA.
- Never view a laser beam through the use of an optical instrument, including binoculars, microscope, etc.
- Inactivate the laser pointer before you turn to face the audience.
- Use of laser pointers with a locking device that keeps the laser beam on is strictly prohibited. It should turn off when the switch is released.
- Never purchase or use unlabeled laser pointers.
- Never aim laser pointers at aircraft, buses, and automobiles.