

What are lasers?

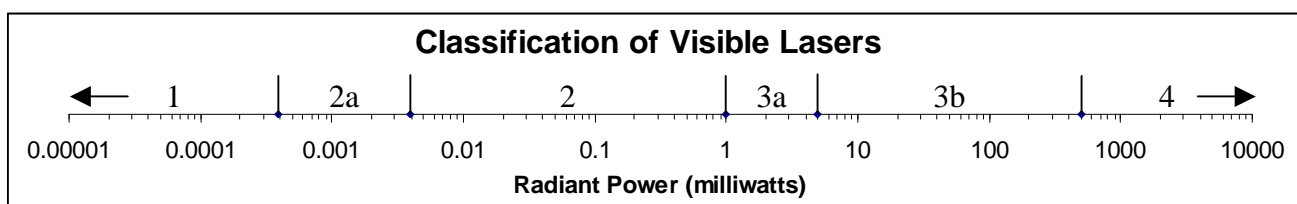
Laser is an acronym for *light amplification by stimulated emission of radiation*. To your eye, the light from even a small laser can be brighter than the light from the sun.

Laser pointers are handheld lasers that are used during lectures or demonstrations to draw attention to a specific area of an object or projected image.

Are lasers dangerous?

As mentioned, lasers can be very bright! Medium and high power lasers can damage your eyes before you can blink. High power lasers can even burn skin and ignite clothing. Fortunately, laser pointers are medium power so they are unable to burn skin or ignite clothing.

Lasers are classified by the radiant power and wavelength of the light they emit:



Class 1 Laser. A Class 1 laser is considered to be incapable of producing dangerous radiation levels and is therefore exempt from most control measures or other forms of surveillance.

Class 2 Laser (Low Power). A Class 2 laser emits visible radiation (400-700 nm). Eye protection is afforded by the normal human aversion response to bright radiant sources. This type of laser may present some danger if viewed directly for periods exceeding the 0.25-s aversion time. The "Class 2a" classification was developed for supermarket bar-code scanners; Class 2a lasers are not intended for viewing but are not hazardous if viewed for up to 1000 seconds. Class 2 does not apply to lasers radiating at wavelengths less than 400 nm or greater than 700 nm.

Class 3 Laser (Medium Power). A Class 3 laser is hazardous under direct beam and specular-reflection viewing conditions, but the diffuse reflection is usually not a hazard. A Class 3 laser is normally not a fire hazard. Ultraviolet (UV) and infrared (IR) lasers that emit invisible beams (<400 nm and >700 nm) are always Class 1, Class 3 or Class 4. Class 3 lasers are divided into two subclasses, 3a and 3b, each having slightly different control requirements.

Class 4 Laser (High Power). The direct beam, specular reflection and diffuse reflection from a Class 4 laser are hazardous to the eye and skin. A Class 4 laser can be a fire hazard.

Safety concerns.



When laser pointers were first introduced, they were normally class 2. During the last few years, the power of laser pointers has increased so that they are now typically class 3a. These have the potential to damage the eyes.

Flashblindness can result if the eye is exposed momentarily to light from a laser pointer – this effect is temporary. It is like the blindness and disorientation that can occur when a camera flashes close to your eyes in a darkened room. A longer exposure to a class 3a laser can cause permanent damage to the eye. The eye is at greater risk when using optical instrument (e.g., binoculars). This could be a potential problem when laser pointers are misused at rock concerts or sporting events.

The misuse of laser pointers has been reported in many countries, including Canada. As the price of the laser pointer has dropped, the frequency of these reports has increased. Saskatchewan Labour's 1999 survey of vendors in Regina and Saskatoon showed that there are few controls on who may purchase a laser pointer.

The survey showed that most vendors of laser pointers were not aware of the potential risk from their misuse. This could explain why the laser pointers were often marketed as a novelty item rather than a visual aid for making presentations. The survey results also indicated that many laser pointers do not meet the labeling requirements of *The Radiation Health and Safety Regulations, 2005*.

What labels are required?



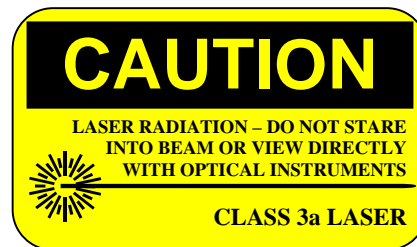
Laser Hazard Symbol



Explanatory Label for
Class 2 Lasers



Explanatory Label for
Class 3a Lasers



Recommendations!



Vendors and owners must comply with *The Radiation Health and Safety Regulations, 2005*. This includes ensuring that lasers are properly labelled and, in the case of Class 3a, 3b and 4 lasers, that all reasonable precautions are taken to ensure that no person is exposed to the direct beam or the specular reflection of the beam. In the case of Class 3b and 4 lasers, precautions should also be taken to ensure that no person is exposed to the diffuse reflection of the beam.

In order to minimize the misuse of laser pointers, it is recommended that vendors of laser pointers implement a policy which:

- a) restricts minors from purchasing lasers;
- b) informs purchasers of their responsibility under *The Radiation Health and Safety Act, 1985*; and
- c) ensures the following written caution is prominently displayed where laser pointers are sold.

CAUTION: Laser pointers can be dangerous. They should be used cautiously and only for their intended purpose. Laser pointers are not toys and should be kept out of the reach of children. In no event should the laser beam be directed at people or at surfaces that could reflect the laser beam directly at people.

If you have questions or concerns, contact the Radiation Safety Unit at 787-4538 / 1-800-567-7233 in Regina or 933-7775 / 1-800-667-5023 in Saskatoon.