

LASERS

The word laser is an acronym for the expression "light amplification by stimulated emission of radiation." In other words, a laser is a device capable of converting light or electrical energy into a focused, high energy beam. Laser light is monochromatic, or contains a single light frequency, and does not spread out very far over long distances. Normal or "white" light, on the other hand, contains many different frequencies, as apparent in a rainbow, and travels in all directions away from the source.

How Are Lasers Classified?

Lasers are classified based on their hazard potential. Laser manufacturers are required to clearly post this classification outside each laser casing.

Class I, II, and IIa lasers, called "low power lasers," pose little risk to users. The beam of this type of laser is so bright that an individual's natural blink reflex prevents one from staring at the beam long enough for injury to occur.

Class IIIa, IIIb and IV lasers, known as medium and high powered lasers respectively, potentially pose a greater risk. Because lasers focus energy into a very small area, the skin and eyes are most vulnerable. Thermal burns are the most common type of damage caused by exposure to lasers.

How Are Lasers Hazardous?

Directly viewing laser light is particularly hazardous. The normal function of the human eye is to collect light and focus it onto the retina, or the delicate vision cells along the back of the eye. Similar to how a magnifying glass can focus intense sunlight and burn paper, the eye focuses laser energy onto the retina (by as much as 100,000X). Looking at high powered laser beams without proper eye protection, even for brief periods, will cause permanent damage or burns the vision cells of the eye. Extensive damage will result in irreversible blindness.

Some high powered lasers are particularly hazardous because their beams may be invisible. High powered laser systems also pose an electrical hazard. Several fatalities have been documented associated with electrocution or explosions resulting from the misuse of high powered lasers around flammable materials.

It is important to know that lasers are not radioactive and do not cause cancer.

Who Is Affected?

Because lasers are very common in today's society, everyone is affected by lasers. Lasers are routinely used in entertainment, communications, construction, medicine, welding, surveying, chemical analysis, and manufacturing. CD-ROM players and checkout scanners in grocery stores are examples of laser applications in our everyday lives.

Lasers serve as effective tools in optics, construction, process (bar code scanners and limiting switches) and quality control.

How Are Lasers Controlled?

To assure the safe use and operation of lasers, be sure you are aware of the following guidelines:

- Never look directly into the beam of a laser, regardless of its classification or your exposure duration.
- If you are involved in setting up or aiming a laser, be sure that you wear the appropriate eye protection; normal eye wear or safety glasses will not be sufficient.
- Be aware of where lasers are used in your work area. Signs and placards are posted for your protection.
- Know the class of lasers you work with. Be especially careful if you work with a high powered laser.
- Always use the laser with the lowest classification possible. That is never use a high power laser when a low power laser will do.
- Never attempt to open, repair or relocate a laser. Leave this job to properly trained technicians.
- For high powered lasers, be familiar with and follow written operating procedures.
- Lasers can be reflected off shiny metal surfaces or mirrors often with little loss of intensity. Use extreme caution in working under these conditions.