



Hazard Alert for Handheld and Weapon-Mounted Searchlights

FACT SHEET 24-012-0316

Introduction: Soldiers in urban environments often use portable searchlights, which are hand-carried or attached to crew-served weapons on vehicles (see Figure 1). These searchlights are bright enough to cause retinal burns at close distances, especially when their beams are focused. Even searchlights with near-infrared (NIR) filters attached for night vision use can cause retinal burns.

However, these searchlights often have no warning labels, and their operator's manuals may have only generic statements like "do not look directly into the light at close distances." This greatly understates the hazard. Some secondary hazards may not even be discussed.

Searchlight users who are unaware of the danger may treat these devices as casually as they would a flashlight. Proper awareness and training are necessary to prevent injuries from the use of these devices.

What are the main hazards from these searchlights? These searchlights pose a hazard to the eye and to a lesser extent the skin. The visible and NIR radiation may be so intense that retinal burns can occur at close distances even with a moment's exposure. Repeated exposures can increase the hazard, but these are unlikely because of the brightness of the beam.

Searchlights may also include NIR filters for night vision use. A retinal hazard at close range may still be present, even though searchlights with NIR filters will visibly appear much less bright. This can lull bystanders into a false sense of safety.

The searchlight beam can also burn the skin at close distances, but the heat from the beam usually provides sufficient warning. Minor effects like glare discomfort are also possible, and these symptoms can occur with exposures that are well within the safety limits.

What are the secondary hazards from these searchlights? Some searchlights can operate in a strobe mode, which can induce epileptic seizures in a small percentage of the population. Strobe effects

may also cause vertigo, nausea, disorientation, irritability, or decreased hand-eye coordination. The effects and severity vary from person to person.



Figure 1. (Upper photo) Handheld searchlight¹, and (lower photo) searchlight mounted on a vehicle's crew served weapon². (¹Photo by APHC Nonionizing Radiation Program) (²Photo by Army Program Executive Office Soldier.

The ultraviolet risk to the eyes and skin is greatly increased if the searchlight is operated with its front lens cover removed or damaged.

Focused beams should not be pointed at flammable materials at close range for long periods of time.

High voltage can present at the xenon lamp connections. Always disconnect the searchlight from electrical power before servicing.

The xenon lamp used in these searchlights is under high positive pressure and should be handled with care.

Always wear protective eyewear and gloves if removing (or, standing in the vicinity of someone who is removing) the searchlight's front lens cover and lamp.

What control measures are recommended?

General control measures:

- (1) Contact the Army's Nonionizing Radiation Program (NRP) to evaluate the searchlight (see below for contact information). The NRP's report will include the retinal hazard distance for the searchlight.
- (2) Place warning labels on searchlights following the design shown in Figure 2, if not present already.
- (3) Develop standing operating procedures (SOPs) for operators and maintenance staff that:
 - state the main hazards and secondary hazards.
 - outline the control measures.
 - provide methods to report accidents or defective equipment.
- (4) Ensure that the SOPs refer to these devices as "searchlights" to prevent confusion with flashlights.
- (5) Allow only persons with proper training to handle these searchlights.
- (6) Aim searchlights only at approved targets.
- (7) Advise operators that hazard distances for momentary viewing can be on the order of dozens of meters for unaided viewing, or hundreds of meters for viewing with 7 x 50 binoculars or other magnifiers.
- (8) Avoid:
 - looking into the searchlight to see if it is operating.
 - pointing searchlight beams at flat-mirror-like surfaces.
 - operating the searchlight if its front lens is damaged or removed.
 - pointing focused beams at flammable materials within close distances for long periods of time.

Maintenance shop-specific control measures. In addition to the general control measures, workers should:

- (1) Post temporary warning signs outside rooms where the searchlight is operating.
- (2) Wear protective eyewear and gloves if removing (or, standing in the vicinity of someone who is removing) the xenon lamp.
- (3) Disconnect the searchlight from electrical power before servicing.
- (4) Operate the searchlight within a controlled area.
- (5) Wear welding goggles with a minimum shade number of 5 for minimally safe viewing of the xenon arc lamp. Welding goggles with shade number 11 should allow comfortable viewing of the arc.

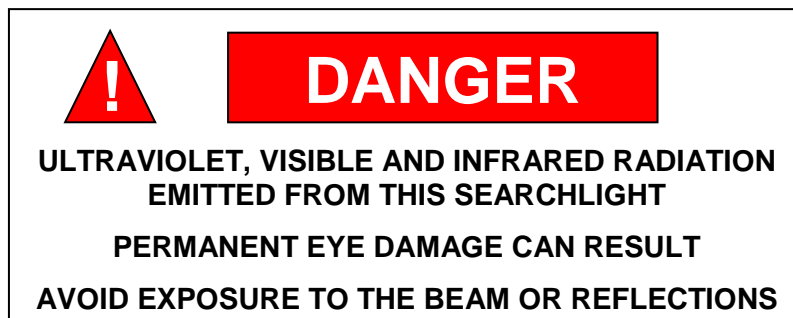


Figure 2. Sample warning label

Where can I get additional information, or report a suspected overexposure? In the event of a known or suspected overexposure, contact the following as soon as possible after getting the accident victim immediate medical attention:

- (1) Your installation radiation safety officer.
- (2) The Army's NRP at DSN 584-3932; commercial (410) 436-3932.
- (3) The Army's Tri-Service Vision Conservation and Readiness Program at DSN 584-2714; commercial (410) 436-2714.