

TECHNICAL INFORMATION

UV Mini Light Source

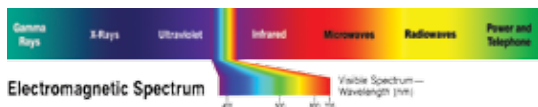
Catalog No. CUV100T

ABOUT ULTRAVIOLET LIGHT

An important thing to know is that ultraviolet (UV) light is not a single entity, but is a wide band of wavelengths within the electromagnetic spectrum (see illustration below).

The chief natural source of UV light is the sun. In fact, about nine percent of all energy emitted by the sun is UV, most of which is in the region between 300-400nm. Artificial sources of UV light include incandescent, gas discharge, low pressure mercury, medium pressure mercury metal halide, electrodeless and xenon lamps.

UV light is electromagnetic radiation in the part of the spectrum between x-rays and visible light. It differs from visible light only in that the UV wavelengths are too short to be seen by the human eye. The boundary between visible and UV light is a wavelength of 400nm. Medical literature divides UV light into three ranges: UV-A (315nm and higher), UV-B (280-315nm) and UV-C (280nm and lower).



An interesting characteristic of UV radiation occurs when it falls upon certain substances known as phosphors, where it causes the phosphors to emit specific radiation. This phenomenon is known as fluorescence. Everyday fluorescent lighting is basically a UV lamp constructed of a type of glass bulb that blocks UV rays. The inside of the bulb is coated with a thin layer of fluorescent material that receives UV generated by the lamp and, in return, emits a visible light.

One effect of UV energy upon certain substances is a phenomenon that takes place at the atomic level. High-frequency UV photons collide with atoms and part of the photon's energy is transferred to the atoms by boosting electrons to higher energy states.

Upon de-excitation, as electrons fall back to lower energy states, energy is released as photons of light. Since only a portion of the incoming photon's energy was transferred to an electron, these emitted photons have less energy than the incoming UV photons, so their wavelengths are longer than the excitation photons. This process is called fluorescence.

In some materials, the fluorescence lingers and disappears, slowing after the UV source is removed. Here, the electron returns slowly to its original energy state, and this delayed fluores-

Ultraviolet (UV) light sources are used at the crime scene and in the laboratory for the preliminary examination and location of physical evidence.

Ultraviolet (UV) light examination of physical evidence traces may yield valuable information toward the solving of many different crimes. Examination of physical evidence under UV light includes just about everything.

Some of the more useful items are as follows: physiological fluids, glass and ceramics, petroleum products, fibers, hair, cosmetics, wood and botanical materials, minerals, gems, glues, adhesives, drugs, poisons, plastics, food-stuffs and arson debris.

Ultraviolet (UV) light is essential when utilizing fingerprint enhancement powders and dyes. Silver nitrate, physical developer and DFO development of fingerprints are enhanced with UV light. The use of fluorescent tracer powders, pastes and inks in conjunction with UV light enhance theft detection and security. Imagination is the only limiting factor.

cence is called phosphorescence. These unique properties of UV fluorescence and phosphorescence are but two of the many ultraviolet phenomena that make it vital to science and law enforcement.



INTRODUCTION

Longwave UV Light Source, No. CUV100T

The CUV100T is a fully portable, battery-operated longwave UV light source for use in crime scene search and forensic applications. Four (4) AA alkaline batteries power the unit and a clear plastic shield protects the 4-watt UV lamp.

PROCEDURE

The CUV100T may be used in the field or laboratory when the need for longwave UV light is indicated. The light source is easily powered ON and OFF with the accessible thumb switch. Its compact size makes the CUV100T the ideal light source when searching for the following forms of evidence:

- Physiological fluids such as semen, saliva and urine stains
- Latent prints developed with fluorescent materials such as fluorescent latent print powders, fluorescent chemicals such as Ardrox, Basic Yellow, Rhodamine 6G, DFO and 1,2 Indanedione
- Fluorescent thief detection powders and pastes
- Fluorescent invisible marking materials

NOTE: The CUV100T is equipped with a clear plastic lens to protect the lamp. This lens should be removed when the unit is in use. See Lamp Replacement for instructions on how to remove the lens.

BATTERY REPLACEMENT

1. Hold the unit so that the ON-OFF switch is facing you.
2. Using your index finger, slide the Battery Compartment Cover down and lift it out of the way (Fig. 1).
3. Remove old batteries and install new ones observing polarity (Fig. 2).
4. Replace the battery compartment cover.



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5

LAMP REPLACEMENT

1. Twist the End Cap Retaining Screw counterclockwise and remove it (Fig.3).
2. Lift the free end of the End Cap. Lift and remove the clear plastic lamp cover (Fig. 4).
3. Twist and remove the lamp (Fig. 5). Place a new lamp in the sockets.
4. Replace the End Cap and End Cap Retaining Screw.

MAINTENANCE

Other than replacing batteries and the lamp, the only other maintenance recommended is to keep the outer shell clean using a mild detergent solution. **NOTE:** *Should any other problems arise, contact the factory (Customer Service) for return authorization at (919) 554-2534.*

PRECAUTIONS: ULTRAVIOLET RADIATION

The three areas of ultraviolet radiation are UV-C at 100 to 280nm, UV-B at 280 to 315nm, and UV-A at 315 to 400nm. UV-C is the shortest wave ultraviolet radiation and UV-A is the longest wave ultraviolet radiation.

The retina of the eye is not very vulnerable in the ultraviolet or the far-infrared portions of the spectrum. It is the cornea and the lens that absorb ultraviolet. High exposure levels can permanently damage these structures of the eye. Intermediate levels in the UV (200-320nm) cause greater injury to the cornea, which is severe but temporary. The injury, photokeratitis, may last for only one or two days but is extremely painful. Near-ultraviolet (long wavelength UV-A) is absorbed heavily in the lens of the eye. Damage to this area of the eye may not be evident for many years and may have lasting effects.

Human skin is also susceptible to radiation injury. This susceptibility occurs in the range of radiant energy present in the ultraviolet spectral region of 200-320nm. This type of radiation can cause severe sunburn. Certain photosensitizing chemicals greatly increase the sensitivity of the skin. Previous exposures to specific wavelength bands that are generally in the long wavelength ultraviolet and visible portion of the spectrum also sensitize the skin. Some orally administered drugs such as tetracyclines and common pain relievers also cause photosensitization.

The factors predisposing individuals to possible harm from ultraviolet radiation are:

- Sensitivity of the individual
- The length of exposure
- Intensity of the ultraviolet light source
- Light source/surface distance

Recommended Personal Protective Equipment:

- UV absorbing face shield or glasses with side shields
- Long sleeved laboratory coat or overalls
- Opaque cotton or garamid fiber gloves

SIRCHIE Finger Print Laboratories shortwave UV lamps utilize low-pressure mercury lamps, which emit radiation in the UV-C (254nm) spectrum. Any amount of exposure to these lamps should be considered hazardous and protective equipment for the eyes and exposed skin must be worn. When using any UV lamp, avoid needless exposure to radiation and turn the lamp off when not in use.



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