



BioLight Kit Instructions

#A-6994FKUV



ARROWHEAD FORENSICS

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BIOLIGHT OVERVIEW

BioLight systems are illumination sources useful for performing fluorescent examinations on materials of forensic interest having excitation bands between 365 and 520 nanometers (nm), including physiological fluids such as urine, semen and saliva, and materials treated with certain powders and dyes. These devices are especially useful in the search for evidence at crime scenes. BioLight systems work with any potential evidence having excitation bands between approximately 365nm and 520nm. BioLight systems are essential in area searches for evidence at the crime scene, and excellent for the photography of evidence after location. BioLight light sources provide the best results when used under subdued lighting conditions. Total darkness is not necessary to see the fluorescence produced from most items of evidentiary value.

CAUTION

- The BioLight Light Source may be used in conjunction with the application of fluorescent powders or chemicals.
- DO NOT look directly into the light beam as this may cause serious injury to your eyes.

HOW IT WORKS:

The BioLight LED illuminator emits light at a wavelength of approximately 455nm (blue region) and 365nm (ultraviolet region). This excitation source causes certain materials to give off weak fluorescence. When used in a totally darkened room, only the light emitted by the LED is present. This light frequency causes some materials to fluoresce, but this fluorescence is hidden or masked by the intense blue light. For this reason, BioLight alternate light sources employ an orange or yellow barrier filters between the objects being examined and your eyes. This filtration effectively blocks the blue or UV light permitting viewing of the weaker fluorescence.

INTRODUCTION

USING THE 455nm LIGHT:

The BioLight Kit offers a convenient means of searching crime scenes for physical evidence that exhibits fluorescent properties. The light source in the kit provides an alternate light operating at or near 455 nanometers (nm), a light frequency known to be of value when seeking items of forensic interest. The kit contains all of the elements necessary for use in the field or crime lab. The new BioLight emits a high-intensity blue light (455nm) that can be viewed through the orange barrier filter goggles provided. The light is powered by two (2) CR123 type Lithium batteries and its light beam comes from a single, 3-watt LED (Light Emitting Diode) that is rated at more than 50,000 hours of lamp life. NOTE: Leaving the lamp on for length periods will cause the instrument to become hot to the touch. The BioLight is excellent for locating and facilitating photographs of a variety of forensic evidence including physiological fluids (urine, saliva and semen), and latent prints enhanced with fluorescent powders or dyes. The hand-held, machined-aluminum, self-contained light source.

USING THE 365nm LIGHT:

Many officers chose to use an ultraviolet (UV) light, Woods lamp, or other alternate light source to assist in the search for biological stains. Such devices can be helpful in a search, given that many biological stains such as semen and saliva may fluoresce, or appear bright, when viewed with UV light in a darkened room. However, there are three important points to remember when using a UV light to assist with your search for biological stains:

1. A number of other materials may also fluoresce, such as urine, stains from food or drink, laundry detergent, and many other substances.
 2. Not all semen or saliva stains will necessarily fluoresce with a UV light.
 3. Blood will not fluoresce when viewed with a UV light; rather, it will appear dark.
- Detecting body fluids at the crime scene is a delicate task. Using a UV light lamp however makes the job easier.

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When to use UV light to detect body fluids:

Most stains from body fluids can be seen when using a high intensity UV light. That is to say that most body fluids have some fluorescent nature or reveal themselves in a special way when illuminated with UV light. In most cases it is not possible to see such stains otherwise. The most effective way of using the UV lamp is to use it to 'mark' the crime scene. In other words, you mark all stains that could be useful 'traces'. When using an intense UV light it is also possible to see things at a distance that otherwise would be nearly impossible to see. While the UV light cannot confirm exactly what sort of stain you are looking at, it does indicate where the stains or body fluids are. This makes it possible to then take samples or perform further investigation.

Dark textiles

The high intensity UV light is a superb complement to more advanced Alternative Light Sources due to the fact that ALS's often have limitations in finding body fluids on very dark textiles. High intensity UV light is being used for example to examine the interior of black colored 'robber' masks, and to illuminate the sweat seen on the inside of these.

What body fluids are fluorescent by nature?

- Semen (DNA)
- Vaginal secretion (DNA)
- Urine (DNA if it contains blood or other body fluid)
- Sweat (DNA)
- Saliva (DNA)

Semen is very fluorescent by nature and the fluorescence can be observed on dark as well as light the tiles when illuminated with an intense UV light, without the need for using orange or yellow goggles.

Vaginal fluid is very hard to detect at all times, as it has a very weak fluorescence. Wear orange or yellow goggles.

Urine is very easy to detect as it is very fluorescent when illuminated with ultraviolet light. You can even see it at great distances. Finding urine can be valuable as it can be analyzed for traces of blood or other particles that contain DNA. Wear orange or yellow goggles.

Sweat contains DNA and is usually easy to see with high intensity UV light. Sweat can be found on gloves, the inside of 'ski' or 'robber' masks, and areas where the criminal has spent a lot of time working under stress i.e. on a door or lock. Wear orange or yellow goggles.

Saliva contains DNA and is therefore valuable to the criminal investigator. Saliva is most often found on the inside of robber masks and is easily detected by high intense UV light. Saliva can also transferred to and found on gloves and areas where the criminal has spent a lot of time working under stress i.e. on a door or lock. Saliva is often found in the same areas that you find sweat. Wear orange or yellow goggles.

PHOTOGRAPHY

Evidence photos may be taken using a standard 35mm or digital camera. The camera lens must be equipped with a barrier filter, which may be ordered from the factory. Lengthy exposures may be necessary, therefore we recommend that the camera be mounted on a sturdy tripod. The area must be darkened as much as possible. When using film (ASA400), begin with a trial exposure of f/5.6 at 1/2 second and bracket exposures on either side of this value. If the camera is equipped with a full automatic mode (film or digital camera), use this mode for best results. BioLight Forensic Photography Not all substances are capable of luminescence. They will not luminesce at all, regardless of the light wavelength used, or may require excitation by specific wavelengths. Fortunately, many substances of primary interest at the crime scene do luminesce when exposed to radiation from a BioLight light source. Those substances that are nonluminescent or are weakly luminescent such as blood and palmer oils, may be made lu-

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minescent by bonding luminescent agents to them. The photographs shown to the right are of latent prints developed with our fluorescent powders and exposed to the BioLight light. The maximum level of brilliance for optimum photographic fingerprint ridge detail may be obtained by varying exposure time. This type of photographic enhancement is not possible with powder-developed fingerprints that have not been externally excited by a forensic light source.

EXAMPLES:

Photo of belt with semen illuminated with WHITE light and then with UV Light



Photo of cloth with semen illuminated with WHITE light and then UV Light



Photo of underwear with urine illuminated with WHITE light and then UV light.



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