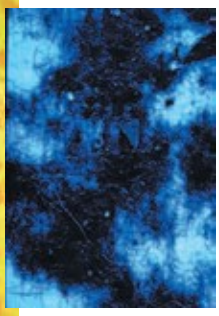
POLILIGHT-FLARE® PLUS

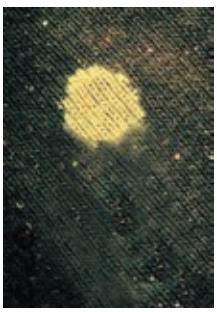












The brightest hand held battery operated unit with a versatile head

USER GUIDE

Version 1.0c

TABLE OF CONTENTS

INTRODUCTION AND SAFETY STANDARDS 3

INTRODUCTION 3

SKIN PROTECTION 3

EYE PROTECTION 3

DEFINITION OF SYMBOLS 4

Rofin Australia Pty Ltd 4

Declaration of Conformity 4

STANDARD COMPONENTS 4

OPERATION 7

SWITCHING ON 8

INTENSITY CONTROL 8

STROBING SELECTION 8

FILTER INSERTION 8

CHARGING 8

Auto Charging 8

AC Charger 9

Belt Clip 9

Quick Lock Wrist Band 9

Tripod Mount 9

Head Handle 9

LIGHT APPLICATIONS 10

INTRODUCTION 10

FLUORESCENCE IMAGING 11

REFLECTION IMAGING 11

Specular Reflection 11

Diffused Reflection 11

ABSORPTION IMAGING 12

Differential Absorption 12

APPLICATIONS AT SCENE OF CRIME 13

Shoe Prints 13

General Fluorescent Method 13

TABLE OF CONTENTS

Blood Marks 14
SEARCHING FOR LATENT FINGERPRINTS 15
Option 1: Absorption or Reflection Mode 15
Option 2: Inherent Fluorescent Mode 15
Option 3: Treatment with Powders 15
Option 4: Superglue Fuming 16

OPTIONAL ACCESSORIES 18
INTRODUCTION 18
OPTIONAL WAVELENGTH HEADS INCLUDING INFRA-RED OPERATION 18
EPISCOPIC COAXIAL ILLUMINATION ACCESSORY 19
BAND PASS AND LONG PASS FILTERS 20
BEAM SHAPING FILTERS 20
CONE ALTERING TYPE 20
SLIT FORMING 20

MAINTENANCE 21
INTRODUCTION 21
CLEANING 21

SPECIFICATIONS AND DEFINITIONS 22
INPUT POWER 22
WEIGHT SPECIFICATION 22
DIMENSIONS 22
LIGHT OUTPUT 22
BATTERY LIFE 22
WATERPROOF 22
OPTICAL OUTPUT BANDS 23
AVAILABLE FILTERS 23

ACRONYMS AND ABBREVIATIONS 24

INTRODUCTION AND SAFETY STANDARDS

INTRODUCTION

The Polilight Flare PLUS (Flare^{+}) is a battery driven, multiple array "state of the art" Light Emitting Diode (LED) forensic light-source with a selection of interchangeable light output heads (patent pending). It has been specifically designed to assist the forensic scientist to efficiently carry out an examination at the scene-of-crime.

The Flare^{+} produces powerful narrow bands of light at centre wavelengths of 360, 415, 450, 505, 530, 555 and 620 nm (other wavelengths available on request). The intensity and beam profile of the output can be varied to suit the application. The beam profile (normally a 5 degree divergent beam) is varied using a set of filters giving an extra divergence of 1, 5,10, 20, 40 and 80 degrees beam cone or a line of light using the 95 x 1; 60 x 1 or 40 x 0.2 degree filters (beam profile filters are optional).

The light output "head" can be either attached directly on to the battery unit or it can be used remotely connected to the battery via a Hi-Temp power cable. With the latter option the battery is attached to the user's belt using the belt clip.

The Flare^{+} is waterproof and can be used down to depths of more than 100 meters (300ft) of water. However the optics of the UV head are NOT waterproof but are water resistant.

SKIN PROTECTION

The Polilight Flare^{+} is a high intensity light source, which if used inappropriately, may be a hazard to the eyes and skin.

Take care to avoid direct exposure to the beam from the Polilight. Appropriate clothing such as gloves and long sleeved shirts should be worn at all times when working with or near the Polilight. The maximum intermittent direct beam skin exposure must not exceed 20 minutes per day, while the maximum continuous skin exposure must be less than 10 minutes per day. In normal use during an 8 hour working day the light source is not hazardous.

EYE PROTECTION

Four pairs of safety goggles, each a different colour, are supplied with the Flare^{+}. These goggles are to be worn by the operator and all people within 15 metres of a working Polilight Flare^{+} unit.

Figure 1 shows an example of the goggles.



Figure 1. Goggles

INTRODUCTION AND SAFETY STANDARDS

DEFINITION OF SYMBOLS

Blue Round symbol: Eye Protection Must Be Warn in this area	Yellow Triangle Symbol: Caution – High Intensity Light





Declaration of Conformity

Rofin declares that the product Polilight® Flare+ is CE compliant.

STANDARD COMPONENTS

The Polilight Flare+ you receive will be made up of all or some of the components from the list below:

LITHIUM ION BATTERY 12V, 4.4 Amp	
FLARE+ HEAD One or more of the following: UV / 360, 415, 450, 505, 530, 555, 620 and white	

HI-TEMP CABLE For connection between head and battery	
AC SMART CHARGER For connection to mains 110 / 240V	
AUTO CHARGER For connection to vehicle 12V outlet	
BATTERY CHARGING HOLDER Which indicates the progress of charging with orange or blue LEDs	
BELT CLIP For attaching the battery to the user's belt	

WRIST MOUNT

Used to support the head on the wrist



FILTER HOLDER

A range of filters are available:
Cone or strip beam shaping filters



GOGGLES



HEAD HANDLE



The following components are standard with the seven head Polilight Flare+ light source kit and should be included with your system:

- 8 x Polilight Flare+ light source heads
  UV/ 360, 415, 450, 505, 530, 555, 620nm and white
- 1 x Battery (second battery optional)
- Light-line Hi Temp Power Cable
- Goggles (Clear, Yellow, Orange and Red)
- AC smart charger
- Auto charger with battery holder
- Carrying Case with charger cable
- Battery - Belt Clip
- Quicklock wrist mount
- Beam profile Filters 1, 5, 10 20, 40, 80 and 90 x 1, 60 x 1 and 40 x 0.2 Degrees (Optional)
- Head Handle (Optional)
- Barrier filters (yellow, orange and red) (Optional)
- Instruction Manual



OPERATION

The Polilight Flare+ is designed to be operated either with the head attached directly to the battery or remote, connected to the battery via the Hi-Temp cable. Select the required head and insert it into the battery (or the Hi-Temp remote cable) by aligning the red dots on both parts before pushing the two together. Push the two parts together until there is a click which indicates that the latch locating the head securely has been engaged. To lock the head in position rotate the silver ring on the head counter clockwise by 1/8 turn. This assumes that you are holding the battery with the LED head pointing away from you. To remove the head from the battery rotate the silver ring 1/8 turn clockwise and pull the two apart.

DO NOT TRY TO TWIST THE HEAD AND BATTERY TO REMOVE THE HEAD. DAMAGE CAUSED WILL NOT BE COVERED UNDER WARRANTY.





When using the Hi-Temp cable, connect the cable (the connector ends are different and only fit the correct part) align the red dots and push together until fully latched connected. To remove, pull the connector away from the head (or battery) and simply pull apart.

The colored bands on the head depict the output color of the head.

The centre wavelength of the light output is also printed on the head.

Special cut off (short pass) filters have been incorporated into the 450, 505, 530 and 565 heads. Since these heads are specifically used for a wide range of fluorescent applications it is essential to remove the long spectral tail at higher wavelengths, which would normally reduce the intensity and observation of fluorescent trace evidence. The UV (360), 415 and RED have specifically narrow bands and do not require a short pass filter.



BAND	COLOR	BANDWIDTH to 1% peak
400 - 750 nm	WHITE LIGHT BAND	400 - 750 nm
360 nm	ULTRAVIOLET BAND	350 - 380 nm
415 nm	VIOLET (BLOOD FILTER)	400 - 430 nm
450 nm	BLUE	435 - 475 nm
505 nm	GREEN	490 - 520 nm
530 nm	GREEN	515 - 545 nm
555 nm	GREEN / YELLOW	540 - 570 nm
620 nm	ORANGE / RED	605 - 635 nm

Figure 2. Head Output Bandwidth

OPERATION

SWITCHING ON

To switch the light ON, press the button on the battery once and release.
To switch the light OFF, press the button on the battery once and release.

INTENSITY CONTROL

Once the light is turned on, pressing the button continuously will change the output intensity. The intensity will continue cycling in steps between 100%, to 35%, to 100%, as long as the button remains depressed. When the intensity reaches 100% or 35% it remains the same for 3 steps to indicate their location.

LOCKING THE FLARE+

Press the button 3 times in quick succession to lock the unit. After 3 seconds the unit can be unlocked by again pressing the button 3 times in quick succession.

CONTINUOUS DRIVE

Each head is fitted with a smart sensor monitoring the temperature of the head. This prevents damage to the LEDs. When operating the light at maximum power in elevated ambient conditions, it will automatically adjust the power to the lamp to avoid overheating and provide optimum battery use.

STROBING SELECTION

The strobing feature increases the intensity above the 100% continuous value to 150%. This can be used in forensic applications where both the background and the evidence fluoresce. In some situations the contrast can be improved compared to continuous illumination. To select strobing depress the button to turn on the unit and keep the button depressed. The light will continue to strobe for as long as the button is kept depressed.

FILTER INSERTION

A series of optional beam profile are available. To fit a filter, remove the front ring of the head (the split ring has two coloured elastic band retainers) and replace it with the desired beam profile filter. The number printed on the front of the filter holder is the divergence in degrees.

After finishing use of the filter remove it and replace the coloured front ring.



CHARGING

Auto Charging

Remove the optical head from the battery unit and connect the auto charger cable to the battery (remember to line up the two red dots and push the connector until it latches). If the battery holder cradle is being used, slide the battery in to the holder, orientating the guide on the battery so that it is aligned with the slot on the holder.

Plug the auto charge connector into the car 12v plug. The battery reaches 80% charged after 1 hour and then trickle charges to reach 100% after 2.5 hours. When the battery is charging the ring on the charger holder glows orange. When the battery is fully charged the ring glows blue. Remember that the battery charges up faster than the discharge when the Flare+ is in continuous full power operation. When the batteries are swapped over, the charging battery will always be ready to use by the time the battery in use with the Flare+ has discharged. Different coloured heads drain the battery at various rates.

The UV head will run on full power for over 3.5 hours after the battery is fully charged. A quick charge of only 10 minutes will give a run time of 10 to 15 minutes on full power.

AC Charger

The operation of the AC charger is similar to that described above. Connect the AC unit to the battery in the holder and then plug the smart charger into the wall socket. When the battery is charging the rim of the battery holder glows orange and when fully charged the rim glows blue.

Belt Clip



When using the Flare+ head remotely from the battery, using the hi-temp cable, the battery can be hung off your belt using the belt clip. To attach the belt clip to the battery, locate it over the protruding ring on the battery and push until it clicks to be secured. Open the belt holder and pass it over the belt and secure the clip on the holder. This supports the battery while allowing the user to hold the head remotely. To remove the belt holder, simply carry out the above locating steps in reverse order.

Quick Lock Wrist Band



Screw the metal stub into the thread on the Flare+ head. Slide the Velcro wrist band onto your arm and tighten the wrist band as required.

Remove the wrist band from the head by unscrewing the metal stub from the Flare+ head. While the wrist band is in place another head can be screwed on to a different head.

Tripod Mount

Use the threaded hole located on the head to connect the tripod.

Head Handle

The head handle can be attached to the head as shown below:





LIGHT APPLICATIONS

INTRODUCTION

The Polilight Flare+ produces powerful narrow bands of light at wavelengths between 350 nm and 670 nm. The various coloured heads of the Flare+ have been selected to facilitate various forensic applications. They are suitable for all fingerprint and other trace evidence detection techniques and can be used in three different ways to detect and enhance forensic evidence:

Fluorescence (Photoluminescence) imaging.

Reflection imaging using specular and diffused reflection.

Absorption imaging.

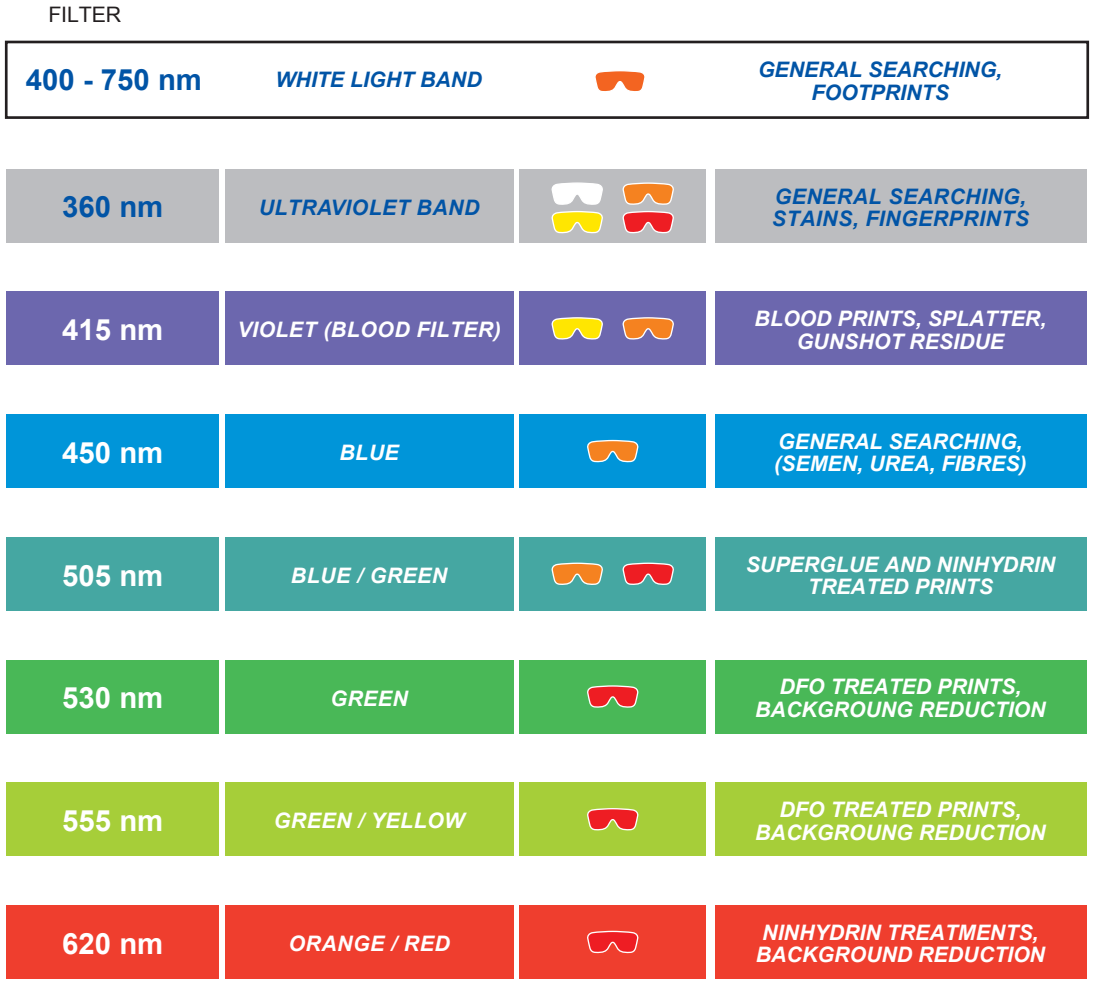


Figure 3. Polilight Flare+ and Applications

FLUORESCENCE IMAGING

Fluorescence occurs when a substance absorbs a specific band of light (energy), turns part of the energy into heat and then transmits the remainder of the energy out as new light. This new light has lower energy and hence a different colour when compared to the original illumination light. The intensity or amount of fluorescent light is always small compared to the intensity of the original light.

Example 1: Fingerprints treated with fluorescence powders or chemicals will fluoresce under certain lighting conditions. This enables very faint fingerprints which could not be photographed under normal light, to be captured with high contrast under fluorescent lighting conditions.

In the example shown in Fig. 4, the view under daylight conditions is on the left and the view when illuminated with 450 nm Flare^{+} head viewed through BP530 is on the right.

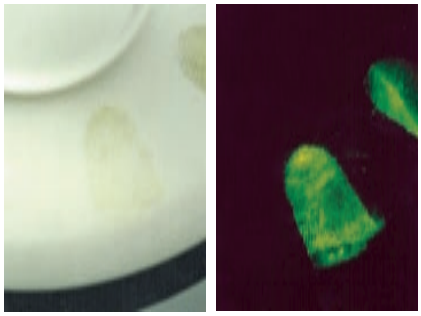


Figure 4. Fluorescence

Example 2: A number of substances and materials fluoresce naturally without any chemical treatment. Semen, urea, fibres, grease, lipstick, paper, gunshot residues and inks are examples of materials that can naturally fluoresce and hence be located on other background material.

REFLECTION IMAGING

Specular Reflection

A surface appears shiny because of specular reflection. The surface acts like a mirror and light hitting the surface is reflected away at the same incident angle.

Untreated fingerprints or shoe prints on shiny surfaces can often be seen when viewed from a suitable angle, so that light reflection to the eye or camera from the background is significantly different to the reflection from the latent print ridges. Images can be captured from a variety of shiny evidence such as cups, glasses, cans and knives.

Example: Untreated fingerprints on glass illuminated with low angle white light. As the glass is highly reflective, the fingerprint looks black as no light is reflected from it towards the eye.

Diffused Reflection

Some surfaces and evidence will reflect light in a diffuse manner known as random scatter. If evidence has different reflection characteristics to its background it can be resolved under specific lighting conditions.

Light from the background is reflected at different angles. The sample may appear lighter or darker compared to the background when viewed from above, depending upon the relative difference in diffused reflections from the surfaces.

Example: Contact impressions such as shoe prints, can be made from dust or dirt being left on, or lifted off, a flat surface. Usually side and low angle lighting with a white light produces the best results. The Flare+ has special filters (90 x 1 degrees, 60 x 1 degrees and 40 x 0.2 degrees), used for enhancing shoeprints, that change the shape of the beam from circular to a rectangular line of light. Position the Flare+ head at an acute angle, with the line of light across the surface. Try different colours according to the background colours.

ABSORPTION IMAGING

Differential Absorption

Materials can both reflect and absorb light. Certain materials are better absorbers of specific light colours and better reflectors of other colours. Differential absorption is used to reduce background interference when attempting to capture fingerprint images.

Example: After either chemical treatment or powdering, fingerprints on multicoloured backgrounds may not be able to be fully photographed because of background interference. Colours in the background can be eliminated through the use of differential absorption, whereby coloured lighting matched to the background can eliminate the background interference.

superglue treated fingerprint on money box



same fingerprint under green light



APPLICATIONS AT SCENE OF CRIME

The following examples describe some methods of detecting latent fingerprints on various surfaces using the Polilight Flare+. Clearly, these are not the only ways in which the Flare+ can be used and experimentation is encouraged, especially when dealing with latent prints on unusual surfaces.

When working in the field, the composition of the absorbing substance in the latent print will be unknown. This is determined by experimentation; varying the light from various heads systematically through the whole wavelength range.

At the same time, the barrier filter (goggles) may need to be varied in order to help distinguish between the fluorescence from the latent print and that derived from the object upon which the latent print has been deposited.

Shoe Prints 

Note	When searching a crime scene, one of the first things to look for is shoe prints. The floor area must be protected against people at the scene introducing new footprints.

The Polilight Flare+ can be used for the discovery of shoe prints and similar marks on flat surfaces such as ceramic or plastic tiles, varnished wooden floors and shiny concrete. However, it cannot be used on rough, porous or textile surfaces like carpets.

Using a very oblique angle, the powerful white light together with the 90 x 1 degrees (or 60 x 1 or 40 x 0.2 degrees) filter, is the most useful for this purpose, although it is recommended that all the Polilight bands be used for scanning, until the right band shows the best results.

⚠ **WARNING**	Amber goggles should be worn to protect the eyes.

General Fluorescent Method 

Very rapid scanning for photoluminescence traces such as transferred fibres, paint, grease, semen and vaginal fluid, sweat and urine can be achieved using the UV and 450 heads to scan the general area.

Light from the 450 nm blue head is recommended for general searching and the operator should wear the amber goggles provided. If some fluorescence is found, the other bands should be checked in case better photoluminescence can be induced in the sample or the luminescence of the background can be modified.

Sometimes it may be necessary to use barrier filters (565, 590 or 600 nm – optional extras) instead of, or in addition to, the goggles to reduce the red luminescence background, which often passes through the goggles.

The UV band together with the clear or yellow goggles, are also useful for general searching.

Example: Viewing an old couch under UV light and using clear goggles will often bring up stains and fibres. Viewing the same couch under the 450 nm band using orange goggles can often bring up a different set of stains and fibres not seen under the UV light.

This type of searching is best carried out at night or in a darkened room. In exposed situations, screening of the exhibit from external light will help but is only likely to reveal strongly fluorescent samples. After the preliminary searching, it is recommended that all mobile exhibits be taken to the laboratory for more detailed inspection under totally dark conditions.

Blood Marks

Although blood has a broad absorption spectrum, it only exhibits a single absorption maximum of around 415 nm and does not display any photoluminescence properties. This means that blood marks can only be detected directly using either the absorption or reflection mode.

In cases where the background surface bearing the blood marks is itself fluorescent, the latent marks will not fluoresce while the rest of the exhibit will fluoresce. In this case the latent will often show excellent contrast, typically a black mark against a bright yellow–orange field. Initial scanning should be conducted using the 450 nm band for illumination with the operator wearing amber goggles. All marks identified in the initial scanning should be further inspected using the full range of Polilight Flare+ bands to maximize detail.

Common fluorescent materials are varnishes, printing inks and fluorescent brighteners placed in paper or clothing during manufacture. The latter materials usually absorb at the upper end of the UV range (280 to 360 nm) and emit in the blue region. If material bearing marks is not fluorescent, or only very weakly fluorescent, scanning with the 415 nm band, which is compatible with the 415 nm blood absorption maximum, can be undertaken. Blood marks look dark against a lighter background.

In the example shown in fig.5, the view under daylight conditions is on the left and the view when illuminated with Polilight using a 415 nm light is on the right.



Figure 5. Bloody Fingerprints

⚠ WARNING	Yellow goggles should be worn to protect the eyes.

SEARCHING FOR LATENT FINGERPRINTS

Option 1: Absorption or Reflection Mode

Fingerprints contaminated with dust, dye, grease and blood or freshly deposited latent fingerprints on highly polished surfaces like glass or metal, can be searched for using this mode.

A low angle white light is used and no treatment of the print is required.

We recommend using the Rofin Australia Pty. Ltd. Episcopic Coaxial Illumination Accessory (ECIA). (See Seperate Manual)

The ECIA allows the operator to safely view the item under investigation. Various wavelengths from the Flare can be used and the resultant absorption or reflection of the evidence item can be recorded photographically.

Option 2: Inherent Fluorescent Mode 

Latent fingerprints contaminated with fluorescent matter will show fluorescent properties and glow under appropriate illumination (photoluminescence).

⚠ WARNING	Goggles are necessary for viewing this sort of latent fingerprint: Use the 450 nm blue band and wear orange goggles for initial searching; then Use the UV band and wear clear goggles. Also 505 and 530 light with red goggles should be tried.

When wearing the orange goggles, search for latent fingerprints which will glow. Any contaminated fluorescent latent fingerprints should be readily detected using this mode. When working in daylight, screening of the search area is essential. Once a latent fingerprint is located, it is recommended that it be checked using the other Flare^{+} bands to obtain optimum photoluminescence.

For photography, use 565 nm or 590 nm barrier filters (select the most appropriate) and if photography is to be carried out in daylight, that area must be screened.

Option 3: Treatment with Powders

This step is an alternative to the superglue fuming described in Option 4: Superglue Fuming. It is up to the fingerprint officers, drawing on their experience, to decide which method should be used. Both steps are applicable to non- or semi-porous surfaces.

This manual provides general methods on how to approach a problem and so particular powders or brand name powders have not been recommended. Experienced fingerprint officers will have their own favourite powders and these should be used.

The following notes are useful as a guide:

Do not over-powder. Subsequent superglue development of latent fingerprints is only possible if there is minimal powder on the ridges.

Fluorescent powder is of much higher sensitivity than normal powder. Only a very small amount of fluorescent powder is needed on top of the ridge to produce excellent latent fingerprints, while the same amount of conventional powder would be almost invisible.

On fluorescent surfaces, good results can be obtained with black, non-fluorescent powders or metal powders.

On non-fluorescent or dark surfaces, white or silver powder can be effective if used in conjunction with the strong white light from the Polilight. The angle of incidence of the white light should be varied to obtain the best results.

On coloured surfaces, try to "remove" the colour by selecting a similar coloured band from the Polilight Flare+, then use black or silver powder to achieve the best contrast or use a fluorescent powder.

Option 4: Superglue Fuming

An alternative to powder treatment is superglue fuming with Cyanoacrylate. In a serious crime, it is recommended that the area of interest be sealed with a plastic tent for superglue fuming. After superglue application, the area is searched for latent fingerprints using white light from Polilight on low intensity. Very often blue 450 nm or green 530 nm bands offer good results.

In cases where the detected fingerprint is barely visible to the eye, enhancement of the superglue developed latent should be carried out. This can be achieved using conventional powders or fluorescent powders, remembering that fluorescent powders are of much greater sensitivity.

The best results are obtained using fluorescent stains such as rhodamine 6G, Basic yellow 40, Ardox and RAM, provided that the material does not absorb the stain as well.

In the example shown in Figure 6, the view under daylight conditions is on the left and the view when illuminated with Polilight ultraviolet (UV) or 450 nm and viewed through a 530 nm BP filter is on the right.

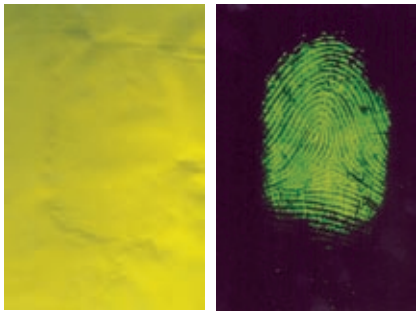


Figure 6. Adrox Treated Fingerprints

When rhodamine 6G is used for staining, the green 530 nm band is recommended, in conjunction with amber goggles. For photographing, the 590 nm barrier filter is recommended, or you can use the blue 505 nm band with the 565 nm barrier filter.

In the example shown in Figure 7, the view under daylight conditions is on the left and the view when illuminated with Polilight 505 viewed through a 565 nm filter is on the right.

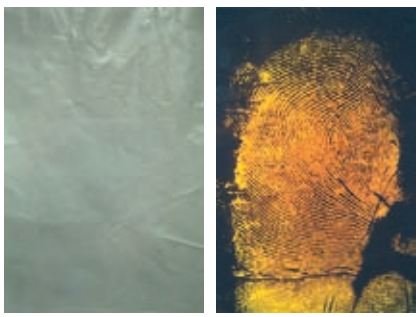


Figure 7. Rhodamine Treated Fingerprints

LIGHT APPLICATIONS

Table 1 shows the settings needed for certain crime scene examinations.

Table 1 – Examination and recording conditions

Technique	Mode	Polilight Band	Barrier Filter
Ninhydrin developed fingerprints	Absorption	White light	BP565
Ninhydrin developed and **cadmium** post-treated fingerprints	Absorption	**505** nm	Darkened room, no barrier filter
	Photoluminescence (77K)	**505** nm	OG550 or BP590
Ninhydrin developed and **zinc** post-treated fingerprints	Absorption	**490** nm or **505** nm	Darkened room no barrier filter
	Photoluminescence (77K)		OG550 or BP565
DFO developed fingerprints	Photoluminescence (RT)	**555** nm	BP600 or BP610
		530 nm	OG590 or BP590
		505 nm	OG550 or BP565
IND-Zn developed fingerprints	Absorption	White light	BP530
	Photoluminescence (RT)	**505** nm	OG550 or BP565
Cyanoacrylate developed and **rhodamine 6G** stained fingermarks	Photoluminescence	**530** nm	OG590 or BP590
		505 nm	OG550 or BP565
Cyanoacrylate developed and **basic yellow 40** stained fingermarks	Photoluminescence	**450** nm	OG515, OG550 or BP565
Blood stains (or fingerprints in blood)	Absorption	**415** nm	Dark conditions, no barrier filter
		415 nm or White Light	BP415
Semen stains	Photoluminescence	**UV** or **415** nm	Yellow Goggles
		440 or **450** or **505** nm	Orange Goggles
		530 nm	Red Goggles

OPTIONAL ACCESSORIES

INTRODUCTION

A number of optional accessories are available to allow the user to enhance the operation of the Polilight Flare+ . These are:

- Optional wavelength heads including infrared
- Episcopic Coaxial Illumination Accessory,
- Barrier Filters,
- Beam shaping filters

OPTIONAL WAVELENGTH HEADS INCLUDING INFRA-RED OPERATION

Additional Flare+ heads can be purchased as options on request (delivery is normally 12 weeks). These include wavelengths found in the Polilight PL500 (440, 470, 490, 555, 590, 620 and Infra-red wavelengths 780, 820 and 950nm).

⚠ **WARNING**	The IR is invisible to the naked eye. Extra care should be taken when using these wavelengths.

Example of using IR with IR sensitive camera or night vision goggles

Figure 8 is of a dark jumper that under normal light shows a bullet hole but not much else. Under IR 820 nm light you can now see a blood stain which is the medium tone and a powder deposit which is the dark tone.

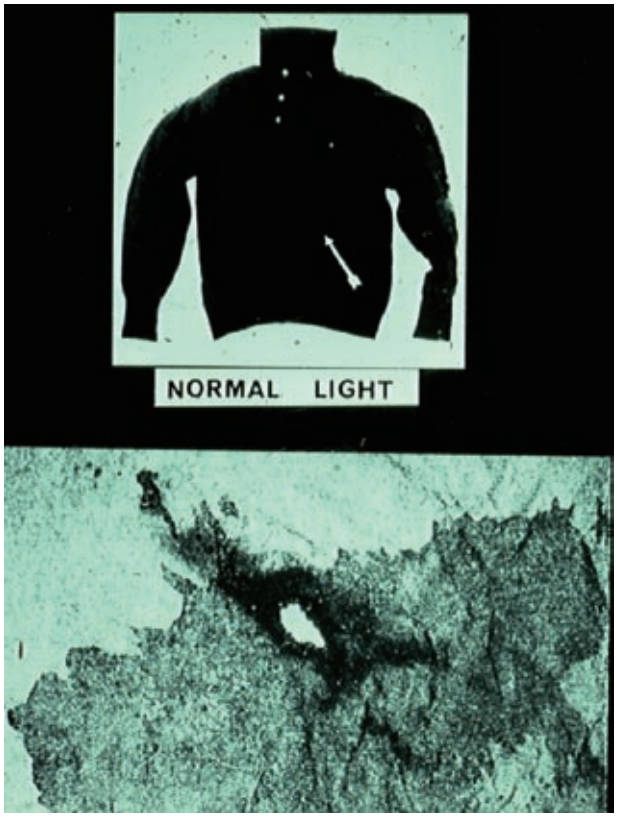


Figure 8. Bloodstained Jumper

Figure 9 shows a hit and run accident. Under normal light you cannot see much, but under IR 780 nm you can see the tyre tread quite clearly.

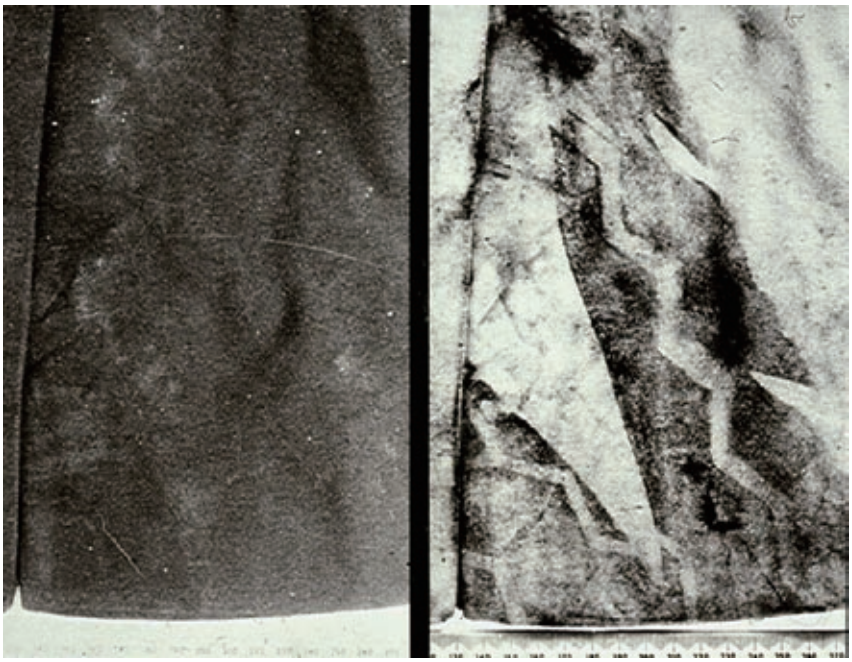


Figure 9. Tyre Tread Under Infra-Red

EPISCOPIC COAXIAL ILLUMINATION ACCESSORY

This accessory allows untreated fingerprints on non-porous surfaces to be viewed and photographed easily. It is a very powerful tool. Figure 10 shows an untreated print on a glass surface (available for Flare+ in Nov 2007).

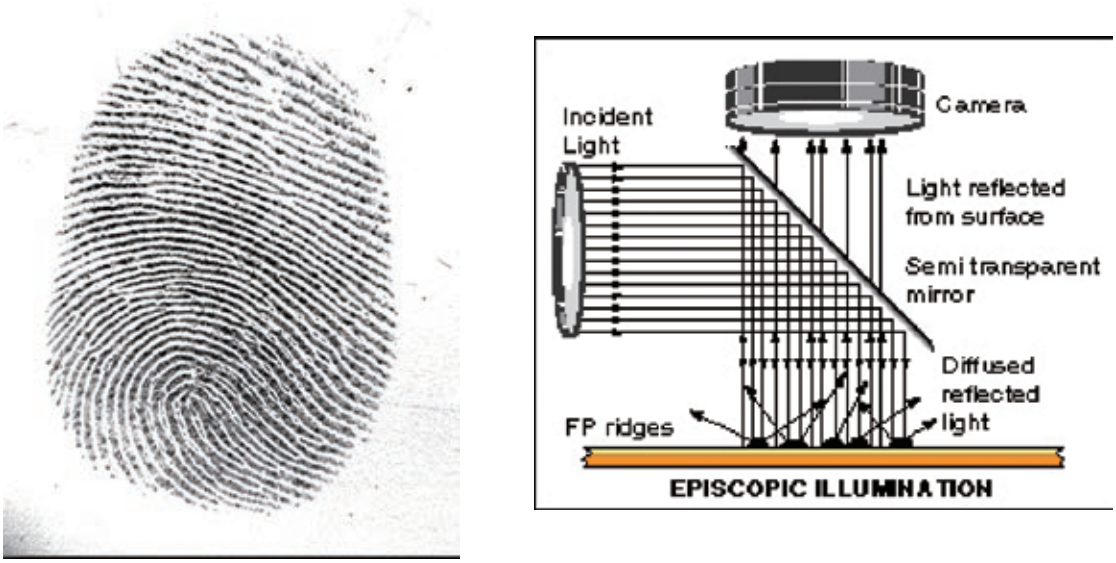


Figure 10. Untreated print on glass surface view using ECI

BAND PASS AND LONG PASS FILTERS

Four additional band pass filters are available for photography while using the Polilight. These are:

- 415 nm (Violet), (± 20nm)
- 565 nm (Green / orange), (± 20nm)
- 590 nm (Orange), (± 20nm)
- 610 nm (Orange / red). (± 20nm)

In addition 3 Long Pass filters are available for photography while using the Polilight. These are:

a. OG 515
b. OG 550
c. OG 590

BEAM SHAPING FILTERS

Special filters are available which change the shape of the Flare+ output beam. These filters are attached to the front of the Flare+ head. Available filters are:

CONE ALTERING TYPE

1, 5, 10, 20, 40, 80 Degrees

Useful for evenly illuminating large areas.

SLIT FORMING

90 x 1 Degrees, 60 x 1 Degrees and 40 x 0.2 Degrees

Useful for illuminating surfaces to view shoeprints.

MAINTENANCE

INTRODUCTION

The Flare+ is built to last. We do not make spare parts to repair the operation of the unit. Any problems and we replace the unit. The unit is warranted for 2 years. However, if the end rings get damaged, replacements can be ordered.

CLEANING

- The exterior of the unit can be cleaned with a wet soft cloth (dilute mild detergent can be used).
- DO NOT use harsh solvents such as acetone, methyl ethyl ketone, methylated spirits, etc.
- Care should be taken when cleaning the optics of the output end.
- DO NOT use any abrasive material on the optics.
- Use a soft dry cloth.

SPECIFICATIONS AND DEFINITIONS

INPUT POWER

Lithium ion – capacity : 12 Volts, 4.4 amps

Mains charger and car charger adapter supplied as standard

WEIGHT SPECIFICATION

(head and battery) 871 grams (31 oz)

Head – 260 grams, Battery 611grams

DIMENSIONS

Head diameter 61 mm (2.442")

Body diameter 46 mm (1.8")

Overall length 240 mm (9.4")

Head length 90 mm (3,5")

Battery length 180 mm (7.2")

Housing : Anodised Aerospace grade aluminium

Grip : Thermoplastic – rubber

LIGHT OUTPUT

Multiple array Light Emitting Diode, >50,000 hours use

Lens :	5 degrees
Continuous operation :	100% output 120 min 70% output 240 min 35% output 480 min
Light output :	White = 1680 Lumens WR output
	UV = 2450mw and 415nm = 6500mw optical output
Strobe effect :	500 Watt
Usable light :	1 lux at 450 m (1200 ft)
Signalling :	22 Km (14 miles) in clear weather conditions

BATTERY LIFE

10 years in normal operation

WATERPROOF:

Submersible to 100 m (300 ft)

Salt water resistant

OPTICAL OUTPUT BANDS

Band	Colour	Band Width	Application Examples
BLANKED			
400 to 680 nm	White light band	280 nm	General searching (footprints)
360 nm	Ultra violet band	30 nm	General searching (stains, fingerprints)
415 nm	Violet (blood filter)	30 nm	Blood prints, splatter, gunshot residue
450 nm	Blue	30 nm	General searching (semen, urea, fibres)
*470 nm Optional	Blue	30 nm	General searching (ninhydrin prints)
*490 nm Optional	Blue	30 nm	General (semen, urea, fibres)
505 nm	Blue / Green	30 nm	Superglue and ninhydrin treated prints
530 nm	Green	30 nm	DFO treated prints, background reduction
555 nm Optional	Green / Orange	30 nm	DFO treated prints, background reduction
*590 nm Optional	Orange	30 nm	Ninhydrin treatments, background reduction
620 nm	Orange / red	30 nm	Ninhydrin treatments, background reduction
*650 nm Optional	Red	30 nm	Ninhydrin treatments, background reduction
*Infrared 720, 750, 820, 950 Optional	Infrared	30 nm	Document examination

AVAILABLE FILTERS

Filter	Status
Camera filter, 50 mm high pass, mounted OG550	Optional Accessory
Camera filter, 50 mm high pass, mounted GG475	Optional Accessory
Camera filter, 50 mm high pass, mounted OG515	Optional Accessory
Camera filter, 50 mm high pass, mounted OG590	Optional Accessory
Camera filter, 50 mm high pass, mounted GG490	Optional Accessory
Band Pass mounted 50 mm Filter 565 to 40 nm	Optional Accessory
Band Pass mounted 50 mm Filter 555 to 24 nm	Optional Accessory
Band Pass mounted 50 mm Filter 415 to 40 nm	Optional Accessory
Band Pass mounted 50 mm Filter 450 to 80 nm	Optional Accessory
Band Pass mounted 50 mm Filter 530 to 40 nm	Optional Accessory
Band Pass mounted 50 mm Filter 590 to 40 nm	Optional Accessory
Band Pass mounted 50 mm Filter 610 to 40 nm	Optional Accessory
*Filter Goggles 555 nm (Semen Searching)	Optional Accessory
*Filter Goggles 530 nm (Semen Searching)	Optional Accessory

** Available on special request – delivery 12 weeks.*

ACRONYMS AND ABBREVIATIONS

Term	Description
Absorption filters	Optical filters remove unwanted electromagnetic radiation by an absorption process (which results in heat generation). Remaining wavelengths are transmitted.
ABTS	A dip used for revealing blood on porous and non-porous surfaces.
ALS	Alternative Light Source.
Ardrox	Fluorescent spray for enhancing latent prints developed with cyanoacrylate (superglue).
Band Pass Filter (BP)	A band pass filter is designed to transmit over a specific wavelength range, while at the same time rejecting the rest. In this way, the band pass filter creates a 'monochromatic band' of the light by transmitting a discrete band of wavelengths.
BW	Band Width.
Cyanoacrylate	Superglue.
DFO (Diazafluoren)	A spray or dip used for developing prints on dry, porous papers.
FLS	Forensic Light Source – a specialised light source designed for forensic applications, for example, the Polilight.
Fluorescence	The direct emission of light from a material following the absorption of light energy. The fluorescence process is fast and fluorescence emission occurs only during the exposure to the excitation light. When the excitation light is removed, fluorescence emission ceases.
Fuming	Developing latent prints using the fumes from heated cyanoacrylate.
Goggles	Fully wrap-around eye protection to be worn by all personnel within 15 m of the operating light source.
Iodine fuming	A fuming technique that may be used on porous and non-porous surfaces.
Light guide	A light transmitting liquid filled tube used to direct the light beam.
Luminescence	The cold emission of light following energy absorption. Examples include: • Photoluminescence (the absorption of light energy). • Chemiluminescence (energy from a chemical reaction). • Thermoluminescence (absorption of heat energy). • Bioluminescence (energy from a biological process).
MBD	Fluorescent spray or dye for enhancing latent prints developed with cyanoacrylate.
Ninhydrin	A spray or dip used for developing prints on porous paper and cardboard.
nm	Nanometre – one billionth of a metre.
Photoluminescence	The cold emission of light from a material following the absorption of light energy. This emission can be immediate (fluorescence) or delayed (phosphorescence).
RAM	A mixture of fluorescent stains used to enhance cyanoacrylate developed prints. Used on non-porous surfaces.
Rhodamine	Fluorescent dye or spray for enhancing latent prints developed with cyanoacrylate. Used on non-porous surfaces.
Superglue	Cyanoacrylate used in fuming to develop latent prints
UV	Ultraviolet light. Electromagnetic radiation in the range of 200 nm to 400 nm.
Wavelength	The length of one wave unit. Wavelength is the distance between the two nearest points in the same phase of motion. Wavelength is inversely proportional to energy.


innovative solutions in technology & light