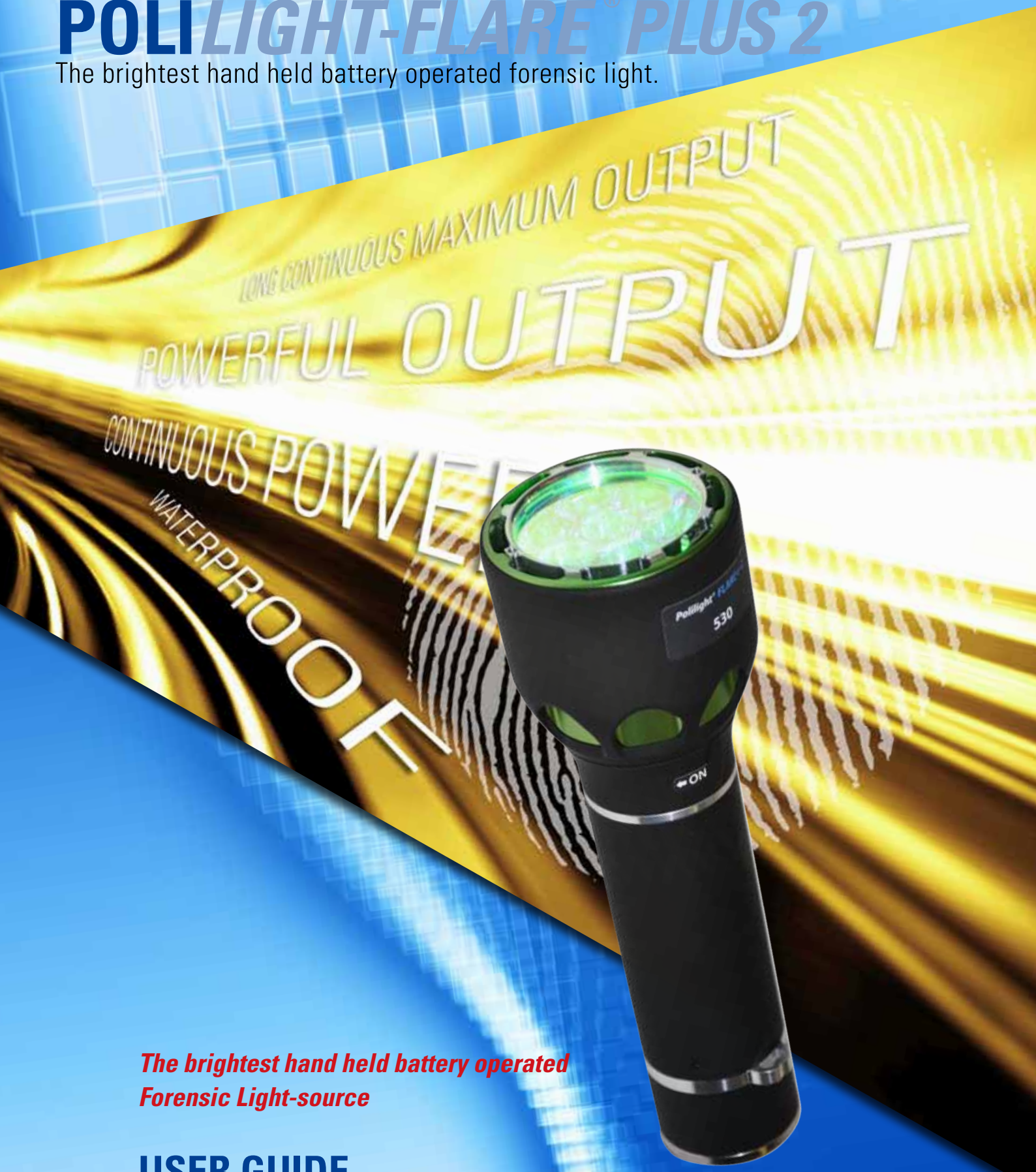
POLILIGHT-FLARE® PLUS 2

The brightest hand held battery operated forensic light.



The brightest hand held battery operated Forensic Light-source

USER GUIDE

Version 3.0

CE

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INTRODUCTION AND SAFETY STANDARDS

INTRODUCTION

The Polilight Flare PLUS 2 (Flare+2) is a battery driven, multiple array "state of the art" Light Emitting Diode (LED) forensic light-source with a variety of filtered light outputs (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+2 produces powerful narrow bands of light at centre wavelengths of 365, 415, 450, 505, 530, 545, 620 nm and 850nm in addition to white light. The 415,450, 505, 530 and 545nm, units are fitted with very deep rejection short-pass filters which give 10^{-6} rejection of stray light outside the band. This is particularly important for visualizing weak fluorescent evidence. 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 diffusion filters giving an extra divergence of 5, 20 and 50 beam cone or a line of light using the 60 x 1 degree filters.

Each output head has its own battery supply with inbuilt battery charge status indicator. The battery is charged in one of four charger cradles fitter in the carrying case using either the mains supply power unit or from the vehicle battery using the cable provided.

The Flare+2 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. The unit is controlled using a Reed switch system incorporated in the collar at the base of the head.

SKIN PROTECTION

The Polilight Flare+2 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 theFlare+2. Appropriate clothing such as gloves and long sleeved shirts should be worn at all times when working with or near the unit . The maximum intermittent direct beam skin exposure must not exceed 20 minutes per day, while the maximum continuous direct 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 since the light is directed away from the user.

EYE PROTECTION

Four pairs of safety goggles, each a different colour, are supplied with the Flare+2. The appropriate goggles are to be worn by the operator and all people within 15 metres of a working Polilight Flare+2 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

MANUFACTURER DETAILS

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Declaration of Conformity

Rofin declares that the product Polilight® Flare+2 is CE compliant.

STANDARD COMPONENTS

The Polilight Flare+2 you receive will be made up of all or some of the components from the list below:

FLARE+2 UNITS

Choose from the following:
UV / 365, 415, 450, 505, 530, 545, 620, white. (IR 850 + 940nm available upon request)
The color of the head indicates the output light color. The number on each head indicates the centre wavelength of the light output.

MAINS CHARGER (AC CHARGER) CABLE – BATTERY TO PSU POWER CABLE

For connection to mains 110 / 240V

AUTO CAR CHARGER

For connection to vehicle 12V outlet

CHARGER – WITH INDICATOR
Which indicates the progress of charging with orange or blue LEDs

BALL MOUNT
used to connect the unit to a tripod

BEAM SHAPING FILTERS
5°, 20°, 50° and 60 x 1°

GOGGLES

The following components are standard with the eight head Polilight Flare+2 light source kit and should be included with your system:

- 8 x Polilight Flare+2 light sources
  UV/ 365, 415, 450, 505, 530, 545, 620nm, (850nm optional) and white each with a fitted battery
- Goggles (Clear, Yellow, Orange and Red)
- Mains charger
- Auto charger with battery holder
- Carrying Case with charger cable and 4 charger cradles cradles
- ball mount
- Beam profile Filters 5, 20, 50 and 60 x 1°
- Barrier filters (yellow, orange and red) (Optional)
- Instruction Manual

OPERATION

The Polilight Flare+2 is operated using the Reed switch collar at the base of the head.

SWITCHING ON/OFF

1. Turn to the left and release turns the unit ON.
2. When ON - Turn to the left and release turns the unit OFF.

INTENSITY CONTROL

3 . When ON – Turn to the right and hold varies the output intensity in steps.

The intensity will continue cycling in 5 steps between 100%, to 35%, to 100%, as long as the switch is turned to the right. When the intensity reaches 100% or 35% it remains the same for 3 steps to indicate their location.

LOCKING THE FLARE+

4. Turn to the left and release four times within 3 seconds, locks the battery for air travel which can be released by repeating the 4 turns to the left within 3 seconds.

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:-

5. When ON – Turn to the left and hold selects strobing which continues until released.

SOS MORSE CODE

6. When ON - Turn to the right and release four times within 3 seconds initiates an SOS morse code output.

CONTINUOUS DRIVE

The unique cooling vents (patent pending) allow the unit to operate continuously without dimming. This means that you get maximum light out-put all the time.

SHORT-PASS FILTERS

The color of the head depicts 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 415, 450, 505, 530 and 545 heads. Since these heads are specifically used for a wide range of fluorescent applications it is essential to remove the long spectral tail of the LED output at higher wavelengths produced by the LEDs, which would normally reduce the intensity and observation of fluorescent trace evidence. The UV (365), and RED head outputs have specifically narrow bands and do not require a short pass filter.

DIFFUSER FILTER INSERTION

A series of optional beam profile filters are available. To fit a Diffusion filter, simply slide the TAB of the filter into the slot in the front ring and push the opposite side downward until it is held by the small spring. To remove the Diffuser displace the retainer outwards to release the filter. There are 4 types of Diffuser giving an extra divergence of 5, 20 and 50 degree beam cone or a line of light using the 60 x 1 degree filters. The number printed on the front of the filter holder is the divergence in degrees.

Inserting the diffusion filter

Releasing the diffusion filter

CHARGING

The carrying case has 4 charger cradles. The units inserted into the cradles can be charged using either mains or car battery supplies. Two cables are provided, one for connection to the mains charger and another for connection to a car battery outlet. The cradle indicates the progress of the charging, illuminating orange when charging or Blue when charging is complete. Batteries retain their charge for 1 year when they are not in use.

Auto Charging (DC Charging)

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+2 is in continuous full power operation. Different coloured units drain the battery at various rates. (see time of use diagram below)

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.

OPERATION

Mains Charger (AC Charging)

The operation of the AC charger is similar to that described above. Connect the AC unit to the carry case (connected to the 4 battery charger cradles) 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.

One of the benefits of the Lithium Ion Battery is that it allows you to use the unit after only partial charging. You do not have to wait until it is fully charged to use the Flare+2.

Always keep the flashlight fully charged when not in use. This will prolong the overall battery life time. The Li-ion battery's chemistry is not able to survive longer periods without energy so if not charged with a timely interval your batteries will get less efficient and the chemistry inside will eventually give up. So therefore remember to fully recharge your flashlight before storing it for longer periods of time. The self-discharge time is 1 years. The unit can be left in the charger cradle when it is fully charged (rim glows blue).

Extended battery lifetime: The batteries can do a minimum of 300 FULL charges if handled correctly, after 300 charges the output will decrease by 20%. After 500 charges the battery will only have 50% of its original capacity and will need to be replaced.

Since the batteries and the charging is controlled by our intelligent inbuilt charging circuitry the lifetime is maximized. With a daily use of 1-2 hours the batteries will last for many years. When the battery needs to be replaced - it will be possible to refurbish it with a new one (you have to send the flashlight to an authorized Servicepartner to get it refurbished).

Inbuilt Charging circuitry: Every individual flashlight has its own inbuilt charging circuitry which makes it possible to charge the Flare+2 directly from the car when provided with 13.5 volt up to 18 volt (the reason for using 13.5V as opposed to 12V is that we don't want to drain vehicle battery unless the generator is running).

40 pcs. of size AA batteries: The battery capacity that the Flare Plus holds is equal to approx. 40 units of size AA batteries but we only use 1/3 of the space/volume for the same power output and 1/2 of the weight. We pack in that amount of energy because we emit a lot of light and use a lot of energy. To obtain that much power we use the latest technology from the computer laptop industry. The result is low unit volume, high degree of battery safety, and small volume size compared to output.

All batteries can be transported by air without special permission, as the amount of lithium is below the allowed equivalent lithium content according to the new TSA regulations on lithium batteries (January 1, 2008). Also all Flare+2 batteries can be "locked", so the light won't be turned on by accident during transport.

Tripod Mount

The Ball mount provided is screwed into the tread located on head of the unit. The screw thread on the Ball mount is used to attach the unit to a standard Tripod mount.

Decontamination of Flare+2 after use at a scene of crime

To clean the Flare+2 use a Neutral detergent such as Liquinox, Alconox, Surgicleanse Neutral Detergent or equivalent

These Neutral Detergents are powerful, low-foaming, non-ionic detergent for the rapid and efficient removal of biological materials from sensitive clinical surfaces and instruments prior to disinfection.

The Battery is submersible in disinfectant such as CAVICIDE or equivalent.

The Head is submersible in disinfectant such as CAVICIDE or equivalent from base to below output filter. Output filter wiped with CAVICIDE or equivalent.

Polilight Flare+2 Spectra

Color/Centre	Wavelength	Half Peak Bandwidth
UV	365nm	360 – 385nm
Purple	415nm	405 – 420nm
Blue	450nm	435 – 465nm
Cyan	505nm	485 – 515nm
Green	530nm	510 – 545nm
Green/Yellow	545nm	530 – 560nm
Red	620nm	615 – 635nm
White		400 – 700nm
InfraRed 850nm		835 – 865nm

LIGHT APPLICATIONS

INTRODUCTION

The Polilight Flare+2 produces powerful narrow bands of light at wavelengths between 350 nm and 670 nm. The various coloured heads of the Flare+2 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.

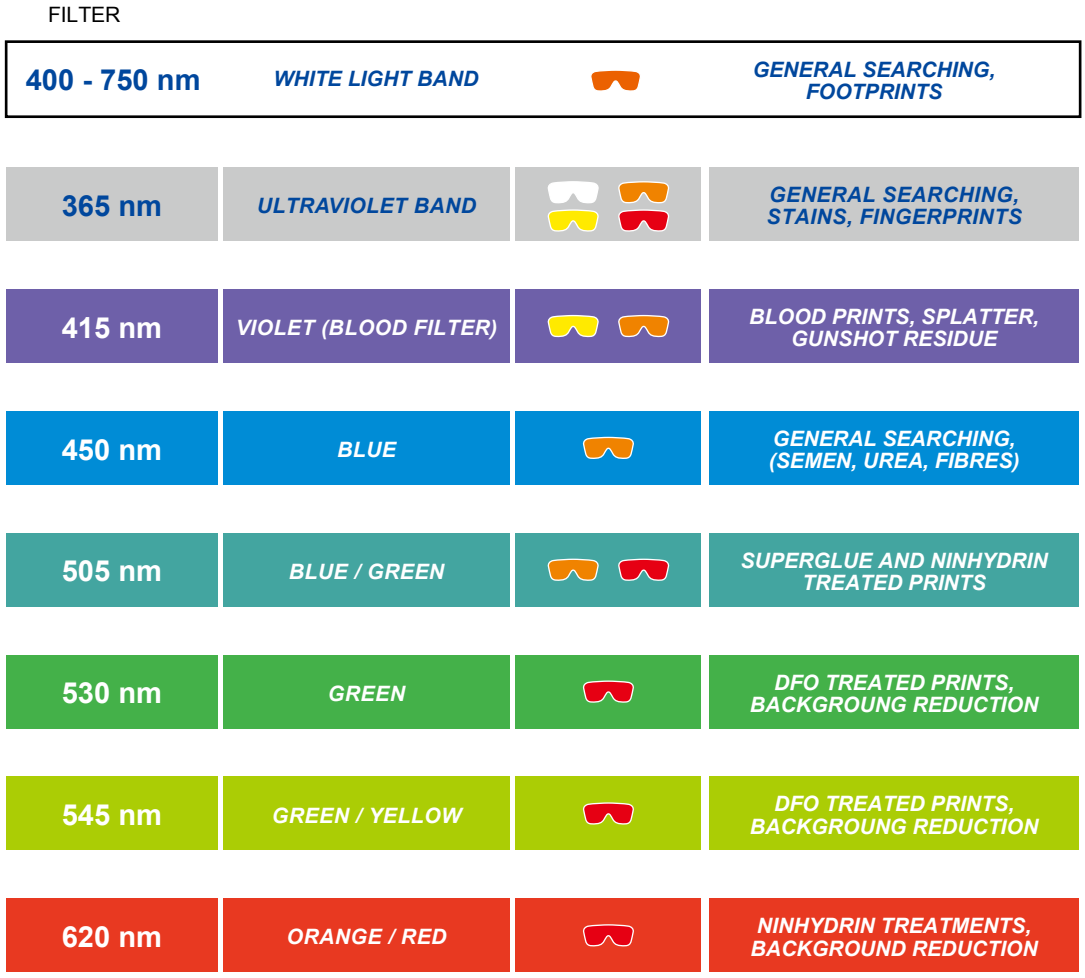

Figure 3. Polilight Flare+2 and Applications

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+2 head viewed through BP530 is on the right.

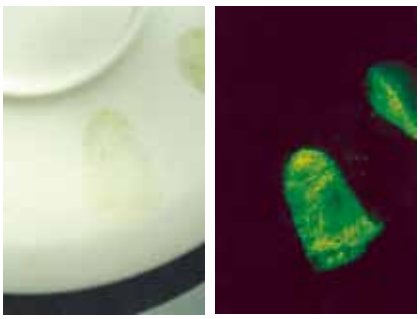

Figure 4. Fluorescence

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. Alternatively when the light is ancident at a low angle the fingerprint ridges scatter the light and they appear bright against the background.

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+2 has a special 60 x 1 degrees filter, used for enhancing shoeprints, that change the shape of the beam from circular to a rectangular line of light. Position the Flare+2 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+2. Clearly, these are not the only ways in which the Flare+2 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+2 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 60 x 1 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 (545, 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+2 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.

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 orange and 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+2 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+2, 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.

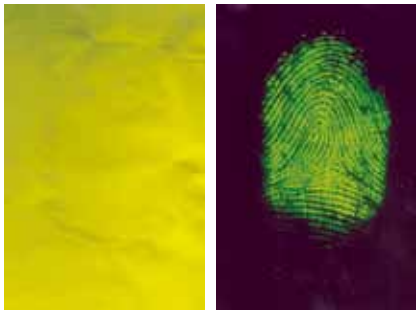

Figure 6. Adrox Treated Fingerprints

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.

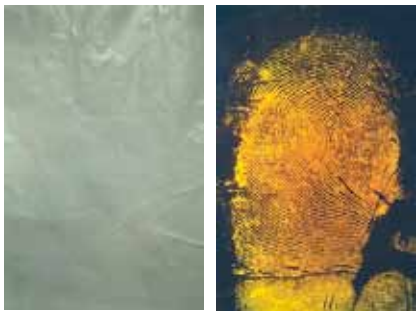

Figure 7. Rhodamine Treated Fingerprints

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)	**545** 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
		850 nm Infra Red	IR senstive Camera
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+2. These are:

- Optional wavelength heads including infra-red 850 and 940nm
- Barrier Filters

OPTIONAL WAVELENGTH UNITS HEADS INCLUDING INFRA-RED OPERATION

Additional Flare+2 units can be purchased. These include wavelengths found in the Polilight PL500 (Infra-red wavelengths 850 and 940nm).

⚠ **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 850 nm light you can now see a blood stain which is the medium tone and a powder deposit which is the dark tone.

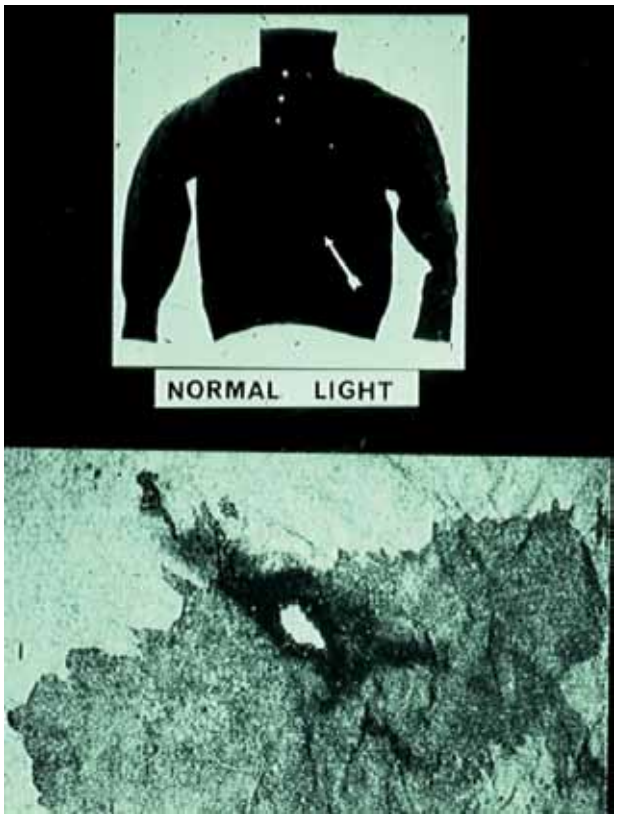

Figure 8. Bloodstained Jumper

BAND PASS AND LONG PASS FILTERS

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

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+2 output beam. These filters are attached to the front of the Flare+2 head. Available filters are:

CONE ALTERING TYPE

5, 20, 50 Degrees

Useful for evenly illuminating large areas.

SLIT FORMING

60 x 1 Degrees

Useful for illuminating surfaces to view shoeprints.

MAINTENANCE

INTRODUCTION

The Flare+2 is built to last.The unit is warranted for 1 year. 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

Lithum ion – capacity : 11.1 Volts, 5.2 amps

Mains charger and car charger adapter supplied as standard

WEIGHT SPECIFICATION

(head and battery) 700 grams (24.9 oz)

DIMENSIONS

Head diameter 74 mm (2.913")

Body diameter 46 mm (1.8")

Overall length 230 mm (9.055")

LIGHT OUTPUT

Multiple array Light Emitting Diode, >50,000 hours using Lens - 5 degrees

Continuous operation : 100% output 200 min; 35% output >1400 min

Light output : White = 3300 Lumens CW output

Strobe effect : >500 Watt incandescent light equivalent

BATTERY LIFE

10 years shelf life and 300 – 500 complete charge cycles in normal operation

WATERPROOF:

White light unit submersible to 100 m (300 ft)

Salt water resistant

SPECIFICATIONS AND DEFINITIONS

OPTICAL OUTPUT BANDS

Band	Colour	Half Peak Band width	Application Examples
BLANKED			
400 to 700 nm	White light band	300 nm	General searching (footprints)
368 nm	Ultra violet band	17 nm	General searching (stains, fingerprints)
415 nm	Violet (blood filter)	15 nm	Blood prints, splatter, gunshot residue
450 nm	Blue	30 nm	General searching (semen, urea, fibres)
505 nm	Blue / Green	30 nm	Superglue and ninhydrin treated prints
530 nm	Green	35 nm	DFO treated prints, background reduction
545 nm	Green / Orange	30 nm	DFO treated prints, background reduction
620 nm	Orange / red	20 nm	Ninhydrin treatments, background reduction
Infrared 850 and 940nm	Infrared	30 nm	Document examination Blood on Dark surfaces Anti-Stokes visualisation

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).

ACRONYMS AND ABBREVIATIONS

Term	Description
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.