

'Safety First with UV Light'



UV 5W LED TORCH
high output 370 nm LED

Operating Manual

(including maintenance and health and safety)



'Safety First with UV Light' Training Courses



Peace of mind that you've got risk assessment and control covered, along with the confidence and acceptance of your process by the workforce.

The Control of Artificial Optical Radiation at Work Regulations 2010 brought into UK law statutory UV light exposure limit values (ELVs) for unprotected skin and eyes.

The Regulations define:

- Minimum health and safety requirements for the protection of employees from the risks arising from UV light exposure.
- Employers must determine personal UV light exposure levels and compare with the ELVs as a means of assessing risk and necessary controls.
- Employees **must not** be exposed above the statutory ELVs and **must** be provided with protection and UV hazard awareness training.

To help you comply with these regulations and ensure the safe use of UV light in your workplace, we offer the following training courses. These are designed to help you meet your legal obligations for compliance with UV light personal exposure limits and specific hazard awareness training for employees.



Risk assessment and control of personal UV light exposure

One day course providing information to help persons responsible for risk assessment and safe use of UV light equipment, welders and plasma cutters in your workplace.



Hazard awareness training

Bespoke information and training for operators, supervisors, maintenance personnel and managers of UV light equipment, welders and plasma cutters.

Designed to help ensure safe use for your particular application.

Usually conducted on-site and consisting of two hours practical training.

To sign up please contact our sales department

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Issue No. 4/15

1 OptiMinUV® - Optimizing your Process – Minimizing the Risk

The UV 5W torch is supplied as an individual product or as part of an OptiMinUV® solution which also includes:

- UV meter for process control
- Health and safety products
- Training course - '*Safety First with UV Light*'

The training course is designed to help you meet your legal obligations for compliance with personal UV light exposure limits and specific hazard awareness training for employees. The result is peace of mind that you've got performance, risk assessment and control covered, along with the confidence and acceptance of the process by your workforce.

OptiMinUV® is the 'Gold Standard' which guarantees optimum performance, easy implementation and compliance with Health and Safety Regulations. This provides peace of mind that performance, risk assessment and control is covered, along with the confidence and acceptance of the process by the workforce.

2 Product Description

The UV 5W LED torch includes re-chargeable battery, spare re-chargeable battery, battery charger (mains and car) and pouch. It is designed for the following applications:

UV light fluorescent inspection, UV light curing of materials, UV light exposure

It **MUST NOT** be used for any other purpose without first consulting UV Light Technology Limited.

Disclaimer – UV Light Technology Limited cannot accept responsibility for damages resulting from improper use or use for any purpose other than those intended.

To help prevent accidents or ill health all operators and maintenance personnel must read, fully understand and follow all the instructions and warnings contained in this manual **BEFORE** operation or maintenance. It should always be readily available and prominently located in the area of usage. If you have any questions please telephone +44 (0)121 423 2000.

Due to our policy of continuous product development, we reserve the right to amend specifications and technical data, therefore information in this manual may be subject to change without prior notice.

Spares and accessories



Re-chargeable Battery

Additional lithium-ion battery to ensure a fully charged battery is always available.



**Belt pouch
(NATO Loop)**



Battery Charger

Spare battery charger to avoid unnecessary delays due to loss or accidental damage

Process control and health and safety products



UV Meter

For monitoring UV-A light irradiance levels for process control and assessing personal exposure levels.



UV Blocking Spectacles

Eye protection against potential adverse health effects of UV light exposure. Conform to BS EN 170 and BS EN 166.



UV Hazard Warning Sign

A4 laminated.

3 Health and Safety

Under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, it is necessary to assess the health and safety risks associated with work activities affecting employees and non-employees and take measures to control these risks as far as is reasonably practicable.

The following health and safety hazards should be assessed: UV Light Exposure, Fire, Explosion and Electrical. Details are provided in sections 3.1 to 3.4.

3.1 UV light exposure



Safety Classification in accordance with BS EN 62471:2008
Risk Group 3

Warning - UV emitted from this product

Over exposure to UV light can cause adverse health effects, such as erythema (sunburn), photoconjunctivitis and photokeratitis (arc eye) in the short term (acute effects) and can be attributed to premature skin ageing, skin cancer and cataracts as a result of repeated exposure in the long term (chronic effects).

The risk for adverse health effects to unprotected skin and eyes from UV light exposure depends on the wavelengths, irradiance levels and personal exposure time.

Occupational UV light exposure in Great Britain is subject to the Control of Artificial Optical Radiation at Work Regulations 2010, which brought into law on 27th April 2010, the European Physical Agents (Artificial Optical Radiation 2006/25/EC) Directive. This incorporates statutory UV light Exposure Limit Values (ELV's). The Regulations define:

- Minimum health and safety requirements for the protection of employees from the risks arising from UV light exposure.
- Employers must determine personal UV light exposure levels and compare with the ELVs as a means of assessing risk and necessary controls.
- Employees **must not** be exposed above the statutory ELVs and **must** be provided with protection and UV hazard awareness training.

The ELVs define a level of UV light exposure, below which it is believed that nearly all individuals may be repeatedly exposed without adverse health effects.

The ELVs – within an 8 hour period per day are as follows:

**Maximum permissible effective radiant exposure to
UV light in the spectral region 180nm-400nm (UV-A, UV-B and UV-C)
for unprotected skin and eyes = 30 J/m² eff**

**Maximum permissible radiant exposure to
UV light in the spectral region 315nm-400nm (UV-A)
for unprotected eyes = 10,000 J/m²**

The ELVs take into account the daily 24 hour light/dark cycle where cellular repair can take place after the exposure is discontinued. Therefore, in cases where continuous exposure for longer than 8 hours is possible, for example 10-12 hour extended shifts or even double shifts, special care needs to be taken.

Where personal UV light exposure levels comply with the ELVs, the risk can be considered low for the majority of the population and adequately controlled so far as is reasonably practicable.

Where personal UV light exposure exceeds the ELVs this constitutes a regulatory offence and additional control measures must be implemented which decrease exposure to below the ELVs.

Control measures

The objective is to ensure that the ELVs for unprotected skin and eyes are not exceeded by any person. This should be achieved by a combination of the following control measures: administrative, engineering, personal protective equipment. Emphasis should be placed on administrative and engineering control measures to minimize the need for personal protective equipment.

All persons who could be exposed to levels of UV light exceeding the ELVs or significant personal exposure must be provided with sufficient information and training to understand the associated risks to their health and precautions which should be taken to adequately manage the risk.

Administrative control measures

Any person who notices any unusual or adverse reaction thought to be due to UV light exposure should not be further exposed until after consulting with a suitably qualified person.

It is essential that the following information regarding the UV bulb and UV black filter glass is fully understood and complied with.

Compliance with UV light exposure limit values for unprotected skin and eyes defined by The Control of Artificial Optical Radiation at Work Regulations 2010

The ELVs, combined with UV light spectral irradiance measurements for the UV torch have been used to calculate maximum permissible UV light personal exposure times (MPEs) at defined positions. These are known as hazard values and are provided below.

Hazard Values		
Distance from front glass (mm)	Maximum permissible UV light exposure times within an 8 hour period per day	
	unprotected skin	unprotected eye
100	2.5 minutes	1.5 seconds
200	3.5 minutes	3 seconds
500	20 minutes	30 seconds
750	1 hour	2 minutes
1000	2 hours	4 minutes
2000	8 hours (HD) with eye protection	16 minutes
3000		30 minutes

Only applicable to a UV 5W LED torch, supplied by UV Light Technology Limited.

UV light irradiance measurements used to produce the hazard values above were taken in the centre of the beam where UV light irradiance is highest. Therefore, for exposures towards the edges of the beam, an extra safety factor is built in due to reduced UV light irradiance levels.

Where a person is located behind or outside the UV light beam shining directly at a reflective surface, determine the MPEs by using the distance from the front glass to the reflective surface and back to the person. This method will automatically introduce an additional safety margin due to reflective losses.

Alternatively, using our UV meter, calculate a reflective loss correction factor to use with the hazard values above. This method is covered during our training course - '*Safety First with UV Light*'.

The distance at which the MPE is equal to 8 hours is known as the Hazard Distance (HD), beyond which the exposure limit value cannot be exceeded.

It is necessary for duty holders to limit personal UV light exposure to below MPEs for unprotected skin and eyes.

All persons must be aware of and comply with the MPEs for the unprotected skin and eyes where less than 8 hours.

If MPEs are exceeded then UV light irradiance must be reduced by appropriate control measures. These could include containment, moving further away from the UV light source, reducing exposure time, or as a last resort provision of personal protective equipment (PPE).

Heightened individual photosensitivity

All persons must be aware that their individual susceptibility to UV light exposure can be heightened by photosensitising agents.

Check that all persons who could be exposed to significant levels of UV light are not unusually photosensitive or exposed to photosensitising agents, including:

- Individuals who are intrinsically photosensitive.
- Individuals who are exposed to photosensitising agents, either ingested, injected or externally applied.
- Very rare cases - aphakics (eye lens removed and not replaced by an artificial lens) or pseudophakics (eye lens replaced with a non UV light absorbing artificial intraocular lens). These persons should be aware that they may not be adequately protected against retinal injury from exposure to UV light within the ELVs.

The ELVs may not be adequate protection for photosensitive individuals and special precautions may be necessary. These individuals should seek medical advice with respect to additional protective measures which may be required before any exposure to UV light.

Heightened collective photosensitivity

Check for any possible photosensitising effects from contact with chemical compounds in the workplace.

Limitation of access - Access to an area where the UV torch is operated should be limited only to persons directly concerned with its use or those necessary.



Warning labels and signs - Should be used to indicate the presence of UV light which could result in persons being exposed to levels of UV light exceeding the ELVs, or significant personal exposure.



Routine maintenance - Essential to ensure optimum performance and minimum risk. The recommended procedures and intervals should be strictly implemented. See section 5.

Engineering control measures

Reduction of reflected UV light – Many surfaces, especially smooth, highly reflective or light coloured, are good reflectors of UV light. To reduce reflected UV light some surrounding area surfaces could be painted in a dark matt colour.

Containment – Indiscriminate emission of UV light into the workplace must not be allowed. The use of screened areas may be appropriate. If used screens must be made of a suitable UV blocking material, well maintained, inspected regularly and replaced as necessary.

Personal protective equipment

Protection of the skin - Areas of skin usually at risk are the backs of the hands, forearms, face and neck, as other areas are usually covered by clothing. Hands can be protected by wearing gloves and arms can be covered by long sleeves, using material with low UV light transmission. In general, darker coloured, heavier fabrics with a closed structure offer a higher level of protection than light coloured, light weight fabrics with an open structure.

Face can be protected by a UV blocking face shield, available from UV Light Technology Limited and this will also provide eye protection.

Particular attention must be paid to prevent gaps in protective clothing that commonly occur around the neck and wrist areas.

Protection of the eyes - We recommend that where personal UV light exposure could be significant, all persons affected should always wear UV blocking spectacles or faceshield. These are available from UV Light Technology Limited and will ensure protection against any residual risk.

3.2 Fire

Never operate in areas where there is a flammable atmosphere hazard.

3.3 Explosion



Never operate in areas where there is an explosive atmosphere hazard.

3.4 Electrical



The battery charger requires a 110-240V/50-60Hz power supply.

Electrical equipment is potentially dangerous and may cause death or injury if sufficient precautions are not taken before operation or maintenance.

Never operate – if any visible damage to UV torch, battery charger, cables or connectors.

The battery should only be charged in a dry environment.

Before maintenance always disconnect the cable from the battery charger.

4 Operation

Operation should only be performed by suitably qualified and trained personnel.

Handle with care to avoid damage and ensure all packaging material is removed.

4.1 Battery installation



- a) Unscrew and remove the rear of the UV torch.
- b) Insert battery - positive terminal first.
- c) Replace rear cover

4.2 Switching on

Before switching on, always check the following. If in any doubt whatsoever do not switch on.

NEVER operate

- a) **If** there is any visible damage to the UV torch, battery charger, cables or batteries.
- b) **Without** the necessary control measures in place for protection against exceeding the UV light exposure limit values.

The operator should always point the UV light beam away from their body and never shine directly at anyone's unprotected skin or eyes.

Switch on and off using the power switch on the side of the UV torch.

Once switched on it will reach its optimum UV light output almost instantly.

Fully charged batteries will provide approximately 90 minutes run time depending upon the number of on/off switching cycles and the battery capacity.

Never put the UV torch down on the front glass when switched on.

4.3 Battery charging

Only use battery charger supplied by UV Light Technology Limited.



Allow to cool for 10 minutes.

Unscrew and remove rear of the UV torch.



Remove battery.



Insert batteries into charger.

Plug in charger - LED's should turn 'red'. If batteries are NOT positioned correctly the LED's will show 'green'.



During charging the 'red' LED's will turn 'amber' then 'green'.

When LED's are 'green' the batteries are fully charged.

Unplug the charger and remove batteries.

Charging fully flat batteries takes approximately 4 hours

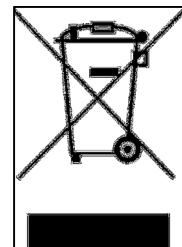
Notes on Charging

- a) If the power supply is turned off during charging, the charger will reset and start a new charge cycle when re-instated.
- b) Do not leave connected for more than 24 hours.
- c) Should the UV torch only be used for short periods (less than 40 minutes) and then returned to charge, we recommend every tenth time the battery is run flat before recharging.
- d) Fully discharged batteries should be recharged as soon as possible. Leaving batteries fully discharged for extended periods can permanently damage them.

- e) The UV light output will reduce as the battery starts to reach the end of its charge.
- f) One battery can be charged at a time if required.
- g) Batteries stored for long periods should be discharged and recharged every 6 months.
- h) After discharging, batteries should be left to stabilise for 30 minutes before charging.
- i) After charging, batteries should be left to stabilise for 30 minutes before use.
- j) Battery life time is approximately 500 charge cycles.

4.4 Disposal of waste batteries, electrical and electronic equipment

The UV torch and any batteries cannot be disposed of with normal waste. They should be taken to an appropriate collection point for the recycling of batteries, electrical and electronic equipment. This will help to conserve natural resources and prevent potential negative consequences for human health and the environment. For more information about where to drop off your batteries, electrical and electronic equipment waste, please contact your local waste disposal authority.



5 Maintenance

Maintenance of any kind must only be performed by an authorised distributor or suitably qualified and trained personnel. Regular cleaning is recommended to ensure optimum performance.

Only use replacement parts supplied by UV Light Technology Limited.

UV Light Technology Limited cannot accept any responsibility for damages resulting from improper maintenance, repairs or use of replacement parts not supplied by UV Light Technology Limited.

5.1 Cleaning of front glass

To ensure optimum performance keep the front glass clean. Wipe over the surface of the front glass with a soft, damp, lint free cloth or Alcowipe. Never use any soaps, detergents or abrasive materials.

5.2 Cleaning of case threads

It is good practise to wipe over the two threads in the battery end cap and front housing with a clean cloth. This helps maintain good electrical continuity.



5.3 UV light irradiance measurement for process control

It is best practice to monitor and record UV light irradiance levels at the working distance to maintain strict process control. This is absolutely essential for some applications to ensure compliance with Standards specifying minimum UV light irradiance or exposure levels.

Our UV light meter allows accurate and reproducible UV light irradiance measurements. This should be done at regular intervals, ideally at the start of each period of use.

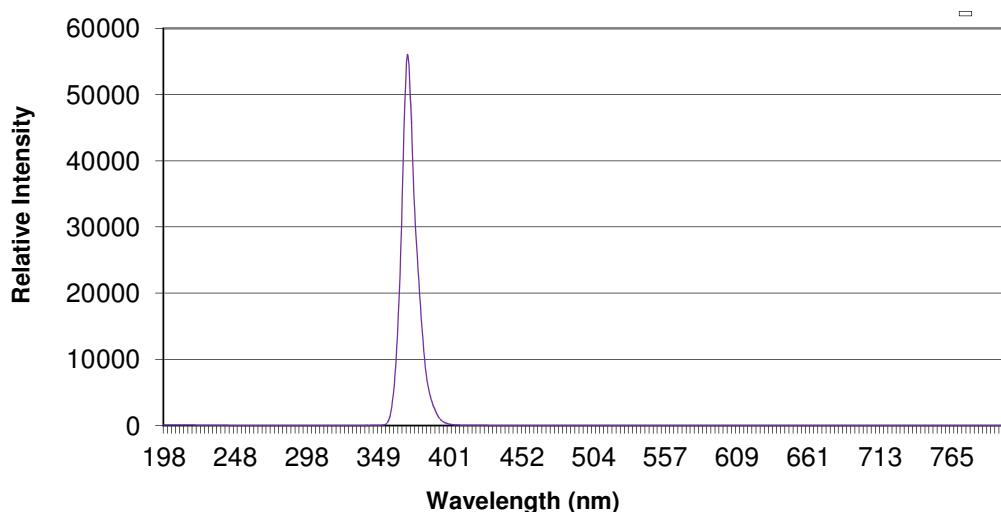


6. TECHNICAL DATA

Due to our policy of continuous development, we reserve the right to amend technical data and therefore information may be subject to change without prior notice.

UV Source:	High powered 370nm LED chip running at 5.18 watts
Warm up:	Instant
Hot restrike	Yes
UV source lifetime (L70)	60,000 hours (estimated)
Reflector:	Material: Anodised Aluminium
Dimensions:	150 x 38.5mm Ø
Weight incl Battery:	185g (approx)
Rating:	IP64
Batteries	
Power supply:	1 x 3.7V DC ICR18650 Li-ion cells
Battery life:	400 charging cycles (approx)
Battery running time:	90 minutes (approx)
Recharge time:	4 hours (approx)
Battery Charger	
Power supply:	110-240 VAC 50/60Hz or 12V DC via supplied car adaptor
Weight:	100g without plug lead and car adaptor
Dimensions	140mm x 65mm x 30mm
Rating:	Indoor use only
Temperature range:	5°C – 40°C
UV Light Technology Limited products are RoHS compliant.	

UV - Spectral Output



Appendix 1

Spares and accessories, process control, health and safety products and training

Spares and accessories



Battery

Additional lithium-ion battery to ensure a fully charged battery is always available.

PB0534



Battery charger

Spare battery charger to avoid unnecessary delays due to loss or accidental damage

UV5WLED-CH



Belt pouch (NATO Loop)

UV5WLED-POUCH

Process control



UV meter

For monitoring UV-A light irradiance levels for process control and assessing personal exposure levels.

UVI-METER-AB

Health and safety products



UV blocking spectacles

Eye protection against potential adverse health effects of UV light exposure.

UV-SC-C&B



UV hazard warning sign

A4 laminated.

PM0006



Publication – 'Safety First with UV Light'

A practical guide to risk assessment and control of personal UV light exposure in the workplace.

BOOK

Training courses



Risk assessment and control of personal UV light exposure

Designed to help you meet your legal obligations for compliance with personal UV light exposure limits and specific hazard awareness training for employees.

Provides peace of mind that you have risk assessment and control covered, along with the confidence and acceptance of your process by the workforce.



Hazard awareness training

Bespoke information and training for operators, supervisors, maintenance personnel and managers of UV light equipment, welders and plasma cutters.

Designed to help ensure safe use for your particular application.

Usually conducted on-site and consisting of two hours practical training.

Appendix 2

Warranty

The UV 5W LED torch is covered by our twelve (12) months back to base warranty, from the date of delivery.

UV Light Technology Limited undertake that if, within the warranty period, our equipment or any part thereof, is proved to be defective by reason only of faulty workmanship or materials, we will at our option, repair or replace the same free of charge. However, the following conditions and exclusions will apply:

Conditions:

- The defective equipment or parts are returned to UV Light Technology Limited at the address below.
- The equipment has been correctly supplied by an authorised UV Light Technology Limited distributor and used in accordance with the operating, maintenance and health and safety instructions.
- The equipment has not been serviced, maintained, repaired, taken apart, or tampered with in any way by any person not authorised by UV Light Technology Limited.
- The equipment is still in the possession of the original user.
- Any equipment or defective parts replaced shall become the sole property of UV Light Technology Limited.

Exclusions:

- Damage resulting from transportation, fire, accident, abuse, misuse, improper use, neglect, or act of God.
- Damage resulting from immersion in or exposure to chemicals, liquids or dirt, extremes of climate, fungus or excessive wear and tear.

UV Light Technology Limited
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UV Light Technology Limited can be contacted during office working hours
9:00 am – 5:00 pm Monday to Friday, excluding Bank Holidays