

RISK MANAGEMENT PROJECT

Eliptig Germicidal UV-C Device

Professional Room Sterilizer- Disinfects Surfaces and Air

09 July 2021

**Blue Sky Laser Technologies
Unit 48a-49 Crofty Industrial Estate
Penclawdd, Swansea
SA4 3RS**

RISK MANAGEMENT PROJECT

ID:

0061

Title:

Eliptig Germicidal UV-C Device

Subtitle:

Professional Room Sterilizer- Disinfects Surfaces and Air

Revision:

A

Date:

09 July 2021

Device or family of devices:

Eliptig-S

Model, size, version:

A00-1515_1_A

Configuration:

8 x 55W UV-C Lamps

Company:

Blue Sky Laser Technologies
Unit 48a-49 Crofty Industrial Estate
Penclawdd, Swansea
SA4 3RS

Authored by:

Shaun Kiernan- Chief Technical Officer

Attachments:

- UV-C White Paper 27 August 2020.pdf
- S15-1006B Eliptig-S_Manual.pdf
- S0440_EMG_-
_Application_of_UV_disinfection__visible_light__local_air_filtration_and_fumigation.pdf
- ICNIRPUV2004.pdf

REVIEWS AND APPROVALS

Reviewed by:

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INTRODUCTION

Introduction

Blue Sky Laser Technologies Ltd are our ISO 13485 certified , who are a world leading manufacturer and supplier of laser machines. They also provide servicing, maintenance and repair of these devices. With a highly experienced team of engineers and technicians with over 50 years of combined experience in laser technology, they design and manufacture a range of high-quality, safe and innovative products that meet customer and market needs. As a technological innovator, they value creativity, invest in research and thrive on agility to maintain the position in a market with rapidly changing needs and one which is driven by continually improving technology.

Blue Sky Laser Technologies Ltd has grown to become a global company with a wealth of experience in clinical research, manufacture and technical customer support. Their products are designed and manufactured in the United Kingdom and meet all product, system and regulatory requirements for a worldwide market. They also successfully distribute their devices worldwide, meeting all product, system and regulatory requirements. They pride themselves on the quality of their product design, their assembly and testing services and after-sales care.

Brief project description

ELIPTIG emits Ultra Violet-C light which kills the Covid 19 virus by disrupting the molecular structure of its DNA and preventing cell reproduction.

The ELIPTIG device is designed to create an optical field ensuring the UV-C light reaches all surfaces from floor to ceiling.

The ELIPTIG's unique, shadowless technology is capable of killing 99.9999% of the COVID 19 virus present in a space within minutes.

A 4m x 4m room takes just 6 minutes to disinfect. Human error is eliminated as UV-C light can extend to places which are difficult or impossible to reach.

Brief summary of results

NON-MEDICAL DEVICE

Device or family of devices:

Eliptig-S

Model, size, version:

A00-1515_1_A

Configuration:

8 x 55W UV-C Lamps

Device purpose and description:

The Eliptig-S is designed to emit UVC radiation at 253.7nm which has been proven to be highly effective at killing bacteria and viruses by destroying the molecular bonds that hold their DNA together.

Designed to meet the needs of sterilisation of multi-use indoor facilities.

Intended and unintended uses:

Intended use and installation

The Product is intended exclusively for air and surface disinfection.

Kills COVID-19 as well as other viruses, bacteria and fungus

No residue, no chemicals

Remote activation for safe operation

Compact design for ease of use

Robust, portable and mobile application

Use requirements and restrictions:

The Eliptig-S is designed to emit UVC radiation at 253.7nm which has been proven to be highly effective at killing bacteria and viruses by destroying the molecular bonds that hold their DNA together.

The Eliptig-S must only be operated in a UVC Hazard controlled secure environment. DO NOT operate the device while people or animals are in the area. Environmental Transport & Storage Conditions.

The transport & storage conditions for the Eliptig-S were determined from specifications set by the manufacturers of critical components as follows: -

Temperature +5°C to +40°C Relative Humidity 35% to 65% Non-Condensing. Atmospheric Pressure 500 – 1060 hPa

User population, countries, culture and languages:

Commercial users, English / French

RISK EVALUATION METHODOLOGY

Risk evaluation method

Risk Matrix Analysis

Rationale for the selection of probability and harm categories

Directive 2006/25/EC - artificial optical radiation
Low voltage directive (LVD) (2014/35/EU)
(EMC) Directive 2014/30/EU

RISK MATRIX

Probabilities

No	Probability	Description
1	Frequent	10^{-3}
2	Probable	10^{-3} and $>10^{-4}$
3	Occasional	10^{-4} and $>10^{-5}$
4	Remote	10^{-5} and $>10^{-6}$
5	Improbable	10^{-6}

Severities

No	Severity	Description
1	Negligible	Inconvenience or temporary discomfort
2	Minor	Results in temporary injury or impairment not requiring professional medical intervention
3	Serious	Results in injury or impairment requiring professional medical intervention
4	Critical	Results in permanent impairment or life-threatening injury
5	Catastrophic	Results in death

Risk Matrix

		Severity of Harm				
		Negligible	Minor	Serious	Critical	Catastrophic
Probability of Occurrence of Harm	Frequent	Medium	High	High	High	High
	Probable	Medium	Medium	High	High	High
	Occasional	Low	Medium	Medium	High	High
	Remote	Low	Low	Medium	High	High
	Improbable	Low	Low	Low	Medium	Medium

SUMMARY REPORT

Risk Case	Probability/Severity	Risk	Residual Probability/Sevrty	Residual Risk	Status
Hazard No. 01: Category: Radiation energy - Hazard: Exposure to UV radiation					
Risk Case: 01 - UV Radiation Control Measures	Prb: Frequent Sev: Critical	High	Prb: Improbable Sev: Serious	Low	Closed
Hazard No. 02: Category: Electrical Energy - Hazard: Electrical					
Risk Case: 02 - Electric Shock	Prb: Remote Sev: Critical	High	Prb: Improbable Sev: Serious	Low	Closed
Hazard No. 03: Category: Electromagnetic energy - Hazard: EMI					
Risk Case: 03 - Electromagnetic Compatibility	Prb: Remote Sev: Critical	High	Prb: Improbable Sev: Serious	Low	Closed
Hazard No. 04: Category: Mechanical energy - Hazard: Mechanical					
Risk Case: 04 - Mechanical Hazards	Prb: Occasional Sev: Critical	High	Prb: Occasional Sev: Negligible	Low	Open
Hazard No. 05: Category: Chemical Hazard - Hazard: Chemical					
Risk Case: 05 - Chemical Hazard	Prb: Occasional Sev: Critical	High	Prb: Improbable Sev: Serious	Low	Closed
Hazard No. 06: Category: Thermal energy - Hazard: Fire					
Risk Case: 06 - Flammability	Prb: Remote Sev: Catastrophic	High	Prb: Improbable Sev: Serious	Low	Closed
Hazard No. 07: Category: Function - Hazard: Control					
Risk Case: 07 - Software	Prb: Remote Sev: Critical	High	Prb: Improbable Sev: Serious	Low	Closed

HAZARDS

Hazard 01 - Exposure to UV radiation

- **Hazard category:** Radiation energy
 - **Hazard Description:** Ultraviolet (UV) radiation is a known cause of skin cancer, skin ageing, eye damage, and may affect the immune system.
-

Hazard 02 - Electrical

- **Hazard category:** Electrical Energy
-

Hazard 03 - EMI

- **Hazard category:** Electromagnetic energy
-

Hazard 04 - Mechanical

- **Hazard category:** Mechanical energy
-

Hazard 05 - Chemical

- **Hazard category:** Chemical Hazard
-

Hazard 06 - Fire

- **Hazard category:** Thermal energy
-

Hazard 07 - Control

- **Hazard category:** Function
 - **Hazard Description:** Software Failure
-

RISK CASES

Risk Case No. 01 - UV Radiation Control Measures

- **Hazard No. 01 - Exposure to UV radiation**

- **Hazard category:** Radiation energy

- **Sequence of events:**

Event 1: Accidental exposure to high levels of UV radiation from UV-C lamps.

- **Harm:**

Effects of UV-C on the eyes. Responses of the human eye to acute over-exposure of UV radiation include photokeratitis and photo conjunctivitis (inflammation of the cornea and the conjunctiva, respectively), more commonly known as snow blindness or welders flash.

Symptoms range from mild irritation to severe pain and possibly irreversible damage.

Effects of UV radiation on the skin. Short-term exposure to UV radiation causes reddening of the skin, sunburn and swelling, which maybe very severe. In some people this sunburn is followed by increased production of melanin, and is recognized as a suntan. Tanning is a sign that damaged skin is attempting to protect itself from further harm. A suntan is not an indication of good health and offers only minimal protection against further exposure. The most serious long-term effect of UV radiation particularly for white skinned populations, is the induction of skin cancer.

- **Probability of occurrence:** Frequent

- **Severity of harm:** Critical

- **Risk:** High

- **Risk reduction actions/controls/detection:**

Action 0024: Containment / Location:

Action 0025: Training

Action 0026: Warning Signs

Action 0027: Personal Protection Equipment

Action 0028: Maintenance

- **Residual probability of occurrence:** Improbable

- **Residual severity of harm:** Serious

- **Residual Risk:** Low

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Comments:**

Protective Measures for the Eliptig UVC Germicidal Device
Introduction

Protection against UVC emitted from artificial sources is generally straightforward where sources are used in a UVC hazard controlled work environment. The basic principles of control by engineering measures, administration, and the provision of protective clothing, can be applied.

Ideally, engineering controls should ensure that UVC radiation at levels hazardous to health is contained within the source or its immediate enclosure.

Where the application of such engineering controls is not practical, administrative controls should be applied aimed at ensuring that workers are made aware of the presence of potentially harmful UVC and providing information to avoid such harmful exposure.

When the nature of the work requires accomplishment of a task close to a source where neither engineering controls nor administrative controls are practical, personal protective clothing should be provided and worn.

Engineering Controls
Use of enclosures and screens
The use of UVC-absorbing glass and plastic shielding and baffles is a key engineering control. Shields, curtains and baffles and a suitable separation distance can be used to protect workers from UVC emitted from the germicidal device.
However, in such process's administrative controls and particularly personal protective clothing are also important.
This can be prevented by carrying out the process in an UVC hazard controlled area.
UVC hazard controlled areas: Such an area should be subject to administrative controls and people should not have access to this area.
In situations where people may enter the area, they should be adequately protected from UVC.
Containment is an important protective measure where public access is likely.

- **Attachments:**
 - BS EN 62471-2008.pdf
 - BS EN IEC 63000 2018.pdf
 - BS EN ISO 15858 2016 UV-C Devices- Safety information- Permissible human exposure copy.pdf
 - F20-1285_1 UV-C White Paper.pdf

Risk Case No. 02 - Electric Shock

- **Hazard No. 02 - Electrical**
- **Hazard category:** Electrical Energy
- **Sequence of events:**

Event 1: Contact to live electrical parts
- **Harm:**

Electric shock and burns from live contact.
- **Probability of occurrence:** Remote
- **Severity of harm:** Critical
- **Risk:** High
- **Risk reduction actions/controls/detection:**

Action 0029: Electrical Hazards
- **Residual probability of occurrence:** Improbable
- **Residual severity of harm:** Serious
- **Residual Risk:** Low
- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer
- **Attachments:**
 - Eliptig Block Diagram A00-1515_402 .pdf
 - Eliptig Relay Board A62-1140_500_C.pdf
 - Eliptig EMI Filter Board A62-1141_400.pdf
 - BS EN 61010-2-0402015.pdf
 - BS EN 61010-1 2020A1 2019.pdf

Risk Case No. 03 - Electromagnetic Compatibility

- **Hazard No. 03 - EMI**

- **Hazard category:** Electromagnetic energy

- **Sequence of events:**

Event 1: Lamps switch on due to device susceptibility to an EMI event resulting in exposure to high levels of UV radiation from UV-C lamps.

- **Harm:**

Effects of UV-C on the eyes. Responses of the human eye to acute over-exposure of UV radiation include photokeratitis and photo conjunctivitis (inflammation of the cornea and the conjunctiva, respectively), more commonly known as snow blindness or welders flash.

Symptoms range from mild irritation to severe pain and possibly irreversible damage.

Effects of UV radiation on the skin. Short-term exposure to UV radiation causes reddening of the skin, sunburn and swelling, which may be very severe. In some people this sunburn is followed by increased production of melanin, and is recognised as a suntan. Tanning is a sign that damaged skin is attempting to protect itself from further harm. A suntan is not an indication of good health and offers only minimal protection against further exposure. The most serious long-term effect of UV radiation particularly for white skinned populations, is the induction of skin cancer.

- **Probability of occurrence:** Remote

- **Severity of harm:** Critical

- **Risk:** High

- **Risk reduction actions/controls/detection:**

Action 0030: EMC Testing

- **Residual probability of occurrence:** Improbable

- **Residual severity of harm:** Serious

- **Residual Risk:** Low

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

Risk Case No. 04 - Mechanical Hazards

- **Hazard No. 04 - Mechanical**

- **Hazard category:** Mechanical energy

- **Sequence of events:**

Event 1: Device un-stable

Event 2: Broken Lamps

- **Harm:**

Physical Injury

- **Probability of occurrence:** Occasional

- **Severity of harm:** Critical

- **Risk:** High
- **Risk reduction actions/controls/detection:**
 - Action** 0032: Mechanical Stability
 - Action** 0033: UV-C Lamp Breakage
- **Residual probability of occurrence:** Occasional
- **Residual severity of harm:** Negligible
- **Residual Risk:** Low
- **Status:** Open

Risk Case No. 05 - Chemical Hazard

- **Hazard No. 05 - Chemical**
- **Hazard category:** Chemical Hazard
- **Sequence of events:**
 - Event 1:** UV-C Lamp Breakage
- **Harm:**

MERCURY HAZARD: The UVC lamps. Each UVC lamp contains small amounts of mercury that can have harmful effects if exposed or ingested.
Mercury (Hg) Content (Nom) 2.0 mg per Lamp.
Exposure to mercury may cause redness or irritation.
In the case of a broken UVC lamp, sweep up all the broken glass and debris into a plastic bag and secure it with a seal.
Dispose of broken or UVC lamp debris at a local recycling centre.
Do not use a vacuum cleaner or incinerator to collect or dispose of any lamp debris.
- **Probability of occurrence:** Occasional
- **Severity of harm:** Critical
- **Risk:** High
- **Risk reduction actions/controls/detection:**
 - Action** 0031: MERCURY HAZARD:
 - Action** 0036: Ozone Generation
- **Residual probability of occurrence:** Improbable
- **Residual severity of harm:** Serious
- **Residual Risk:** Low
- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer
- **Attachments:**
 - QS039_A_WEEE_2012-19-EU.pdf

Risk Case No. 06 - Flammability

- **Hazard No. 06 - Fire**
- **Hazard category:** Thermal energy
- **Sequence of events:**
Event 1: Electrical Fire
- **Harm:**
Burns
- **Probability of occurrence:** Remote
- **Severity of harm:** Catastrophic
- **Risk:** High
- **Risk reduction actions/controls/detection:**
Action 0034: Flammability
- **Residual probability of occurrence:** Improbable
- **Residual severity of harm:** Serious
- **Residual Risk:** Low
- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

Risk Case No. 07 - Software

- **Hazard No. 07 - Control**
- **Hazard category:** Function
- **Sequence of events:**
Event 1: Software failure / loss of control
- **Harm:**
Effects of UV-C on the eyes. Responses of the human eye to acute over-exposure of UV radiation include photokeratitis and photo conjunctivitis (inflammation of the cornea and the conjunctiva, respectively), more commonly known as snow blindness or welders flash.
Symptoms range from mild irritation to sever pain and possibly irreversible damage.
Effects of UV radiation on the skin. Short-term exposure to UV radiation causes reddening of the skin, sunburn and swelling, which maybe very severe. In some people this sunburn is followed by increased production of melanin, and is recognized as a suntan. Tanning is a sign that damaged skin is attempting to protect itself from further harm. A suntan is not an indication of good health and offers only minimal protection against further exposure. The most serious long-term effect of UV radiation particularly for white skinned populations, is the induction of skin cancer.
- **Probability of occurrence:** Remote
- **Severity of harm:** Critical
- **Risk:** High

- **Risk reduction actions/controls/detection:**

Action 0035: Software Failure

- **Residual probability of occurrence:** Improbable

- **Residual severity of harm:** Serious

- **Residual Risk:** Low

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

RISK REDUCTION ACTIONS / CONTROLS / DETECTION

Action No. 0024 - Containment / Location:

- **Category** : Engineering Controls

- **Objective to be achieved:**

Prevent the Exposure to UV-C Radiation

- **Description of the action/control/detection:**

Containment / Location: Limit access to those working directly with the equipment by locating equipment in a hazard controlled environment.

4 x Passive Infrared Sensors (PIR) detect motion and switch off the lamps within 2 seconds , effective up to 8 meters.

The PIR Sensors control the hardware and are monitored by the software, if any failure occurs in the software the operation of the PIRs is maintained.

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- P23-1036_1 PIR Sensor.pdf

Action No. 0025 - Training

- **Category** : Personal

- **Objective to be achieved:**

Prevent the Exposure to UV-C Radiation

- **Description of the action/control/detection:**

Personnel should be trained in correct and safe working procedures of preparing, start-up, working with the UV-C device.

Full training and certification provided

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Comments:**

Administrative Control Measures

Training

People working with a UVC source or maintaining such a source should be provided with adequate training to understand the need for control of the hazards involved and to carry out their work safely.

Limitation of access

Access to an UVC hazard controlled areas, where hazardous levels of UVC exist should be restricted to those informed of the potential hazards and trained in appropriate protective measures.

Hazard warnings and signs

Hazard warning signs should be used to indicate the presence of a potential UVC hazard when exposures are likely to exceed recommended exposure limits and indicate restriction of access, and if appropriate the need for personal protection.

Personal protection

Where, because of the nature of the work, for example the need to carry out a task close to a source, and neither engineering nor administrative controls are practical, personal protection is required.

Protection of the skin

For occupational exposure to artificial sources, the areas of the skin most usually at risk are the backs of the hands, the face, the head and the neck, as other areas are generally covered by working clothes. The hands can be protected by wearing gloves with low UVC transmission. The face can be protected by a UVR-absorbing face shield or visor, which may also offer eye protection.

Suitable headwear will protect the head and neck.

Various degrees of UVC protection to the eyes, head and neck provided by protective eyewear

Protection of the eyes

Goggles, spectacles, visors or face shields, which absorb UVR, should be worn where there is a potential eye hazard .

- **Attachments:**

- F01-1697_1_A-Eliptig User Training.pdf

Action No. 0026 - Warning Signs

- **Category :** Personal

- **Objective to be achieved:**

Prevent the Exposure to UV-C Radiation

- **Description of the action/control/detection:**

All potentially dangerous areas should be conspicuously labelled with warning signs e.g. "UV HAZARD- PROTECT EYES AND SKIN"

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

Action No. 0027 - Personal Protection Equipment

- **Category :** Personal

- **Objective to be achieved:**

Prevent the Exposure to UV-C Radiation

- **Description of the action/control/detection:**

Face Shield and Glasses to be rated to EN170 2C 1.2 ANSI-Z87 rated.

Wear lab coat and long trousers

Gloves: Nitrile gloves are recommended.

- **References:**

UV-C Devices — Safety information — Permissible human exposure (ISO 15858:2016)

Personal eye-protection — Ultraviolet filters — Transmittance requirements and recommended use EN 170:2002

Photobiological safety of lamps and lamp systems BS EN 62471:2008

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- mpdf (2).pdf

- A90-1096_1 - Eliptig Face Shield Assembly.pdf

- mpdf (1).pdf

- mpdf (4).pdf

- mpdf.pdf

- mpdf (5).pdf

- mpdf (3).pdf

- BS EN 170 2002.pdf

- F40-0005_150_A-UV-C PPE Test Report.pdf

Action No. 0028 - Maintenance

- **Category** : Production / Service

- **Objective to be achieved:**

Prevent the Exposure to UV-C Radiation

- **Description of the action/control/detection:**

There are no serviceable parts inside the unit. DO NOT attempt to do any repairs beyond basic cleaning and lamp replacement.

Cleaning the Equipment

Before cleaning maintenance is carried out, please ensure the unit is disconnected from the mains supply.

The Eliptig-S can be cleaned by wiping down with a soft lint free cloth, slightly dampened with isopropyl alcohol, care should be taken not to spill any cleaning fluids onto the unit.

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

Action No. 0029 - Electrical Hazards

- **Category** : Electrical Testing

- **Objective to be achieved:**

Reduce the risk of electrical shock

- **Description of the action/control/detection:**

Electrical safety testing to the clauses of EN 61010-1:2010. EN 61010-2-040:2015,

All safety critical components third party tested. See Certificates of Conformity for verification.

Device Third party certified

- **References:**

Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements BS EN 610101:2010+A1:2019

Safety requirements for electrical equipment for measurement, control, and laboratory use Part 2-040: Particular requirements for sterilizers and washer-disinfectors used to treat medical materials BS EN 61010-2-040:2015

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- A00_1515_601_A_Eliptig-S_Critical_Components_List copy.pdf

Action No. 0030 - EMC Testing

- **Category** : Electromagnetic Compatibility

- **Objective to be achieved:**

Reduce the risk of the Lamps switching on due to an EMI event.

- **Description of the action/control/detection:**

Test to the requirements EMC: EN 61326-2-1:2013 FCC CFR 47 Parts 15.107 & 15.109; ICES-003 Issue 6.

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- F01-1693_1_A_Eliptig_EMCTest_Report_TRA-051489-44-01A copy.pdf
- F01-1695_1_A_Eliptig_EMCImmunity_Test_Certificate_TRA-051489-44-03A.pdf
- F01-1694_1_A_Eliptig_EMCEmissions_Test_Certificate_TRA-051489-44-02A copy.pdf
- F01-1692_1_A_Eliptig_EMCTest_Report_TRA-051489-44-00A copy.pdf

Action No. 0031 - MERCURY HAZARD:

- **Category :** Contamination

- **Objective to be achieved:**

Prevent exposure to mercury

(Mercury (Hg) Content (Nom) 2.0 mg per Lamp)

- **Description of the action/control/detection:**

Contain the mercury within a shatterproof Fluorinated ethylene propylene (FEP) tube

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- F01-1698_1_A-FEP Lamp Test .pdf

Action No. 0032 - Mechanical Stability

- **Category :** Mechanical Stability

- **Objective to be achieved:**

Ensure the device is mechanically stable

- **Description of the action/control/detection:**

Technical stability tests of: EN 61010-1:2010. EN 61010-2-040:2015,

- **References:**

Safety requirements for electrical equipment for measurement, control, and laboratory use Part 1: General requirements BS EN 610101:2010+A1:2019

Safety requirements for electrical equipment for measurement, control, and laboratory use Part 2-040: Particular requirements for sterilizers and washer-disinfectors used to treat medical materials BS EN 61010-2-040:2015

- **Status:** Open

Action No. 0033 - UV-C Lamp Breakage

- **Category :** Lamp Breakage

- **Objective to be achieved:**

Avoid injury from broken glass

- **Description of the action/control/detection:**

Contain the mercury within a shatterproof Fluorinated ethylene propylene (FEP) tube

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**
 - F01-1698_1_A-FEP Lamp Test .pdf

Action No. 0034 - Flammability

- **Category :** Electrical Testing
- **Objective to be achieved:**

Prevent electrical fires
- **Description of the action/control/detection:**

Ensure all safety critical components have been third party tested and certified.

All PCBs are UL94-V0 certified

All cables are Tri-rated UK, USA, Canada:

BS6231
UL, 758 AWM, Styles 1015, 1028, 1283 and 1284 as applicable
CSA, TEW, Standard C22.2, No.127
- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer
- **Attachments:**
 - P23-1036_1 PIR Sensor UL Cert E320045.pdf
 - PCB UL Cert no. E1437491.pdf
 - P20-1037_1-Touchscreen 7inch UL cert.pdf
 - P70-1024_1-ZPMV2.E122808.pdf
 - P23-1036_1 PIR Sensor UL Cert E199900.pdf
 - M62-1141_500_A-PCB UL Cert no. E1437491.pdf

Action No. 0035 - Software Failure

- **Category :** Software Error
- **Objective to be achieved:**

Reduce the risk of exposure to UVC radiation
- **Description of the action/control/detection:**

Administrative Control Measures

Training
People working with a UVC source or maintaining such a source should be provided with adequate training to understand the need for control of the hazards involved and to carry out their work safely.

Limitation of access
Access to an UVC hazard controlled areas, where hazardous levels of UVC exist should be restricted to those informed of the potential hazards and trained in appropriate protective measures.

Hazard warnings and signs
Hazard warning signs should be used to indicate the presence of a potential UVC hazard when exposures are likely to exceed recommended exposure limits and indicate restriction of access, and if appropriate the need for personal protection.

Personal protection
Where, because of the nature of the work, for example the need to carry out a task close to a source, and neither engineering nor administrative controls are practical, personal protection is required.

Protection of the skin
For occupational exposure to artificial sources, the areas of the skin most usually at risk are the backs of the hands, the face, the head and the neck, as other areas are generally covered by working clothes. The hands can be protected by wearing gloves with low UVC transmission. The face can be protected by a UVR-

absorbing face shield or visor, which may also offer eye protection.

Suitable headwear will protect the head and neck.

Various degrees of UVC protection to the eyes, head and neck provided by protective eyewear

Protection of the eyes

Goggles, spectacles, visors or face shields, which absorb UVR, should be worn where there is a potential eye hazard .

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

Action No. 0036 - Ozone Generation

- **Category :** Chemical

- **Objective to be achieved:**

Prevent the risk of Ozone generation

- **Description of the action/control/detection:**

The Philips TUV 55W HO G55 T8 Lamps do not produce Ozone

- **Status:** Closed out date/by: 09/07/2021 : Shaun Kiernan Chief Technical Officer

- **Attachments:**

- TUV 55W HO G55 T8.pdf