

## Title of HWBGM Guidance Note: **Safe Use of Ultraviolet Light**

Cross Ref. to University of Oxford Policy Statement:

### ***Introduction***

Trans-illuminescence and epi-illuminescence by UV light are used extensively in microscopy & molecular biology. UV light is a type of non-ionising radiation and can be categorised into three regions (UVA 400-315nm, UVB 315-280nm and UVC 280-100nm). All three types can present a significant hazard (particularly UVB and UVC) and as such individuals must be trained in these procedures before using any potential light source.

### ***Responsibilities***

All **Users** must ensure they are fully aware of the risks associated with working with UV light sources and understand the appropriate precautions to take before they start using the equipment.

**NOTE:** This guideline should be read in conjunction with the equipment's 'User Guide'.

### ***Hazards***

The potential hazards to health arise from UV with wavelengths greater than 180nm.. UV of shorter wavelengths are strongly absorbed in air.

The main organs likely to be affected by exposure are the

- **Skin** - Excessive short-term exposure causes sunburn and can result in an increased risk of skin cancer
- **Eyes.** Exposure can cause acute damage to the cornea and conjunctiva causing pain, light sensitivity and tearing. These effects can be felt between 30 minutes and 24hrs after exposure. Prolonged exposure can cause permanent retinal damage.

The main risk of UV is therefore from direct exposure to the light source. Provided the following guidelines are followed to limit exposure then the associated risk to the user is minimal.

### ***Control Measures***

An appropriate combination of the following control measures should be implemented to ensure that the risk to health and safety from UV exposure will be low.

#### **Engineering controls.**

- **Enclosure.** The use of light tight cabinets and enclosures is the preferred means of ensuring exposure is prevented.
- **Screened areas** will be required where the exposure process takes place external to the source housing. Such an area will need to be subject to administrative controls [see below] and access will be restricted.
- **Interlocks** should be fitted where the removal of a blocking cover from a source could result in hazardous exposure. Transilluminators are now available which have a UV Blocking Cover with an interlocking safety switch and indicator light and these should be considered for new acquisitions.
- **Shielding.** Where this is not practicable to fully enclose the process UV absorbent shields and barriers must be provided.
- **Elimination of reflected UV** by avoiding shiny surfaces and using non-reflective UV material.
- If the **pressure** within the source is significantly different from atmospheric pressure [e.g. mercury vapour microscope lamps] consideration must be given to risk of explosion.

#### **Administrative controls**

- **Training.** Staff/students working with UVR sources must be provided with adequate information, instruction and training in its safe use.
- **Minimising exposure.** The exposure time should be kept to a minimum and where source is not enclosed/shielded the user should keep as far away from source as practicable.

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- **Restricting access** to people directly concerned with the operation of the UV source.
- **Hazard warning signs.** The following signs should be used where relevant to indicate the presence of potential UV hazards, the requirement to restrict access and the need for personal protective equipment.



- **Warning lights**

should also be used to show when equipment is energised.

- **Regular testing** by users of the correct functioning of interlocks **and** recording results.

### **Personal protection**

- The areas of skin usually at risk are hands, eyes & face,
- Hands must be protected by wearing gloves with low UV transmission. Nitrile/latex gloves are suitable.
- Arms will be protected by wearing long sleeve lab coat but care must be taken to ensure there is no gap between cuff and glove.
- A full-face visor conforming to BS EN 170 must be worn whenever the UV source is unprotected. Care must be taken not to use non-UV absorbent visors, which may be present in the lab for use with liquid nitrogen. Where 2 sorts of visor are present they should be clearly labelled as to their use.
- Where PPE is provided for use with UV sources it must be subject to a regular regime of monthly checks to ensure it is available adjacent to the source, clean and not damaged. In laboratories where ethidium bromide is used this is particularly important in controlling exposure to this mutagen.

### **Disposal of UV tubes**

- The tubes from UV sources contain mercury and therefore require specialist disposal. Contact the lab support for further information.

### **Further Information**

If you have any difficulties while using any of the Ultraviolet Light sources within the HWBGM, then please contact [lab-support@well.ox.ac.uk](mailto:lab-support@well.ox.ac.uk) for further help & advice.