

Health and Safety Department

Non Ionising Radiation Policy (Excluding Lasers)

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DEFINITION

Non-Ionising Radiation:

NIR includes optical radiation, radio frequency and Electromagnetic radiation. It can be defined as radiation that has insufficient energy to produce ion pairs in biological matter. For the purposes of this document, this encompasses wavelengths from >0m in the EMF region to 400 nm in the UV region. The health hazards of NIR are very wavelength dependant.

1. **University Policy**

It is the intention of Loughborough University to ensure that all work involving the use of Non-Ionising Radiation is subject to the standards of control necessary to prevent, or where this is not possible to minimise, risks to human health, safety and the environment.

No work will be undertaken which is liable to expose any employees, students or visitors to risk from the use of Non-Ionising radiation (excluding lasers), unless a risk assessment has been carried out and steps have been taken to eliminate or reduce exposure to minimise risk and remain compliant with the Exposure Limit Values (ELV's) .

All work involving Non-ionising radiation Laser work must comply with the Laser Safety Policy.

2. **Key legislative requirements**

**The Control of Artificial Optical Radiation at Work Regulation 2010 (AOR10)
Physical Agents (Electromagnetic Fields) 2013/35/EU Directive 2013.** This will be transposed into UK legislation in July 2016.

The general duties in the **Health & Safety at Work etc Act 1974**, and the requirements of the **Management of Health & Safety at Work Regulations 1999** (as amended) also apply, and require, amongst other things, that risk assessments are carried out and appropriate measures to control exposure are put in place.

The Provision and Use of Work Equipment Regulations (PUWER) 1998; require the risks to people's health and safety, from equipment that they use at work to be prevented or controlled.
The Personal Protective Equipment Regulations 2002

3. PROCEDURES / GUIDANCE

3.1 Responsibilities of the Dean of School/Heads of Support Services (HoSS's)

Deans of Schools/Head of Support Services have responsibility for ensuring compliance with the Regulations in general but in particular that:

- Suitable and sufficient risk assessments are undertaken
- Any required risk reducing measures, emergency arrangements, etc., are implemented
- Sufficient information and training is provided

While responsibility lies with the duty holder, the task may be delegated to a Duty Appointed Person (DAP) (supervisor, technical manager or other designated responsible person) within the department or School. Where this occurs it should be made explicit in the Departmental or School safety policy. In larger Schools it may be appropriate to several DAP's

3.2 Duty Appointed Person

Duty Appointed Person will have been designated the day to day responsibility for non-ionising radiation within their School/Department. The DAP needs to attend Non-Ionising radiation supervisor training from the URPO or external training body. The DAP will be responsible for:

- Keeping an up to date inventory of all non-ionising radiation producing equipment and sending this inventory to URPO periodically
- Reviewing and signing risk assessments for working involving NIR producing equipment and ensuring that the URPO can review risk assessments. Risk assessments must

include what measurement of exposure the worker or people around the environment can potentially receive. This information must be obtained by the manufacturer or measured by the URPO.

- Work involving high risk equipment such as UV equipment or equipment producing large static EMF should be forwarded to the RPO for approval before work commences.
- Ensure all staff/students are trained appropriately and understand the hazards and risks associated with the equipment.

3.3 University Radiation Protection Officer (URPO)

The Radiation Protection Officer within the University Health & Safety Service has responsibility for:

- Monitoring compliance with this policy
- Reviewing and amending Radiation safety policies
- Providing information and advice to Heads of Schools/Support Services and delegated Duty Appointed Persons.
- Take measurements and calculate compliance under the Exposure Limit Values (ELV's) set for non-ionising radiation producing equipment where required
- Monitoring exposure for 'Workers at particular Risk' as defined by the EMF directive.

3.4 Staff and other individuals

Staff and other individuals must:

- Be conversant with the risk assessments that apply to their work and ensure they are signed off accordingly by Duty Appointed Person.
- Adopt safe practices (standard operating procedures) in activities involving Non-Ionising radiation, in particular to carry out work in demarcated areas, wear appropriate protective equipment and clothing. Never over ride interlocks or safety devices on equipment producing NIR.
- Report any incident, accident or defect in equipment relating to NIR.
- Cooperate with their supervisors, Duty Appointed Person and URPO in matter related to Non-Ionising radiation.

4 PROCEDURES AND GUIDANCE

4.1 Introduction

Non-ionising radiation can cause serious health including:

- Conjunctivitis, cataracts and retinal thermal damage to the eyes
- Erythema, ageing, burns, changes in pigmentation to the skin
- Skin cancer (causes by repeated exposure to UV)
- Effects on blood flow, heart function and cognitive ability
- Sensory effects such as vertigo, nausea and metallic taste
- Indirect effects such as interference with active implanted medical devices
- Forces and torques on passive metallic implants
- Projectile risk from movement of magnetisable objects in the field

Therefore it is necessary to ensure thorough risk assessments are carried out before any work with non-ionising radiation commences.

Non-ionising radiation includes Ultra-violet, visible and infrared optical radiation, radio and microwave frequencies and static EMF. It is present in most pieces of equipment in some small level however most domestic equipment is inherently safe.

Equipment that needs risk assessments and possible risk reducing measures can include:

All open sources of Ultra-violet light

UV Transilluminators

UV/Mercury lamps

Biological Safety cabinets with UV germicidal lights

UV curing

Solar Simulator

Industrial Microwaves

Sputtering/deposition devices

Induction heaters

All types of Welding in particular arc welding and resistance welding.

All equipment giving off static EMF above 5mT (including MRI, NMR, MPMS etc.)

Flocking devices

Dilatometer

Spark Erosion Units

Radar systems

Plasma induction systems

ICP Mass Spectrometer

Mobile phone antennae

Power substations (where separate phases are not close together)

See Artificial Optical radiation and EMF radiation guidance documents for more information

4.2 Exposure Limit Values (ELV's)

Due to the health and sensory effects of non-ionising radiation on people, Exposure Limit Values have been set to each different type of Non-ionising radiation in both AOR10 and the Electromagnetic Directive. All workers exposure to non-ionising radiation must not exceed

these limits and if they do procedures must be put in place to eliminate or reduce exposure to ensure it falls below the limits.

Therefore all equipment that produces non-ionising radiation need to be assessed to see if the ELV's could be exceeded. Information from the manufacturer should indicate this information otherwise measurements may need to be taken.

There are different ELV's for different types of Non-ionising radiation, including the different types of Ultra violet radiation, visible light, infrared, EMF in different Hz ranges. **See Artificial Optical radiation and EMF radiation guidance documents for these levels and more information**

It is important to note that **any** exposure to UV increases the risk of getting skin cancer and therefore exposure must be kept As Low As Reasonable Practicable (ALARP). Where possible all UV sources should be enclosed and fully interlocked. If this is not possible full UV appropriate PPE must be worn at all times.

Both AOR10 and EMF directive require a different risk assessment for 'Persons at Particular Risk'. Persons at particular risk include:

- People wearing passive implants
- People wearing active implants
- People wearing body worn medical equipment
- Pregnant women
- People with photo sensitivity

The ELV levels are too high with 'Persons at Particular risk' and therefore the reference levels (Council Recommendation 1995/519/EC) for the general public need to be used instead.

4.3 Risk Assessments

It is a requirement of both AOR10 and Electromagnetic Directive that prior risk assessments are carried out on any equipment producing non-ionising radiation. The risk assessment must also include the following:

- Type of non-ionising radiation
- How it is used
- Whether other workers or visitors could be potentially affected by the non-ionising radiation
- Amount of non-ionising radiation (either measured or taken from the manufacturers information)
- Indirect effect caused by non-ionising radiation such as spark effects, interference with electrical equipment, projectile magnetic objects.

If the risk assessment shows that the ELV's are not exceeded and there is no other further risk associated with the exposure (indirect effects), no further action is required.

However if the ELV's are exceeded control measurements must be implemented to reduce exposure. The control measures must also be documented in the risk assessment.

4.4 Reduction of risk

In any area where workers could be exposed to levels of artificial optical radiation or EMF radiation then the area must be demarcated and access restricted so far as reasonably practicable.

Other options for eliminating, restricting or reducing exposure would be:

- Choose equipment that is fully enclosed or adequately shielded at point of purchase

- Fully enclosing Artificial Optical source with safety interlocks
- Demarcate area and ensure other workers and visitors cannot access area
- Shielding of EMF
- Limit amount of time within the area
- Demarcate EMF field boundaries
- Suitable and appropriate PPE
- Communicate with manufacturer in regards to 'Workers at Particular Risk'

Reduction of risk from indirect effects must also be considered.

4.5 Information and training

All those who are working with non-ionising radiation equipment and could be potentially exposed to these hazards must be given training on:

- The nature and level of risk
- How to detect adverse health effects and how to report them
- The possibility of transient symptoms and sensations related to effects in the central or peripheral nervous system.
- Local policies in place to manage the risk
- Responsibilities of the individual to reduce the risk
- Workers at particular risk
- Where to seek further advice or information

Training can be provided either by the local Duty Appointed Person or directly from the URPO in the Health & Safety Service on request.

Schools should also incorporate training for new employees (and students where appropriate) into local induction procedures.

4.6 Health Surveillance

Although there is no requirement for routine health surveillance there may be occasion where it is necessary. Workers at Particular risk may require health surveillance or medical examination. Communication with manufacturers of pacemakers and other medical implants may be necessary to discuss the potential of interference with non-ionising radiation.

Medical examination is required if exposure exceeds ELV's.

5. FURTHER READING

- Health and Safety at Work Act, 1974
- Management of Health and Safety at Work Regulations 1999
- Control of Artificial Optical Radiation at Work Regulations 2010
- Physical agents (Electromagnetic fields) Directive 2013/35/EU
- LU Guidance documents on Artificial Optical Radiation and EMF
- LU Laser Safety policy
- Non-binding Guide to Good Practice for Implementing Artificial Optical Radiation
- HSE Guidance for Employers on the Control of Artificial Optical Radiation at Work Regulations

