

Non-ionising Radiations

Statement of purpose/objectives

All reasonably practicable provisions will be made by Shropshire Council to protect any persons against risks to their health, safety and welfare arising out of, or in connection with work, medical or teaching activities that involve the use of non-ionising radiation.

Non-ionising radiation may have a detrimental effect on the health, safety and welfare of persons exposed to them and Shropshire Council will take all reasonably practical steps to minimise any risks arising from such work.

Arrangements for securing the Health and Safety of Employees

Optical radiation

Optical radiation is another term for light, covering ultraviolet (UV) radiation, visible light, and infrared radiation. The greatest risks to health are probably posed by:

- UV radiation from the sun. Exposure of the eyes to UV radiation can damage the cornea and produce pain and symptoms similar to that of sand in the eye. The effects on the skin range from redness, burning and accelerated ageing through to various types of skin cancer.
- The misuse of powerful lasers. High-power lasers can cause serious damage to the eye (including blindness) as well as producing skin burns.

Electromagnetic fields

What are EMFs?

Electromagnetic fields (EMFs) arise whenever electrical energy is used. So for example, EMFs arise in our home from electrical appliances in the kitchen, from work processes such as radiofrequency heating and drying and in the world at large from radio, TV and Telecoms broadcasting masts and security detection devices.

What are their effects?

It has been known for a long time that exposure of people to high levels of EMFs can give rise to acute effects. The effects that can occur depend on the frequency of the radiation. At low frequencies the effects will be on the central nervous system of the body whilst at high frequencies, heating effects can occur leading to a rise in body temperature. In reality, these effects are extremely rare and will not occur in most day-to-day work situations

The benefits from the use of non-ionising radiation must be considered alongside the detrimental effects it may have on persons exposed to them. If the risk in using non-ionising radiation is justified, then the risk must be minimised.

More information on the effects of EMF can be found in A guide to the Control of Electromagnetic Fields at Work Regulations 2016 (HSG 281).

Definition of Terms Used.

Non-Ionising Radiation: Non-Ionising Radiation may be defined as electromagnetic radiation with insufficient energy to produce ion pairs in biological matter. For the purpose of this document, this encompasses wavelengths from >0m in the radio frequency region to 400nm in the UV region.

Extremely low frequency (ELF) radiation: Electromagnetic energy with frequencies between 0 to 300 Hz.

(Including most domestic appliances and power source frequencies)

Radiofrequency radiation: Electromagnetic energy with frequencies in the range 300 Hz to 300GHz.

(Inclusive of microwave radiation).

Microwave radiation: Electromagnetic energy with frequencies between 1GHz and 300 GHz.

(Including mobile phones, microwave ovens).

Infra-red radiation: Electromagnetic energy with wavelengths between 700 nm and 1mm.

Visible light radiation: Electromagnetic energy with wavelengths from 400nm to 700 nm.

Ultra-violet radiation: Electromagnetic energy with wavelengths from 100nm to 400nm.

This covers the regions

UV-A	400-315 nm
UV-B	315-280nm
UV-C	280-100nm

(Including transilluminators, PCR cabinets, and sterilizing equipment)

Safe system of work

At present, there are no specific regulations governing the use of non-ionising radiation. However, 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 do apply, and require, amongst other things, that risk assessments are carried out and appropriate measures to control exposure are put in place.

In order to demonstrate compliance with these regulations and specifically the requirement to adequately control exposure, Public Health England (PHE) advice should be used as the standard when assessing exposure.

For artificial sources of optical radiation, the Control of Artificial Optical Radiation (AOR) at Work Regulations was introduced in 2010. These regulations legally implement 'Exposure Limit Values (ELV)' for artificial sources. However, the Health and Safety Executive's guidance states that the majority of light sources are safe or 'Trivial' and in that sense, do not require any specific action other than routine maintenance and relevant instruction of personnel.

Non-ionising radiation (NIR) is the term used to describe the part of the electromagnetic spectrum covering two main regions, namely optical radiation (ultraviolet (UV), visible and infrared) and electromagnetic fields (EMFs) (power frequencies, microwaves and radio frequencies).

The use of non-ionising radiation covers a very broad range of applications. The content of local procedures outlining the safe system of work depends on the complexity of the work with non-ionising radiations but should always contain:

- A description of, or procedure for, determining non-ionising radiation designated areas;
- Where necessary written systems of work to enable persons not designated for work involving ionising radiation to enter these areas;
- Assessment of hazards and risks;
- General procedures and practices for working with and exposure to non-ionising radiation;
- Details of personal protective equipment, information, instruction and training;
- Details/information to limit the exposure of persons to 'as low as reasonably practicable' e.g. (microwaves which receive annual emissions testing);
- Basic principles and practices of non-ionising radiation protection.

Should any employee experience any problems resulting from work with non-ionising radiation, they must inform a responsible person immediately and the manager will then investigate the circumstances and take remedial action.

Record Keeping

To satisfy the requirements of Physical Agents (Optical Radiation) Directive the 'Optical Radiation Directive' was published in the Official Journal of the European Communities on 27 April 2006 (Ref: L114) under the title of "Directive 2006/25/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (artificial optical radiation).

- Instruction and training.

- Occurrences, incidents and accident reports and investigations.
- Maintenance of personal protective equipment.
- Performance, maintenance and modification of plant and equipment.

Summary of statutory duties

Currently there is no UK legislation specific to optical radiation. The general duties to assess and control risks contained in the Health and Safety at Work Act 1974 and the Management of Health and Safety at Work Regulations 1999 apply. The proposal adds little to these existing requirements, but it does define more precisely what is expected. For example, it requires, for artificial sources, assessment of exposure as a means of assessing risk and compliance with ICNIRP guidelines and specific items of information and training. There are two types of optical radiation that need to be considered separately: lasers and broadband sources.

At the present time, there are no legal specifications to cover the use of Non-Ionising Radiation. All safety recommendations are made with close reference to the following:

- Health and Safety at Work Act, 1974;
- International Commission Non-Ionising Radiation Protection (ICNIRP) guidelines;
- National Radiological Protection Board (NRPB) guidelines;
- International Commission on Non-Ionising Radiation Protection/ International Radiation Protection Association (IRPA/INIRC) guidelines;
- World Health Organisation (WHO) guidelines;
- 18th Directive 2004/40/EC of the European Parliament and of the Council;
- 19th Directive of the European Parliament and of the Council (Optical Radiation) Article 16; 89/39/EEC.
- Guidance for Employers on the Control of Artificial Optical Radiation at Work Regulations (AOR) 2010

Where can I get further information?

The corporate health & safety policy [click here](#)

Health & Safety Executive - Non-Ionising Radiation [click here](#)

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