

H9 – Opening Statement

Radiation at Work

The presence of radiation on sites is somewhat rare; where it is present, however, it needs to be correctly managed.

The Radiation Procedure covers the management and control of radiation in the workplace. It gives guidance on the different types of radiation and how they affect the human body. There is a section on ionising and non-ionising radiation. Additionally, there is advice on what both the employer and employee need to do when working with products which emit radiation.



H9 – Radiation at Work

What is this?

This is a written procedure which covers the management and control of radiation in the workplace.

The person responsible for implementing this procedure is:

What is radiation?

Radiation is energy which is transmitted, emitted or absorbed in the form of particles or waves. Exposure to radiation can be a significant occupational hazard for a variety of employees. The effect of radiation on living tissue is variable.

Understanding radiation

All matter, including the human body, is composed of particles called atoms. Electrons, along with neutrons and protons, comprise the basic building blocks of all atoms. The electrons form the outer layer or layers of an atom, while the neutrons and protons make up the nucleus, or core, of the atom.

- **Neutrons** are neutral
- **Protons** have a positive charge
- **Electrons** have a negative charge.

Radiation is often separated into two categories, ionising and non-ionising, to denote the energy and danger of the radiation.

What is the difference between ionising and non-ionising radiation?

Ionising radiation: The term radioactivity generally refers to the release of ionising radiation. If the number of electrons within an atom is less than the number of protons, the atom has a net positive charge. Due to this imbalance, the atom may become ionised and allow energy to escape from the atomic shells which, if exposed to, can lead to functional changes in body tissue.

Non-ionising radiation: Many forms of radiation such as heat, visible light, microwaves, or radio waves do not have sufficient energy to remove electrons from atoms and hence, are called non-ionising radiation. In the case of heat, for objects at room temperature, most of the energy is transmitted at infra-red wavelengths. Adverse health effects may still be experienced when exposed to ultra-violet light and lasers.



Health effects of radiation on the body

The potential short- and long-term health effects may range from:

- Skin burns
 - Infertility
 - Foetus damage
 - Stomach and blood damage
 - Problems with nervous system
 - Cancer
 - Cataracts
 - Brain damage
 - Dermatitis
 - Death.
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Types of ionising radiation

- Gamma rays and x-rays
 - Cosmic rays
 - Alpha particles
 - Beta particles
 - Neutrons.
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Types of non-ionising radiation

- Laser beams
 - Visible white light
 - Induction heating
 - Radio, radar and microwaves
 - Infrared
 - Ultraviolet (UV).
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What does an employer need to do?

The employer needs to:

- Consult a radiation protection advisor.
- Appoint a site radiation protection supervisor (SRPS).
- Give the HSE prior notice of specified work with ionising radiation



- Seek prior authorisation to use x-ray machines and other sources
 - Ensure that a suitable and sufficient risk assessment is undertaken before starting new work
 - Set up controlled areas where radiation levels are high
 - Have a written safe system of work for radiation
 - Have a written emergency action plan with personnel trained in its use
 - Undertake and make a record of routine emergency drills.
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What do employees need to do?

Employees need to:

- Avoid deliberate exposure to radiation
 - Take reasonable care of themselves and others who may be affected by their actions or omissions
 - Adhere to any company policy or procedure involving work with radiation
 - Make full use of any personal protective equipment that has been issued to them
 - Notify their employer of any suspected overexposures
 - Attend the required health surveillance days as requested by their employer.
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Lasers

If you are an employer who uses laser equipment you must:

- Assess the health and safety risks caused by your work; including risks to employees and the public, and ensure that these risks are controlled so far as is reasonably practicable; and
- Ensure that the work equipment you provide is suitable "in any respect which will affect the health and safety of any person". The current British Standard on the safety of laser products gives useful information on safe equipment design and lists the personal laser radiation exposure limits HSE is guided by.

In particular, you must:

- So far as reasonably practicable, ensure that your products are used so that hazardous beams are inaccessible to people. This applies both during normal operation and following any reasonably foreseeable fault in the product's operation; and
- If access to a hazardous emission is necessary during the use of the products, provide the employee with safety information, eg on the training, safe systems of work and any personal protective equipment that will be needed.



Legislation

- Ionising Radiation Regulations 1999
- Provision and Use of Work Equipment Regulations
- Management of Health and Safety at Work
- Personal Protective Equipment at Work Regulations
- Safety of Laser Products. Part 1. Equipment classification, requirements and user's guide British Standard BS EN 60825-1:1994 ISBN 0 580 23532 7 Contact BSI for latest revision

