# An Overview to Radiation Protection

**QUESTION**: What is the difference between Ionising and Non-Ionising Radiation?
**ANSWER:** The main difference is that ionising radiation carries more energy than non-ionising radiation.

## Ionising radiation includes:

- X-rays
- gamma rays
- radiation from radioactive sources and sources of naturally occurring radiation, such as radon gas

Ionising radiation has many uses in industry, such as energy production, manufacturing, medicine and research and produces many benefits to society. However, it is important that the risks of ionising radiation are managed sensibly to protect workers and the public.

## Non-ionising radiation includes:

- visible light
- ultra-violet light
- infra-red radiation
- electromagnetic fields

Sources of electromagnetic fields are used extensively in telecommunications and manufacturing with little evidence of related long-term health problems.

Ultra-violet light is part of natural sunlight and also forms part of some man-made light sources. It can cause a number of health problems, including skin cancer.

Further information on ionising and non-ionising radiation can be obtained from the Public Health England.

## Where does Ionising Radiation occur?

Ionising radiation occurs as either electromagnetic rays (such as X-rays and gamma rays) or particles (such as alpha and beta particles). It occurs naturally (eg from the radioactive decay of natural radioactive substances such as radon gas and its decay products) but can also be produced artificially.

## How can people be exposed to ionising radiation?

People can be exposed externally to radiation from a radioactive material or a generator such as an X-ray set, or internally by inhaling or ingesting radioactive substances. Wounds that become contaminated by radioactive material can also cause radioactive exposure.

Everyone receives some exposure to natural background radiation and much of the population also has the occasional medical or dental X-ray. HSE is concerned with the control of exposure to radiation arising from the use of radioactive materials and radiation generators in work activities. This is to ensure that workers and members of the public are not harmed by these activities.

The use of ionising radiation covers the use of radioactive materials and radiation generators in these work activities in:

- manufacturing, food production and waste processing
- construction
- engineering
- oil and gas production
- non-destructive testing
- medical and dental sectors
- education and research establishments (e.g. universities and colleges)
- nuclear

The nuclear industry and transport of radioactive substances is regulated by the Office for Nuclear Regulation

http://www.onr.org.uk/index.htm

However, employers will also need to notify, register or gain consent from HSE where these requirements apply. For more information go to Working with ionising radiation: notify, register or get consent.

https://www.hse.gov.uk/radiation/ionising/notification-process.htm

The main legal requirements enforced by HSE are detailed in Working with ionising radiation. Ionising Radiations Regulations 2017. Approved Code of Practice and guidance.

https://www.hse.gov.uk/pubns/books/l121.htm.

More information is available in the Radiation Legal Base.

https://www.hse.gov.uk/radiation/ionising/legalbase.htm