The nature and different types of ionising and non-ionising radiation

THE ELECTROMAGNETIC SPECTRUM

The nature and types of non-ionising radiation

Infrared (IR)

- Infrared radiation (IR) relates to the range of invisible radiation wavelengths from about 780 nanometres, just longer than red in the visible spectrum, to wavelengths of 1 millimetre, on the border of the microwave region of the electromagnetic spectrum
- This part of the electromagnetic spectrum is further subdivided into three regions according to wavelength

19

The nature and different types of ionising and non-ionising radiation

THE ELECTROMAGNETIC SPECTRUM

The nature and types of non-ionising radiation

Microwave radiation

- Microwaves are the name given to the electromagnetic radiation between the infrared and radio wave region of the electromagnetic spectrum, with wavelengths typically in the 1mm to 10cm range
- Microwaves are actually just radio waves of shorter wavelength and therefore higher frequencies
- As they constitute the highest frequency radio waves they have significant energy related to them

20

The nature and different types of ionising and non-ionising radiation

THE ELECTROMAGNETIC SPECTRUM

The nature and types of non-ionising radiation

Radio wave radiation

- This part of the electromagnetic spectrum ranges from a wavelength of approximately 1 mm to thousands of kilometres, there is no defined upper limit to the radio wave wavelength category
- If microwaves are considered to be in a separate category the remaining part of the radio waves range from approximately 10 cm upwards
- Radiation relating to these electromagnetic waves contains little energy
- At the longer wavelengths of this range the photon character of the energy is not apparent and the waves appear to transfer energy in a smooth manner

21

The nature and different types of ionising and non-ionising radiation

THE ELECTROMAGNETIC SPECTRUM

Particulate and non-particulate types of ionising radiation

Particulate ionising radiation

- Particulate ionising radiation refers to the radiation energy carried by moving particles
- Ionising radiation in the form of a particle includes very small (sub-atomic) particles such as electrons, protons and neutrons

Non-particulate ionising radiation

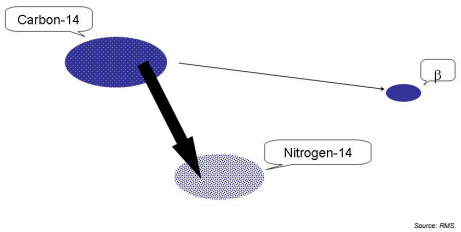
- Non-particulate ionising radiation refers to the radiation energy carried by electromagnetic waves
- Electromagnetic waves can vary in energy, frequency and wavelength

22

The nature and different types of ionising and non-ionising radiation

THE ELECTROMAGNETIC SPECTRUM

Carbon 14 radioactive decay



23

The nature and different types of ionising and non-ionising radiation

THE ROLE OF THE RADIOLOGICAL PROTECTION ORGANISATIONS

Role of the International Commission for Radiological Protection

- The International Commission on Radiological Protection (ICRP) was founded in 1928 to advance for the public benefit the science of radiological protection
- The ICRP provides recommendations and guidance on protection against the risks associated with ionising radiation from artificial sources, as widely used in medicine, general industry and nuclear enterprises, and from naturally occurring sources
- Reports and recommendations are published four times each year on behalf of the ICRP as the journal

24

The nature and different types of ionising and non-ionising radiation

THE ROLE OF THE RADIOLOGICAL PROTECTION ORGANISATIONS

Role of the Health Protection Agency/Health Protection Scotland

The Health Protection Agency

- The Health Protection Agency's (HPA) role is to provide an integrated approach to protecting UK public health through the provision of support and advice to the NHS, local authorities, emergency services, other 'arms-length' bodies, the Department of Health and the devolved administrations

Advisory groups

- Advisory Group on Non-Ionising Radiation (AGNIR)
- Advisory Group on Ionising Radiation (AGIR)
- Radiation, Risk and Society Advisory Group (RRSAG)

25

The nature and different types of ionising and non-ionising radiation

THE ROLE OF THE RADIOLOGICAL PROTECTION ORGANISATIONS

Role of the Health Protection Agency/Health Protection Scotland

Health Protection Scotland

- Health Protection Scotland (HPS) was established by the Scottish Government in 2005 to strengthen and co-ordinate health protection in Scotland
- HPS is organised into specialist groups with expertise provided by a multi-disciplinary workforce and includes doctors, nurses, scientists and information staff

26

The nature and different types of ionising and non-ionising radiation

THE ROLE OF THE RADIOLOGICAL PROTECTION ORGANISATIONS

Role of the Environment Agency/Scottish Environment Protection Agency

- The Environment Agency and the Scottish Environment Protection Agency (SEPA) are the environmental regulators for England and Wales and Scotland respectively
- Their main role is to protect and improve the environment
- This is done by assisting organisations to understand their environmental responsibilities, enabling them to comply with legislation and good practice

27

CONTENTS

28

Non-ionising radiation

SOURCES OF NON-IONISING RADIATION GENERATED IN WORKPLACES AND NATURALLY OCCURRING

Ultraviolet

Workplaces

- Curing with UV
- UV sources in photocopiers and laser printers
- UV Lasers
- Welding
- Germicidal lamps used in water treatment, research and food processing
- Diagnostic lighting such as foetal/neonatal transilluminators

29

PART ONLY OF THE COMPLETE ELEMENT B7 – PHYSICAL AGENTS 2 - RADIATION

30