

Radiation Testing & Onsite Screening Summary

1. Radiation is energy that emanates from a source material, travels through space, and may be able to penetrate various materials.
2. Non-ionizing radiation ranges from extremely low frequency (ELF) to the higher end of the ultra violet (UV) spectrum.
3. Visible light, microwaves and radio waves are examples of non-ionizing radiation.
4. Examples of ionizing radiation include short-wavelength UV, x-rays, alpha, beta and gamma rays.
5. Different forms of radiation are present in a number of occupational settings including healthcare (x-rays), outdoor work (extreme sunlight) and industrial environments (lasers).
6. Ionizing radiation may be harmful to living organisms.
7. Due to the health risks of ionizing radiation, radiation testing is recommended for occupational setting where exposure may occur.
8. The OSHA website provides guidance on the regulations regarding radiation testing, safety and exposure.

Overview

Because ionizing radiation exposure can alter the structure of atoms, it can lead to harmful health effects. Different forms of radiation are experienced in a number of occupational settings including healthcare (x-rays), outdoor work (UV exposure), industrial and construction (lasers) and nuclear installations. Occupational environments where radiation is present should be subjected to thorough radiation testing.

Radiation and its impact on health

Non-ionizing radiation ranges from extremely low frequency (ELF) radio waves through the ultraviolet (UV) spectrum. Visible light appears in the non-ionizing range and is detectable to the human eye. Natural sunlight contains a mix of visible and UV light. While UV light is technically nonionizing, its harmful effects can mimic that of ionizing radiation – including incidence of mutagenesis and carcinogenesis. Outdoor workers, particularly in hot climates, are susceptible to sunburn on exposed skin, which increases the risk of skin cancer development. Welders are also exposed to UV radiation (see our Welding Pathfinder).

Power lines, electric cables and electrical systems emit ELF. There are different schools of thought regarding the health effects of ELF exposure, but some studies have suggested a link to certain forms of cancer after prolonged and intense exposure.

Ionizing radiation has extremely short wavelengths. Short-wavelength UV and x-rays as well as alpha, beta and gamma rays fall into this category. Workers in the healthcare, medical, defense, nuclear and weapons production industries are at risk of ionizing radiation exposure. In these environments, radiation testing is crucial to worker safety.

Depending on the type and intensity of ionizing radiation, biological systems such as tissues and organs may sustain damage. Genetic damage and cancer formation may occur as a result of ionizing radiation exposure. Thorough radiation testing is required to protect employees from exposure.

Regulatory measures

Employers should be aware of all the regulations associated with radiation testing and safety in the workplace. The OSHA website is a fantastic resource, and their page on radiation leads you to specific pages regarding non-ionizing and ionizing radiation. See our essential links section to find links to the regulations pages. Additionally, there is an e-tool entitled *Eye and Face Protection* with pages designed specifically for those working with lasers in industries such as healthcare and construction: www.osha.gov/SLTC/etools/eyeandface/ppe/laser_safety.html.