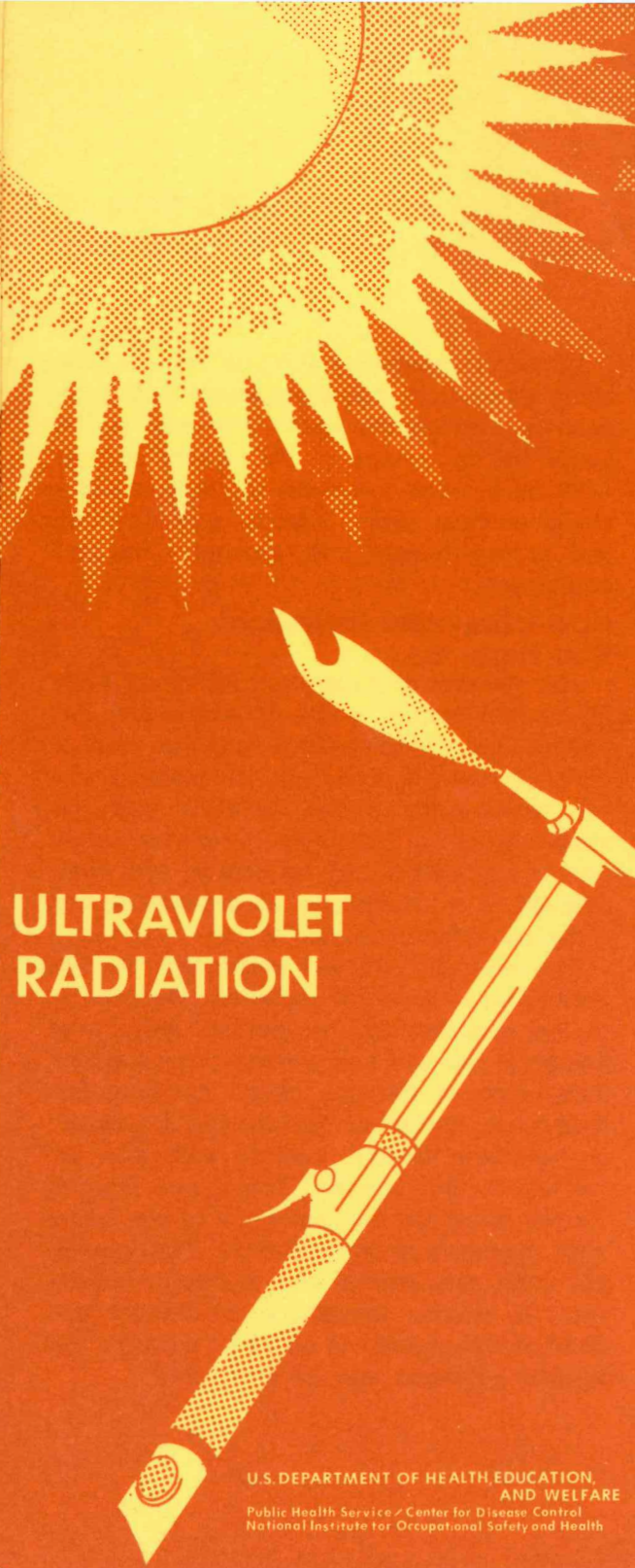


ULTRAVIOLET RADIATION

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service / Center for Disease Control
National Institute for Occupational Safety and Health

ULTRAVIOLET RADIATION AND THE WORK ENVIRONMENT

Ultraviolet radiation (UV) is an invisible short wavelength radiation which frequently accompanies visible light. The sun is the major natural source of UV radiant energy. Artificial sources commonly found in industry are germicidal lamps, carbon arcs, welding and cutting torches, and laboratory and test equipment.

How Ultraviolet Radiation Can Harm You

The severity of a radiation injury depends on several factors, some of which are: exposure time, intensity of the radiation source, distance of the source from the exposed person, wavelength of the radiation, and the sensitivity of the individual. Since UV radiation is not visible and its effects are often delayed, it is possible to be exposed to the radiation without realizing it.

The eyes and skin are particularly vulnerable to injury from UV radiation. Absorption of the radiation by the mucous membrane linings of the eye and eyelids causes an inflammation of the eye called conjunctivitis (commonly known as "ground glass eyeball" or "welder's flash"). Lesions may also be formed on the cornea. These eye injuries usually manifest themselves 4 to 12 hours after exposure to the radiation. The injuries are often very painful and, although impairment is usually temporary, permanent eye damage can result. In cases of extreme exposure, cataracts may be produced.

A common example of the effect of UV radiation on the skin is sunburn. Exposure to UV radiation from industrial sources can cause a similar and, in some circumstances, a severe skin burn. Continual exposure of the skin to UV radiation hastens the aging of the skin and, in some cases, may cause skin cancer.

Some chemicals and drugs, such as antibiotics, antihistamines, diuretics, tranquilizers, and sulfonamides may cause photosensitivity, or increased sensitivity to light. Persons using these substances, who are subsequently exposed to UV radiation, may develop a photodermatitis. This condition manifests itself in erythema (a reddening of the skin similar to an exaggerated sunburn), swelling and skin eruptions. The leaves, roots, fruits, and seeds of numerous plants also contain a chemical which may cause photosensitivity if it comes in contact with the skin. Some of these plants are celery, wild parsnips and carrots, figs, parsley, fennel, caraway, coriander, angelica, common rue, bergamot, buckwheat, limes and other citrus fruits.

Exposure to the UV radiation emitted by black light sources may cause temporary blurring of vision, eye fatigue, and headaches. No permanent damage is known to result.

Controlling Exposure

Employees working with equipment which are sources of high-intensity UV radiation such as welding arcs, plasma torches, carbon arcs, and high-pressure mercury vapor lamps need to take strict precautions against exposure of the eyes and skin. Eyes should be protected by the use of suitable goggles, face

shields, or masks. Protective clothing of densely woven flannelette poplin or synthetic fabric will provide adequate skin protection against UV radiation. (In operations where a fire hazard exists, flame-resistant clothing should be worn.)

Gloves should be worn to protect the hands. Face shields and barrier creams may be used as supplementary skin protection. The operations producing UV radiation should take place behind enclosures that absorb the radiation and shield nearby workers from accidental exposure. Walls, ceilings, lamp housings, and other reflective surfaces should be painted with a pigment-based paint of low UV reflectance. Whenever possible, shiny metal objects should be removed from the work area.

Persons exposed to low-intensity sources of UV radiation such as low-pressure mercury vapor lamps, sunlamps, and black light lamps also need protection for the eyes and skin. Glass or plastic spectacles of sufficient thickness to absorb UV radiation may be used to protect the eyes. Alternatively, goggles or face shields can provide eye protection. Employees should prevent skin injury by the appropriate use of protective clothing, face shields, and barrier creams. Susceptible fair-skinned persons working outdoors in strong sunlight should take equivalent precautions.

In some industrial processes, toxic and potentially explosive mixtures of gases may be produced as a result of the interaction of UV radiation with the chemical constituents of air or its contaminants. It is essential to remove these gases, which are primarily ozone and oxides of nitrogen, by the use of

a good ventilation system.

Management's Responsibility

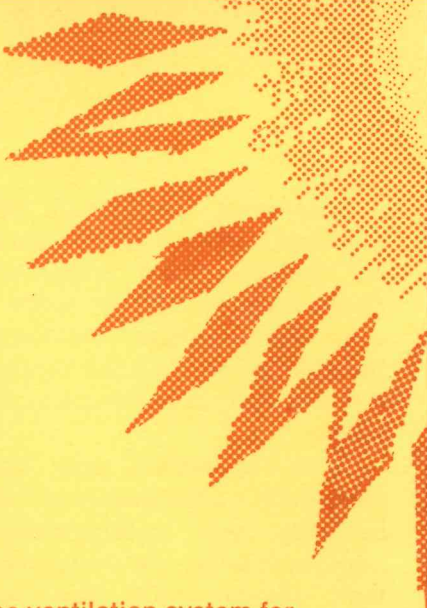
Management is responsible for informing workers about the hazards of UV radiation. Employees who are exposed to high-intensity sources should be instructed in the use of protective devices and in the recognition of symptoms of eye and skin damage due to the radiation. Those working in industrial processes in which toxic or potentially explosive gases are produced should be informed of the precautions they should take.

Very susceptible light-skinned persons who work outdoors and are regularly exposed to sunlight should be informed of the possible long-term effects of sun exposure and of the need to protect the skin. If an employee has a medical history which shows that he has a condition aggravated by exposure to UV radiation he should not be permitted to work in areas where this hazard exists. Warning signs should identify the areas where UV radiation hazards exist and should caution the employee to protect the eyes and skin. All safety measures should be strictly enforced.

Employee's Responsibility

Each employee should be aware of the UV radiation that exists in his work area. He should follow all safety rules required by management. In particular, he should be careful to:

- Avoid unnecessary exposure to UV radiation.
- Remove unneeded shiny objects from the work area.
- Use all required protective equipment and clothing.



- Check the ventilation system for adequate performance before starting his work if the industrial process is one in which toxic gases are formed.
- Report all suspicious eye and skin disorders to his supervisor.

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