



Industrial Radiography

Safety, durability, and quality are very important in manufactured products, especially where product failures can have dangerous consequences or require expensive repairs. Industrial manufacturers use a testing method called “radiography” to check for defects in metal parts and welds before products are put on the market. Radiography allows the examination of an object without affecting its usefulness (such methods are referred to as *Nondestructive Inspection* or *NDI*). Much like a dentist uses x-rays to check for decay in teeth, so too can manufacturers use radiography to check for product defects.

Industrial radiography is used commonly in the following applications:

- gas pipelines
- oil pipelines
- pipes
- boilers
- pressure vessels in chemical plants, vehicles, and aircraft.

Industrial radiography uses two types of radiation: x-rays and gamma rays. X-rays used in industrial radiography are produced by an x-ray generator, which is large and used in a fixed location. Similar to medical x-ray machines, radiation is present only when these machines are turned on.

Portable industrial radiography devices are smaller, and use radioactive material in a sealed container, known as a “sealed source” to provide gamma rays. These metal capsules are generally less than 1 centimeter in diameter and only a few centimeters long. Although portable industrial radiography devices are generally small physically, they are usually heavy due to the shielding which is added to protect operators from the radiation.

The potential for exposure from the radiation sources exists when the equipment is mishandled. The most frequent cause of accidents is the failure of the radiographer to return the source to the fully shielded position and conduct a radiation survey to confirm that the shields are in place. This can result in exposures above protective limits and even radiation burns.

Be Aware: Portability makes industrial radiography cameras susceptible to theft or loss. The small size of the source allows for easy unauthorized removal by an individual, and the potential placement of it into the pocket of a garment.

Who is protecting you

U.S. Nuclear Regulatory Commission (NRC)

The NRC regulates the licensing and possession of industrial radiography equipment.

U.S. Environmental Protection Agency (EPA)

The EPA has begun evaluating some of the most common applications of radioactive sources to identify those that could potentially be replaced by alternative (non radiation) technologies. Already, alternative inspection

technologies are increasingly replacing gamma-ray radiography in industry. In some instances, such as ultrasonic inspection, the replacement rate has been limited by the availability of trained personnel.

U.S. Department of Transportation (DOT)

Regulates transportation of portable radionuclide sources that are used in the field.

American Society of Mechanical Engineers (ASME)

Establishes the rules of safety governing the design, fabrication, and inspection of boilers and pressure vessels and nuclear power plant components during construction to provide a margin for deterioration during service. Radiographic examination has been permitted by the ASME Boiler and Pressure Vessel Code since 1931.

American Petroleum Institute (API)

The API codes govern the manufacture of oil and gas steel pipelines, how they are assembled by welding, and their inspection.

What you can do to protect yourself

Unless you are a trained professional, avoid industrial radiography devices and follow all safety rules. Because workers not immediately involved in the testing must be cleared from the area where radiography is being conducted, their exposure is unlikely.

Resources

You can explore this radiation source further through the resources at the following URL:
<http://www.epa.gov/radtown/industrial-radiography.html#resources>

We provide these resources on-line rather than here so we can keep the links up-to-date.