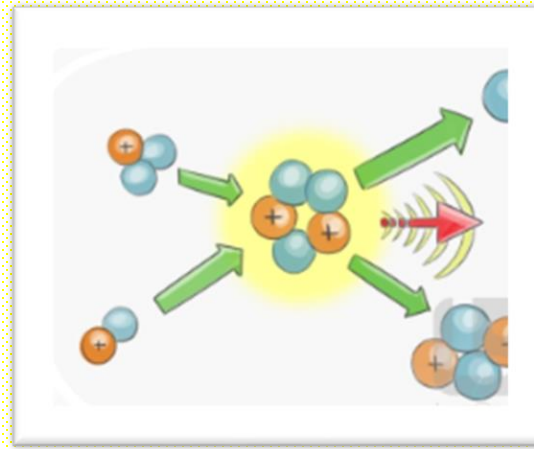


USE OF NUCLEAR GAUGES IN INDUSTRY

Presenter Name :
Avi Altman



AGENDA



- A. Industrial Radiography?
- B. What uses does the nuclear gauges have in industry ?
- C. Basic concepts of nuclear radiation ?
- D. half-life values for radioactive substances in the industry
- E. What are the advantages of using a nuclear gauges?





INDUSTRIAL RADIOGRAPHY

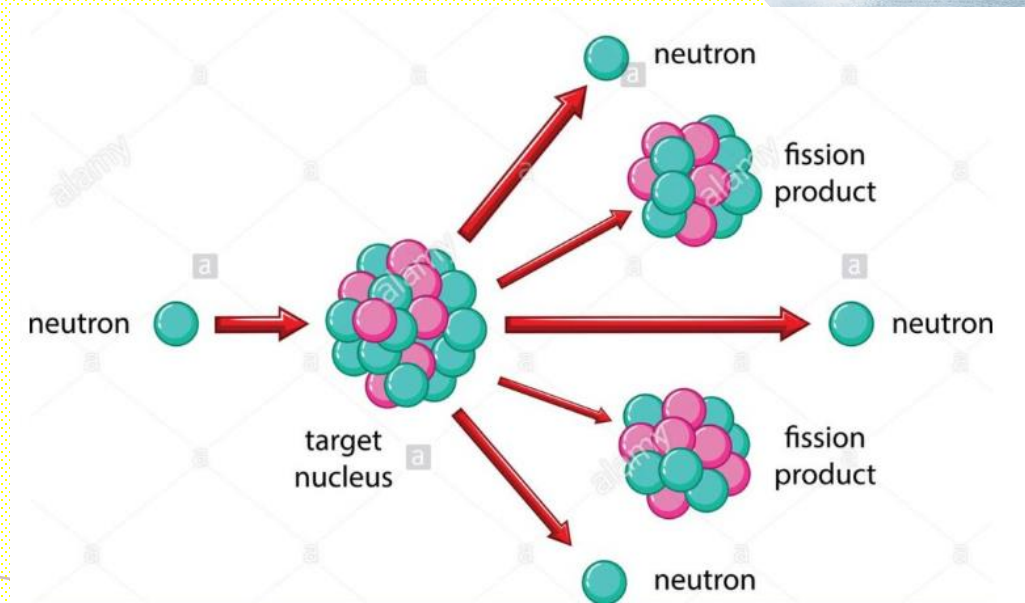
Manufacturers use industrial radiography to check for cracks or flaws in materials. Industrial radiography mostly uses x-ray and gamma radiation to show flaws that cannot be detected by the naked eye. Because x-rays and gamma rays can travel through different types of materials, such as air, soil and water, industrial radiography is useful in inspecting materials without having to move or damage the material itself.



BASIC CONCEPTS OF NUCLEAR RADIATION ?

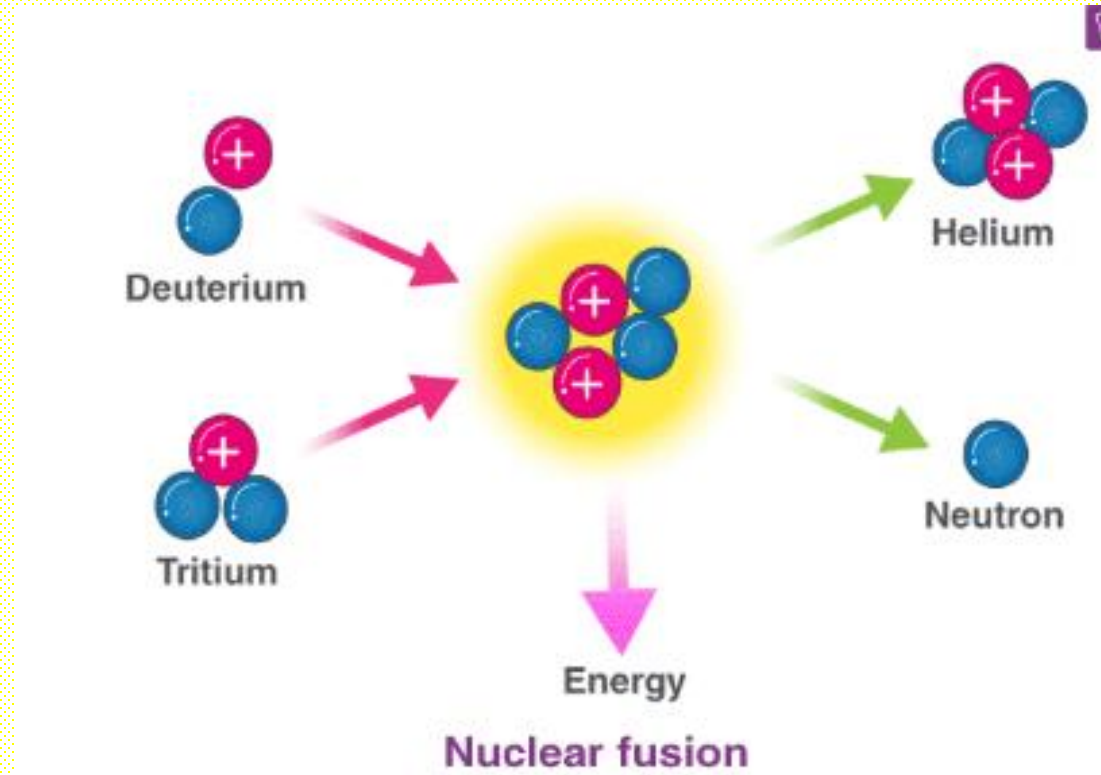
Nuclear gauges use radioactive sources to identify the thickness, density or make up of a wide variety of material or surfaces.

These gauges, which are safe to use when the proper safety measures are followed, help people build safe buildings, roads, and make reliable products



BASIC CONCEPTS OF NUCLEAR RADIATION ?

- Nuclear gauges measure three main things: thickness, density, and fill level. Thickness gauges are used in manufacturing to make sure an entire product or material is the same thickness throughout, or to make sure the coating on a material is even. Density gauges are used in cement, petroleum, and road production to make sure that the density of a material is the same. Level gauges measure how much liquid is in a container, to make sure that each container has the same amount of product.



ABOUT NUCLEAR GAUGES

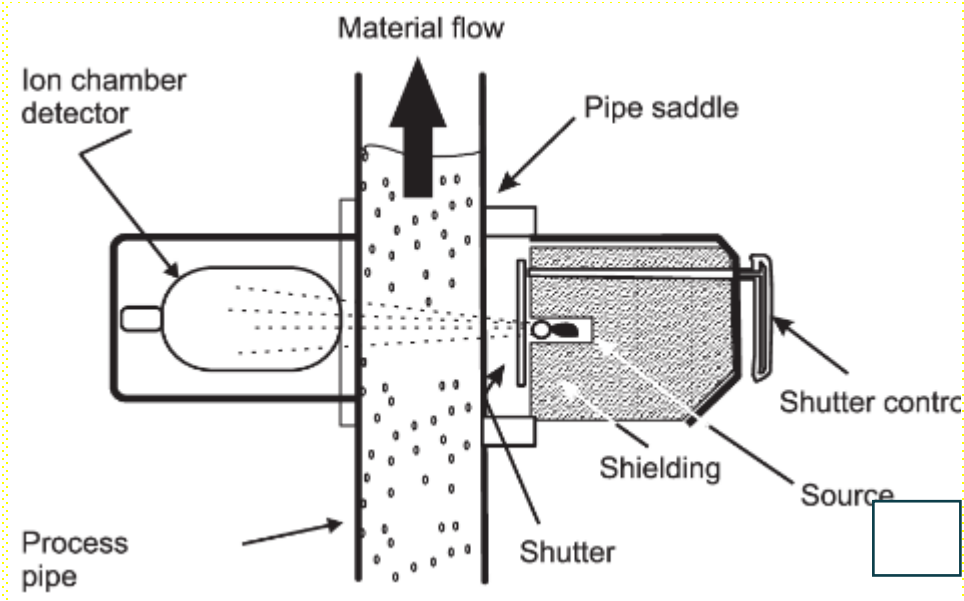
Nuclear gauges have a radioactive source that is covered by a radiation blocking shield. Gauges can contain a gamma, beta or neutron radiation source. Different sources are used depending on what the nuclear gauge is measuring. Radiation from a nuclear gauge does not make the materials it measures radioactive.

Nuclear gauges are either fixed or portable. Fixed nuclear gauges are permanently mounted in a location. Typically, objects pass by the fixed gauge on a conveyor belt for inspection. On the other side of the object is a radiation detector. When the radioactive source is opened, radiation is emitted from the gauge and some of the radiation will pass through the object. The rest of the radiation is absorbed by the object. Any radiation that is able to pass completely through the object will be measured at the detector. Usually, fixed gauges are used to ensure that each item passing by the gauge is the same

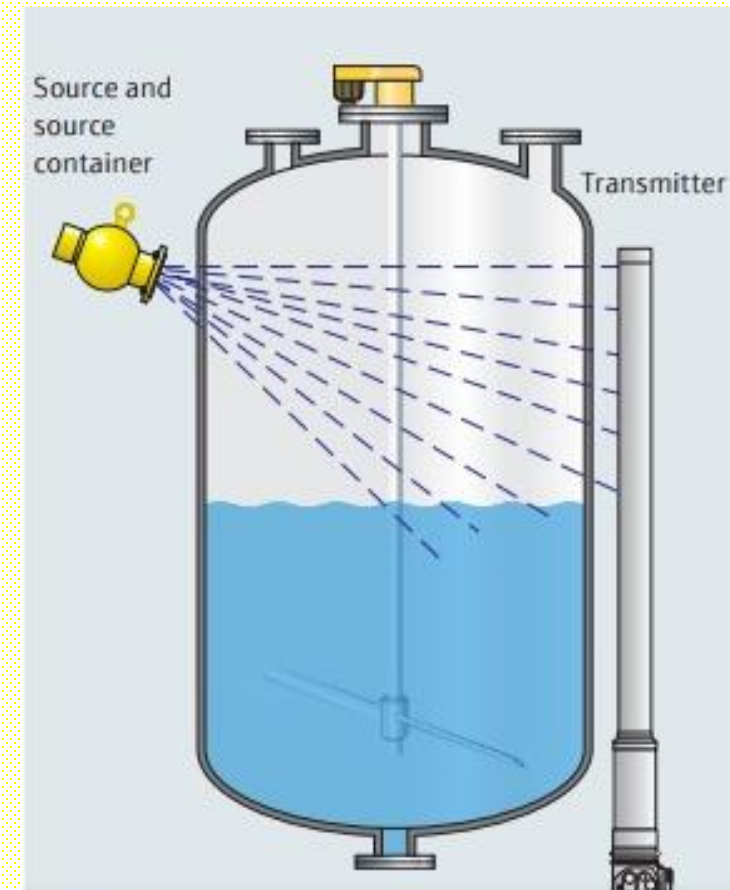


HOW DOES A NUCLEAR GAGE WORK SAMPLE

SAMPLE 1 NUCLEAR DENSITY GAUGE



SAMPLE 2 NUCLEAR LEVEL MEASUREMENT



HALF-LIFE VALUES FOR RADIOACTIVE SUBSTANCES IN THE INDUSTRY

- A. Most popular in the industry will be cobalt 60 .
& cesium 137.

<i>Element</i>	<i>Symbol</i>	<i>Mass #</i>	<i>Radiation</i>	<i>Half Life</i>
Cobalt	Co	60	Beta, Gamma	5.27 years
Strontium	Sr	90	Beta	28.8 years
Cesium	Cs	137	Beta	20 years
Uranium	Ur	238	Alpha, Gamma	4.5 billion years
Plutonium	Pu	239	Alpha, Gamma	24,100 years
Americium	Am	241	Alpha	432 years



POPULAR USE. OF. NON NATURAL ISOTOPES.

CESIUM 137.

- Used for detecting density. Flow. Height gauge. Moist.
- Kept all times. Inside. Alert. Case. With an opening. Just to the gauge. that's able to read the photons.

COBALT 60

- Popular use. Medical device. Injection. Ecological. Patients. And can be replacement. For X-ray.
- Just like the cesium kept inside. Case made out of lead. Very high energy. Therefore, Half life is much shorter.

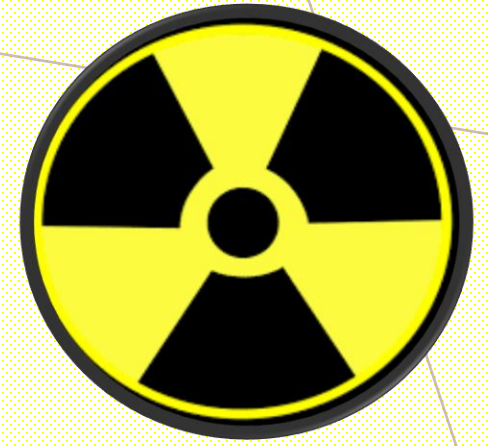


WHAT ARE THE ADVANTAGES OF USING A NUCLEAR GAUGES?

1. Very high accuracy.
2. Very clean energy.
3. Low cost.
4. Low on maintenance.
5. If maintained, correct. No danger for the environment or the people around you.



THANK YOU



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