

# Personal dosimetry

**Dosimetry** is a set of methods used to measure the absorbed dose of radiation and used mainly in medicine or nuclear energy.

The human sensory system is unable to perceive the effects of ionizing radiation. Its excessive action increases the risk of endangering an individual's health. **Personal dosimetry** is used to measure the absorbed dose of radiation. We obtain information about individual types of ionizing radiation thanks to the interaction of a substance with a suitable absorbing substance - a detector.

## Types of personal dosimeters

Dosimeters measure the dose of radiation that falls on a doctor or a worker in a nuclear power plant.

### Film dosimeters

Film dosimeters are the oldest type of detector in use. It is similar to an X-ray film. The worker wears the device on the front of the jacket with the window facing forward, and the film is sent for analysis after a month. They are produced in the size of 3x4 cm. The dosimeter is placed in a light-proof paper package, covered with a plastic cover and has a window on the front. The film is very sensitive to radiation. The blackening density of the film is proportional to the amount of exposure. Evaluation is based on the degree of blackening. The advantage of film dosimeters is their low financial cost, easy handling, and satisfactory accuracy. The downside is a limited lifespan and increased susceptibility to damage from moisture and higher temperatures.

### Thermoluminescence dosimeters

Thermoluminescence dosimeters are based on the sensitivity of certain substances to ionizing radiation. An example is the use of the crystalline form of lithium (LiF). After exposure to radiation and subsequent heating to high temperatures, electrons in the crystals are deexcited, accompanied by the emission of visible light. The photomultiplier measures the intensity of emitted light, which is proportional to the dose of radiation absorbed by the crystal. It is used in the form of a finger dosimeter, when it measures the dose falling on the hands of the exposed person. The advantage is their simplicity, sensitivity and at the same time resistance to moisture. The disadvantage is the higher price and sensitivity to visible and ultraviolet light. They are worn for three months.



Personal dosimeter

### Pencil dosimeters

Pencil dosimeters are ionization chambers in the form of a pencil.

### Blind dosimeters

Blind dosimeters are small ovoid or rounded chambers. Dosimeters can be unscrewed and charged to the selected voltage. After a certain period of radiation exposure, the electrometer measures the drop in voltage and electrostatic charge, which is proportional to the irradiation of the cell.

## References

### Source

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