

NI-08

NEUTRON IRRADIATOR



MAIN ADVANTAGES

- 7 different neutron radiation sources
- Independent mechanical indicator for carousel position verification
- Fully automated irradiation process
- Integrated safety system

PURPOSE

The NI-08 Neutron Irradiator, fitted with appropriate radionuclide source, serves as a reference source of the neutron flux.

Usually, it is a part of neutron dose and dose rate meters calibration laboratories.

The irradiator consists of a rotary carousel for max. 7 sources, vertical source-lifting mechanism in aluminum protective case which enables to eject the source up to 4 m distance, a neutronstop and lead shielding, a mechanical source position indicator, alarm and safety system.

The sources are placed in the rotary carousel. The carousel is equipped with 7 slots for placing sealed radionuclide sources and one empty slot (parking position) securing safe status of the irradiator when all sources are safely shielded. The irradiator is installed under floor.

For irradiation the selected source is placed into the source-lifting mechanism which takes it to the exposure position 4 m above the floor of the irradiation room so as it could irradiate in all directions. All the time the source remains in the aluminum protective case. The design of the source-lifting

mechanism requires min. 5,3 m cylindrical hole under the irradiator so as it was possible to take the source back to the irradiator parking position.

The irradiator is equipped with the safety system enabling automatic exposure termination in case of non-standard or emergency situations. In case of the power failure the exposed source automatically returns to the shielded position by gravity.

SPECIFICATION

| | |
|---|------------------------|
| Number of nests for the sources | 7 |
| Max. dimensions of sources ($\varnothing \times h$) | 35 × 60 mm |
| Max. activity $^{239}\text{Pu-Be}$ | 185 GBq |
| Dose rate in v 1 m | < 5 $\mu\text{Sv/h}$ |
| Time transporting source to working position | approx. 40 s |
| Power supply | 230 V / 50 Hz / 160 W |
| Weight | 3 600 kg |
| Shielded sources container dimensions (H × W × L) | 2000 × 1400 × 1400 mm |
| Dimensions including lift (H × W × L) | 11500 × 1400 × 1700 mm |
| Operating temperature | from 10 to 45 °C |

OPTIONAL ACCESSORIES

A **Circular Turntable** primarily used for the precise placement of larger amounts of calibrated personal dosimeters in the radiation field.

Heavy Water or Polyethylene **Moderating Sphere** intended to slow down fast neutrons to achieve the energy of thermal neutrons.

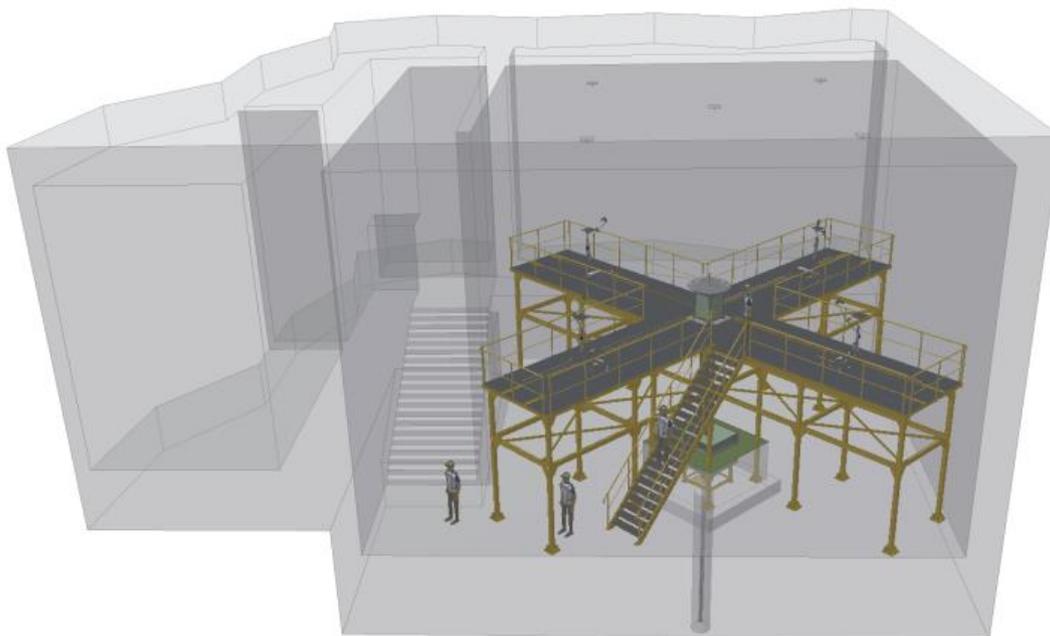
Shadow cones used to determine the proportion of directly captured and reflected neutrons.

Safety system preventing any unacceptable exposure of the personnel.

General Information Panel providing the overall status of the calibration laboratory with irradiator and other components.

RELATED PRODUCTS

| Name | Description |
|--------|---|
| CB-60 | Calibration Bench for the precise positioning of the meter within the ionizing radiation field. |
| NI-01 | Neutron Irradiator for one radionuclide source |
| GI-07 | Gamma Irradiator for seven radionuclide sources |
| GI-02 | Gamma Irradiator for two radionuclide sources |
| GI-01H | Gamma Irradiator for one Co-60 source |
| GI-01L | Gamma Irradiator for one Cs-137 source |
| DARS | Data and Control System, which manages completely the calibration laboratory operation. |



A system comprising an irradiator and four calibration benches for a neutron calibration laboratory