

OG-8 Irradiator



The irradiator fitted with appropriate radionuclide sources can serve as a gamma radiation source for very high dose rates up to 7 Gy/h.

It is designed as a part of the hi-tech calibration system for the dose and dose rate meters.

Purpose

The OG-8 irradiator is a part of the calibration system for the gamma dose / gamma dose rate meters. When fitted with appropriate radionuclide sources it can serve as a gamma dose rate source in a very wide range from tenths of $\mu\text{Gy/hr}$ up to units of Gy/hr .

It generates a homogeneous and collimated ionizing radiation beam with an angle of 15 degrees and with the axis at a height of 1.5 m above the ground level as standard.

Description

The OG-8 irradiator includes metal support with source holder, shielding, collimator, source transport piping and the control and power supply switchboard.

The holder is intended for up to eight radiation sources. The sources are placed in the horizontal carousel of the irradiator. A gear stepping motor drives the carousel. This makes it possible to select the required position of the carousel, as well as the desired source.

The holder is stored above the floor in the dual layer lead shield. As standard both the basic and additional layer are included. This enables the maximum permissible activity of the sources to reach up to 100 TBq and the dose rate on the surface remains lower than $1 \mu\text{Sv/hr}$.

The source moves from the holder to the collimator electromechanically (or optionally by means of compressed air). The time when the source moves from the holder to the collimator, is shorter than 3 seconds.

The irradiator is controlled via RS-485 interface from the control system.

Main advantages

- Able to provide a homogenous and collimated dose rate beam of up to 7 Gy/h
- Able to use up to 8 different radiation sources
- Completely automated operation controlled from control system
- Provision of safety interlocks

Standards used

ISO 4037-1:1996 - X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy -- Part 1: Radiation characteristics and production methods;

Certification

Type approval No 5548/2005, issued by State Office for Nuclear Safety, Czech Republic, with the amendment No 27865/2005.

Specifications

Basic data:

| | |
|------------------------------|--------------------------------------|
| Number of source holders | 8 |
| Maximum source dimension | diam. 40 x 80 mm (1.57 x 3.15 in) |
| Collimator angle | 15° (20°) |
| Axis of the beam | 1,5 m (59 in) above ground |
| Total source adjustment time | within 10 s |

Description

The collimator parameters comply with the ISO 4037 standard. The local control switchboard provides the following:

- Information on the holder position, this means information on the operational source position
- Transporting the required source to the operational position
- Monitoring the source position at any moment during operation
- Transporting any source from transport piping to the collimator and vice versa
- Displaying the message that the source is placed in the working position of the collimator

If any failure occurs, the source will automatically return back into the safe position in the holder.

Typically there are several ^{137}Cs sources with different activities, one ^{60}Co and one ^{241}Am source installed in the irradiator to provide a large scale of dose rate and different energies as well.

Calibration system / main parts and function



OG-8 Irradiator serving as a radiation source

KL3D-50 calibration bench which enables precise 3D detector positioning opposite the OG-8 irradiator

Specifications

| | |
|---|----------------------------------|
| Positioning accuracy | $\pm 0,3$ mm (± 0.01 in) |
| Total maximum activity of ^{137}Cs | 1,0E+14 Bq |
| Total maximum activity of ^{60}Co | 1,0E+11 Bq |
| Power supply | 110-230 VAC |
| Communication with host system | RS-485 |

Dimensions & Weight:

| | |
|------------------------------|-----------------------------|
| Weigh – standard dual shield | approx. 3.5 t (7700 lbs) |
| Diameter | approx. 700 mm (27.5 in) |

Ordering data

When ordering, please specify the name, type and the model.

| Model | Description |
|----------|--|
| K0123-01 | Basic option with dual layer shielding |
| K0123-xx | All system parameters will be specified according to the customer's requirements. For example, pneumatic source movement instead of electromechanically, system with only basic shield, etc. |
| K0124 | KL3D-50 calibration bench for the precise and safe adjustment of the desired detector-source distance |
| N/A | DaRS Control and Information System for Calibration laboratory. |
| N/A | Calibration sources – nuclide and activity on request. |



www.vf.eu

Contact address

Czech Republic
VF, a.s., nám. Míru 50
CZ 679 21 Černá Hora
tel. +420 516 428 611
fax +420 516 428 610
info@vf.eu

Slovak Republic
VF, s.r.o., M. R. Štefánika 9
SK 010 02 Žilina
tel. +421 415 072 411
fax +421 415 072 410
info@vf.eu

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