

Radiometer RAS-01-TE

Purpose and operation mode

A radiometer is aimed to measure of volume activity of radioactive aerosols which are caused by artificial (technogenic) alpha- and beta-emitting nuclides in the air.

The technical features of radiometer meet the requirements IEC¹ series 761 (p.1,2) «Equipment for continuous monitoring of radioactivity in gas emissions» and IEC 61578.

The operation mode is based on analyse of the energy distribution of particles emitted by radionuclides which has left on the filter in the result of pumping air through it.

Radiometer provides measurement of volume activity of radioactive aerosols in the combined (for operational control) and separated (to determine the daily emission) modes.

To aspirate of aerosols and measure of accumulated activity on the filter are made simultaneously in the combined mode, and the value of the aerosol volume activity is calculated according to the algorithms of detection, accumulation and average hourly measurements.

To measure of accumulated activity of aerosols is made after sampling in the separated mode.

Application areas

Continuous automatic control of concentration of radioactive aerosols in the independent mode or as a part of automation radiation monitoring systems in the air at nuclear power and industry facilities:

- workplaces;
- ventilation systems.

Operation modes:

- a stationary measuring device with own pump block or with work from external sampling line;
- a portable measuring device on a trolley with pump block;
- a point of continuous control in a radiation control system with ability of transfer data to a local network.



Features:

- silicon spectrometric detectors;
- compensation of the contribution of radon radiation and external gamma background;
- built-in air flowmeter;
- communication interface RS-485;
- work with own pump block or with external sampling line, control of solenoid valves when working with an external sampling line;
- economical movement of the tape by the frame;
- control of tape breakage and filter clogging;
- setting by means of the console and notebook;
- ability of connection external block of indication and alarm.

Specifications

Type of detectors - silicon, spectrometric	
Quantity of detectors - 4 (2 measuring and 2 compensating)	
Measurement range in separated measurement mode [*] : - volume activity of alpha-emitting aerosols - volume activity of beta-emitting aerosols [*] Sampling time is 24 hours, volume speed of pumping is 40 l/min, equivalent equilibrium volume activity of radon is no more 50 Bq/m ³ , exposure time is 4 hours, measurement time is 1 hour.	from 0,01 to 2,4·10 ⁶ Bq/m ³ from 0,05 to 3,0·10 ⁶ Bq/m ³
Measurement uncertainty of volume activity in the separated measurement mode with probability 0,95	no more 40 %
Measurement range in combined measurement mode ^{**} : - volume activity of alpha-emitting aerosols	from 0,01 to 4,8·10 ⁷ Bq/m ³

¹ International Electrotechnical Commission

- volume activity of beta-emitting aerosols ** Sampling time and measurement is 1 hour, volume speed of pumping is 40 l/min, equivalent equilibrium volume activity of radon is no more 50 Bq/m ³ .	from 0,1 to 1,6·10 ⁸ Bq/m ³
Measurement uncertainty of volume activity in the separated measurement mode with probability 0,95	no more 40 %
Energy range of registration: - alpha-particles - beta-particles	from 3,0 to 6,1 MeV from 0,1 to 3,0 MeV
Air flow rate through a filter	from 10 to 40 l/min
Measurement uncertainty of air flow rate with probability 0,95	± 7 %
Types of filter tapes	ЛФАС, FSLW
Power supply of the radiometer from AC mains 50 ± 2 Hz, voltage	from 187 to 242 V
Power consumption: - without a pump block - with a pump block	no more 70 V·A no more 470 V·A
Ambient temperature range	from +5 to + 50°C
Maximum relative humidity (within 2 hours)	up to 100 % at + 50°C
Protection class	not worse IP65 (IP20 for a pump block)
Average failure time	no less 20000 hours
Average service life	no less 10 years
Dimensions	430×350×190 mm
Weight of radiometer: - without pump - with pump	no more 33 kg no more 60 kg

Purpose indicators:

- a radiometer by purpose refers to the elements of the system of normal operation, the impact on the safety of nuclear power plants - to systems and elements important for safety, third class;
- analyse of energy spectre of particles on a filter by means 1024 channel AD converter allows to take into account the contribution of radon and thoron decay products, and calculate the activity of alpha- and beta-emitting man-made nuclides;
- a radiometer measures consumption and pumped volume of air by means of the built-in flowmeter;
- a radiometer controls its own pump block and can control external devices (for example, solenoid valves while working with an external sampling line).

Delivery set

Standard:

- a detection device UDAS-01A;
- a console USR-04-01;
- a verification and configuration software;
- an operation manual.

On request:

- a pump block BN-01
- a set of mounting parts.