



MZHG-A02

WATER CONTAMINATION MONITORING SYSTEM

INTENDED USE

Determination of radionuclide composition and measurement of volumetric (specific) activity of radionuclides in the monitored liquid.

APPLICATION

The MZHG-A02 water contamination monitoring systems can be used for continuous automated radiation monitoring of liquid discharges, process media, unbalanced water and waste water at nuclear power plants and other enterprises using gamma-emitting radionuclides in their processes, as well as for monitoring of drinking water at water intakes and for environmental monitoring.

DESIGN

MZHG-A02 includes two UDS-GC gamma radiation detecting devices based on (Ø76×305) mm and (Ø40×40) mm NaI(Tl) crystal installed in a measuring chamber, and a spectrometric processing unit (BOS-01).

The measuring chamber is designed to ensure continuous and uniform flow of the measured liquid around the gamma radiation detecting device in the required geometry.

Structurally, the measuring chamber is a stainless steel flow-through chamber with a well-shaped recess for the gamma radiation detecting device. Lead shielding blocks surrounding the chamber from all sides reduce the influence of external background during measurements.

The spectrometric processing unit includes a panel computer with specialised software installed, as well as power supply and communication units for the radiometer components.

KEY FEATURES

- Monitoring mode is flow-through, no sample preparation required
- Measured parameter is volumetric activity of radionuclides
- Monitoring of liquid media is spectrometric and radiometric
- Easy operation due to automation of the whole measurement cycle
- Decision support when thresholds are exceeded
- Remote management of settings and viewing of results
- Several MZHG-A systems can be combined to build a distributed site monitoring system
- Cross-platform system software, including for Linux OS





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SPECIFICATIONS

Range of registered gamma-energies	0.05 to 3 MeV
Energy resolution, max	10 ¹ % (UDS-GC-76×305-485-AS) 8 ² % (UDS-GC-40×40-485-AS)
Identified radionuclides*	⁵¹ Cr, ⁵⁴ Mn, ⁵⁹ Fe, ⁵⁸ Co, ⁶⁰ Co, ⁶⁵ Zn, ⁹⁵ Zr, ¹⁰³ Ru, ¹⁰⁶ Ru, ¹³¹ I, ¹³⁴ Cs, ¹³⁷ Cs, ¹⁴¹ Ce, ¹⁴⁴ Ce
Range of measured volumetric activity for the ¹³⁷ Cs radionuclide in the operating geometry	0.1 to 5×10 ⁶ Bq/l
Limits of tolerable error of volumetric activity measurement for the operating geometry, max	±30 %
Operating mode setting time, max	15 minutes
Continuous operation, min	24 hours
Power supply	~220 V, (50±1) Hz, 500 V·A
Environmental: – Temperature – Humidity – Sinusoidal vibrations – Electromagnetic compliance	+5 to +50 °C up to 98 % at +35 °C and lower temperatures without moisture condensation; up to 100 % at +25 °C and lower temperatures with moisture condensation for the detecting devices; up to 80 % at +35 °C and lower temperatures without moisture condensation for BOS-01 Group 3 according to GOST 29075-91 Group III with performance quality criteria A according to GOST 32137-2013
Safety class	3 or 4N according to NP-001-15, NP-016-05, NP-022-17, NP-033-11
Dimensions and weight: – UDS-GC-76×305-485-AS – UDS-GC-40×40-485-AS – Measuring chamber MZHG-A02 – Spectrometric processing unit BOS-01	(Ø108×598) mm; 10 kg (Ø66×306) mm; 1.1 kg (1050×700×1150) mm; 1000 kg (510×780×270) mm; 36 kg
Designated service life before overhaul, min	10 years
Calibration period	18 months
Mean time between failures, min	28,000 hours

* Radionuclide library can be extended

CERTIFICATION

- Registered in the State Register of Measuring Instruments under No. 90851-23

The MZHG-A water contamination monitoring systems were developed taking into account 20 years of positive results of operation of the prototype model (the RSKV-01A water contamination monitoring systems) at water intakes of water utilities and at enterprises using gamma-emitting radionuclides in their processes in Russia (St. Petersburg, Krasnoyarsk, Lesosibirsk, Severomorsk), Austria (Vienna), South Africa (Pelindaba), Thailand (Pattaya).

As of 2023, over 20 sets of RSKV-01 have been produced and put into operation.