

MAK-01 Liquid Activity Monitor



The MAK-01 monitor is intended for the on-line measurement of the volume activity of liquid waste in storage tanks, especially prior to their release into public sewers or the environment.

Purpose

The MAK-01 liquid activity monitor is designed for the on-line measurement of beta and gamma volume activity within storage tanks. The device is used to monitor potentially active liquids in PET centre sump tanks, radioactive material warehouses, process water tanks in nuclear power plants, nuclear medicine workplaces, and similar facilities.

The release of radionuclides into the public sewer system or the environment requires meeting legislative requirements – to avoid exceeding release levels. To compare the activity of a liquid against release levels, MAK-01 ensures the determination of radionuclide composition and activity of individual radionuclides, i.e. spectrometric evaluation.

The MAK-01 monitors are particularly supplied with automatic discharge control systems, connected to a master system for controlled discharge by means of a RS-485 line. The device can also be used as an autonomous monitor with local signalling in the place of measurement as well as for manual discharge.

Description

The MAK-01 liquid activity monitor consists of two basic parts enclosed in a steel case:

- a detection part and
- an evaluation unit.

The detection part of the MAK-01 monitor is equipped with a NaI(Tl) 1 x 1" scintillation crystal with optically connected photomultiplier. The lower part of the monitor with the scintillation crystal is shielded. In the lead shield there is a circular collimating slit with the angle of 20° with a variable width (5 - 50 mm) which ensures optimum geometry for the detection of ionizing radiation for the given purpose of measurement.

Main Advantages

- The monitor can be placed in a tank
- Measurement of volume activity of individual radionuclides, basic spectrometric evaluation
- Adjustable collimating slit for various activities
- Minimum maintenance

Standards and certifications

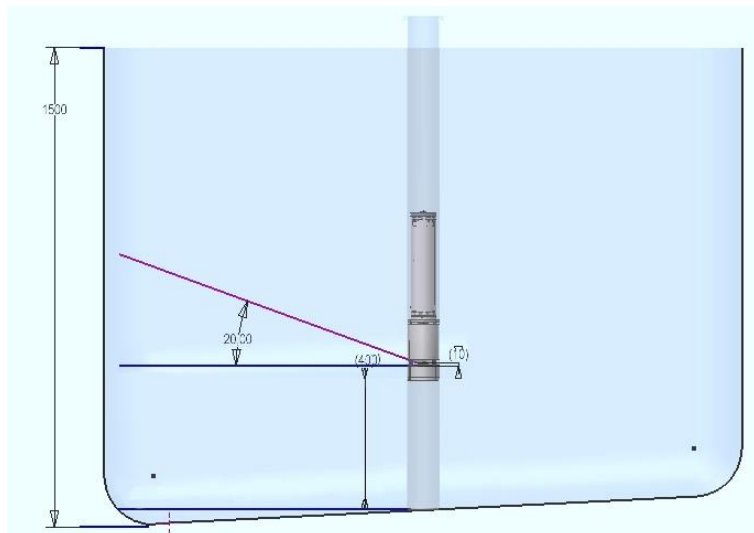
EN 60861 Equipment for monitoring of radionuclides in liquid effluents and surface waters

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use

EN 61000-6-2~4 Electromagnetic compatibility

Description

A check source is put in the lower shielded part of the monitor (^{137}Cs , 1 kBq) which serves for the automatic stabilization of the peak. In the upper part of the case there is an input-output connector (ECTA) and lugs. The MAK-01 monitor is hung in the tank with liquid waste on a steel wire. In the tank, it is placed in a protecting tube, typically to a height of 40 cm above the tank bottom.



Positioning of the MAK-1 probe in the sump tank for liquids intended for release in a public sewer system in a nuclear medicine workplace

At the top of the detector there is a processing unit with multichannel analyser (standard version MCA-256) and auxiliary electronic circuits (high-voltage source of the probe, signal amplifier, communication interface, etc.).

MAK-01 can be connected to devices that communicate by means of the RS-485 line, e.g. to a local display unit LZJ-22.

*Detail of the lower part of the MAK-01:
Adjustable collimating slit
at the detection part of the probe;
with an extension angle of 20°, with
an adjustable width from 5 to 50 mm*



Specification

Detector type	scintillation NaI(Tl), Ø 1" x 1"
Energy range	55 keV ~ 2 MeV
Radiation detected	gamma (^{18}F , $^{99\text{m}}\text{Tc}$, ^{131}I et al.)
Measurable volume activity	10 MBq/m ³ ~ 20 GBq/m ³ (2.7E-4 ~ 0.54 µCi/cc)
Check source	^{137}Cs , type EG 1X, 1 kBq (2.7 kCi)
Energy resolution (^{137}Cs , 662 keV)	better than 8%
Dimensions (Ø x L)	95 x 551 mm (3¾ x 21¾ in)
Weight	app. 5 kg (11 lb)
Ambient temperature	+5 ~ 55 °C (41 ~ 131 °F)
Ambient humidity	max. 90%, non cond.
Multichannel analyser	256 channels
Electric protection	IP 66
Power input	24 VDC, 10 W
Connector	ECTA 1332 E212MZ
Communication	RS-485

Models and Accessories

Type	Description
K0327	MAK-01 Liquid Activity Monitor
Optional Accessories	
N/A	Mains Adaptor 230/110 V AC / 24 V DC
Related Products	
K0743	LZJ-22 Local Display Unit
K0830	ASU-50 Alarm Slave Unit
K0734	MCA-1000 Multichannel Analyser
K1481	LAM-501 Liquid Activity Monitor
K144X	LEM Liquid Effluent Monitor
<ul style="list-style-type: none"> Software for calculating dilution to meet a specified release level; the system of automatic discharge control RMS Radiation Monitoring System 	

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