

TUNA – SPECTROSCOPIC WATER GAMMA DETECTOR

This self-contained spectroscopic in-situ detector is designed to measure and analyze online and continuously the gamma spectrum in fresh water, sea water or potable water. It calculates the activity of each identified nuclear isotope, the total gamma activity as well as the total gamma dose rate. It provides fast detection of artificial nuclear radiation and an automatic identification of the nuclear isotopes in water. Thus, the detector is able to detect minor changes of the composition of the nuclear spectrum in aquatic environments and to alarm on single nuclear nuclides. The nuclide library and their individual alarm levels are configurable. It is designed for fixed installation and for continuous operation under harsh environmental conditions. The detector unit is enclosed by a waterproof housing and can be submerged directly into the water. The hermetically sealed housing protects the detector system and the electronics. The NaI(Tl)-based scintillation detector together with the MCA (multi-channel analyzer) provide good energy resolution under ambient temperature operation conditions. If a higher resolution is required compared to NaI(Tl) different sizes of CeBr₃-based scintillation detector are offered. The integrated embedded Linux-PC enables online data exchange through a data network (LAN). The standardized ANSI N42.42 protocol allows the use of many spectra evaluation software programs. An integrated web server facilitates data access and allows full remote control and remote configuration capabilities, using a web browser (e.g., Firefox). For an extended gamma dose rate range an additional Geiger-Müller-detector (GM) or a high dose rate spectrometer can be integrated as option.

FEATURES

- Fast detection of very low artificial radiation
- Online spectrum analysis
- In-situ isotope identification
- Standardized data protocol ANSI N42.42 (XML-based)
- Embedded PC with LINUX provides ultimate flexibility
- Operation under harsh environmental conditions
- Absolute unattended operation
- Easy to maintain - neither consumables nor wear parts
- Rugged design (IP 68, max. depth 500 m / IP 69K)
- Easy and quick set up
- Detector verification with optional test set

FUNCTIONS

- **Nonvolatile memory for 3 years of data or more**
- **Three user configurable aggregation intervals**
- Dose rate evaluation for each aggregation interval
- Nuclide specific dose rate evaluation
- Nuclide identification
- **Extended dose rate range with additional GM detector or high dose rate spectrometer* as option**
- Free configurable isotope library
- Isotope based alarm management
- Integrated detector accuracy test
- Temperature stabilization of energy spectra based on K40
- Supervision of detectors and electronic devices
- Overload protection of detector
- Data access and parameter setting with web browser
- Characteristic limits of peak/nuclide analysis according ISO11929
- **Integrated WiFi for wireless service**

*patent DE 10 2016 117 356



ORDERING INFORMATION

TUNA can be selected as follows:

	LAN
TUNA-1xx-L	X
TUNA-1xx-Lx-xT comes with additional GM detector.	
TUNA-1xx-Lx-xH with an additional high dose rate spectrometer.	
The standard length of the optional sea water cable is 5 m.	
On request customer specified lengths are possible.	

PERFORMANCE SPECIFICATION

	Unit	TUNA-103	TUNA-121	TUNA-122	TUNA-123
Spectroscopic detector					
Material		NaI(Tl)	CeBr ₃	CeBr ₃	CeBr ₃
Size	Inch	3.0x3.0	1.5x1.5	2.0x2.0	3.0x3.0
Dose rate range ¹	μSv/h	Up to 100	Up to 1000	Up to 600	Up to 250
Activity range ¹ (10 min interval)	Bq/Liter	0.55...200 000	0.8...2 000 000	0.6...1 200 000	0.5...500 000
Energy resolution ¹	FWHM (guaranteed)	typ. 6.6 % (<7.8 %)	typ. 4 % (< 4.5 %)	typ. 4 % (<4.5 %)	typ. 4 % (4.5 %)
Energy range	keV	30...3000			
Total efficiency ¹	cpm / μSv/h	260 000	56 000	113 000	270 000
Photopeak efficiency ¹	cpm / μSv/h	70 600	10 300	29 400	71 800
Intrinsic background	nSv/h	<5	<5	<5	<5
MCA					
Number of channels		8192 (2048 used)			
ADC	Bit	14			
Peaking time	μs	0.1			
Filtering		Digital			
Option additional integrated Geiger Mueller tube (GM) model SARA-500-T					
Detector		GMT			
Range	mSv/h	0.04..1000			
Accuracy	%	+/-15			
Sensitivity	cpm / μSv/h	7.5			
Intrinsic background	nSv/h	<270			
Energy range	keV	50..1250			
Option additional integrated high dose rate spectrometer model SARA-500-H (*patent DE 10 2016 117 356)					
Detector		CeBr ₃			
Range	mSv/h	0.05...100			
Accuracy	%	+/-15 %			
Energy resolution ¹	FWHM	Typ. 5 %			
Energy range	keV	30 keV...3.0 MeV			
Total efficiency ¹	cpm / μSv/h	1650			
Photopeak efficiency ¹	cpm / μSv/h	125			
Environmental specification					
Operation temperature	°C	-40...+60			
	°F	-40...+140			
Water depth	m	0...500			
Protection class		IP68 / IP69K			
Humidity	%	0...100			
Electrical specification					
Power	W	2.2 (average)			
Supply voltage	V	8...17			
EMC-proofed		EN55022:2006 + A1:2007 + A2:2010 Class B EN55024:1998 + A1:2001 + A2:2003			
Size and weight specification					
Volume	l	7.57 (+1.29 for mooring bracket)			
Diameter	mm (in)	150 (5.91)			
Height	mm (in)	570 (22.05)			
Weight	kg (lb)	8.7 (19.2)	7.7 (17)	8.0 (17.6)	9.1 (20.1)
Communication interfaces		Ethernet 100 Mbit/s RS232 (Service) WiFi (for wireless service on shore)			
Optional Accessory		Test Set for detectors verification and testing (TUNA-800-0151) Mooring bracket (TUNA-800-2004) Water cable (fresh or sea-water, please specify length)			

¹ Cs-137

RELATED PRODUCTS: SPECTROSCOPIC WATER STATION (SUBMERSIBLE TYPE)

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Technical contents are subject to change without notice!