

DOWN-HOLE TRITIUM IN WATER DETECTOR

Model Series ~ SSS-33DHC

SSS-33DHC ~ SSS-33DHC-WH ~ SSS-33DHXT ~ SSS-33DHC4- ~ SSS-33DHC4-WH

FEATURES:

- ENHANCED SENSITIVITY
- WELL-HEAD SERIES
- SENSITIVE BELOW PAG CLEAN DRINKING WATER LEVELS
- CONTINUOUS, REAL-TIME
- NOT INFLUENCED BY OTHER NUCLIDES
- NO LIQUID SCINTILLANT REQUIRED
- DATA ARCHIVE AND RETRIEVAL



FM-9 ELECTRONICS

APPLICATION:

- Monitor aquifer quality
- Early detection of underground plume or Tritium leakage
- Reassure the public by continuous monitoring of drinking water sources



DOWNHOLE PROBE

CURRENT PROBLEM & SOLUTION:

DETECTORS & DETECTION FLOW-THRU CELL:

Thousands of bore holes in the United States should be monitored for Tritium. The water in these bore holes cover a wide range of Tritium concentrations; from highly contaminated to very clean.

- Current bore hole sampling and lab test methodology involves taking a sample and sending it to a lab.
- A labor intensive, slow, and expensive process.

Automating the monitoring of these bore holes for aquifer purity with **SSS-33DHC** Detectors is a cost effective, real-time continuous monitoring process.

DESCRIPTION:

- Small diameter, water tight detector assembly
- Pump
- Processor.

The sample is passed through a deionizer and filter and thence to the scintillation crystals in the flow cell which is viewed by a matched pair of photomultiplier tubes.



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WELL-HEAD (WH) SERIES

- Same function as other models with significantly higher sensitivity.
- Reduced maintenance.
- Only the pump goes down the hole to bring the detection cell, filtration and amplifiers up to the surface.
- Readout and data transmission package on the surface at the **WELL-HEAD**.

The process portion of this system conditions and analyzes the output from the photomultiplier tubes by pulse height and coincidence, thereby permitting the system to eliminate counting most background and noise counts. Sensitivity is enhanced by use of stochastic resonance plus high gain, low noise PM tubes, and preamps.

SUB-SYSTEMS:

Down-hole Tritium measurement system involves the following subsystems:

- Sonde-casing,
- Sample water filtration & deionization pump,
- Detectors & detection flow thru cell,
- Plumbing,
- Preamplifiers, amplifiers
- Electronic pulse analysis
- Detector bias supply,
- Cables,
- Data presentation,
- Data archive and retrieval
- System power.
- The electronics displays count-rate, total count and elapsed count time at the well head.
- Data download via RS-232, USB and/or ethernet.

SPECIFICATIONS:

Sensitivity:	1 μ Curie/ml in 30 minutes. <ul style="list-style-type: none">▪ LLD is better than the FDA drinking water standard which is 20,000 pCi/L (0.02nCi/ml) averaged over 48 hours.
Range:	0-1000 μ Curies/ml.
Pumping Frequency:	Standard - Twice per day.
Above Ground Dimensions:	13" H x 21" W x 20" D. (Larger for weather house version.)
Weight (Standard Unit):	Detector Housing: 30 lbs. Shipping: 100 lbs.



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Detector Sonde and Filtration System:

- The flow path (plumbing) all wetted parts are stainless steel or chemically inert materials.
- Filters are easily cleaned/recharged/replaced in the field
- The Technical Associates Tritium detection sonde contains a 400cc screw-in replaceable cartridge consisting of two stages.
- Replaceable Particulate Filter Cartridge.
 - ✓ The lower stage has glass wool and, **Optional**, micro-pore alumina ceramic filter for removal of particulates and gelatinous contaminants.
- Replaceable Deionizer Cartridge.
 - ✓ The upper filter contains deionizer beads to remove dissolved salts and metals from the sample water.
 - ✓ The user has the option to refill the plastic filter cartridge or to replace the plastic filter cartridge with pre-filled replacements. Both of which are low cost.
 - ✓ The current clear-plastic filter housing allows the user to visually inspect the filter contents without opening the filter. This gives very useful information on whether filter change interval can be increased in the future for that location due to its' local ground water quality.
- Stainless Steel Sonde allows easy cleaning & maintenance.
- Pump which operates even at deep underground/underwater 1800 psi. Ambient
- Scintillation Cell
- Dual PM Tubes
- Dual Pre-amps.
- Cabling.

Options:

- Higher Temperature for sample or above ground electronics.
- Other ranges.
- Addition of Strontium⁹⁰ Detector.
- Conductivity Detectors to learn more about the ground water and to tell when ion exchange beads need replacing.
- Dry Hole Detector.
- Depth/Cable Length.
- Well head display electronics mounted in weather-tight housing.
- Data stored electronically at site.
- Data transmitted periodically (twice a day) to a distant data collection lab.

Optional Back-Flushing: To periodically reverse the direction of the pump flow, so as to flush the filters and thereby further extend the time between filter replacement



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WELL-HEAD (WH) SERIES (Five Models)

DETECTOR	SSS-33DHC SSS-33DHC-WH	SSS-33DHXT	SSS-33DHC4 SSS-33DHC4-WH
ENVIRONMENTAL:			
Sample Temperature:	35 to 122 F	35 to 135 F	35 to 122 F
Ambient Temperature:	35 to 122 F	35 to 135 F	35 to 122 F
Ambient Pressure:	0-100 psi	0-1800 psi	0-100 psi
Humidity:	Submerged Operation	Submerged Operation	Submerged Operation
Diameter:	1.75"	1.75"	3.5"
Recommended for Hole Diameter:	CPT	CPT	4"
Max. Deployment Depth:	160 ft.	5,000 ft.	160 ft.
Material Construction:	Stainless Steel	Stainless Steel	Stainless Steel
ABOVE GROUND PORTION			
Temperature:	35 to 100 F	35 to 100 F	35 to 100 F
Humidity (Non-condensing):	0-96%	0-96%	0-96%
Weatherproof (Optional):	Yes	Yes	Yes

NOTE: CPT: Cone Penetrometer Technology is often used to create 2" diameter vertical holes in the ground for the purpose of monitoring soil, vapor, and ground water.

****Below 0°C temperature can be accommodated by use of optional heat tracing.**



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TRITIUM IN WATER								
LOW END SENSITIVITIES								
MODEL	TOP OF RANGE			MDA				
		20sec	3min	20min	3hr	24hr	7 day	1 month
WLD-77	100 kBq/l	3.7 kBq/l	1.0 kBq/L	500 Bq/l	185 Bq/l	60 Bq/l	20 Bq/l	TBD
		100,000 pCi/l	27,000pCi/l	13,500 pCi/l	5,000 pCi/l	1600 pCi/l	540 pCi/l	
	RANGE	20sec	3min	20min	3hr	24hr	7 day	1 month
TMW-3	300 kBq/l			3.7 kBq/l	500 Bq/l	185 Bq/l	100 Bq/l	60 Bq/l
				100,000 pCi/l	13,500 pCi/l	5,000 pCi/l	2,700 Bq/l	1,600 pCi/l
	RANGE	20sec	3min	20min	3hr	24hr	7 day	1 month
SSS-33M84	1,000 Bq/l			37 kBq/l	5 kBq/l	740 Bq/L	185 Bq/l	TBD
				1.0 µCi/l	0.135 µCi/l	20,000 pCi/l	5,000 pCi/l	
	RANGE	20sec	3min	20min	3hr	24hr	7 day	1 month
SSS-33DHC-WH	1,000 kBq/l			37 kBq/l	5 kBq/l	740 Bq/l	185 Bq/l	TBD
(sensitivities dependent on sufficient water volume)				1.0 µCi/l	0.135 µCi/l	20,000 pCi/l	5,000 pCi/l	
	RANGE	20sec	3min	20min	3hr	24hr	7 day	1 month
HWLD	130 kBq/L		3.7 kBq/l	1.0 kBq/l	500 Bq/l	185 Bq/l	TBD	
Model 1925			100,000 pCi/l	27,000 pCi/l	13,500 pCi/l	5,000 pCi/l		

DETAILS AT TECH-ASSOCIATES.COM



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