

# Down-Hole Tritium in Water Detector

Model # SSS-33DHC

Now 5 models to choose from



SSS-33DHC

## Features

- Features:
- **Enhanced Sensitivity – Well-head Series**
- Sensitive Below Epa Clean Drinking Water Levels
- Fits In CPT Bore Hole (Cone Penetration)
- Continuous Monitoring – 24/7 Days/week
- Real Time
- Not Influenced By Other Nuclides
- No Liquid Scintillant Required

### Application:

- Early Detection of Underground Plume or Tritium Leakage
- Reassure the Public by Continuous Monitoring of Drinking Water Sources

### Detectors and Detection Flow-Thru Cell:

There are many thousands of bore holes in the United States which could or 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 for measurement which is precise, but also slow and expensive. Technical Associates SSS-33DHC Detectors automate, (and bring down the cost) of monitoring these bore holes.

## Description

This System consists of a small diameter, water tight detector assembly with pump plus 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.

**WELL-HEAD (WH) SERIES** monitors have the same function as the other models, but they all have significantly higher sensitivity with reduced maintenance by the simple expedient of placing only the pump down the hole and bringing the detection cell, filtration and amplifiers up to the surface where they can sit along side the readout and data transmission package which was already 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 and deionization pump, detectors & detection flow thru cell, plumbing, preamplifiers, amplifiers & electronic pulse analysis, detector bias supply, cables, data presentation, storage & transmission, and system power. The electronics displays count-rate, total count and elapsed count time at the well head. The data is transmitted in RS-232 format. Data is printed out on a digital printer with date and time stamp.



**TECHNICAL ASSOCIATES**  
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## Specifications

- **Sensitivity:** 1 nanoCurie/ml in 30 minutes.  
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 nanoCuries/ml.
  - **Pumping Frequency:** Typical - Twice per day.
  - **Above Ground Dimensions:** 13" H x 21" W x 20" D. (Larger for weather house version.) Detector Housing: 30 lbs.
  - **Weight (Standard Unit):** Shipping: 100 lbs.
- 
- **Detector Sonde Contains:** The flow path (plumbing) all wetted parts are stainless steel or chemically inert materials.  
Replaceable Particulate Filter Cartridge.  
Replaceable Deionizer Cartridge.  
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.  
Other Electronics.
- 
- **Filtration:** Filters easily cleaned/recharged/replaced in the field. The Technical Associates tritium detection sonde contains a 400cc screw-in replaceable cartridge consisting of two stages. The lower stage has glass wool and, **Optional**, micro-pore alumina ceramic filter for removal of particulates and gelatinous contaminants. 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.
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- **Options:** Higher Temperature for sample or above ground electronics. Other output interface.  
Other ranges.  
Addition of Strontium<sup>90</sup> Detector.  
6 Digit LED Display.  
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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DETECTOR	SSS-33DHC SSS-33DHC-WH	SSS-33DHXT	SSS-33DHC4 SSS-33DHC4-WH
<b>ENVIRONMENTAL:</b>			
<b>Sample Temperature:</b>	35 to 122 F	35 to 135 F	35 to 122 F
<b>Ambient Temperature:</b>	35 to 122 F	35 to 135 F	35 to 122 F
<b>Ambient Pressure:</b>	0-100 psi	0-1800 psi	0-100 psi
<b>Humidity:</b>	Submerged Operation	Submerged Operation	Submerged Operation
<b>Diameter:</b>	1.75"	1.75"	3.5"
<b>Recommended for Hole Diameter:</b>	CPT	CPT	4"
<b>Max. Deployment Depth:</b>	160 ft.	5,000 ft.	160 ft.
<b>Material Construction:</b>	Stainless Steel	Stainless Steel	Stainless Steel
<b>ABOVE GROUND PORTION</b>			
<b>Temperature:</b>	35 to 100 F	35 to 100 F	35 to 100 F
<b>Humidity (Non-condensing):</b>	0-96%	0-96%	0-96%
<b>Weatherproof (Optional):</b>	Yes	Yes	Yes

\*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 0oC temperature can be accommodated by use of optional heat tracing.



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TRITIUM IN WATER MONITORS LOW END SENSITIVITIES									
MODEL	TOP OF RANGE	20sec	3min	MDA 20min	3hr	24hr	7 day	1 month	price
HWLD-77	100kBq/L	3.7kBq/L	1.kBq/L	500Bq/l	185Bq/l	60Bq/l	20Bq/l	TBD	\$196,000
		100,000pCi/l	27,000pCi/l	13,500pCi/l	5,000pCi/l	1800pCi/l	540pCi/l		
		20sec	3min	20min	3hr	24hr	7 day	1 month	
TMW-3	300kBq/l			3.7kBq/L	500Bq/l	185Bq/l	100Bq/l	60Bq/l	\$96,500
				100,000pCi/l	13,500pCi/l	5,000pCi/l	2,700Bq/l	1,600pCi/l	
		20sec	3min	20min	3hr	24hr	7 day	1 month	
SSS-33M84	1,000kBq/l			37KBq/l	5KBq/l	740Bq/L	185Bq/l	TBD	\$69,500
				1.0uCi/l	0.135uCi/l	20,000pCi/l	5,000pCi/l		
SSS-33DHC-WH (sensitivities dependent on sufficient water volume)	1,000kBq/l			37KBq/l	5KBq/l	740Bq/L	185Bq/l	TBD	\$88,500
				1.0uCi/l	0.135uCi/l	20,000pCi/l	5,000pCi/l		
			3min	20min	3hr	24hr	7 day	1 month	
HWLD model 1925	130kBq/L		3.7kBq/L	1.kBq/L	500Bq/l	185Bq/l	TBD		\$250,000
			100,000pCi/l	27,000pCi/l	13,500pCi/l	5,000pCi/l			
All prices subject to change									
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