

Innovative Industrial Solutions



I.I.S.

SAM-12

The SAM12 replaces the complexity of using hand held probes by providing:

- Complete coverage
- Precise, computerized, measurement control
- Background shielding and compensation to reduce shine and scatter effects
- Simple operation
- Ruggedness and reliability

Applications:

- Clean Tool Shop
- Hot Tool Shop
- Green Tag Table
- HP Control Point
- Active Barrier at RCA Boundary
- Unsupervised locations, using SAM-12 and viewpoint monitoring system
- Containment exits
- Boot barriers/step-off pads
- Monitoring laundry and garment bags
- Segregation
- Free release sureveys during dismantling
- Contamination control during outage
- Monitoring for incoming Naturally Occuring Radioactive Material (NORM) at 5000 dpm (e.g., flash-light batteries can exceed 5000 dpm)



Innovative Industrial Solutions, Inc.

2830 Skyline Drive Russellville, AR 72802

Phone (479) 968-4266

Fax (479) 890-9072

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SAM12 - Small Articles and Tools Monitor

The SAM12 builds on the rugged capabilities of the SAM11 to monitor articles for gamma emitting radionuclides. Readily measures down to clearance levels less than 5000 dpm (83 Bq), but adds sophisticated new electronics allowing dynamic discrimination between natural and man-made radiations, as well as a unique feature for Co-60 monitoring.

- Measures fixed, smearable, internal and external gamma contamination simultaneously
- Measures down to 5000 dpm independent of methodology
- Excellent uniformity of response across the chamber
- Fast, easy and thorough with no special training or supervision required
- Equally effective for single particles or distributed contamination
- Discrimination of Natural Occurring Radioactive material via

Natural Background Reduction (NBR)

- Cobalt coincidence monitoring
- Reduced time to count
- Ability to check for changing background during the measurement
- Large touch-screen colour LCD display - no keyboard required
- Automated calibration and checking routines
- Easy upload and download via USB
- Viewpoint compatibility



Thermo Scientific SAMs are operating on a large number of power station sites worldwide, demonstrating why using a SAM, or "SAMMING", is the ideal method of monitoring for unrestricted release. Articles used in radiation controlled areas of nuclear facilities should undergo monitoring to confirm they are free of contamination. In the US, this clearance limit is 5000 dpm, which is easily achievable by the SAM12 for higher energy gamma emitters such as Cs-137 and Co-60. The inclusion of the Natural Background Reduction (NBR) feature minimises the possibility of false alarms due to the presence of naturally occurring radioactive material (NORM). Using NBR, the SAM12 discriminates between NORM and man-made radiations even in a fluctuating natural background. Where Co-60 contamination is present, the SAM12 can monitor specifically for this radionuclide using Cobalt Coincidence monitoring (CCM). This technique is particularly insensitive to fluctuating gamma background radiation, even from a source of Co-60. In this way, the performance of this monitor is superior to monitors without this feature but with thicker shielding.

The use of the Reduced Time to Count (QuickScan) algorithm significantly reduces the counting time when articles clearly exceed, or are well below the alarm level. The monitor is constantly checking for changing background radiation conditions, both during background monitoring, and during the measurement cycle.

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Sophisticated voltage scanning software is included which clearly displays the optimum voltage settings in order to optimize discrimination between man-made and NORM.

EXISTING SAM11 users can readily UPDATE their complete instruments with our new advanced electronics too!!

Just contact our sales office for details of economical upgrade kits. Why not ask our service engineers to convert your monitors on your site ? Remember that the highly sensitive SAM11 detectors, the existing doors and lead shielding can ALL be reused at no extra cost. Our brilliant new SAM is helping to protect our loyal customers' investment into the future too!!

Mechanical Specification		Environmental			
Dimensions:	45" H x 27" W x 33" D* *36.3" for 6 detector, 2 door option.	Operating Temp	0° to 45° C		
Weights:	1480 lb nett: 1700 lb packed (1" lead)	Storage Temp	-10° to 60° C		
Detectors:	4 or 6, BC-412 plastic scintillation detectors, 225 in ² each. The 4 detector SAM12s have detectors in the base, top and 2 sides. The 6 detector variant has additional detectors in the front and at the back. Detectors are fitted with a magnetic shield.	Humidity	Up to 95C% RH non condensing		
Detection Areas:	4 Detectors, 900 in ² 6 Detectors, 1350 in ²	Parameters Settings			
Detection Volumes:	4 Detectors, 2025 in ³				
Lead Shielding:	1" or 2" lead shielding may be specified as standard			Units:	Bq, kBq, MBq, dpm, pCi, nCi, mCi, Ci
Measuring Volume:	15" H x 15" W x 18" D			Article monitoring	3 to 300 s
Doors:	One or two doors may be specified			Probability of False Alarm:	0.1 to 10 sigma
Switches	Door switch for rolling average background collection Push-button to activate count cycle			Probability of Detection:	0 to 10 sigma
Electronic Specification					
Power:	Integral 12 V power pack, 8 hours operation if AC supplies are lost. Integral continuous Dual State Float Charger 85 to 264 VAC, 47 to 63 Hz 65VA				
Display:	Colour LCD, with 12.1" diagonal viewing area and touch sensitive overlay				
EMC & LVD:	EMC Compliances: EN61326, EN5502 (emissions), EN16000-4 (immunity) LVD Compliance: EN 61010				
Digital I/O connections:	Ethernet and 4 USB. Optional: RS-232, RS-422, RS-485				
Pulse Height:	Five Thresholds with programmable setting, used for NBR and CCM Top threshold used for setting best over background ratio.				

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Radiological Specification			Order Codes	
Typical 4 π Efficiency in centre of chamber:	6 detector version:	Co-60: 57%; Cs-137: 28%; Ba-133: 34%; Co-57: 12%	SAM12-6C-2D-2L	6 detectors, 2" lead shielding, 2 doors
	4 detector version:	Co-60: 40%; Cs-137: 16%; Ba-133: 26%		
	Low energy option:	Am-241: 13%		
Minimum Detectable Activity where Probability of false alarm is 0.1% (3.1 σ), Probability of Detection is 95% (1.65 σ) and 10 s monitoring time, with 2" lead shielding				
In a 0.1 μ Sv/h (10 μ R/h) background:	6 detector version:	Co-60: 56 Bq (3400 dpm)	SAM-12A-6C-1D-2L	6 detectors, 2" lead shielding, 1 door
	4 detector version:	Cs-137: 120 Bq (6900 dpm)		
	Low energy option:	Am-241: 390 Bq (24000 dpm)		
In a 5 μ Sv/h (0.5 mR/h) background	6 detector version:	Co-60: 160 Bq (9600 dpm), Cs-137: 330 Bq (20000 dpm)	SAM-12A-4C-2D-2L	4 detectors, 2" lead shielding, 2 doors
	With Quicksan period set to 10 s, and alarm levels set to 83 Bq (5000 dpm) of Co-60, the majority of samples can be monitored in the 10 s Quicksan period			
Energy Range	50 keV to 2 MeV		SAM12AUP6C2D	Electronics Upgrade for 6 detector, 2 door SAM11
Spatial Uniformity of Response:	\pm 22% at 68% confidence, for Cs-137			
Linearity:	Linear response in excess of 5 MBq (130 μ Ci) of Cs-137		SAM12AUP6C1D	Electronics Upgrade for 6 detector, 1 door SAM11
User Options				
Language:	Various languages available including changes to date format		AE0208A	CCM option
Quicksan:	Faster monitoring for articles which are either clearly clean or clearly contaminated			
CCM:	Alarms may be set on the basis of a separate counting channel that monitors coincidences due to Co-60		Accessories	
NBR:	A Natural Background Reduction assessment is undertaken when pulse height criteria are met		AE0181B	SAM12 mounting stand for floor bolting
Changing background:	The user may specify the minimum count rate deviation (in sigma) that will trigger a full reassessment of the background count rate		AE0210A	USB Dot matrix printer
Changing conditions:	The user may specify the minimum count rate deviation (in sigma) during the monitoring period that will abort article monitoring and trigger a full reassessment of the background count rate		SAM11 2DR JIG Co-60 SAM11 1DR JIG Co-60	Jigs available for both 1 and 2 door SAM12s
Residual contamination Check:	A Residual contamination check may be undertaken after a contaminated article is removed from monitor			
Calibration integrity Checking:	The monitor takes itself out of service if the required calibration interval is exceeded			
Background Monitoring:	The background count rates on each detector are logged to the database at a frequency prescribed by the user			

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