ORTEC®

Model OS5500

Clamp-On Water Monitoring System

The ORTEC Clamp-On Water Monitoring System (Model OS5500) is ideal for monitoring gamma activity of water (or any other) effluent flowing continuously through a pipe. Potential users include nuclear power plants, waste reprocessing facilities, and DOE facilities.

The OS5500 system includes the lead shielding, detector, electronics, and data acquisition system. Three versions are available: 1) a basic NIM component system; 2) a PC controlled system and 3) a fully customized system per customer specifications.

To maximize counting efficiency, a 3 in. x 3 in. NaI(Tl) detector is located directly below the pipe, which may, standardly, be up to 3.5 inches in diameter.[1] The detector is surrounded by shielding to minimize background. A unique feature is installation of the OS5500 after the pipe is in place! There is no need for an overflow tank with expensive tap-off points for sample removal and return. As no pump is required to draw a sample, cost and maintenance are minimized.

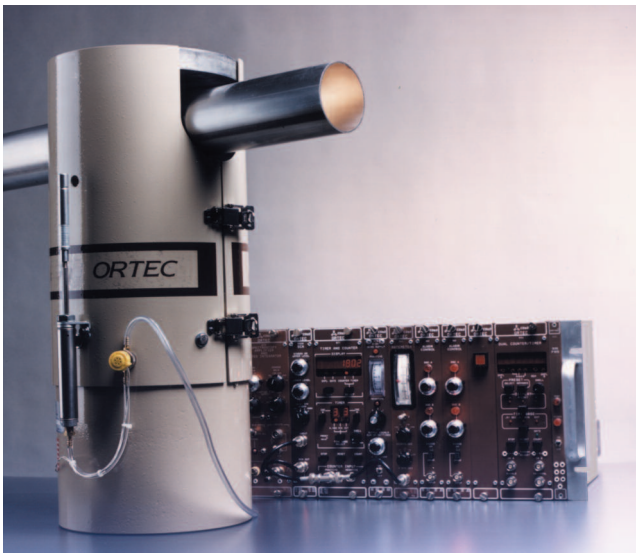
The shielding can be put in place without disturbing anything on or near it. A mounting stand may be required depending on the height above the floor that the unit is to be installed.

The OS5500 is an On-line Monitor as opposed to a batch or grab-sampling device. Additional counters, analyzers, or other equipment are not needed. Complete electronics and optional computer-based analysis are provided in a single, integrated and tested package.

[1]Custom shielding available for larger diameter pipes upon request.

The Basics

All Model OS5500 systems include a lead shield and a Model 905-4 (3 in. x 3 in.) NaI detector. The lead shield, 2.5 in. thick, is antimony-impregnated for strength. The large NaI detector provides high efficiency for low-level counting and can easily be calibrated with suitable radioactive sources. A steel casing surrounds the shielding after assembly to prevent it from shifting. It also provides a safety barrier to the lead.



NIM-Based Systems

The NIM-based system consists of a Model 276 tube base, a Model 672 amplifier, a Model 556 bias supply, a Model 550A single-channel analyzer, a Model 871 counter/timer, and a Model 661 ratemeter — all installed in a NIM Bin/Power Supply (Model 4001A/4002D).

There are two options for the NIM system. These are:

- Model 449 Log/Lin Ratemeter
- Model 850 Quad SCA for monitoring up to 4 Regions-of-Interest (ROIs) simultaneously

Detection Limit

ORTEC has measured the detection limits of this system in the laboratory. These tests were done for systems both with and without the check source installed. The Total PC Control system was used to determine the MDAs for ^{241}Am and ^{137}Cs peaks with the check source and ^{241}Am, ^{137}Cs, and ^{60}Co without the check source.

Total PC Control

An advanced choice is complete replacement of the NIM bin and associated modules by a PC and an ORTEC digiBASE. The digiBASE is a 14-Pin PMT Tube Base with integrated bias supply, preamplifier and MCA (with Digital Signal Processing) for NaI spectroscopy. Special effluent software with trending can be used for gross activity or ROI activity. This software package, EMS-ISG, has been developed in our Integrated Systems Group and used for a wide variety of applications.

The EMS-ISG software allows the user to define up to 4 ROIs. Standard calculations are used to convert the ROI area to activity units and plot the data in a trend display. In the spectroscopic analysis mode, the software collects and stores spectra, analyzes it for the library-specified nuclides, and plots the data in a strip-chart like fashion on the computer display (see Figure 2). In either mode, alarm setpoints with relay outputs can be set.

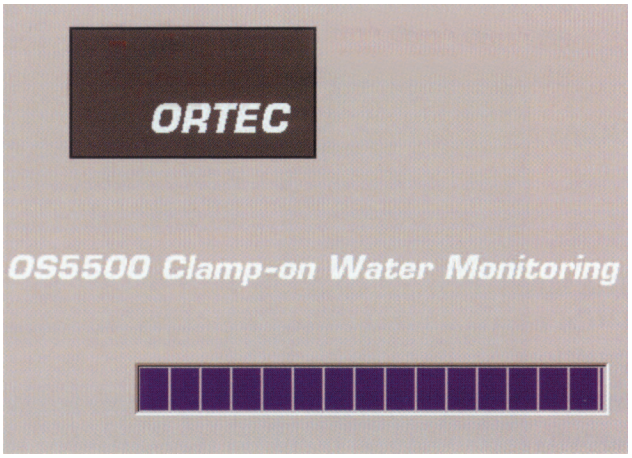


Figure 1.

The EMS-ISG software can also be combined with ORTEC's A66SV-BW GammaVision Gamma Spectroscopy application for full spectroscopic analysis. GammaVision's highly-evolved analysis engine allows for the most complete spectral analysis available on the market. GammaVision performs energy and efficiency calibrations, and also creates libraries, performs background correction, corrects for density and weight, and reports in a number of formats.

When used in conjunction with the automatic check source option, GammaVision's built-in Quality Assurance can be exploited to ensure the validity of the data analysis.

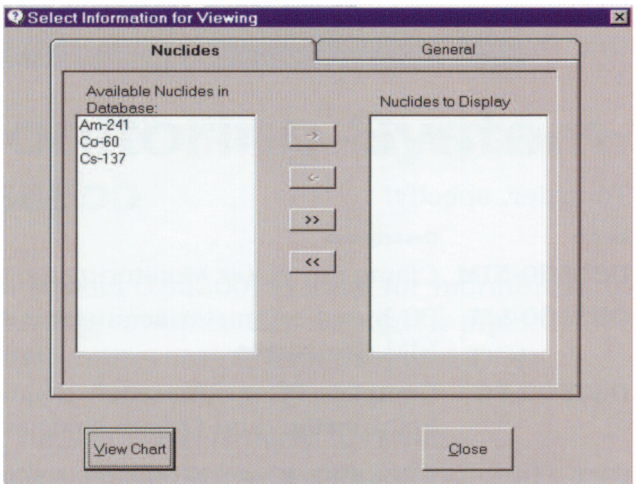


Figure 2.

Automatic Check Source Option

The silver-colored cylinder with plastic tubing is the optional ^{137}Cs check source. The pneumatically driven source is fully shielded in the "unexposed" position.

In the NIM systems, proper operation is ensured via an SCA measuring the check source activity. The source position is controlled by a compressed air actuator (not supplied).

In the full PC system, the computer controls the check source action and instruct ScintiVision to perform a QA measurement. The advantage is that the check may be done unattended and at fixed time intervals.

Analog/Digital Input/Output Options

Any number of Input/Output options can be configured for the Total PC Control version. A typical arrangement would include:

- User configurable software setup
- PC Input/Output Card(s)
- Isolation modules
- Termination wiring for facility connections
- Industrial, rack-mounted PC
- Electronics enclosure

For a quotation, contact the factory with your specific requirements.

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Table 1. Without Check Source*.

Count Time (in Secs)	^{241}Am	^{137}Cs	^{60}Co
60	1.1E-06	1.1E-06	3.9E-06
300	4.7E-07	4.4E-07	1.5E-06
500	3.6E-07	3.5E-07	1.1E-06
1000	2.6E-07	2.3E-07	6.3E-07
2000	1.8E-07	1.6E-07	5.4E-07
3000	1.5E-07	1.3E-07	4.3E-07
3600	1.3E-07	1.2E-07	3.9E-07

*MDAs measured in µCi/ml @ 95% confidence level.

Table 2. With Check Source*.

Count Time (in Secs)	^{241}Am	^{137}Cs
1000	2.7E-07	3.0E-07
2000	1.8E-07	2.1E-07
3000	1.5E-07	1.7E-07
3600	1.4E-07	1.6E-07

Ordering Information

Contact ORTEC or your local representative.

Specifications subject to change
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