

Welcome to the ORTEC Newsletter

In this issue of our Newsletter we start with an introduction to our new ICS cooler, the next generation of liquid nitrogen free cooling systems for Germanium detectors. Continuing on the Germanium detector theme we also discuss our revised Profile Series extended range Germanium detectors which now include Stable Thin Front Contact (STFC) technology to extend their useful energy range even further, now down to below 3keV. This issue also includes articles on other new product developments including a new Waste Assay System, the ISOCART-85 plus the latest updates to our MOBIUS liquid nitrogen recycling system. We hope you enjoy this newsletter and as always would appreciate your comments and feedback.



Inside this issue:

- [Advanced Cooling Option For HPGE Detectors](#) 1
- [PROFILE detectors now with STFC technology](#) 3
- [MOBIUS Becomes More Versatile](#) 5
- [The Ultimate in Mobile Waste Assay Systems](#) 7
- [Other Recent Product Developments](#) 10
- [GammaVision Training Course](#) 13
- [Germanium Detector Stock List](#) 14
- [Contact List](#) 14

If you would like your details removed from our database, please send an email to: ortec.uksales@ametek.co.uk.

All requests will be completed within 5 working days of receipt.

ADVANCED COOLING OPTION FOR HPGE DETECTORS

The superior energy resolution offered by High Purity Germanium (HPGe) detectors makes them the first choice for gamma spectroscopy, especially if a high degree of precision is needed. However one of the main challenges is cooling the detector to the optimum operating temperature of less than 120 degrees Kelvin (-153°C). A liquid nitrogen dewar is the most established method of cooling a germanium detector, but safety concerns around burns, asphyxiation, plus the amount of time taken and cost to refill the dewar, means that electro-mechanical cooling has become more popular in recent years.

ORTEC has offered an electro-mechanical cooling option for germanium detectors for over 30 years, most recently with the 'X-COOLER' range. These coolers use refrigerant to transfer heat away from the detector to a compressor, using well established technology similar to that in a domestic freezer. A new advanced electro-mechanical cooling option has now been developed. The 'Integrated Cryocooling System' or ICS uses new technology offering greater efficiency and reliability, with no loss of detector resolution and measurement precision compared to liquid nitrogen. How is this possible?

At the heart of ICS is an advanced Stirling cycle cooler, developed and manufactured by Sunpower, now a fellow company to ORTEC within AMETEK AMT. The cooler uses gas bearings and a linear alternator in a 'free piston' design, which is maintenance free. Sunpower has sufficient reliability data for these coolers to calculate an expected lifetime of over 200,000 hours or 22 years. The design is very efficient, requiring less than 70W of power in a typical installation. It is also quiet; audible noise is considerably less than 60dB. The cooler is linked to the detector crystal by a hardened cryostat which operates at a higher vacuum than conventional designs with no molecular sieve and metal seals. As a result the detector and cooler do not need to be thermally cycled and can be switched immediately back on after an interruption to the power supply.



ADVANCED COOLING OPTION FOR HPGE DETECTORS

One of the disadvantages of electro-mechanical coolers in the past has been the loss of detector resolution at lower energies. Typically the resolution specification would have to be relaxed by 10% compared to liquid nitrogen for measurements below 500 keV. This is caused by microphonics generated by the moving parts of the cooler. The free piston design used by ICS is inherently low noise anyway, but any microphonics present are removed by AVC, 'Active Vibration Cancellation'. AVC is a small device inside the ICS, which tunes into the small amount of micro phonic noise produced by each cooler and then works to actively cancel it.

As a result, for the initial release of ICS, customers can buy ORTEC GEM 'p' type detectors with no loss of spectroscopic performance compared to liquid nitrogen at all energies. Orders are also being accepted by the factory for other detector types including our GMX series 'n' type detectors plus our revised Profile series detectors now with Stable Thin Front Contact (STFC) technology. However at this stage the resolution specifications are being relaxed slightly at very low energies for the GMX, PROFILE-S and PROFILE-C Series detectors but it is expected that 'liquid nitrogen level' performance specifications at very low energies will be rolled out to these other detector types once further testing has taken place. Another feature of ICS is the remote mounting of the detector preamplifier away from the detector crystal, this makes it easy to shield the preamplifier components from the detector in low background measurements.

How easy is ICS to install? ICS is integrated into a single compact housing with dimensions 391 x 333 x 135mm and weighing 18kg without the detector. It can operate in any orientation, lending itself to a variety of applications, however most laboratory customers will probably use it mounted vertically inside a lead shield. A specially designed stand allows ICS to be wheeled underneath a laboratory lead shield and then easily raised to a pre-selected height by a pneumatic arm. Once installed, it is easy to make the normal power, HV bias and electronics connections. Four conveniently positioned LEDs on the outside of the case allow the user to make a quick visual check that the device is operating correctly.

So far, we have just talked about purchasing ICS with a brand new detector. What about adding it to the detectors you already own? This can certainly happen, although the detector needs to be returned to the factory for integration to ICS. This adds cost and the process is likely to lead to a small loss of detector performance. Alternatively, you could consider the other new cooling options available from ORTEC, which are easily installed on site, or a detector trade-in may be possible, please ask and we will be able to advise further.

How does ICS fit in with the other new cooling options now available? ICS is the best choice for customers who want to move away completely from liquid nitrogen, do not want to compromise on detector resolution and need a very high level of reliability with the absolute minimum of system downtime. The hardened cryostat, wide operating temperature range, low power consumption and rugged construction make it ideal for industrial installations as well as counting laboratories.

For customers with a more limited budget, who are prepared to accept some loss of resolution below 500 keV, ORTEC are continuing to offer the X-COOL-III electro-mechanical cooler. It is the latest version of the XCOOLER range, with many improvements and can be easily fitted to existing pop top detectors.

Last but not least is the MOBIUS recycler, which combines all the advantages of electro-mechanical and liquid nitrogen cooling. It is a great choice for sites that experience regular power cuts or where cooling needs to be upgraded on an existing detector. The system combines a 28 litre dewar with a Stirling cycle cooler, which condenses and recycles nitrogen during use. In normal operation, the device only requires topping up with liquid nitrogen every two years. In the event of a power cut, the liquid nitrogen inside the dewar will keep the detector cold for up to 10 days. Please see the article on page 6 for the latest new configurations available with MOBIUS. Please use this link to download the ICS data sheet:

<http://www.ortec-online.com/download/ics.pdf>



PROFILE DETECTORS NOW WITH STFC TECHNOLOGY

A common figure of merit for comparing or specifying HPGe detectors is the relative efficiency as defined by the IEEE standard-325. This is derived from the response of the detector at 1332 keV from a Co-60 point source placed 25cm from the front of the detector relative to the same measurement with a 3" x 3" NaI detector. Many detectors (i.e. the ORTEC GEM and GMX Series) are designed specifically to optimise the relative efficiency for that particular measurement scenario. Although these represent good all-purpose ranges of detectors they do not necessarily provide the best use of valuable HPGe material for any particular measurement. The geometry of the source or sample coupled with the position relative to the same detector crystal can have a significant impact on the efficiency of the measurement. Changing the shape of the crystal can be very effective to optimise the response of a fixed volume of germanium crystal to a particular measurement. For this reason the PROFILE range of detectors has been supplied by ORTEC for a number of years. These "Application-Matched" P-type HPGe Detectors are optimized for specific sample types, gamma energy ranges and measurement geometries.

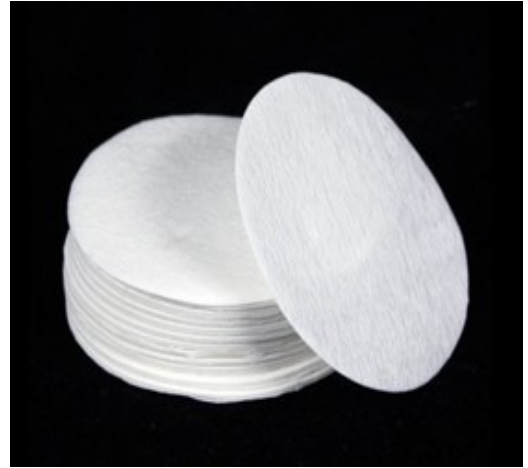


Figure 1 Filter papers



Figure 2 Waste assay drums

ORTEC recently modified the range to incorporate stable thin front contact (STFC) technology adding significant improvements to the performance of the PROFILE range. The new stable, thin front contact (STFC) technology provides excellent gamma transmission at the front crystal surface for energies as low as 3 keV. This advanced contact design does not diffuse into the germanium crystal at room temperature which ensures stable detector efficiency, even when stored warm. At low energy this leads directly to an extended range detector with greater counting efficiency, lower counting time and lower minimum detectable activity.

F-Series and S-Series PROFILE GEM Detectors

F-Series PROFILE detectors employ "over-square" (diameter > length) coaxial structures. For a given relative (IEEE) efficiency, the F-Series represents the "best use" of germanium material producing the maximum absolute counting efficiency for on-endcap or "close

geometry" extended samples, such as:

- Point sources on-endcap
- Filter paper samples on-endcap
- Samples presented in bottles
- Pots on-endcap
- Bio-assay applications (e.g., lung monitoring)
- Waste drum monitoring

In addition, the over-square geometry helps improve low-energy resolution by reduced crystal capacitance.

S-Series PROFILE detectors have all the advantages of the F-Series but the incorporation of the STFC at the front surface add excellent extended range sensitivity down to 3 keV energy and prolonged warm storage of the detector without degradation of performance.



Figure 3 Marinelli beakers

PROFILE DETECTORS NOW WITH STFC TECHNOLOGY

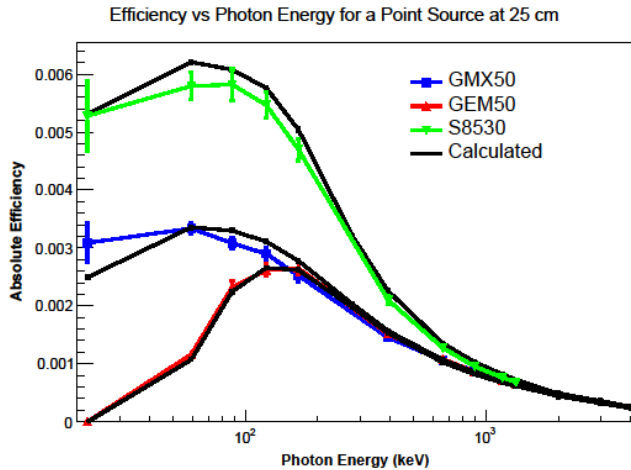


Figure 4 Point source at 25cm for 50% relative efficiency detectors

Figure 4 shows the extensive improvement in efficiency at lower energies for an extended range PROFILE “S” detector when measuring a point source. The S8530 S-Series detector’s absolute efficiency is significantly higher between 600 keV and 20 keV when compared to the same 50% relative efficiency coaxial P- and N-type detectors. At 59 keV, the S series detector area is nearly 6X more efficient than a P-type coaxial detector (GEM50) and almost 2X more efficient than a coaxial N-type (GMX50) low-energy detector due to its greater front surface area. As expected, curves converge at 1332 keV, where relative efficiency is measured. Measured (colour) and calculated (black) curves show absolute efficiency versus energy for a point source positioned 25 cm from the detector endcap.

Measured data points are obtained using mixed NIST traceable sources. Calculated data points were generated using MCNP-X. Note, energy range shown is from 20 keV to 4 MeV.

Figure 5 reinforces the marked improvement in efficiency for the PROFILE “S” detectors when measuring a filter paper on-endcap source. S8530 has significantly higher absolute efficiency at all energies below 1MeV down to 10 keV. Due to a larger diameter crystal, at 122 keV, the S-Series detector is 2.5X more efficient than a P-type coaxial and nearly 2X more efficient than an N-type low-energy detector. Calculated (colour) curves show absolute efficiency versus energy for a 100 mm diameter filter paper source positioned on the detector end cap. Note, energy range shown is from 10 keV to 4 MeV.

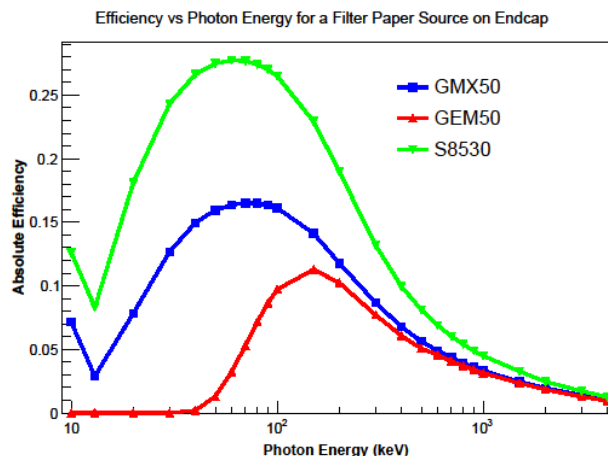


Figure 5 Filter paper on endcap for 50% relative efficiency detectors

M-Series and C-Series PROFILE GEM Detectors

The M-Series detectors are designed for use with Marinelli beakers to provide optimum solution and efficiency. M-Series detectors provide the same resolution and better absolute efficiency (below 50 keV) than GEM series detectors, and better resolution but lower absolute efficiency (below 50 keV) than GMX series detectors. These are made where the endcap diameter is “filled with crystal” and the length slightly longer than the diameter. The overall absolute efficiency for a Marinelli beaker is maximized. This is the most common beaker where the well diameter is equal to its length. Additionally, M-Series for a given relative (IEEE) efficiency, represents the optimum “use” of germanium material, generating the maximum absolute counting efficiency for on-endcap or “close geometry” extended samples with a higher energy range requirement than F- or S-Series, such as:

- Point sources on-endcap
- Filter paper samples on-endcap
- Samples presented in bottles and pots on-endcap
- Waste drum monitoring

PROFILE DETECTORS NOW WITH STFC TECHNOLOGY

The C-Series detectors provide all the attributes of the M-Series detectors combined with an ultra-thin, stable entrance window. This extends the lowest usable energy down to 3 keV while maintaining the efficiency at higher energies. Nuclides such as ²⁴¹Am and ²¹⁰Pb may be measured while providing excellent efficiency for higher energy emitters; all in a single detector. The largest of these detectors provides the maximum efficiency available in a single detector for energies greater than 3 MeV.

General Guidelines for choosing a PROFILE GEM Detector

Choosing the optimum M- or C-Series detector for use with a specific Marinelli beaker could not be easier: simply choose the detector with the tightest fit inside the Marinelli beaker well. An F- or S-Series detector may be used in a Marinelli geometry, it will have better resolution performance, but will have lower efficiency than an M- or C-Series detector of the same diameter. Correspondingly, an M- or C-Series detector may be used as a substitute for an F- or S-Series detector in an on-endcap geometry. For the same diameter, the M- or C-Series will give slightly higher efficiency (improvement increasing with increasing energy). For a close or on-endcap sample, the detector diameter should exceed the sample diameter by 20% or more. Beyond 30% the gain in efficiency is small. In addition, if the detector diameter exceeds the sample diameter by 20% or more, errors due to irreproducibility of the sample position will be minimal. If budget constraints must be considered, first select the largest diameter in comparison with the optimum diameter. Selection of a deeper detector will further increase the absolute efficiency, specifically at higher energies. For samples counted in geometries similar to those listed above, choose an F-Series PROFILE detector with a diameter 20% (or more) larger than the sample to ensure a high absolute efficiency for a given relative (IEEE) efficiency. Choose an S-Series PROFILE detector with a diameter 20% (or more) larger than the sample to ensure the highest absolute efficiency at lower energies between 3 to 50 keV. If the application or situation includes prolonged storage of the detector in an ambient environment, selection of the S-Series PROFILE detector will maintain excellent performance, with no degradation in the low-energy range. Over-square detectors can often achieve better low-energy resolution than longer, smaller diameter detectors of the same relative efficiency. See <http://www.ortec-online.com/download/PROFILE.pdf>

General Guidelines on the Choice of High Purity Germanium (HPGe) Detector

Energy (keV)	Marinelli Beaker		Near or Far Point Source		Large Surface Area	
	Efficiency	Resolution	Efficiency	Resolution	Efficiency	Resolution
3 to 3,000	GMX	PROFILE-C	PROFILE-S	PROFILE-S	PROFILE-S	PROFILE-S
3 to 5,000	GMX	PROFILE-C	PROFILE-C	PROFILE-C	PROFILE-C	PROFILE-S
3 to above 5,000	GMX70 or larger	PROFILE-C94100	PROFILE-C94100	PROFILE-C94100	PROFILE-C94100	PROFILE-C94100
50 to 2,000	GMX	PROFILE-M	PROFILE-F	PROFILE-F	PROFILE-F	PROFILE-F
50 to 5,000	GEM	GEM	GEM	GEM or PROFILE-F	GEM or PROFILE-F	PROFILE-F
Above 5,000	GEM70 or larger	GEM70 or larger	GEM70 or larger	GEM70 or larger	GEM70 or larger	GEM70 or larger
Neutron Damage	GMX	GMX	GMX	GMX	GMX	GMX
High Count Rate	small GEM or GMX	small GEM or GMX	small GEM	small PROFILE-F or PROFILE-S	small PROFILE-F or PROFILE-S	small PROFILE-F or PROFILE-S

MOBIUS BECOMES MORE VERSATILE

A liquid nitrogen dewar is the most established method of cooling a germanium detector. The detector is physically connected to a cryostat inserted in the liquid, and the system relies on liquid nitrogen boiling off at 77 degrees Kelvin. The advantage of this approach is that cooling continues until all the liquid nitrogen is exhausted, even if the lab experiences a lengthy power cut. The user does not have to worry about thermally cycling the detector and possibly degrading the vacuum inside it. However, the dewar has to be refilled at least every two weeks and there are safety concerns around handling such a cold material, as well as the possibility of asphyxiation. These drawbacks, the improved temperature and calibration stability offered, plus the sheer convenience of electro-mechanical cooling have led to its increased popularity in recent years.

Just over a year ago, ORTEC developed a new cooling option called MOBIUS, which combines the advantages of both liquid nitrogen and electro-mechanical cooling. MOBIUS has become a popular choice for sites that experience regular power cuts or who want to upgrade cooling on an existing germanium detector. The device integrates a 28 litre dewar with an advanced Stirling cycle cooler. As the liquid nitrogen evaporates and rises, it condenses onto a cold plate inside the top of the dewar and drops back into the reservoir. As a result the dewar does not need frequent refilling; under normal continuous operating conditions it will typically only require topping up every two years. In the event of a power cut, the liquid nitrogen inside the dewar will keep the detector cold for up to 10 days.



MOBIUS is now available in 'side looking' and 'J' configuration versions. The SL (side looking) configuration is typically used in industrial and process measurements, where the detector needs to monitor a pipe containing gas or liquid. This format is available with streamline or PopTop type cryostats. The SJ and HJ (J configuration) allow the detector to be used in a lower background shield design with no shine path from the exterior of the shield to the detector or sample. HJ adds a further refinement, by positioning the preamplifier remotely from the detector and outside the lead shield. It is often chosen by customers who want to reduce background to an absolute minimum, for example underground laboratories researching 'dark matter'. Another typical use is NORM (naturally occurring radioactive material) measurements in the lab to date samples brought back from geography or archaeology field studies. The low

level of micro phonic noise produced by MOBIUS makes it a great choice for this type of application, with no loss of detector spectroscopic performance compared to liquid nitrogen above 15 keV. SJ can be supplied in streamline or pop top configurations; HJ as streamline only. Please use this link to download the data sheet with details of the new versions: <http://www.ortec-online.com/download/mobius.pdf>

THE ULTIMATE IN MOBILE WASTE ASSAY SYSTEMS

ORTEC has been supplying mobile Waste Assay systems for a number of years but in the past the use of these systems have been limited as the Germanium detector required liquid nitrogen for cooling and was often deemed to be too fragile to be used in often harsh environments. Over the last 10 years ORTEC has pioneered the development of rugged battery powered and electrically cooled Germanium detector systems and our latest generation Waste Assay system makes full use of these developments.

Our new ISO-CART-85 system is built around an Integrated Detector Module (IDM) that incorporates a large area, high efficiency electro-mechanically cooled Germanium detector. The IDM-200-V is a rugged design, has low power requirements (typically 30 W) and can operate over a temperature range from -10°C to $+50^{\circ}\text{C}$ making it suitable for use in the challenging environments that will often be encountered at a decommissioning facility.

The detector system can be powered via an AC or DC power supply and includes an internal Lithium-Ion battery which will operate the system for approximately 2.5 hours. Adding a small external battery pack increases the operation time by a further 8 hours. Essentially the complete Waste Assay system can be operated for a full day on battery power alone allowing the system to be deployed virtually anywhere.



The ISO-CART-85 system can either be supplied factory calibrated as a turn-key system or alternatively can be configured from the individual components. The key individual components of the system are as follows:

- IDM-200-V Integrated Detector Module
- ISOTOPIC Waste Characterisation Software
- ISO-CART Transport Cart
- ISO-2-IDM-SHD Modular collimator/shield kit
- Notebook or Tablet Computer

The active area of the Germanium detector used in the ISO-CART-85 system is over $5,600\text{mm}^2$ which results in exceptional efficiency and allows the system to reach free-release limits of detection. Actual count times to specific detection limits will always depend on the nuclide in question, the density of the sample, the container, the counting geometry and the radioactivity in the environmental background as “seen” by the detector.

As an approximate guide the minimum detectable concentrations (MDC) achievable when assaying a container with a light waste matrix of 0.3 to 0.4 g/cc and a count time of 2000 seconds is shown below.

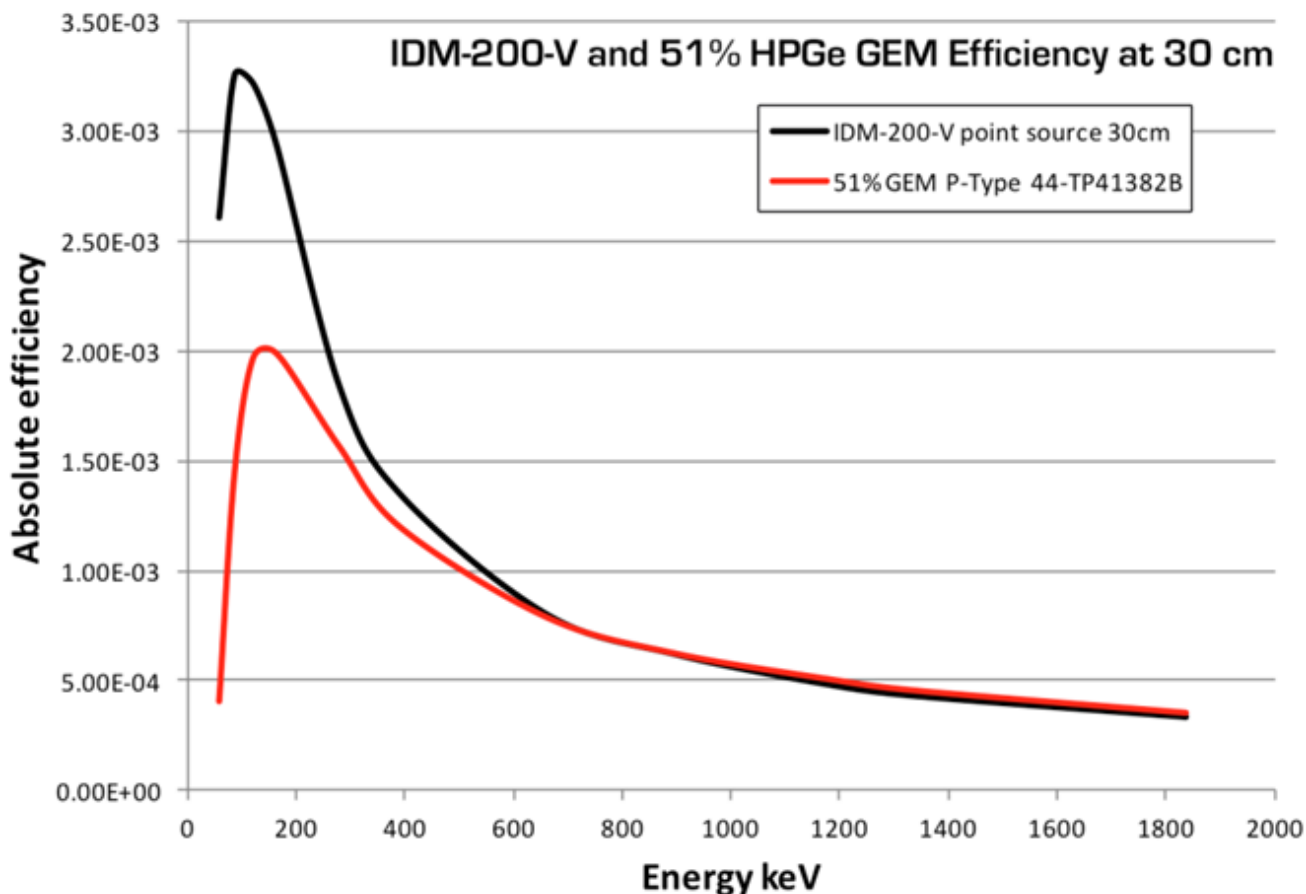
Container Assay Mode

Cs-137 2 to 4 Bq/kg
Co-60 2.5 to 5.5 Bq/kg

Bottle Assay Mode

Cs-137 3.5 Bq/kg
Co-60 4.4 Bq/kg

THE ULTIMATE IN MOBILE WASTE ASSAY SYSTEMS



To further illustrate the excellent efficiency of the IDM-200-V the picture above shows a comparison of the IDM's absolute efficiency versus a conventional 51% Relative Efficiency P-type Coaxial Germanium detector. As the energy of the gamma ray photon drops below 600keV the efficiency of the IDM-200-V increases dramatically in comparison to the conventional detector primarily due to the large surface area of the Germanium detector.

As well as excellent efficiency the IDM-200-V also offers excellent energy resolution. For example energy resolution at photon energy of 1.33MeV is typically around 2keV and at a photon energy of 122keV resolution is typically around 1.2keV. This excellent resolution allows the ISO-CART-85 system to assay material containing complex mixtures of nuclides without the need for a prior 'fingerprint' of the waste stream and still give accurate results. This is a major advantage over Waste Assay Systems that utilise low resolution detector technology such as Sodium Iodide (NaI) detectors which have a limited capability when assaying sample materials which contains a complex mixtures of nuclides.

A major part of the ISO-CART-85 system is the ISOTOPIC Waste Characterisation software, an integrated package that controls the complete data acquisition and analysis process. ISOTOPIC employs two different analysis methodologies, "container mode" for the counting of packages, pipes and surfaces, and "soil mode" for wide-area counting of soils and contaminated land. In "container mode" which is most commonly used the detector is characterised by a single point source efficiency measurement. This primary calibration, which can be traced to a certified standard, is extrapolated or modelled to match the physical situation of the sample; container geometry, material, and matrix composition. The model is based on "point-kernel" methods in which the entire measurement problem is broken down into multiple source/matrix voxels and their contribution to the composite spectrum are calculated and summed. The approach, which is similar to Monte-Carlo methods, utilises detector parameters (crystal diameter, crystal length, dead layer, and end cap thickness) which the user supplies as part of the measurement configuration and a point source efficiency calibration of the detector. No special separate measurements are needed to characterise the detector other than one point-source calibration.

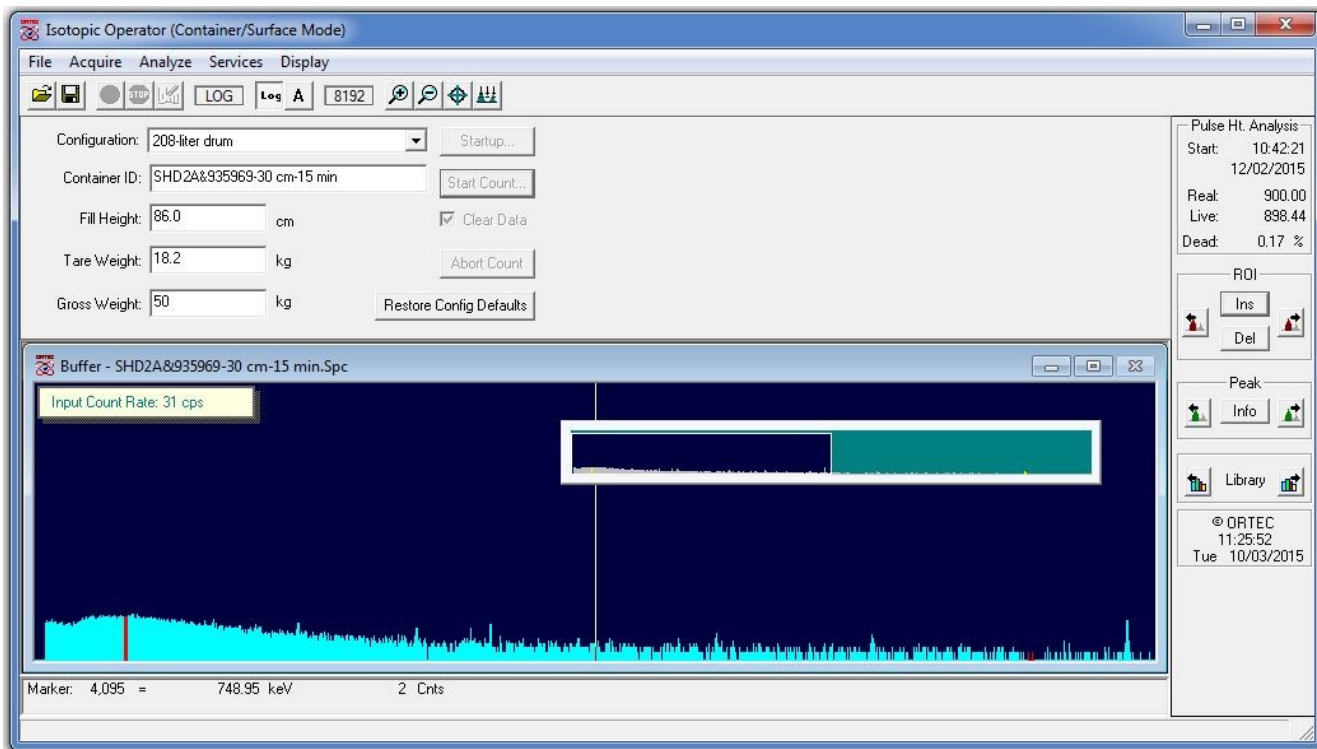
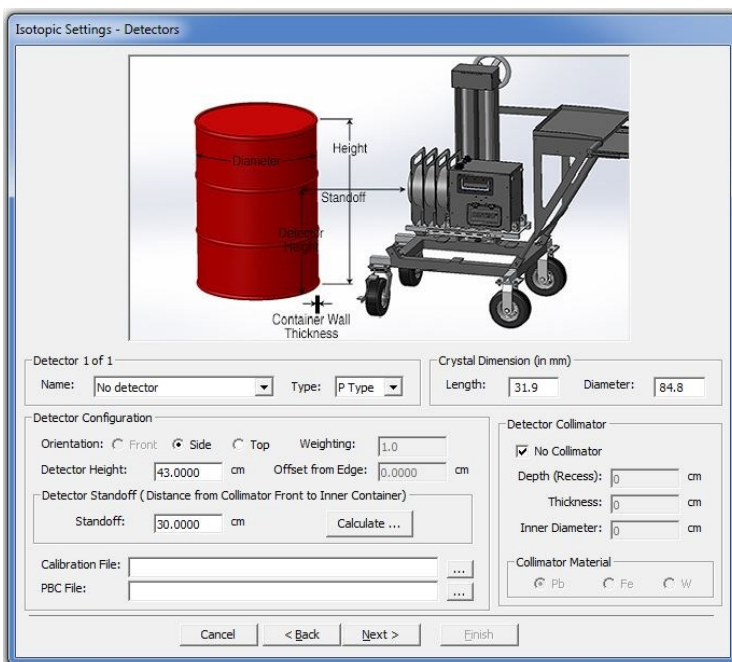
THE ULTIMATE IN MOBILE WASTE ASSAY SYSTEMS

A key feature of ISOTOPIC is its integrated approach. ISOTOPIC controls the data acquisition and also performs the analysis all via a simple, easy to use Graphical User Interface (GUI).

ISOTOPIC has two operational modes: supervisor and operator where the supervisor mode defines what operations the operator is allowed to carry out. A wizard guides the supervisor through the process of setting up the operator procedures and container configurations to be assayed. The Supervisor calibrates the system, creates libraries, defines sample geometries, matrices, collimators to be used, and other functions for later use by the operator. In routine use, for container analysis, the operator need only start the acquisition, select the configuration and enter basic data such as the container ID, container weight and container fill height.

The ISO-CART-85 system is designed to deal with a wide range of Waste Assay and Decommissioning activities. As well as the ability to assay containers, pipes and surfaces it also has the additional flexibility with the optional bottle counting shield extension.

This option allows the ISO-CART-85 to analyse small bulk samples and is useful for screening purposes to establish if material is not contaminated. The bottle counting shield extension may be added to the standard upward facing modular collimator assembly to provide a small counting shield which will allow a 1 litre bottle of material to be counted directly on the endcap of the detector, in a high efficiency counting geometry. For further information on the ISO-CART-85 system please download a copy of the data sheet using the following link <http://www.ortec-online.com/download/ISO-CART-85.pdf> or to discuss your application in more detail please contact our Sales Team.

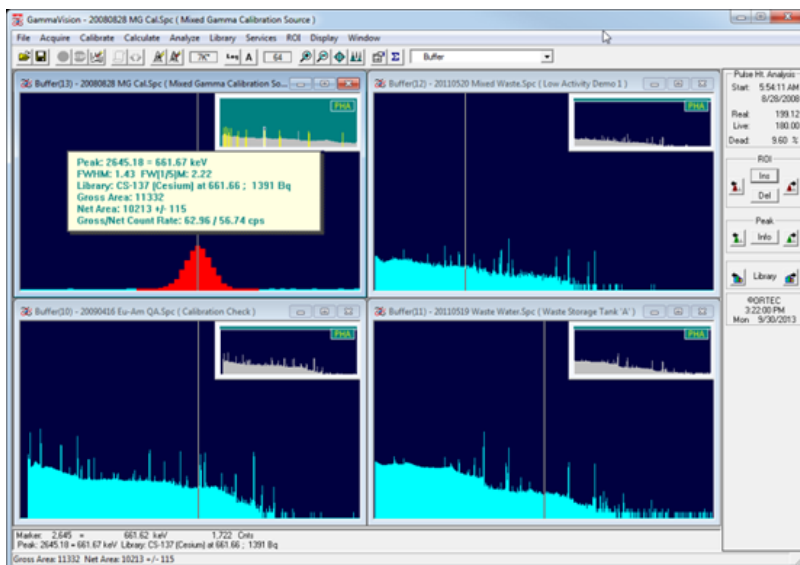


OTHER RECENT PRODUCT DEVELOPMENTS

There have been many more exciting new product developments since our last newsletter. Hopefully we can outline them in more details in later editions but for the moment you can click on the links to learn more. Or as always contact the UK sales team with any questions.

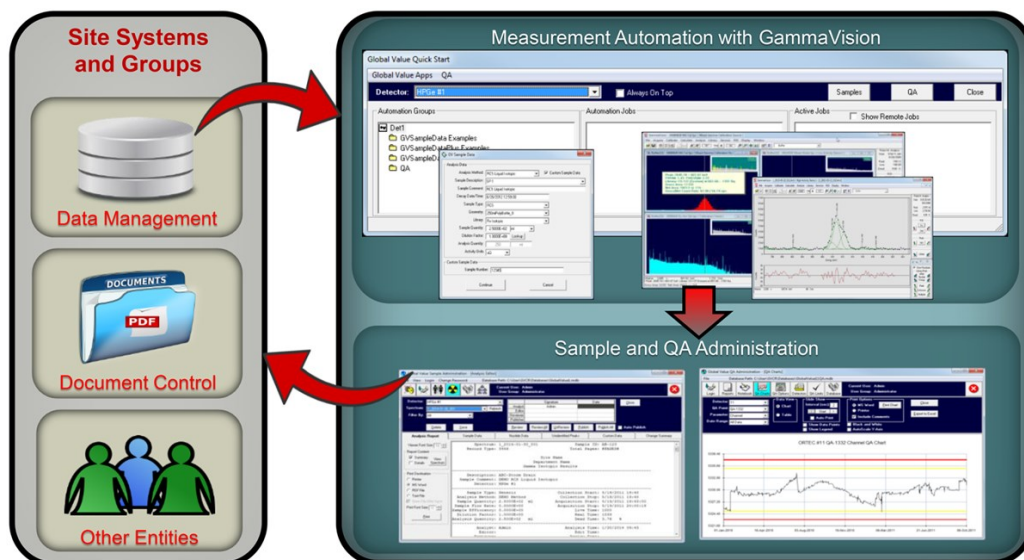
GammaVision 7

As with all recent updates of our software packages, GammaVision 7 introduced full compatibility with Windows 7 64 bit and Windows 8.1 Professional. This latest version adds some significant functional improvements. Only a very small subset of those changes can get a mention here. Control of list mode has been added allowing time dependent inspections of spectrum time slices. The job file command list has been extended with many new job commands added. The implementation of the true coincidence correction methodology has been improved making the process more transparent and the associated documentation has been expanded. Peak background correction no longer requires peaks to be associated with specific nuclides in the library. Peak detection and fitting has been improved. Numerous additional improvements in analysis, calibration, automation and reporting capability have been introduced. See <http://www.ortec-online.com/download/GammaVision.pdf>

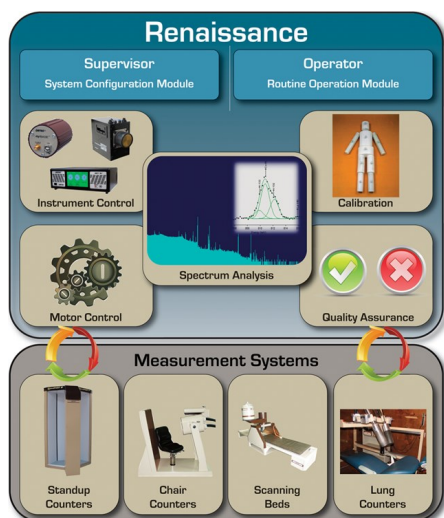


Global Value 7

Global Value is a software application suite designed to operate in conjunction GammaVision software and which provides a counting laboratory or production environment with automated measurement processes, custom reporting, quality assurance, and secure data management. These functions greatly simplify measurement and data integration processes by predefining measurement details, minimising manual data entry, and eliminating labour intensive document control practices. Global Value 7 adds many improvements and new features in addition to full compatibility with Windows 7 and 8.1 Professional operating systems. See <http://www.ortec-online.com/download/Global-Value-GammaVision-Productivity-Add-On-Software.pdf>



OTHER RECENT PRODUCT DEVELOPMENTS

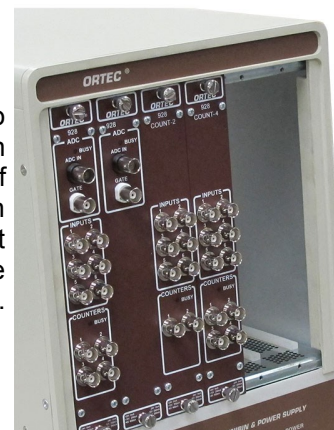


Renaissance 7

Renaissance is a comprehensive gamma spectroscopy solution for Lung Burden and Whole Body Counting applications using either or both High and Low Resolution detectors in a broad spectrum of measurement systems. It is easily configured for single or multiple detector measurements using fixed position or automated scanning systems, such as Stand up, Chair, and Bed counters. This latest update provides 64-Bit Windows 7 and 8.1 Professional compatibility along with Crystal Reports version 11.5 integrated controls and report templates, maximum dead time limit for operator measurements, operator module password protection, integration of the latest HPGe analysis engines from GammaVision 7, compatibility for multiple networked instruments on a common database and improved spectrum stripping functionality for sodium iodide analysis. See <http://www.ortec-online.com/download/Renaissance-32-Whole-Body-Counting-Software.pdf>

EASY-NIM-928

The new ORTEC EASY-NIM 928 suite of instruments offers a new approach to nuclear pulse counting and pulse-height analysis for a variety of applications in nuclear science, providing customers with extensive flexibility, reliability, and ease-of-use in a cost effective package. Each member of the family comprises hardware in the form of a compact single-width NIM module; software in the form of a "front panel emulator" for the Windows environment, and an optional toolkit to enable the user to integrate the hardware into his own experiment or instrumentation system. See <http://www.ortec-online.com/download/928.pdf>

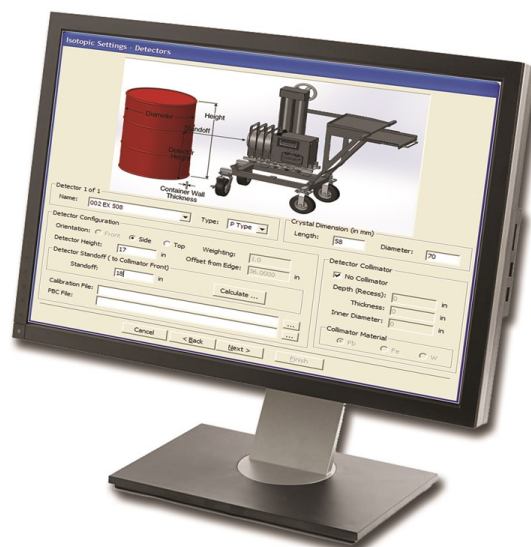


UMCBI Developer Toolkit

The CONNECTIONS Programmer's Toolkit provides interface modules and instructions to easily control ORTEC hardware instrumentation from your own custom Windows applications. The toolkit includes ActiveX Controls to simplify coding in supported software development environments and a standard Dynamically Linked Library (DLL). This release includes the current version of CONNECTIONS, modern programming examples (such as Visual Studio .NET and LabVIEW) and extensive updates to the programmer's manual. See <http://www.ortec-online.com/download/A11.pdf>

ISOTOPIC Version 4.3

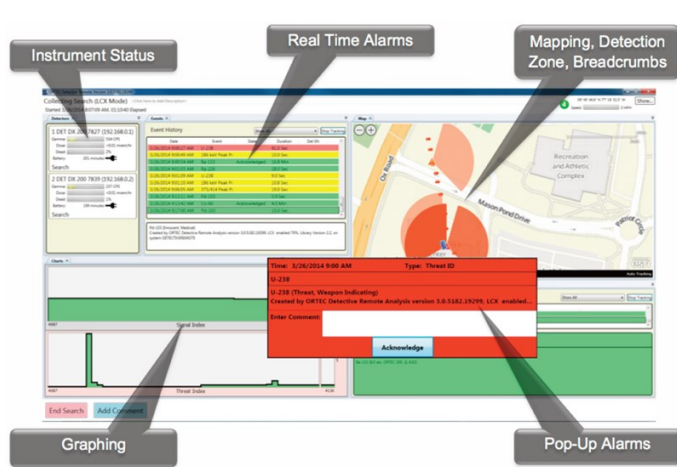
ISOTOPIC provides an integrated, practical solution to a wide range of gamma-ray measurement problems encountered in radioactive waste assay and characterisation applications. High resolution, High Purity Germanium (HPGe) spectra are analysed and assay results determined for large-scale bulk samples. With the release of Version 4.3 the package is now compatible with Windows 7, 64-bit systems and utilizes the latest 64-bit UMCBI and therefore supports all ORTEC spectrometers, including the latest IDM-200-V. A new algorithm for close geometries was introduced in V4.0 has now been extended to "bottle on end-cap" measurements primarily for use with the bottle counter option to the ISO-CART-85. Reporting has also been improved. Custom reports may now be written using Crystal Reports version 11.5 See <http://www.ortec-online.com/download/ISOTOPIC.pdf>



OTHER RECENT PRODUCT DEVELOPMENTS

Detective-Remote

The ORTEC Detective-Remote software is a Windows based software application for use in conjunction with one or more ORTEC Detective family Radionuclide Identifiers in a range of applications. Such applications all involve detection and identification of radioactive sources either in motion relative to the detector, at a distance from the detector or both. Detective-Remote measurement solutions are easily configured to meet a wide range of CONOPS requirements and with the new mapping capability, provide a universal search tool for nuclear threats. For further information see <http://www.ortec-online.com/download/Detective-Remote.pdf>



PINS3-CW

For many years ORTEC has been supplying our Portable Isotopic Neutron Spectroscopy (PINS) non-destructive assessment system that analyses and provides on-site identification information about the contents of unidentified or suspect chemicals inside unopened containers. This system utilises a neutron source to excite the atomic nuclei within a container producing a characteristic gamma ray signature which is measured using a Germanium detector system and from this the chemical agent identified using the PINS system software.

In 2013 we released the PINS3-CF in which we replaced the liquid nitrogen cooled Germanium detector used in the original systems with a Trans-Spec-N hand portable, battery powered and electro-mechanically cooled detector system. This development drastically improved the ability of the PINS system to be deployed to remote locations.

We have now released a further development of the system with the PINS3-CW. The new system makes deployment of the PINS system even more flexible by replacing the Cf^{252} neutron source used on the PINS3-CF system with a portable neutron generator. For further information see <http://www.ortec-online.com/download/PINS3-CW.pdf>

FRAM Version 5.2

FRAM software is used to analyse spectra from a HPGe detector and from this determine the isotopic ratios of plutonium and uranium in a wide variety of sample types. The results are obtained using only the spectral data and known fundamental nuclear constants, efficiency calibration with reference standards is not necessary. In addition to 64 bit compatibility a number of improvements have been made to the operation, analysis and reporting capability of the software, see <http://www.ortec-online.com/download/FRAM.pdf>



GAMMAVISION TRAINING COURSE

GammaVision Training Course

GammaVision, a Windows based Gamma-ray spectroscopy software package is the industry standard for laboratory based radioactivity measurements using High Purity Germanium (HPGe) detectors and enables users to analyse any spectrum format and provide precise reports for the region of the spectrum needed. For a number of years, ORTEC has offered a comprehensive training program which gives an overview and understanding of gamma spectroscopy in relation to GammaVision. All the features of GammaVision are reviewed and students will end the training confident and ready to use it for their gamma-ray spectroscopic measurements.

The GammaVision software training course provides an introduction to gamma-ray spectroscopy for those new to the subject, as well potential improvements to existing working practices to those already engaged in the field. It is primarily intended for analysts, technicians, and anyone else undertaking gamma-ray spectroscopy, although quality assurance officers and data reviewers who need an understanding of gamma-ray spectroscopic measurements will also benefit.

Taking place over 4 days, the course is designed to give students the knowledge required to correctly operate systems for the detection, monitoring, recording and analysis of radioactive materials. It is a mixture of lectures and hands-on laboratory-type exercises using representative spectra. The course is aimed at explaining why and how GammaVision produces gamma-ray spectroscopic results, and begins with an overview of the fundamental physical processes for basic radioactive decay and interaction of radiation with matter. It reviews how these processes impact the spectrum and explains spectral features along with how they are interpreted in the analysis. An overview of HPGe detectors, signal processing and techniques employed in gamma-ray spectroscopy follows, with special emphasis given to the advances in Digital Signal Processing (DSP). These topics will provide the fundamentals of gamma-ray spectroscopy while emphasising areas the operator needs to optimise system parameters as well as understand the effects of true coincidence summing, interference peaks, and source-detector geometry. The methods for energy and efficiency calibration are discussed, including the efficiency correction for True Coincidence Correction (TCC). Other corrections are explained, both their operation and when they should be used. The nuclear gamma-ray 'fingerprints' are used for identification and the making and editing of 'libraries' is discussed as is Laboratory QA, automation (JOB files), and good practices. Finally, the analysis results report is examined with emphasis on verifying the results.

The 2015 GammaVision course will be held at our offices in Wokingham from the 20th – 23rd April 2015. You will have the opportunity to take a look at our facilities as well as have all your technical support questions answered by members of our staff. The fee for the course includes all your course materials, as well as lunch and refreshments on each day.

Do you have any training requirements?

If you are interested in the GammaVision training course or training covering other ORTEC software products please let us know. We can offer a range of course types tailored to specific requirements including short one-day introductory courses through to week long in-depth courses.

Courses can be held either at our office in Wokingham or alternatively at or local to your site. If you would like to discuss your training requirements please contact Trevor Hatt whose contact details are on the last page of this newsletter.

If you would like to register for the GammaVision course, please contact Shilpa Soni to reserve your place.



GERMANIUM DETECTOR STOCK LIST

For many years ORTEC has maintained a stock list of Germanium detectors which are available from our factory in Oak Ridge, Tennessee. The stock list is published on our web site and lists all the available detectors and importantly includes the actual measured performance of the detector as tested in our factory. In many cases the actual measured performance of a detector is significantly better than the generic warranted specifications for that specific model. For example we currently have several of our new Profile Series extended range Stable Thin Front Contact (STFC) detectors listed which have significantly improved specifications compared to the warranted performance. The table below shows how the measured performance of these detectors compares with the generic warranted performance.

Model GEM-C8295P4, Serial Number TP42737A				
	Relative Efficiency	FWHM @ 1.33MeV	FWHM @ 122KeV	FWHM @ 5.9KeV
Warranted	115% (Nominal)	2.1keV	1250eV	1215eV
Measured	123%	1.96keV	995eV	999eV
Model GEM-S7025P4-B, Serial Number P50627C				
	Relative Efficiency	FWHM @ 1.33MeV	FWHM @ 122KeV	FWHM @ 5.9KeV
Warranted	20% (Nominal)	1.9keV	650eV	450eV
Measured	25%	1.7keV	625eV	439eV
Model GEM-S5825P4-B, Serial Number P51264A				
	Relative Efficiency	FWHM @ 1.33MeV	FWHM @ 122KeV	FWHM @ 5.9KeV
Warranted	15% (Nominal)	1.8keV	650eV	400eV
Measured	17%	1.6keV	552eV	330eV

As mentioned earlier, in addition to the measured performance data being available for review prior to purchase we can also generally offer delivery of stock list detectors within two weeks of order. The complete list of stock list detectors can be viewed on our web site using the following link <http://www.ortec-online.com/Products-Solutions/RadiationDetectors/detector-stocklist.aspx> and to discuss the most suitable detector for your application please contact a member of our Sales Team.

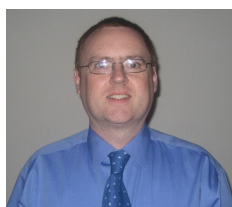
The UK Sales Team



Trevor Hatt
International Sales Manager
Tel: 0118 936 1224
Mobile: 07818 097234
Email: trevor.hatt@ametek.co.uk



Nigel Rimmer
Sales Engineer, North UK
Tel: 01244 677746
Mobile: 07971 063709
Email: nigel.rimmer@ametek.co.uk



Shane Toal,
Sales Engineer, South UK & Ireland
Tel: 0118 936 1239
Mobile: 07818 097235
Email: shane.toal@ametek.co.uk



Shilpa Soni
Sales & Marketing Coordinator
Tel: 0118 936 1223
Email: shilpa.soni@ametek.co.uk

AMETEK Advanced Measurement Technology

Spectrum House
1 Millars Business Centre
Fishponds Close
Wokingham
RG41 2TZ

Tel: 0118 936 1210
Fax: 0118 936 1211
E-mail: ortec.uksales@ametek.co.uk