ORTEC®

ISO-CART™
Mobile Assay System

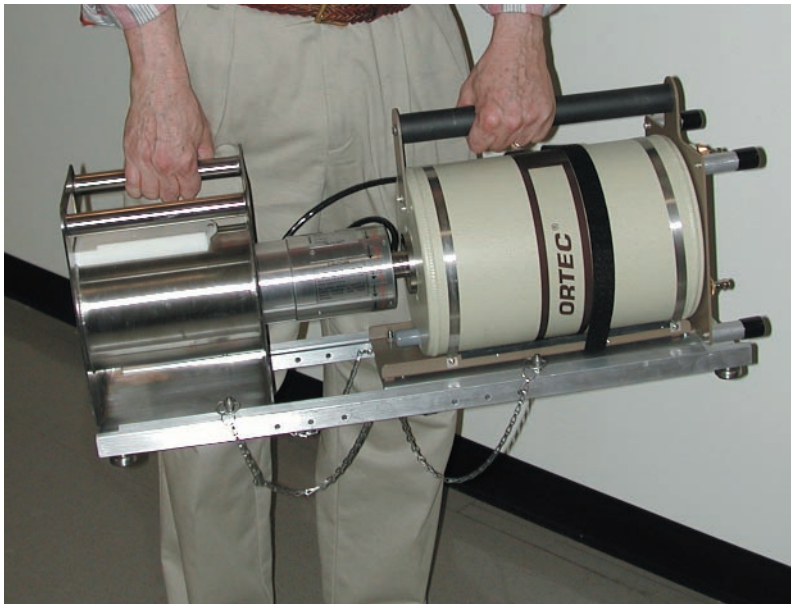
A Complete *In-Situ* NDA Gamma-Ray Analysis for a Wide Variety of Samples

- **Measures all common geometries: pipes, cylinders, floors, ceilings, walls, drums, boxes, and soils**
- **Easy-roll cart for maneuvering over any surface**
- **Wide selection of collimators and shields available for different measurement situations**
- **Continuous height adjustment and variable tilt adjustment**
- **Easily disassembles to fit into your car**
- **ISOTOPIC software, proven results on thousands of real-world samples**
- **Simple to calibrate with a single inexpensive mixed isotope point source**
- **Flexible reporting: measurement results can be reported in grams or activity (Bq or Ci)**

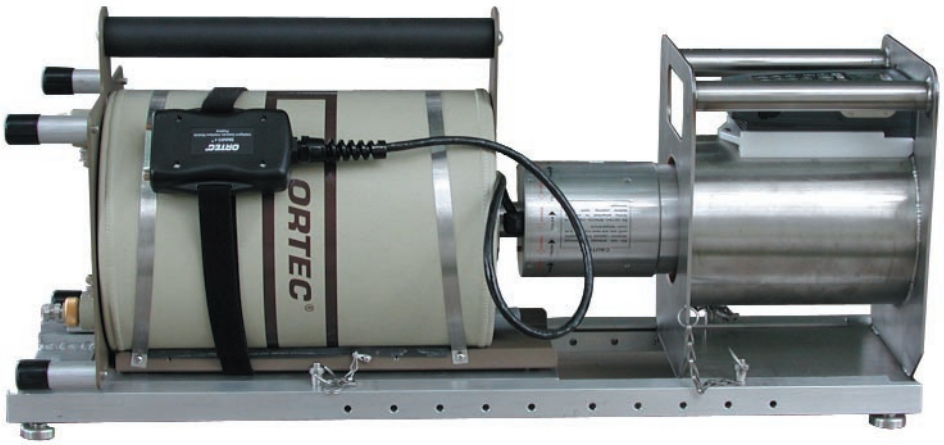
The ISO-CART Mobile NDA System is an ideal solution for a wide variety of *in-situ* gamma-ray measurement requirements. The hardware comprises a specially-designed cart which carries all the components: HPGe detector, shield and collimator, digiDART™ high performance multichannel analyzer, and laptop computer. The system software package provides everything necessary to produce quantitative results quickly and easily "right out of the box." The ISOTOPIC software can control up to eight ISO-CART systems at once for the measurement of large containers. One answer is given for each item measured.

Calibration is a simple procedure, requiring only the use of a single point, mixed isotope source. The patented ORTEC automatic energy calibration technique and automatic efficiency calibration make setup a breeze. ANY standard HPGe detector may be used with the ISO-CART system. No special factory calibrations are required.

The ISO-CART allows the entire assay system to be easily transported to any measurement location. The large wheels permit easy movement over rough surfaces. The detector support can be positioned at heights from 0.38 m (15 in.) to 1.2 m (48 in.). The pivot mechanism orients the detector at different angles from 0 to 180°. A sturdy adjustable shelf supports the electronics and the notebook computer for convenient on-the-cart operation. An additional shelf is available at the bottom of the ISO-CART, and is easily removed for *in-situ* soil measurements.



If the detector must be moved to a location where it is impractical to move the cart, the detector/collimator unit can be removed and carried. The collimator may be easily removed for “infinite-plane” soil measurements.



ORTEC Portable HPGe Detectors

ORTEC HPGe detectors are the industry standard in terms of quality and performance. The ISO-CART system may be configured with a wide variety of ORTEC HPGe detectors from which relative efficiencies of over 200% are available.The latest SMART-1 technology raises the bar in ensuring spectral data acquired is of the highest quality, via an internal state of health function which monitors the detectors performance parameters.

Dewar Options

A portable, all-attitude HPGe detector is available with a 3-0 liter Gamma Gage dewar. A new 7.0-liter multi-orientation dewar (MOD) is also available. The MOD dewar allows near all attitude use while offering reduced size compared to the equivalent holding time Gamma Gage model. Typically, the HPGe detector chosen would be a large volume GEM (P-type) or GMX (N-type); however, a wide variety of detector choices are available.

Standard systems may be ordered by model number located on the back of this brochure. Contact us to suggest a configuration according to your detection limit and count-time requirements.

digiDART™ Data Acquisition Hardware

The digiDART is the ideal MCA for use with an ISO-CART system. It can acquire preliminary data in the field as a stand alone unit or perform a complete *in-situ* analysis with the use of a notebook computer.

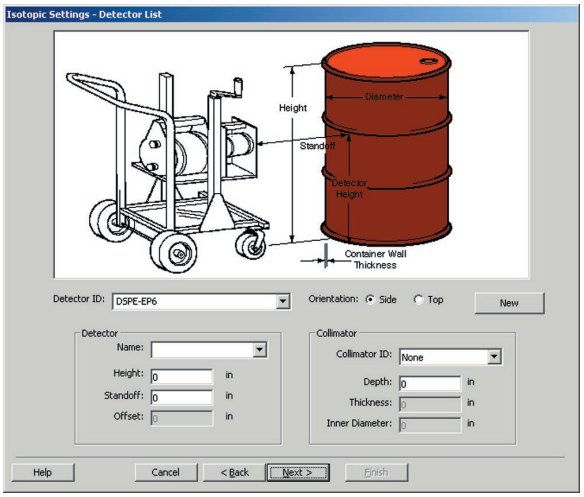
- High-performance rugged HPGe grade spectrometer, 16k channels
- Digitally stable: consistent answers for long counts, changing count-rates and temperatures
- Operates with or without an attached PC
- Built-in backlit LCD display and control keypad — live display of acquiring data
- Energy calibration using keypad
- Nuclide ID and activity calculation for nine Regions of Interest (ROI)
- High throughput — over 100,000 processed pulses per second
- Fits in the palm of your hand or attaches to your belt
- Holds 23 16k spectra in internal memory (614 at 512 resolution)
- ~9 hour battery life, recharge internally
- Only 860 grams, including batteries
- Fast USB communications
- Supports the latest generation "SMART-1" HPGe detectors and all other detectors using the Detector Interface Module (DIM)
- Provides authentication of spectral data
- Optional 32k-channel resolution model

System Calibration

The system is designed to allow the user to calibrate the detector. For measuring items with discrete dimensions, the only calibration necessary is a traceable mixed-nuclide source positioned 30 cm or greater from the face of the detector. For fallout measurements, the length and diameter of the detector are used to determine detector efficiency. No additional sources are necessary.

Data Acquisition Analysis Software

Program ISOTOPIC V. 3.0 controls the data acquisition and the analysis. Most of the controls for data acquisition are similar to the standard GammaVision features. For ease of use Operator and Supervisor modes are available to combine the simplicity needed for operator use and versatility needed by the spectroscopist. Other features of ISOTOPIC include a modeling program which allows the user to easily configure the item to be measured for size, matrix content, container configuration and detector position. Data is stored in a Microsoft® Access™ database.



Sample Geometries: ISOTOPIC allows unlimited geometries for quick setup and analysis. In addition, any of these geometries can be adjusted by the operator at the time of analysis to accommodate any sample, any time.

Typical geometries include:

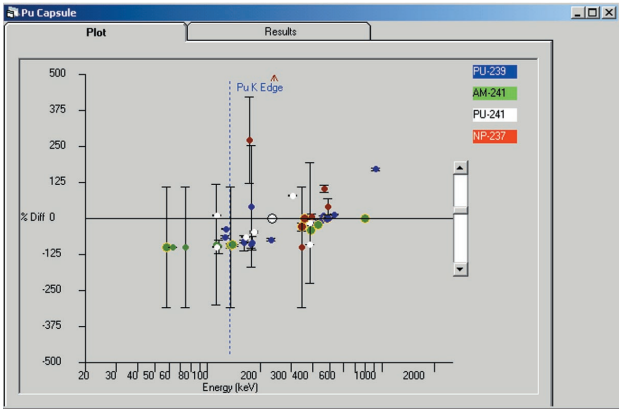
Cylinders (lined and solid): used for drums, pipes, and bottles

Boxes: used for large rectangular shaped containers such as B-25 boxes and crate

Discs: used for localized contaminated areas on floors and walls or down looking on cylinders

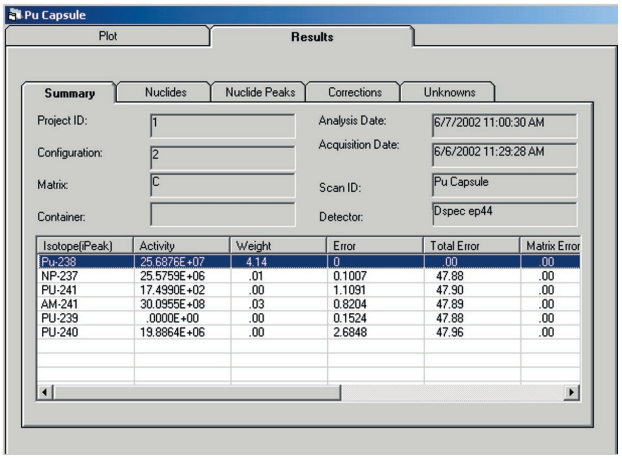
Point Sources: used for radioactive "hot spots" anywhere

Infinite Plane: used for fall-out measurements



Fine Tuning Adjustments: ISOTOPIC has a unique fine-tune adjustment of the correction factors. After all correction factors, including branching ratios, are implemented, all peak areas of a nuclide should be the same. These peak areas are plotted relative to a reference value and a trend with energy is noted. Adjustments to density and container attenuation and self attenuation (for uranium) can be made dynamically. When all points (corrected peak areas) are aligned, the user can be satisfied that the attenuation correction factors are correct.

Results: Many report options are available for printing and archiving. Alternately, the user can develop a customized report using the query feature of the Access database. Microsoft Access must be purchased separately to use the query feature. Results are displayed for the user to observe before storing or printing.



ISO-CART™ Accessories

Collimators

Three different collimators are available for use in most analysis situations. The collimator thickness and length improves the sensitivity of the measurement system.

(1) The standard collimator is 1.6 cm (0.625 in.) thick and 20.3 cm (8 in.) long. It is composed of lead with a 2 mm (0.08 in.) copper liner.

(2) The medium-duty collimator is 1.3 cm (0.5 in.) thick and 20.3 cm (8 in.) long. It is composed of tungsten-copper alloy with a 2 mm (0.08 in.) copper liner for better shielding characteristics while maintaining a small volume assembly.

(3) A heavy-duty collimator is available for high radiation areas. The collimator is 5.1 cm (2 in.) thick and 20.3 cm (8 in.) long, with a 2 mm (0.08 in.) copper liner.

All collimators include a copper liner to reduce fluorescence X-rays from high-Z shield materials. The larger shields are made in sections, to allow the shield assembly to be removed from the cart by one person. No lead is exposed.

Laser Meter

The Laser Meter accurately determines the distance from the detector endcap to the measurement point. A sighting laser mounted on the collimator is used to center the detector on the measurement point. The range finder can be set to display the distance in meters or feet. A computer interface is included.

Wireless digiDART Control

This option includes a hand-held computer located near the digiDART on the ISO-CART. It is designed to operate with the laptop computer supplied with the ISO-CART system. Typical communications range is 150 ft. with a clear field of view.

Self-Pressurized Storage Dewar

Use to safely fill the detector from a 50-liter self-pressurized dewar. The system includes a 50-liter dewar, 6-foot transfer line, pressure-fill bayonet, and withdrawal device. Specify portable dewar type.

Turntable for Drums

Improved analysis results can be obtained if items are rotated. This option ia necessity for measuring drums containing nonhomogeneous material.

Heavy Duty Shipping Crate

This box is necessary for frequent shipment of the ISO-CART. The box is designed for quick opening, easy ISO-CART removal and includes an air-tight instrument case for digital range finder, digiDart and additional small parts and tools.

System Calibration

A point-source calibration that is NIST traceable can be performed at the factory. The calibration covers a range from 59.5 keV to 1835 keV.

Specifications

Cart with SHD-1 1.6 cm (0.625 in.) lead shield: 122 cm (48 in.) H x 55 cm (21.75 in.) W x 101 cm (40 in.) D. Weight: cart alone = 25 kg (55 lbs), cart and shield = 42 kg (92 lbs)

SHD-1 Shield (lead; includes mount for HPGe detector): 26.42 cm (10.4 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in.) D; (shield/collimator section: 20 cm (8 in.) long, 1.6 cm (0.625 in.) wall thickness). Weight: 16.82 kg (37 lbs)

SHD-2 Shield (tungsten copper alloy; includes mount for HPGe detector): 26.68 cm (10.5 in.) H x 2 cm (8 in.) W x 77.5 cm (30.5 in.) D; (shield/collimator section: 20 cm (8 in.) long, 1.3 cm (0.500 in.) wall thickness). Weight: 27.27 kg (60 lbs)

SHD-3 Shield (heavy duty lead; includes mount for HPGe detector): 25 cm (9.75 in.) H x 20 cm (8 in.) W x 77.5 cm (30.5 in). D; (shield/collimator section: 20 cm (8 in.) long; 5.1 cm (2 in.) wall thickness). Shield is split in two sections for assembly purposes. Weight: 68 kg (150 lbs).

Laser Meter: 18.8 x 7.0 x 4.7 cm (7.4 x 2.8 x 1.9 in.). Accuracy: 3 mm.

digiDART: 12 x 8.2 x 3.3 cm (4.7 x 3.2 x 1.3 in). Weight: 900 g (2.4 lbs) with battery.

Turntable: Diameter: 30 in.; Rotation Speed: 1 rev/min; Capacity: 1000 lbs.; Height: 9.5 in.

Ordering Information

To fully specify your choice of ISO-CART system, select the model number below for the size of detector needed and replace the letters DDD in the model number with the desired choice of dewar, as follows:

3.0 = 3.0-liter Gamma Gage dewar; **M3L** = 3.0-liter MOD dewar; **M7L** = 7.0-liter MOD dewar

Other configurations may be supplied on request. Your existing detectors may be used. Contact your ORTEC representative or e-mail info@ortec-online.com with your requirements.

System Description

Complete ISO-CART system includes: pneumatic-tired CART, fitted with 5/8-inch copper-lined lead collimator, carrier and mounting plate, storage shelf, HPGe Detector with SMART-1 technology, bayonet pressure fill adaptor, digiDART, ISOPLUS-B32 software and Laptop computer. System is integrated and tested and supplied with factory calibration.

Model No.

ISOCART-GEM25-DDD	ISO-CART Mobile Assay System incorporating GEM25 detector
ISOCART-GEM40-DDD	ISO-CART Mobile Assay System incorporating GEM40 detector
ISOCART-GEM60-DDD	ISO-CART Mobile Assay System incorporating GEM60 detector
ISOCART-GEM80-DDD	ISO-CART Mobile Assay System incorporating GEM80 detector
ISOCART-GEM100-DDD	ISO-CART Mobile Assay System incorporating GEM100 detector
ISOCART-GEM120-DDD	ISO-CART Mobile Assay System incorporating GEM120 detector
ISOCART-GMX25-DDD	ISO-CART Mobile Assay System incorporating GMX25 detector
ISOCART-GMX40-DDD	ISO-CART Mobile Assay System incorporating GMX40 detector
ISOCART-GMX60-DDD	ISO-CART Mobile Assay System incorporating GMX60 detector
ISOCART-GMX80-DDD	ISO-CART Mobile Assay System incorporating GMX80 detector

SHD-2-SUB	Substitute SHD-2 for SHD-1 in system
SHD-3-SUB	Substitute SHD-3 for SHD-1 in system

ISO-CART System Options

ISO-CART	Cart and Detector/Collimator Carrier only (collimator must be ordered separately)
ISO-DCC	Detector/Collimator Carrier
ISO-CAL	Point-Source Calibration at the factory
ISO-LASERMETER	Laser Range Finder
ISO-WIRELESS	Complete set add-ons to replace PC-to-digiDART wiring by wireless networking Includes remote computer.
ISO-DEWAR	STD50L dewar, WD/50 withdrawal device, and TL-6 6-ft. transfer line
ISO-TURNTABLE	Turntable for drum rotation. Capacity = 445 kg (1000 lb.)
ISO-CASE	Transportation case for digiDART, laser range finder, and laptop.
ISO-BOX	Airworthy "roll-in" system transportation box for complete ISO-CART (detector ships in its own crate). Includes space for ISO-CASE.
ISOPLUS-B32	ISOTOPIC-32 Software
M1-T-1	Variable-length Tripod for In-Situ Soil Measurements
SHD-1	5/8-inch Lead Shield/Collimator, copper lined
SHD-2	Tungsten Shield/Collimator, copper lined
SHD-3	Heavy Duty Lead Shield (2” thick), copper lined, for high backgrounds

NOTE: Contact factory for ISO-CART systems based on alternate detectors types.

ISO-CART™
Mobile Assay System

Specifications subject to change
102402

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