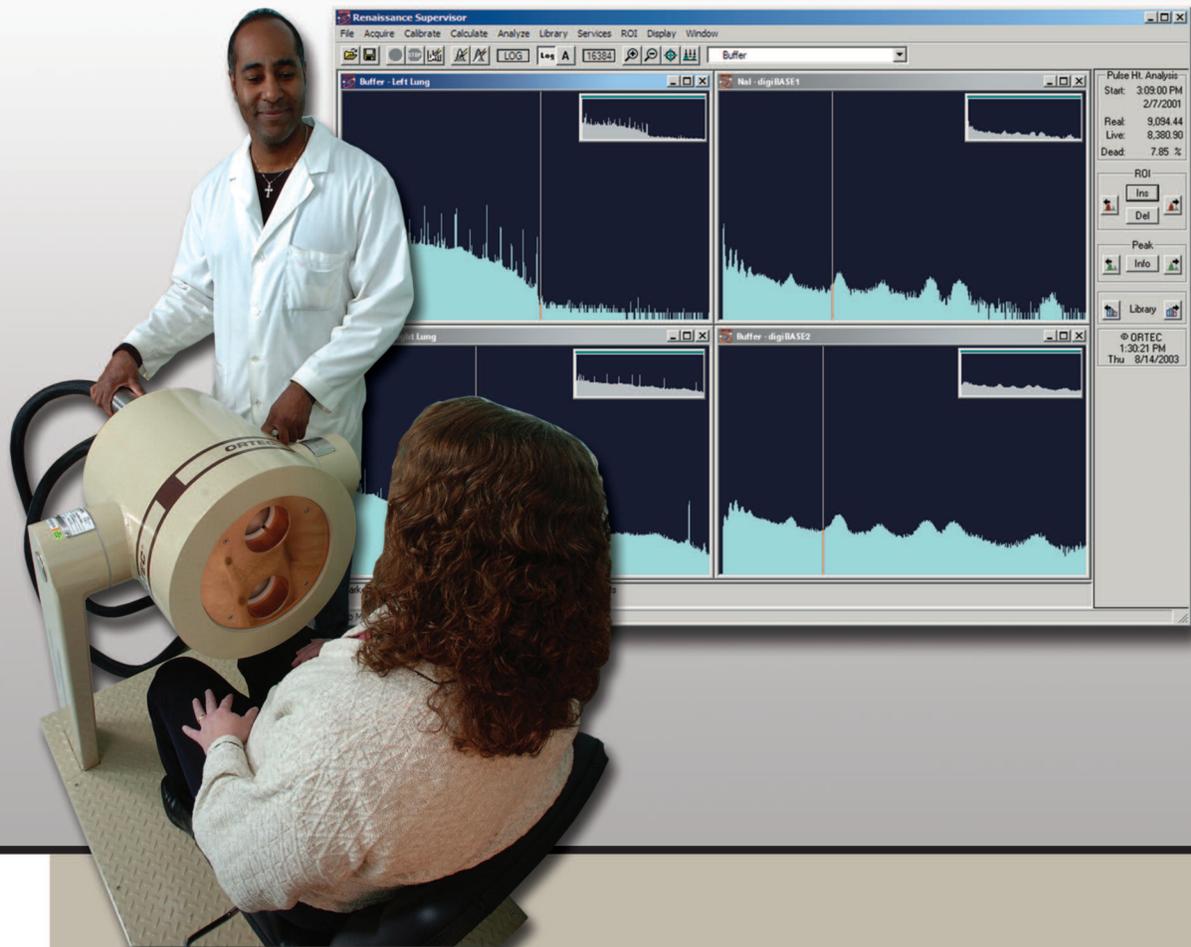


ORTEC[®]

Whole-Body Counting Systems



“Whatever your Whole-Body Counting Problem. . .
ORTEC has the Solution”

AMETEK[®]
ADVANCED MEASUREMENT TECHNOLOGY

Whole-Body Counting Systems

For more than 25 years ORTEC has been supplying Bio-Assay Counting Solutions around the world. That experience has taught us that a one-size-fits-all approach is NOT the answer. Needs differ from facility to facility. ORTEC can design a solution to match your operational and regulatory need. Exactly:

- Need to screen a lot of temporary workers, FAST, during an outage? The ORTEC StandFAST II is capable of screening 50+ people per hour with the lowest detection limits in the industry.
- Need to screen fewer people with greater accuracy? No problem. ORTEC produces a variety of chair configurations to keep your workers comfortable while the high performance, high resolution Germanium (HPGe) detectors precisely quantify the isotopes and levels of activity.
- Want the accuracy that only Germanium detectors can provide, but not the operational complexity of Liquid Nitrogen? Most ORTEC HPGe whole-body counters can be fitted with mechanical cooling. ORTEC leads in this transformational technology, offering you a cost effective alternative to the weekly or even daily liquid nitrogen management chores. Reduced background PopTop™ detector capsule designs combine high sensitivity and serviceability.
- Need to perform baseline and follow-up analyses for Transuranics on your workers? ORTEC customized Lung Burden systems offer the highest absolute efficiency with ORTEC 85 mm diameter ACTINIDE-85 detectors. These unique detectors have up to 13% more frontal area and hence greater sensitivity than other HPGe detector types, giving better coverage of the human lungs when measuring Americium, Plutonium, and other low-energy, low-yield gamma emitters. Actinide-85 detectors are provided with the industry's only all Carbon Fiber endcap, which results in improved efficiency due to transmission through the low Z Carbon. . . and it is absolutely the LOWEST background material of any available endcap.

Fast Screening Systems

StandFAST II

The ORTEC StandFAST® II excels as a “stand-up” screening counter, offering industry leading performance in several areas. It offers a remarkably large interior dimension compared to other counting systems. The walk-through design is unique in the industry and makes the counting process more efficient by allowing workers to pass through the system much like a body contamination monitor.

The large 4" x 4" x 16" NaI(Tl) detectors in the center column of the StandFAST II give an ideal geometry and high efficiency for a stand up counter. The combination of large detectors with superior shield design ensure very low detection capability to achieve 150 Bq (4 nCi) ⁶⁰Co LLD.

The StandFAST II system includes detectors, digitally stable electronics, a computer, and Renaissance-32 analysis software. The single cable connection from the detectors to the computer (USB or Ethernet) provides ease of installation, service, and maintenance. The entire system, including the shield, is modular for installation and easy maintenance.



Whole-Body Counting Systems

Systems for Detailed Investigation

Typically a backup to a fast screening system, such as a contamination monitor or StandFAST II, is a counter designed to do further investigation of any potentially high counts. These systems have several common features:

- Chair or Bed for the worker
- Smaller discreet detector units (Nal or HPGe)
- Automated software for data analysis and reporting

Because the count times are typically longer in order to achieve lower minimum detectable activities (MDAs) for the investigation, a chair or even a bed are used to provide a comfortable position for the worker while being examined. ORTEC can offer a number of configurations of this type to suit specific requirements. If you are unsure, we are happy to advise.

HPGe detectors are most commonly used because of their higher resolution which results in better fidelity of the radioisotopic analysis. Multiple detectors are often used so that the distribution of sources can be located and isolated to, for example, the lungs, gastrointestinal tract, or thyroid. Scanning systems, in which the detector system is moved relative to the subject, can gather data (spectra) versus position to achieve the same distribution information or measure a total body activity.

The swivel chair makes entry and exit of this system easy for the person being counted. The simple design offers many advantages over complex positioning mechanisms. Lower maintenance costs, increased safety, and fixed geometry for calibration and assessment are a few of the features. The large shield and collimator surrounding the detector, along with the shadow shield behind the individual being counted, deliver low-background capabilities to this unique system design.

Examples of HPGe Systems in Chair/Bed Configuration



Combination HPGe (Lung and GI Tract) and Nal (Thyroid) System.



Dual HPGe Detector System with X-COOLER III.



HPGe-based Scanning Bed.

Whole-Body Counting Systems



NaI System with Single, Large Crystal in Collimated Shield and Swivel Seat.

NaI-Based Systems

A variety of chairs using NaI detectors are in common use throughout the nuclear industry in routine screening. This particular ORTEC model uses a single, large (5" x 4") crystal in a collimated shield to provide good performance from a simple system. Like the HPGe systems, the swivel design of the chair makes entry and exit to the system easy for the worker and the geometry reproducible for accurate results.

Low-Background Room

A number of facilities have low-background rooms where very low level measurements can be made. ORTEC can outfit this type of room with a customized solution depending on the application.



Low-Background Room with Whole-Body Counting Detectors Cooled with X-COOLER III units.

ACTINIDE-85 Detector

Lung Burden measurements are made with an array of large diameter, low background detectors such as our unique ACTINIDE-85 assemblies.

ACTINIDE-85 is a high-resolution, high-purity germanium detector designed specifically for lung burden and whole-body counting applications. The unique detector design allows for the detection of small amounts of actinides such as uranium, plutonium, and americium, as well as higher energy fission products and naturally-occurring radioisotopes, in a distributed source such as the human lung. The detector is based on the PROFILE GEM-FX8530 detector, which employs a proprietary thin entrance window in order to improve low energy efficiency. The ACTINIDE-85 has been optimized to provide high detection efficiency and resolution performance in the energy range of actinides such as Pu, Am and U, which span the 13 – 200 keV energy range, while the excellent warranted energy resolution at 1.33 MeV means that the ACTINIDE-85 is equally well suited for analysis of fission products as well. It is therefore ideal for monitoring radiation workers — for lung burden, body burden and wounds.

- 85-mm diameter and 30-mm thick high-purity germanium (HPGe) detector optimized for Actinide Bioassay measurements.
- 5400 mm² frontal active area with excellent photon sensitivity for photon energies above 10 keV.
- Warranted Energy Resolution (FWHM) equal to or better than 600 eV at 14.4 keV.
- Warranted Energy Resolution (FWHM) equal to or better than 50 eV at 122 keV.
- Warranted Energy Resolution (FWHM) equal to or better than 1.9 keV at 1332 keV.
- Warranted P:C ratio >55:1.
- FWD.1M/FWHM typically <2.0, FWD.2M/FWHM typically <2.9.
- Available in LN₂-free mechanically cooled configurations.

The all carbon fiber endcap is ideal for high transmission of low energy photons and exceptional low-background performance. The large diameter (85 mm) gives greater geometric efficiency than any comparable detector system, as much as 13% more per detector in fact. Higher efficiency means shorter count times to achieve the same Minimum Detectable Activity.



Four Detector ACTINIDE-85 Array for Lung Burden Measurements.

Whole-Body Counting Systems

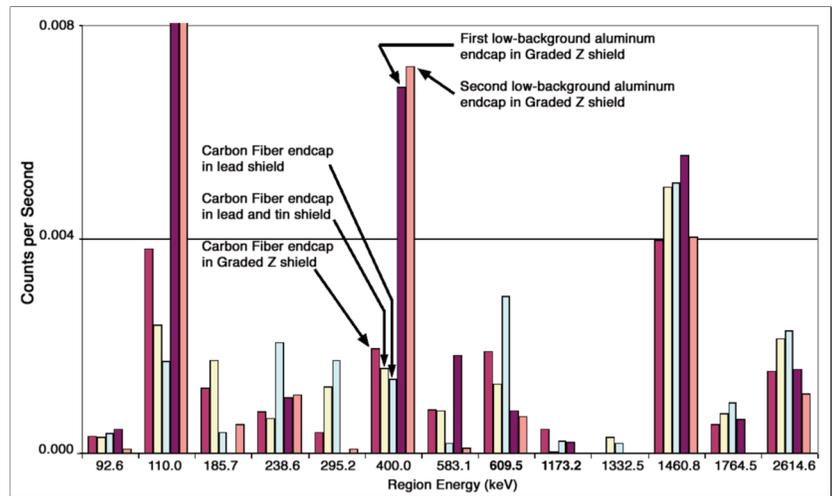
Low-Background Whole-Body Counting Detectors

Many low-background rooms also measure the whole-body for internal contamination. This can be performed with large detectors positioned over the torso or with a scanning system placed under the bed. Whole-body counting with HPGe detectors requires high efficiency, superb resolution, low-background, and excellent peak-to-Compton background. ORTEC's series of GEM, P-type detectors with low-background cryostats are ideally suited for this application. ORTEC has been manufacturing high efficiency detectors (>120%) for 15 years. Current state of the art is 200% relative efficiency with many whole-body counting facilities using ~150% efficient detectors today. Using these high performance detectors in conjunction with low-background materials and excellent peak shape performance ensures lower detection limits and higher throughput for any Whole-Body Counting system.

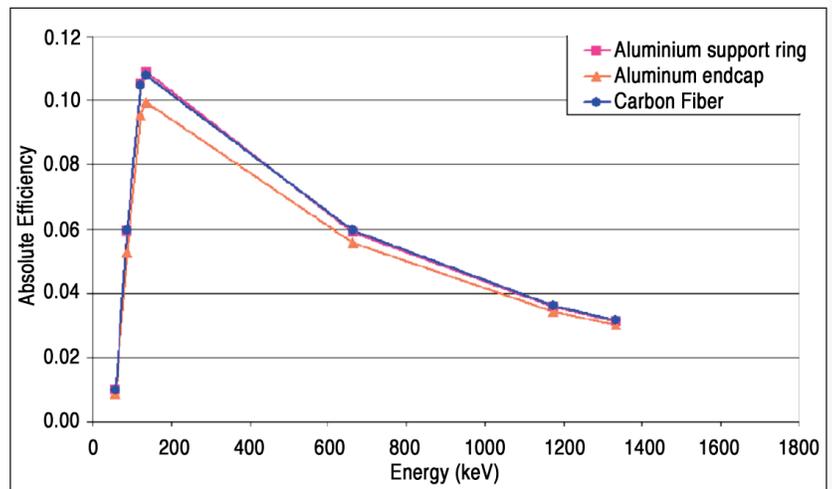
Advances in technology have allowed ORTEC to upgrade many of these systems with mechanically cooled options to alleviate the problems associated with liquid nitrogen filling in these confined spaces (there are safety issues as well). The capsules still utilize the carbon fiber endcaps to maintain low-background performance and high efficiency for low energy photons.



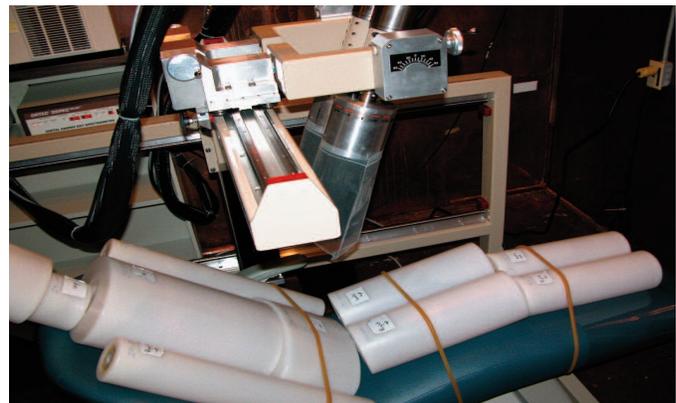
LN₂ based Detectors in Scanning Whole-Body Counter (mounted under bed).



Low-Background Improvement from Carbon Fiber Endcaps.



Improved Efficiency from Carbon Fiber Endcaps.



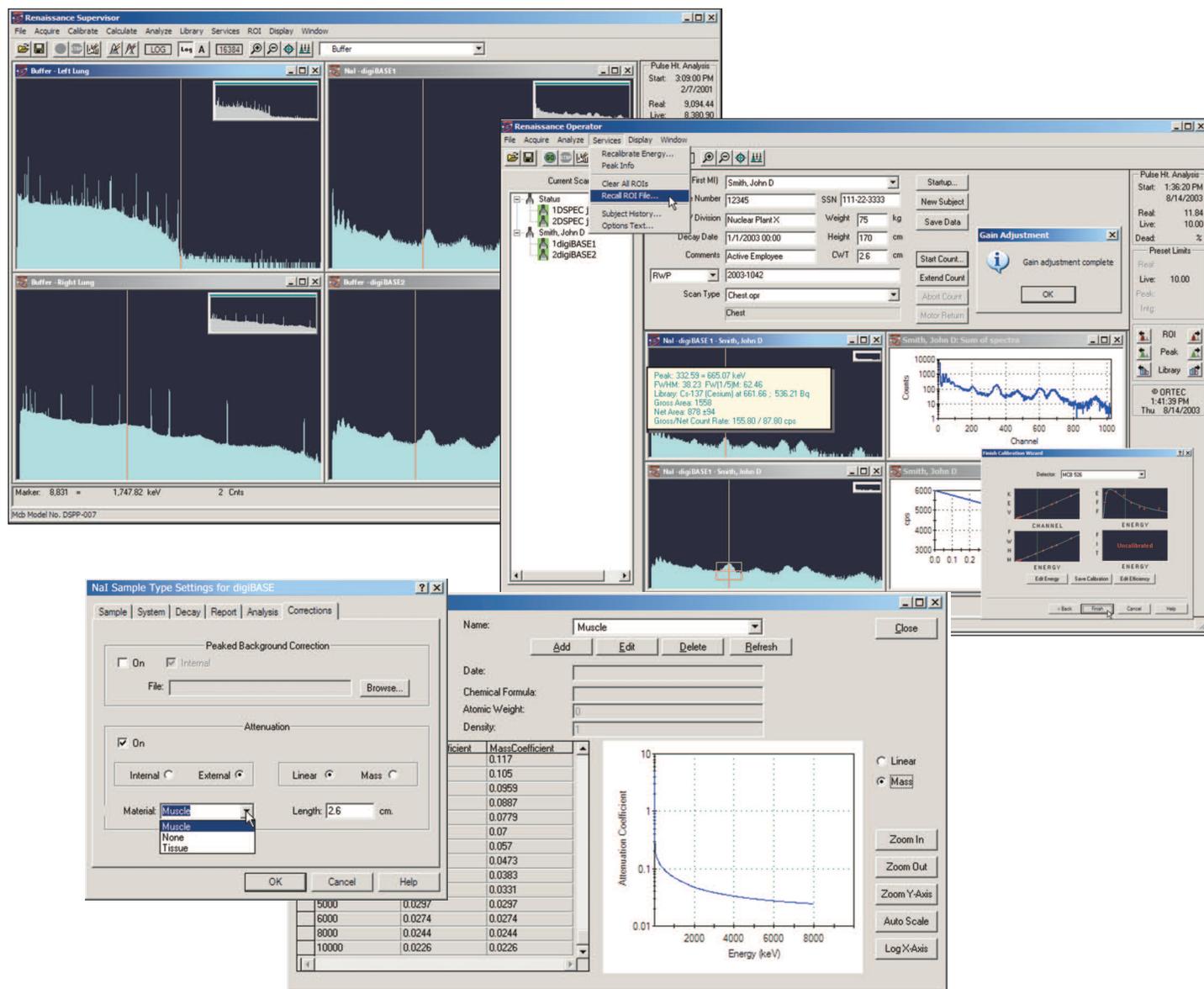
Whole-Body Counting Systems

Upgrading Systems

Renaissance software is the core software component of upgrading Whole-Body Counting systems. Many facilities already have a variety of counting equipment, shields, and detectors. With large investments being often made in a whole-body counter at the time of initial purchase, upgrades need to be as simple and low-cost as possible. Renaissance software is designed to operate not only the new systems being developed today, but also those existing counters already in the facility.

The ORTEC Technical Development Team has been upgrading whole-body counters around the globe with new detectors, X-COOLER mechanical cooling options, new digitally stable electronics, or improved software functionality. Many customers have adopted the ORTEC CONNECTIONS strategy for their counting laboratories and now for their whole-body counters as well. The combination of PC-based acquisition, Microsoft Windows operating systems and full networking support, in addition to the high-quality detectors and electronics combined Renaissance software make an upgrade simple and straightforward.

Contact your local ORTEC Representative to see how economical an upgrade can be!



Whole-Body Counting Systems

Ordering Information

Contact your local sales representative for a quote on any of the systems listed below.

Model	Description
StandFAST II	Stand-Up Whole-Body Counter
WBC-200	Sodium Iodide Based Chair with one detector
WBC-200-2	Sodium Iodide Based Chair with two detectors
WBC-200-DFX8530	High Resolution HPGe Based Chair with two detectors and LN ₂ free cooling
WBC-BSCAN	High Resolution HPGe Based Scanning Bed with one detector and LN ₂ free cooling
WBC-T	NaI Based Counter Top Thyroid Screening System with one detector
WBC-LB-2	High Resolution HPGe Based Lung Burden Analysis System with two detectors
WBC-LB-4	High Resolution HPGe Based Lung Burden Analysis System with four detectors

For over 25 years, ORTEC has supplied and continues to supply a wide variety of Bio-Assay products world-wide: complete systems, upgrades, support and training. We are committed to supplying high performance, innovative and reliable solutions to all aspects of whole-body counting and would be happy to discuss your requirements in detail. In the first instance, please contact your local ORTEC Representative.

Whole-Body Counting Systems

Specifications subject to change
051214

ORTEC[®]

www.ortec-online.com

Tel. (865) 482-4411 • Fax (865) 483-0396 • ortec.info@ametek.com
801 South Illinois Ave., Oak Ridge, TN 37831-0895 U.S.A.
For International Office Locations, Visit Our Website

AMETEK[®]
ADVANCED MEASUREMENT TECHNOLOGY