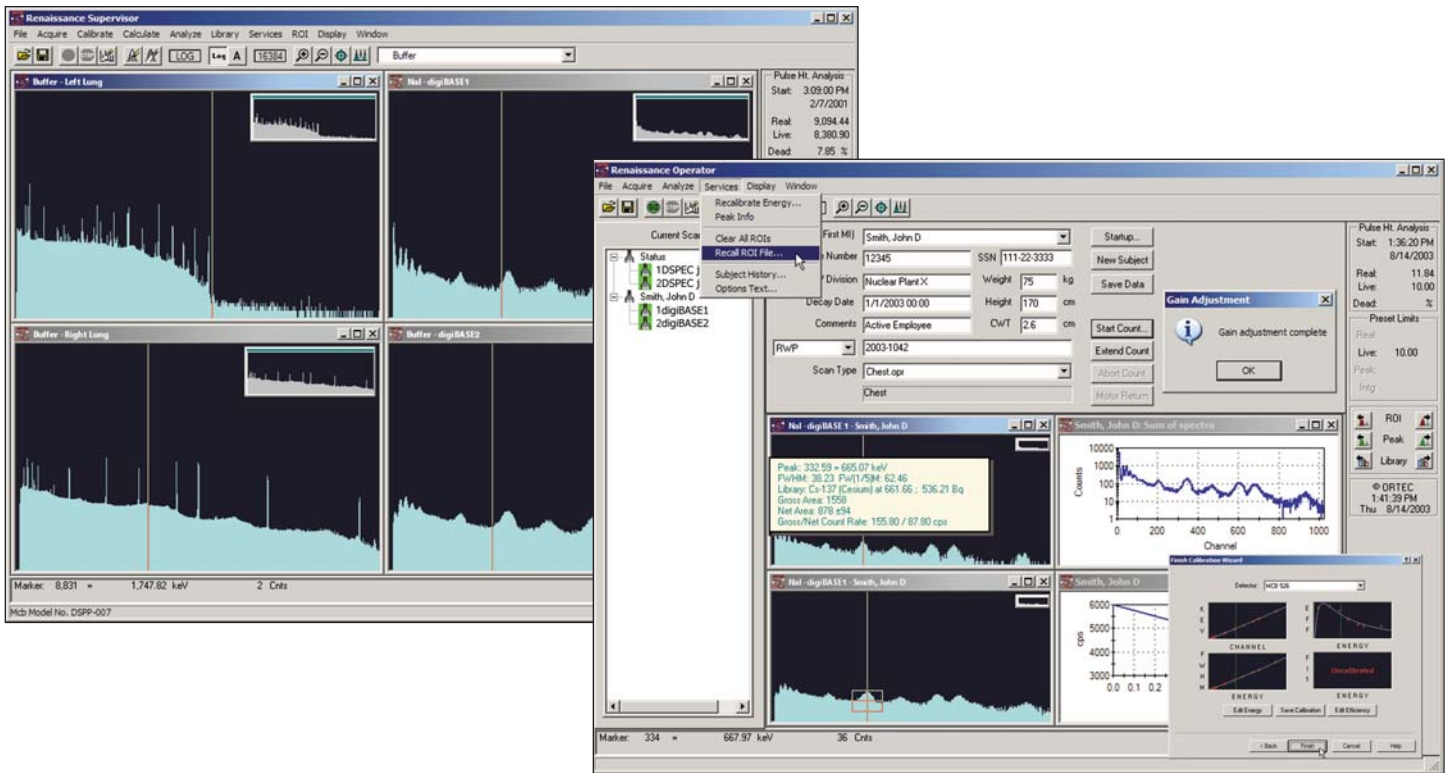


Software for Whole-Body Counting and Lung Burden Analysis for NaI and HPGe Systems

Comprehensive. . .



In touch with today's Health Physics needs. . .

- Simplify routine scans and tasks with Operator Mode
- Combined NaI(Tl) and HPGe acquisitions support
- Multi-Detector Arrays: up to 64 detectors for complex applications
- Highly-Synchronized automated multi-detector acquisition features
- Automated Gain Synchronization optimizes summed spectra analysis
- Full support for scanning and fixed geometries (chair and bed facilities)
- PC-Based Software with easy archive of Subject History in Microsoft Access™
- SEAMLESS transfer of results to the latest version of IMBA¹ Dose Assessment Software

¹IMBA software analyzes activity in the body and/or excreta and calculates the resulting doses. The software implements the International Commission on Radiological Protection's (ICRP's) currently recommended respiratory tract, tissue dosimetry, and biokinetic models for the reference worker, for 75 radionuclides.

Announcing Renaissance-32 Version 4 — Whole-Body Counting and Lung Burden Spectrometry Software for Today's Health Physicist.

Version 4 is the latest version of the ORTEC Renaissance-32 software, a complete PC-Based solution for whole-body counting and lung burden analysis.

It provides a complete and integrated solution based on high performance PC's. For simplicity of operation, separate Supervisor and Operator modes are provided. A comprehensive array of advanced spectral analysis tools are included.

Data are archived for easy retrieval in a LIMS compatible Microsoft Access database. Set up via Supervisor mode is simple and interactive, using user friendly "Wizards" to assist in defining the critical analysis parameters. Renaissance-32 V4 is the most comprehensive and advanced choice for your Health Physics personnel monitoring program.

Renaissance-32 — Your First Choice In Whole-Body Counting and Lung Burden Acquisition, Analysis and Reporting Software.

Why Choose Renaissance-32? . . . Read On!

Renaissance-32 V4 Main Features:

Comprehensive

- Supports NaI(Tl) and HPGe detectors in Whole-Body and Lung counting applications
- Supports Different Geometry Counters: Walk Through, Chair and Bed systems, including scanning systems

Flexible

- Microsoft Access-compatible results database; custom report generation via Crystal Reports Templates

Powerful

- Proven and advanced analysis algorithms for library and unknown peak analysis
- True Coincidence Summing Corrections

Compliant

- Extensive Quality Assurance features for building control charts and monitoring system performance

Simple, Yet Secure

- Operator program with login/password protection
- Supervisor program to define Operator privileges and options

Connected

- Complete Network support; employs industry standard PC's and Windows Networking

Renaissance-32 V4 In Use

Renaissance-32 supports NaI(Tl), HPGe, and Mixed Detector types, all with simple drop-down menus and wizard dialogs that are intuitive and easy to follow.

Supervisor and Operator Modes improve productivity. Supervisor mode enables the experienced practitioner to set up sequences for Operators that are foolproof, just "set and forget": Detector Calibrations, Analysis Parameters, Corrections, all present and correct. It is that simple. Data integrity is assured. Routine analyses run flawlessly every time.

Operator Mode

The Operator program controls data acquisition, spectrum analysis and reporting, in the manner predefined by the Supervisor program. Display of analysis results can be via Notepad™ (or other program) directly to a display if desired, and can be set to print automatically. An automated Start up feature, usually run daily, assists the human Operator in routine tasks such as gain adjustment, sample and background QA, and energy calibration. Data are stored in a Microsoft Access database; retrieval of records for custom reports and LIMS connectivity are thus simple and straightforward.

Renaissance[®]-32 v4

Whole-Body Counting Software

Operator Mode in Use

In Operator mode the emphasis is on simplicity. Live spectra from each detector may be displayed simultaneously for "at a glance" reassurance. Summed spectra and Scan spectra may also be displayed in their own windows. To initiate a subject count, all that is needed is to fill in the key information (badge number or last name), and click "Start". (For routine counts, Subject Personal data are stored in the database and need only be entered once.) The subject is counted for the predetermined time, analysis is completed automatically, and the results are printed and stored in the database.

The system checks against preset "alarm limits" for each nuclide found and warns the operator if an activity measurement exceeds a specific limit. If the data looks suspect, or the detection limit for a particular nuclide was not reached, the Extend Count button is pressed and the count continues from where it left off, saving time, effort, and money for the facility.

In order to maximize subject throughput, data for the next person to be counted can be entered while the current person is in the counter. Comment data entry fields allow inclusion of additional, site-specific information in the database along with the personal data.

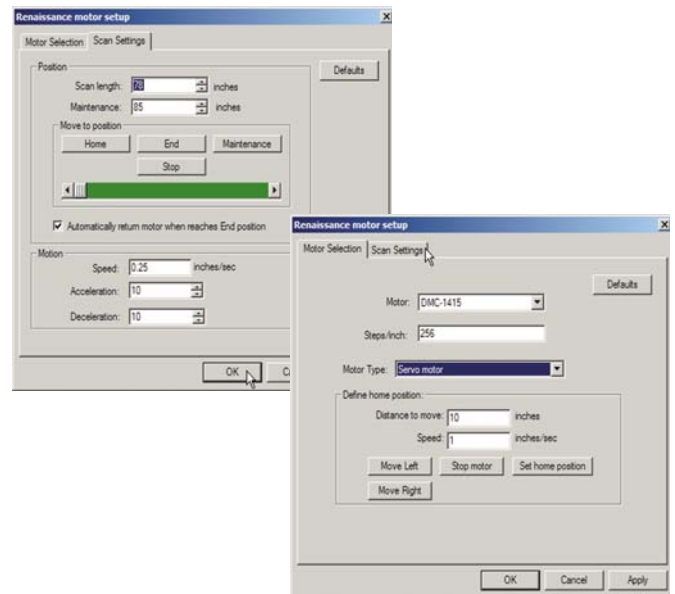
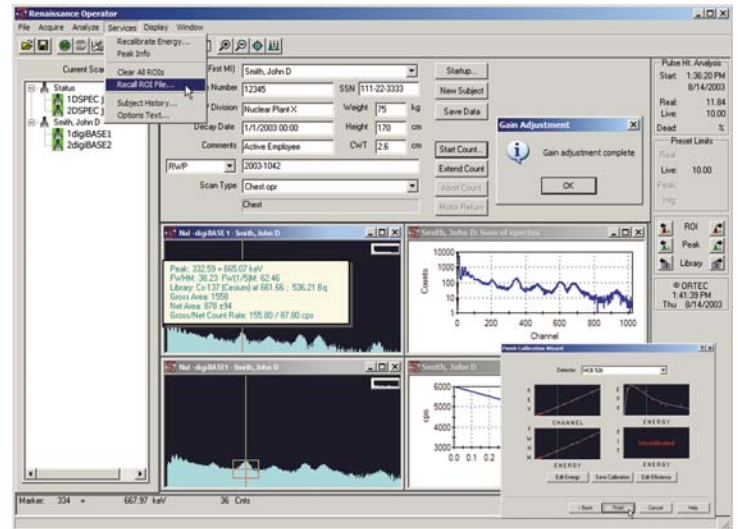
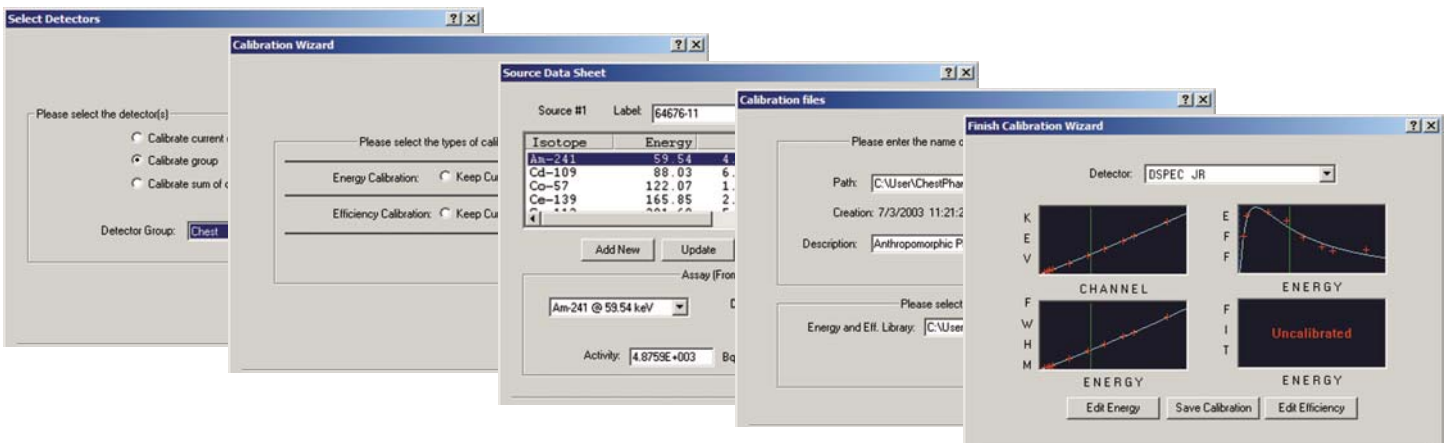
Scanning System Setup

The Renaissance-32 motor setup dialogs make customizing and running scanning geometry analyses simple. All that is needed is to choose motor type, scan length (in metric or imperial units), step size, and scanning speed.

Scanning Mode Operation

Scanning mode operation is simple to use and easy to interpret. It measures the variation of count rate with time, which in conjunction with scanning bed hardware, records activity versus position. It can record gross count rate, that is counts in the entire Spectrum, or the rate in Supervisor-defined regions of interest. (There is no limit on the number of ROIs which can be used). The total count time is correlated to the number of steps and the dwell time for each step (e.g., 120 steps at 0.5 second dwell = 60-second count time). In ROI mode it is therefore possible to measure activity profiles of different specific isotopes simultaneously.

Calibration Wizard Screens



Automatic Gain Synchronization Feature

This feature reduces the time and effort required to match individual detector gains in multi-detector arrays. This is very important if it is intended to sum the spectra from multiple detectors in an array. Up to 64 detectors in a single array may be easily matched, in three easy steps:

- ..Select the Detector Group to synchronize
- ..Select the Region Of Interest for reference peak
- ...Click "Adjust"

Following synchronization, the spectra from multiple detectors may be summed into a single, composite spectrum before analysis, or display in summed spectrum mode.

The screenshots illustrate the gain adjustment process:

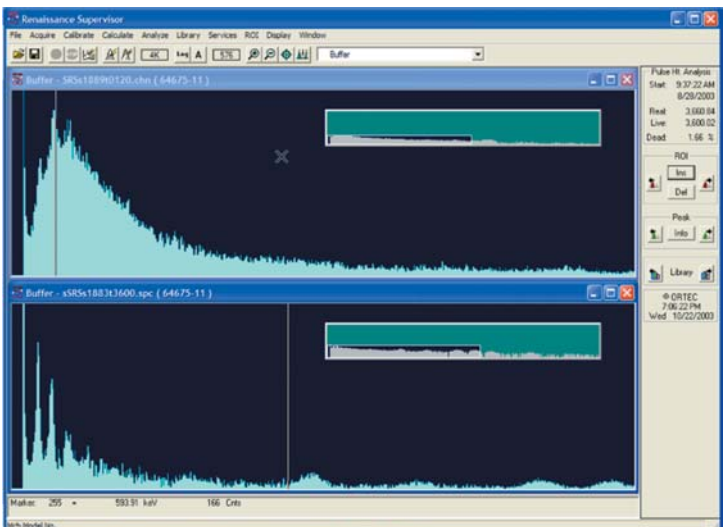
- Select Detectors:** A dialog box with radio buttons for "Adjust gain of current detector" and "Adjust gain of detector group". The "Adjust gain of detector group" option is selected, and "Chest" is chosen from a dropdown menu.
- Gain Adjustment:** A dialog box prompting the user to enter peak center, low, and high channel values. The fields are: Center: 350 ± 1, ROI Low: 300, ROI High: 400.
- Adjust Gain:** A dialog box displaying a table of detector gains:

Detector	Fine Gain	Peak Channel	Status
MCB 526	1.122376		Ready
MCB 533	1.046692		Ready
- Gain Adjustment complete:** A small information dialog box with an "OK" button.

The background image shows the main Renaissance Operator interface with various data fields and spectral plots.

Channel by Channel Subtraction of NaI(Tl) Spectra

A new feature, added to Renaissance-32 V4 is channel by channel spectral subtraction, in which a time-normalized background spectrum may be subtracted from the subject spectrum before peak search commences. This results in a remarkable improvement in peak visibility.



Renaissance[®]-32 v4

Whole-Body Counting Software

Proven Analysis Algorithms

Renaissance-32 V4 provides an array of analytical tools to handle any spectral analysis problem with ease — all in a "seamless" design. The product includes patented True Coincidence Summing Corrections and compatibility with all ORTEC electronics and detectors for gamma-ray spectrometry measurements, including advanced digital signal processing electronics.

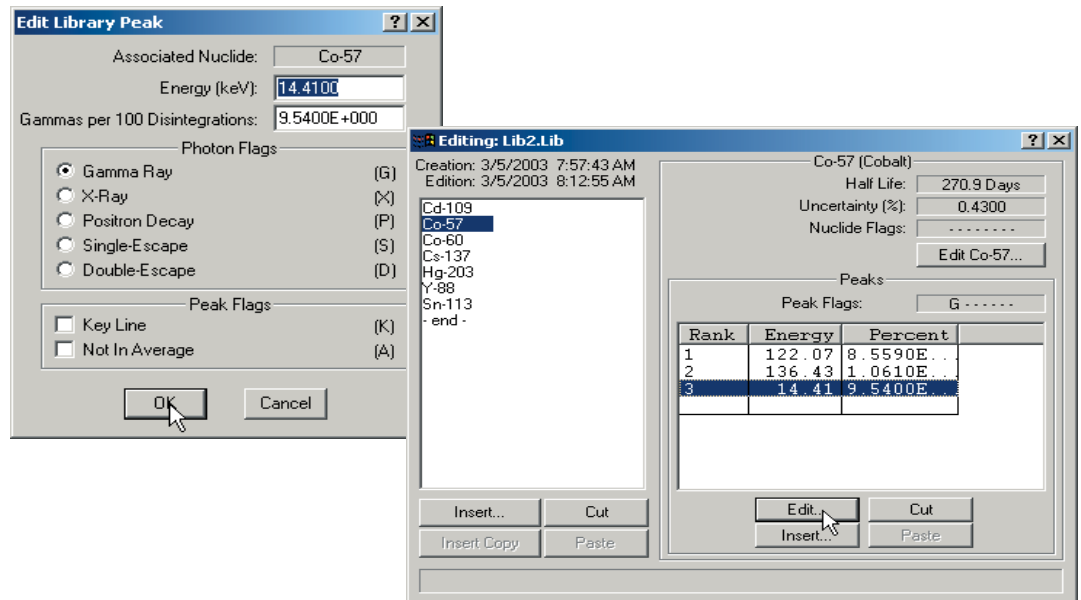
Analysis "Engines"

The basic analysis "engines" which extract peak areas from the subject spectra are derived from ORTEC's tried and tested GammaVision and ScintiVision analysis packages for HPGe and NaI detector types respectively.

Analysis Library Editor

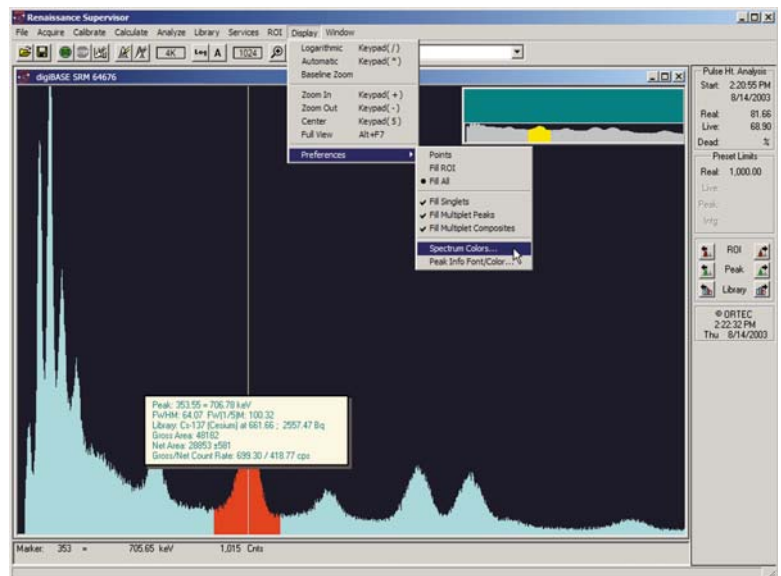
The Renaissance-32 library editor allows full editing of new and existing libraries in a fully windows-compliant cut and past approach. There is no limit to the size or number of libraries which may be stored other than disk space.

In addition, Renaissance-32 now includes full integration of the Nuclide Navigator III library tool (sold separately as model C53-B32). NOTE: The Nuclide Navigator option is required for incorporation of the True Coincidence Summing correction method.



Spectral Display Preferences

The Renaissance-32 spectral displays are easily customized to personal preference. Colors and fill properties for regions, spectrum display, and background are easily changed and saved as new default settings.



Full details on ALL ORTEC Products may be found at www.ortec-online.com

Reports the Way You Need Them

Create reports precisely as you want them. The output capability of Renaissance-32 is extremely flexible. The setup allows outputs to be sent to the Printer, Display, and/or Disk File in addition to the standard database output. If multiple detectors are used, reports can be generated for the individual detectors, the sum of the detectors, or both.

Choose any ORTEC Standard report option:

- Unknown peaks
- Library peak list by energy
- Library peak matrix by isotope
- Activity summary

Uncertainty reporting options:

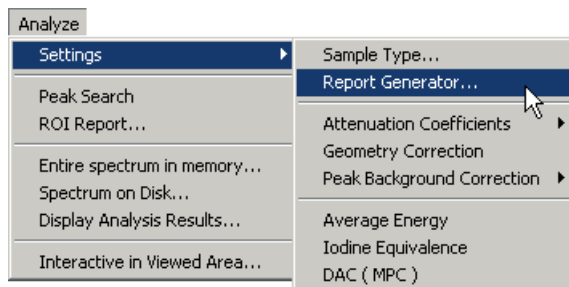
- Percent of activity
- Counting or total
- 1, 2, or 3 sigma
- Propagation of additional systematic or random uncertainties

Derived quantity Isotope reporting:

- Average Energy (EBar), to TID 14844
- Iodine Equivalence, to TID 14844
- DAC (Maximum permissible concentration)

Totally custom reporting:

- Using Crystal Reports™ Version 7 or 8



Integrated Crystal Reports

Renaissance Average Count Report

ORTEC - Standard Renaissance Report Generated: 8:58:57AM 9/3/2003

Company: Whole Body Counting Laboratory Subject

Name: John C. Smith Comments: Current Employee

Badge: A12345-CB SSN: 123-45-6789

Date Counted: August 1, 2003 Date: July 15, 2003

Weight: 78 kg Chest Wall: 2.6 cm

Height: 170 cm

Acquisition

Acquisition Date: August 1, 2003 Real Time: 30.0 min.

Live Time: 30.0 min. Energy

Detector	Type	Spectra	Energy	Efficiency
rray	ORTEC HPGe	Smith20030801.spc (1-4)	July 15, 2003	July 15, 2003

Analysis

Channel = , End Channel = PBC: Peak Bkd

Chest Wall Method: My Method

Performed by: _____ Date: _____

Comprehensive...

***** IDENTIFIED PEAK SUMMARY *****							
Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma	FWHM % keV
Cs-137	44.23	36.26	29517.	0.	0.000	0.00	1.057
Cd-109	148.96	88.03	396840.	0.	0.000	0.00	1.084D
Co-57	217.78	122.05	287388.				
Co-57	246.84	136.42	98209.				
Sn-113	487.91	255.58	35066.				
Hg-203	536.48	279.59	57668.				
Sn-113	763.98	392.05	42612.				
Y-88	1004.62	511.00	24037.				
Cs-137	1309.81	661.86	41608.				
Cs-137	1594.00	802.34	4272.				
Y-88	1787.85	898.16	28144.				
Co-60	2344.32	1173.23	15203.				
Co-60	2666.44	1332.46	7589.				
Y-88	3685.10	1836.01	1223.				

***** SUMMARY OF LIBRARY PEAK USAGE *****					
Nuclide Name	Code	Average Activity Becquerels	Energy keV	Peak Activity Becquerels	MDA value Becquerels
Cd-109		0.0000E+0			
Co-57		0.0000E+0			
Co-60		3.5645E+0			
Cs-137		3.0630E+0			

***** SUMMARY OF NUCLIDES IN SAMPLE *****				
Nuclide	Time of Count	Time Corrected	Activity Bq	Uncertainty 1 sigma
Cd-109	<	1.8954E+02	2.2387E+02	
Co-57	<	8.0451E+00	1.0690E+01	
Co-60		3.5645E+03	3.7100E+03	1.9432E-01%
Cs-137		3.0630E+03	3.0845E+03	2.6807E-01%
Hg-203		5.4061E+02	2.8202E+03	5.5184E-01%
Y-88		3.5672E+03	7.3466E+03	3.0808E-01%
Sn-113		1.7925E+03	3.4997E+03	3.1633E-01%

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Half-life limit exceeded

***** SUMMARY *****

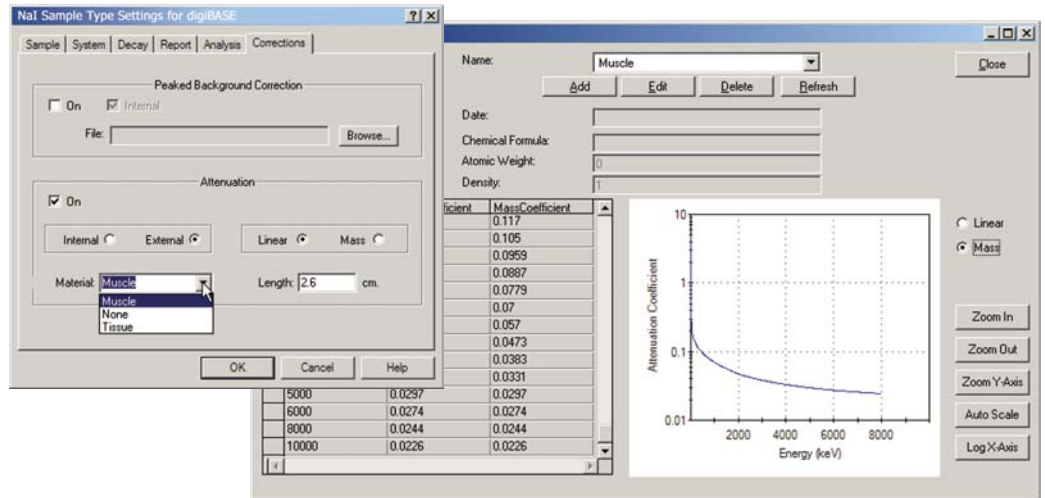
Total Activity (34.2 to 1966.9 keV) 1.2527937E+04 Bq
Total Decayed Activity (34.2 to 1966.9 keV) 2.0461029E+04 Bq

Reports made your way... with Renaissance-32

Corrections for Spectral Peak Interferences and Distortion

Renaissance-32 can deal with a number of sources of spectral interference providing corrections for their effects:

- Peaked Background Correction (correction for the presence of a sample nuclide in the spectral background).
- Peak Interference Correction for "total overlap" problems — implement automatically or manually, for user-selectable interference corrections.
- Attenuation Correction for chest wall thickness (ANSI N42.14 and ASTM E181–82 compliant), or any other absorber using internal materials database or calculated from spectra acquired with an absorber present.
- Geometry Correction, allows multiple sample geometries to be referenced to a single standard.

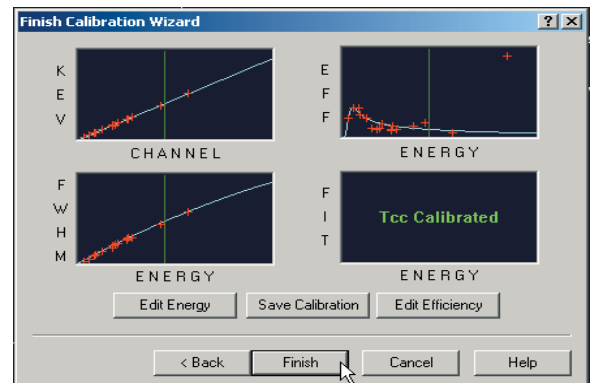
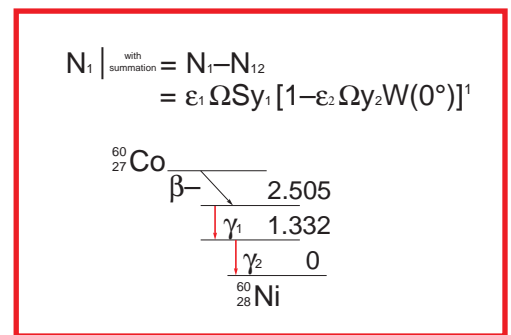


True Coincidence Summing Correction

Renaissance-32 now includes a patented algorithm to correct for the presence of true coincidence (or "cascade") summing effects in spectral data.

Cascade summing refers to the phenomenon in which a radionuclide emits two or more photons in rapid succession from a single decay, such as the 1173 and 1332 keV gamma rays in Co-60. These gamma-rays are said to be "in cascade". When these cascade gamma rays are fully absorbed by the detector within a time frame less than the resolving time of the detector and electronics, they will appear to have an energy equal to their sum (2505 keV in this case). A corresponding "ghost" peak is generated in the spectrum. This results in (1) a loss of counts in the peaks and thus an underestimation of the true activity for Co-60 in the sample, and (2) another peak in the spectrum to be identified.

Isotopes with cascade sum peaks such as Co-60, Eu-154, and Cs-134 can now be accurately determined through the use of a simple calibration process and a comprehensive coincidence library applied to every spectral analysis. A "TCC" check box in the analysis settings enables the feature and Renaissance-32's algorithms will apply the correction factors to the results.



QA and Flexible Reporting Ensure Regulatory Compliance

Safe and Secure. . .

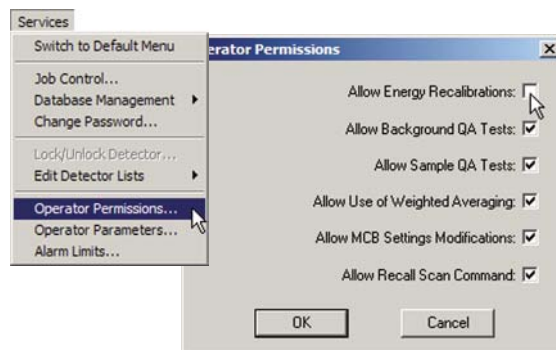
. . . Designed In

Quality Assured Results are "designed in" to Renaissance-32.

Supervisor mode can allow access to only what is important.

All hardware parameters are saved with the spectral data to ensure traceability.

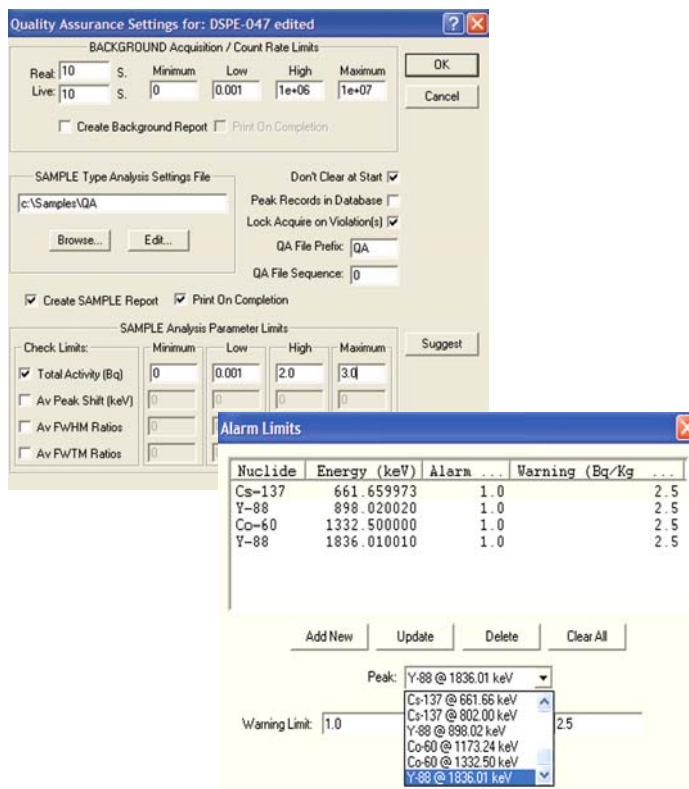
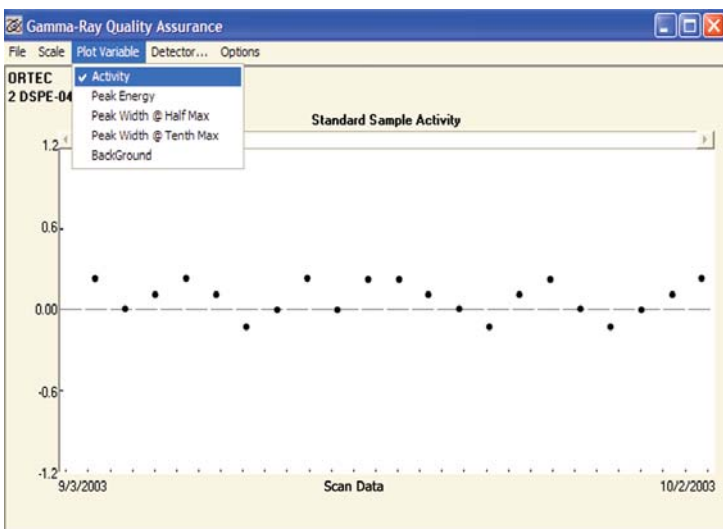
Analysis results are written to the database.



Quality Assurance

Complies with the demands of ANSI N13.30 and for each detector allows tracking of:

- Total detector background
- Total (decay corrected) activity for all calibration nuclides
- Average FWHM ratio (spectrum to calibration standard)
- Average FW1/10M ratio (spectrum to calibration standard)
- Average peak shift from library values
- Actual peak centroid energies



Alarm Settings

Renaissance-32 includes an easy-to-use utility for defining alarms for activities calculated in the subject analysis. If any condition is exceeded, the operator is notified both on the screen and in the report.

The Supervisor establishes the alarm limits for the subjects being counted. These alarm settings are normalized to the individuals weight (a field already in the Subject Analysis database in Renaissance-32). The Supervisor can easily scroll through the list of nuclides and limits, add new nuclides, delete alarm limits for specific nuclides, and save all the information for use by the Operators. Upon completion of the count, the analysis results are compared with the Alarm Limits.

Renaissance[®]-32 v4

Whole-Body Counting Software

Specifications

General

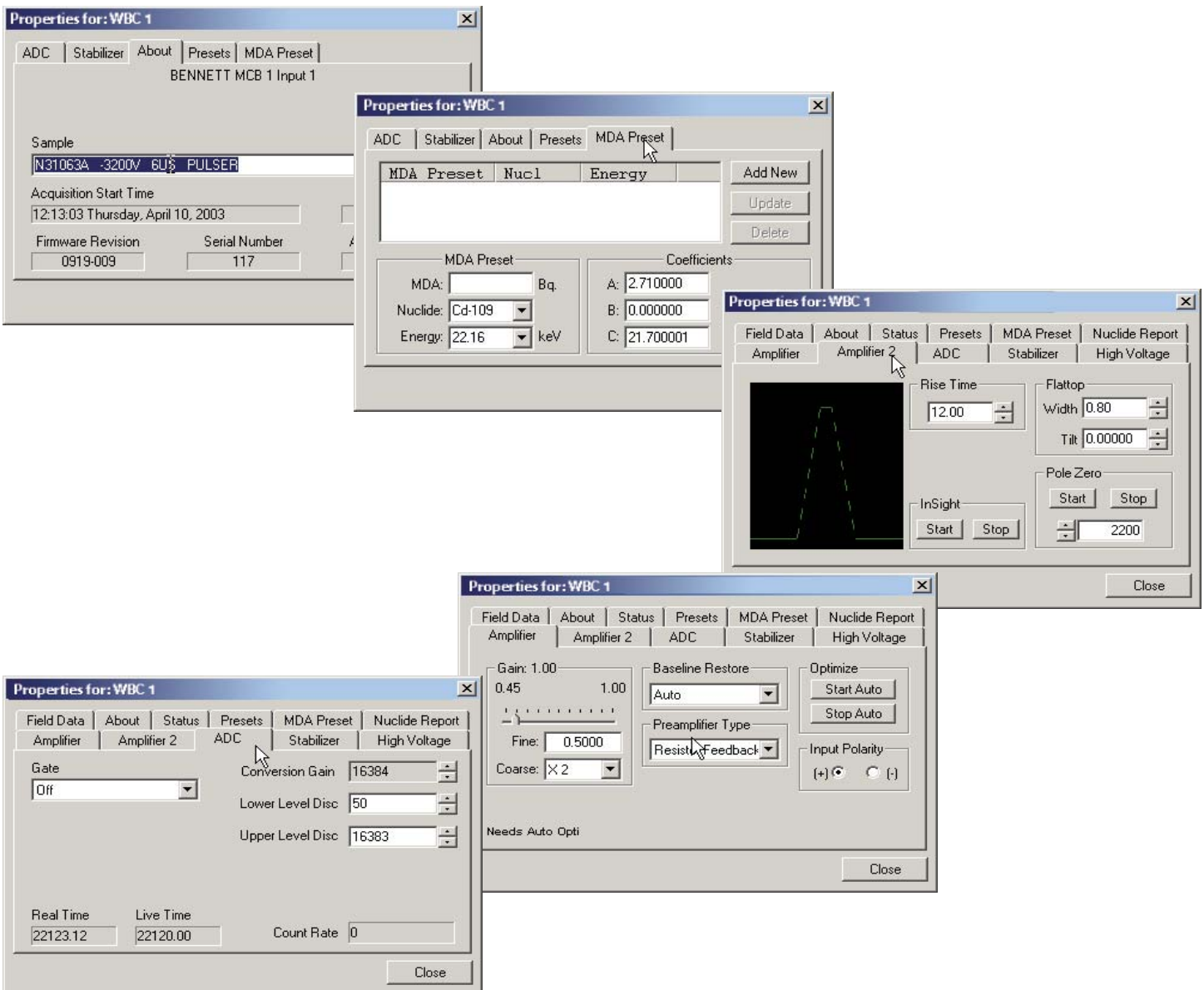
Renaissance-32 integrates acquisition control, "Smart" MCA and quantitative analysis functions for use in conjunction with PC-based gamma spectroscopy workstations. On-line help and Operator Menu password protection are included.

Operating Systems

Windows™ 2000/XP network capabilities; support for preemptive multitasking; and ORTEC CONNECTIONS-32 compliant.

Spectroscopy Hardware Support

All ORTEC MCBs (past and present) and all other devices supported by ORTEC CONNECTIONS-32 (see CONNECTIONS-32 literature). Built-in support for advanced operations (where supported in hardware): amplifier gain/shaping control, Auto-PZ, DSPEC "optimize" and InSight™ mode, digiDART field mode, graphical setting of MCB spectrum stabilizer and statistical uncertainty peaks. Detector Locking password protection is supported.



File Formats Supported

ORTEC .SPC and .CHN are supported as standard in file save, recall, and compare functions. Most non-ORTEC file formats are supported by loadable modules, in a "set and forget" fashion for save and recall. Check for availability of specific modules.

Optional DataMaster (Model A49-B32) spectrum file import/export software can be added for easily converting and reading any spectrum format.

Semi-Quantitative "Smart" MCA Functions

"Instant" Mariscotti peak search, with ROI marking and "nearest match" suspected nuclide identification.

Net/Gross peak areas with uncertainty calculation, peak centroid, and shape.

- Spectrum Strip
- Spectrum Smooth
- Spectrum Compare

Quantitative Analysis Methods

Default Mode

Peak search by library direction for specified nuclides, plus Mariscotti peak search for non-specified nuclides, referenced to "suspected nuclides" list. Recommended for routine samples; lowest detection limits.

Automatic

Isotope Identification Mode Mariscotti peak search followed by library peak qualification and reanalysis based on reduced library. Recommended for unknowns. False-positive-resistant.

Interactive Reanalysis Mode

Iterative refitting of multiplets, addition or deletion of deconvolution peak centroids, adjustment of energy calibration with visual display of residuals. Recommended for the most complex analysis problems.

Deconvolution Method

Both peak finder and library are used to direct the deconvolution process. Automatic recalibration of energy/channel based on identified peaks where possible.

Background Methods

Wide range of background methods — automatic, multi-point, parabolic, directed fit, and stepped. Selection by user or automatically applied to improve analysis results.

Multi-Peak Activity Averaging

Peaks are averaged on the basis of their relative abundance in the nuclide to produce the lowest possible uncertainty in the calculated activity.

Detection Limit Formalisms

ORTEC MDA	Currie Limit	NUREG 0472 Method
ORTEC Critical Level	Riso MDA	Counting Lab (USA)
No MDA (report zeros if less than MDA)	ORTEC LLD	DIN 25482.5 Erkennungsgrenze
KTA MDA	Peak Area	DIN 25482.5 Nachweisgrenze
Detection Limit 2 sigma (Japan)	Air Monitor (Gimrad method)	GTN5/CEA/EDF (France)
Detection Limit 3 sigma (Japan)	NUREG 4.16 Method	

"Directed Fit" Reporting of Negative Activities

User-selectable alternative method of calculating and reporting of small peaks which can result in negative peak areas (and negative activity values). The use of negative activities is useful in complying with regulations on environmental releases.

Decay Corrections

Decay correct to any date/time, either back or forward
Decay corrections for losses during acquisition

Renaissance[®]-32 V4

Whole-Body Counting Software

Spectral Corrections

- Peaked Background Correction
- Geometry Correction
- Absorption Correction ANSI N42.14 and ASTM E181–82 compliant from materials database, and/or from physical standards
- Random summing (high-rate counting losses)
- True Coincidence Summing Correction¹
- Library-based peak interference correction

Calibration for HPGe Spectroscopy and NaI(Tl)

Energy Calibration:

- Multipoint, quadratic for energy and FWHM
- Automatic Energy Calibration (Patent 6,006,162)

Efficiency Calibration fit options:

- Single Function Polynomial (x-Point)
- Interpolative
- Quadratic above or below user-set "knee"
- Linear above or below user-set "knee"

Includes True Coincidence Summing Corrections for HPGe

Quality Assurance

Complies with the demands of ANSI N13.30 for each detector and allows for tracking of:

- Total detector background
- Total (decay corrected) activity for all calibration nuclides
- Average FWHM ratio (spectrum to calibration standard)
- Average FW1/10M ratio (spectrum to calibration standard)
- Average peak shift from library values
- Actual peak centroid energies

Automation

- Multiple detector Start/Stop/Clear/Analyze function
- Extensive, built-in Job Streaming (macro language) allowing one-click analysis from a user-built icon (Supervisor Mode)

Reporting

Choose any ORTEC standard report option:

Unknown peaks

- Library peak list by energy
- Library peak matrix by isotope
- Activity summary

Uncertainty reporting options:

- Percent or activity
- Counting or total
- 1, 2, or 3 sigma
- Propagation of additional systematic or random uncertainties

Derived quantity Isotope reporting:

- Average Energy (EBar), to TID 14844
- Iodine Equivalence, to TID 14844
- DAC (maximum permissible concentration)

Fully integrated Microsoft[®] Access[™] database and embedded Crystal Reports included.

System Prerequisites

Operating Systems

As a CONNECTIONS-32 product, Renaissance-32 V4 requires a Windows 2000/XP platform. Interfacing of MCB hardware to the system may be by Ethernet, printer port, serial port, or ORTEC Dual-Port Memory. (Check hardware literature for details).

Computer

Any computer that will support any of the operating systems listed above will support Renaissance-32 V4.

Ordering Information

Model	Description
REN-P-B32	Renaissance-32 Whole-Body Counter Software for NaI and Ge
REN-P-G32	Documentation for REN-P-B32
REN-P-K32	Upgrade from REN-BI, REN-B32, or REN-B32-Ge to REN-P-B32
REN-P-N32	REN-P-B32 additional network copies
REN-P-U32	Update for REN-P-B32

¹Requires calibration using a source including nuclides with known coincidence sum peaks, e.g., Cs-134.

Renaissance[®]-32 v4

Whole-Body Counting Software

Export of Renaissance Results to IMBA Professional Plus

The IMBA Professional Plus software supercedes the IMBA Expert software developed for the U.S. Department of Energy, by the Radiation Protection Division of the UK Health Protection Agency (formerly the UK National Radiological Protection Board) and ACJ & Associates, Inc. (Richland, WA, USA).

This software provides a user-friendly interface with the (HPA's) proprietary suite of Integrated Modules for Bioassay Analysis (IMBA), to analyze measurements of activity in the body and/or excreta and calculate the resulting doses. The software implements the International Commission on Radiological Protection's (ICRP's) currently recommended respiratory tract, tissue dosimetry, and biokinetic models for the reference worker, for 75 radionuclides.

IMBA Professional Plus consists of a base unit and various Add-Ons which increase the functionality of the software. Users can thus customize the software to meet their individual requirements.

Base Unit

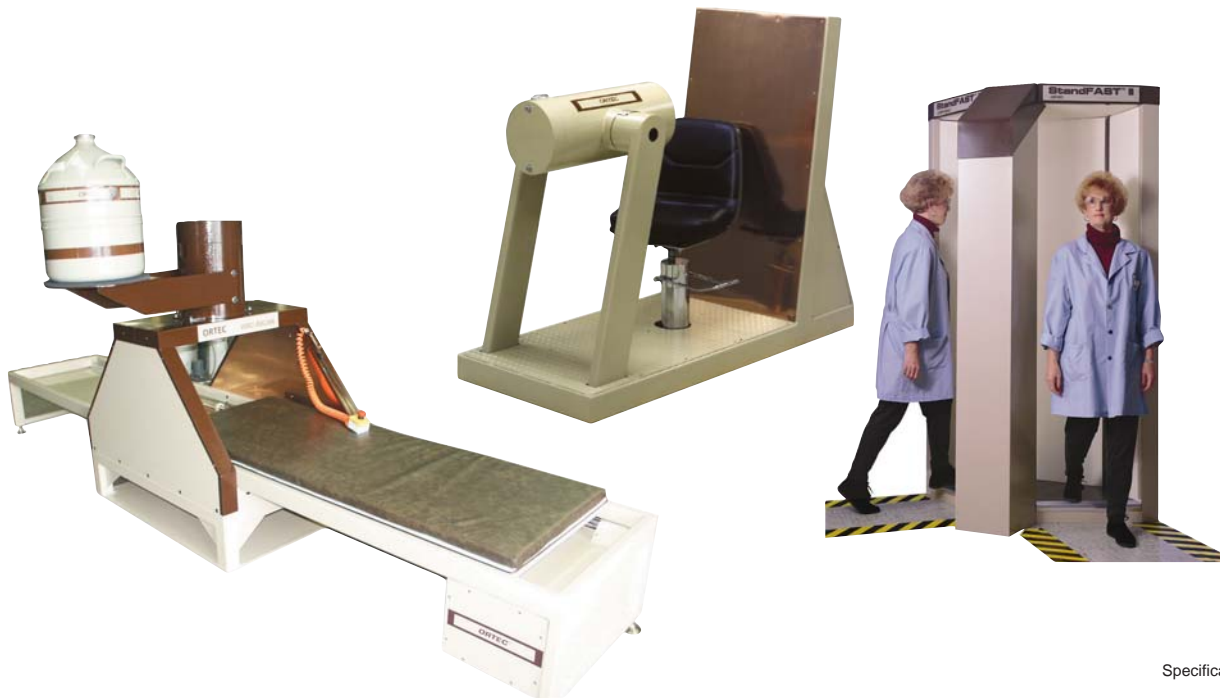
The base unit enables the user to (a) assess an intake from bioassay measurement data; (b) calculate bioassay quantities at different times from a specified intake; (c) calculate equivalent organ doses and effective dose from a single intake. 75 nuclides are supported in the base unit. Output is both tabular and graphical and special tools enable data transfer between Windows™ applications.

Add-On 12 ORTEC Import Tool

This add-on allows the user to import information from the Renaissance database directly into IMBA Professional Plus. The user can then use the software directly after a measurement to obtain the best estimate of the intake and the corresponding doses to organs and the total effective dose.

See the IMBA brochure for details of other IMBA add-ons.

IMBA Professional Plus can be ordered directly from HPA at www.lmbaprofessional.com or can be supplied by ORTEC as part of a complete system.



Specifications subject to change
040306

ORTEC[®]

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For International Office Locations, Visit Our Website

AMETEK[®]
ADVANCED MEASUREMENT
TECHNOLOGY