The Mirion Fastscan whole body counter is designed to quickly and accurately monitor people for internal contamination of radionuclides with energies between 300 keV to 1.8 MeV. The FASTSCAN system uses large area sodium iodide detectors and the Mirion Apex-InVivo™ and Genie™ software to achieve low minimum detectable activities with count times as fast as one minute. It is intended for use in power plants and other facilities where the possible contamination spectra are well known and uncomplicated.

The system is as easy to use as today’s digital cameras. The operator simply positions the person to be counted inside the shield and in front of the detectors, and then begins the count with the software. The software starts the count, completes the count, stores the data, displays the spectral data, performs the analysis and prints the report. The best part is that this system will be ready for operation as soon as the installation is completed.

The FASTSCAN system includes two large sodium iodide detectors (NaI(Tl)) 7.6 x 12.7 x 40.6 cm (3 x 5 x 16 in.) that typically provide a priori Lower Limit of Detection of approximately 150 Bq (4 nCi) for $^{60}$Co with a count time of one minute for a normal person containing $^{40}$K. The FASTSCAN system’s dual detector design provides uniform or flat (±15%) response along the longitudinal axis from the thyroid of the tallest 99th percentile male to the lower gastrointestinal tract of the shortest female.
The FASTSCAN unit uses a shadow shield to minimize spectral background interference. This type of shield provides an optimal trade-off between shield size, weight and cost with background reduction for environments with slightly elevated background. The shield is constructed of 10 cm (4 in.) thick low background steel (2 in. in a few less critical areas).

Steel was chosen over lead because of its structural properties and because it doesn't contain $^{226}$Ra which is always present in lead. The low background steel is manufactured for Mirion using a special cobalt-free process. This special process guarantees that the steel will be free of the $^{60}$Co contamination found in normal steel. The FASTSCAN system's steel shield is covered with painted sheet metal and lined with molded plastic for ease of decontamination.

The Fastscan counter is designed to save facilities money in operation. It has no moving parts to minimize maintenance costs. The stand-up design also saves floor space and allows personnel to enter and exit the counter quickly and easily. The stand-up design also allows the use of front and backsle counts to test for external contamination when a count result shows contamination.

The Mirion FASTSCAN Whole Body Counter is a turnkey system that includes all of the hardware, software and services needed for immediate operation. The FASTSCAN counter is factory integrated and calibrated before shipment. Once the system arrives at the customer’s site it is installed by Mirion personnel or representatives and on-site training is provided.

**SYSTEM OPERATION**

The subject enters the counting shield and leans against the back wall. There are molded positioning devices on the back wall that make it natural for the subject to stand in the correct location. The operator starts the count using the Apex-InVivo software included with the system. The software starts the data collection and brings up a subject demographics screen. The operator fills in a brief demographics screen about the count (subject name, ID number, reason for count, etc.). The rest is completely automatic. The Apex-InVivo software displays the spectral data during the acquisition.

It stops the count when the pre-programmed count time has elapsed, it stores the data, analyzes the spectral data and reports the results. Once the reporting phase of the count is completed the Apex-InVivo software automatically resets the system for the next count.

**STABILIZED DETECTORS**

The FASTSCAN counter can be built with stabilized NaI detectors. Stabilized detectors provide the additional benefit of keeping the energy response of the detector consistent despite changes in room temperature. Even slight variations of a few degrees can alter the response such that nuclide identification and quantification are adversely affected. Stabilized detectors eliminate this problem without requiring constant system validation and oversight by a technician. Stabilization helps ensure accurate results and increase throughput during busy times.

The patented LED stabilization has been used reliably for years in Mirion’s stabilized NaI probes for handheld instruments such as the IPROL-1™ and IPROS-2™ devices. This same technology has been integrated into the FASTSCAN system. These detectors remain stable to within $\pm 2\%$ (typical) over the temperature range of -20 °C to 50 °C. No matter what the temperature range, your FASTSCAN counter will provide consistent and reliable results.

![Energy Shift over 2 °C change](image1.png)

Figure 1 – Centroid variation for temperature range 20-22 °C
**SPECIFICATIONS**

**Shield**
- Total weight: 4800 kg (10 600 lb)
- Heaviest item weight: 385 kg (850 lb)
- Floor space required: 1.24 m x 0.9 m (49 in. x 35 in.)
- Height: 2.11 m (83 in.)
- Cable separation from shield: 9 m (30 ft)

**Power**
- Specify: 110/220 V ac, 50 or 60 Hz
- Requirements: Vary depending upon computer and electronics

**Environment**
- Operating temperature: Stable to within ±1 °C
- Operating humidity: Non condensing
- Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2
- Background radiation: Normal background assumed
- General: Clean dust free area
- Detection limits: Actual system performance will vary with ambient environmental background

**OPTIONS**
- Model 2257 Transfer Phantom
- Single pedestal desk: 81 cm x 183 cm (32 in. x 72 in.)

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**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2250-OS</td>
<td>FASTSCAN system with Osprey® unit, Stabilized Detectors, Apex-InVivo software</td>
</tr>
<tr>
<td>2250-OS-EX</td>
<td>FASTSCAN system with Osprey unit, Stabilized Detectors, Apex-InVivo, Extended Shield</td>
</tr>
<tr>
<td>2250-OS-EX2</td>
<td>FASTSCAN with Osprey, Stabilized Detectors, Apex-InVivo software, Extended &amp; Taller Shield</td>
</tr>
<tr>
<td>2250-L</td>
<td>FASTSCAN system with Lynx® DSA, Non-Stabilized Detectors, Apex-InVivo software</td>
</tr>
<tr>
<td>2250-L-EX</td>
<td>FASTSCAN system with Lynx, Non-Stabilized Detectors, Apex-InVivo, Extended Shield</td>
</tr>
<tr>
<td>2250-L-EX2</td>
<td>FASTSCAN system with Lynx DSA, Non-Stabilized Detectors, Apex-InVivo software, Extended &amp; Taller Shield</td>
</tr>
<tr>
<td>2250-LS</td>
<td>FASTSCAN system with Lynx DSA, Stabilized Detectors, Apex-InVivo software</td>
</tr>
<tr>
<td>2250-LS-EX</td>
<td>FASTSCAN system with Lynx DSA, Stabilized Detectors, Apex-InVivo, Extended Shield</td>
</tr>
<tr>
<td>2250-LS-EX2</td>
<td>FASTSCAN with Lynx, Stabilized Detectors, Apex-InVivo, Extended &amp; Taller Shield</td>
</tr>
<tr>
<td>2250-S-UPG</td>
<td>FASTSCAN upgrade kit to stabilized detectors (MCAs not included)</td>
</tr>
<tr>
<td>2250-OS-UPG</td>
<td>FASTSCAN upgrade kit to stabilized detectors and Osprey unit</td>
</tr>
<tr>
<td>2250-LS-UPG</td>
<td>FASTSCAN upgrade kit to stabilized detectors and Lynx DSA</td>
</tr>
</tbody>
</table>

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Figure 2 – Centroid variation for temperature range 10-30 °C