



AccuRate® Anthropometric Correction

Features

- Corrects for self shielding effects of individuals in Argos-3/-5 contamination monitors
- Easy on-site calibration
- Can be ordered and factory installed on gamma-sensitive versions of Argos™-3/-5 monitors
- Retrofit existing Argos-3/-5 with Zeus option or Argos-3/-5PBG monitors using the AccuRate field kit

Benefits

- Improves the accuracy of gamma contamination monitoring
- Helps detect lower levels of contamination
- Reduces False Negative and False Positive Rates
- Results in better accuracy and identification of contamination within the Radiation Control Area (RCA), avoiding its spread outside the controlled area
- Improved accuracy and sensitivity of monitoring ensures HP staff is targeted and used efficiently
- Improved measurement accuracy contributes to meeting ALARA goals

* US 8,748,838 B2

Description

AccuRate® is CANBERRA's patented solution that improves the performance of its current generation of gamma-sensitive whole body surface contamination monitors by correcting for the self shielding effect of an individual in the monitor. The AccuRate system enables the detection of lower levels of contamination, reduces false negatives and positives, and minimizes overall personnel monitoring effort. Its optimized analysis addresses the industry need to reduce cost, improve accuracy, and increase ALARA.

Argos-3/-5 Whole Body Contamination Monitors are used to assess surface contamination on the body of the workers. When a person is present in the portal during the monitoring cycle the gamma background can be significantly reduced because of the body's self-shielding effects.

Therefore, the gamma activity estimate is biased. Self-shielding effects can easily mask contamination levels of 5000 Bq in a 300 nGy/h (30 µR/h) background environment.

The AccuRate algorithm compensates self-shielding effects and the associated change in background count rate due to the presence of individuals inside the monitor. The algorithm enables the monitor to more accurately measure potential contamination levels.

Self-shielding varies greatly between individuals (anthropometric effect) and sites (background spectrum and spatial distribution). The site-to-site variations are taken into account through the calibration procedure which is done once, provided the background conditions are stable.

The advantage of AccuRate compared to the average correction method that can be deployed on current Argos-3/-5 monitors is its ability to correct for the self-shielding based on the actual measured anthropometrics of the subject being monitored. A large person would have an increased self-shield factor compared to the average person and thus could end up with a false negative (missed contamination). Conversely, a smaller person would have a reduced shielding effect compared to the average, increasing the probability of a false positive (false alarm).

The AccuRate system is suitable for individuals ranging in height from 150 to 205 cm (4' 11 to 6' 9 in.) and a body thickness from 10 to 70 cm (4 to 28 in.). Individuals outside of these physical dimensions will find the monitor difficult to use.

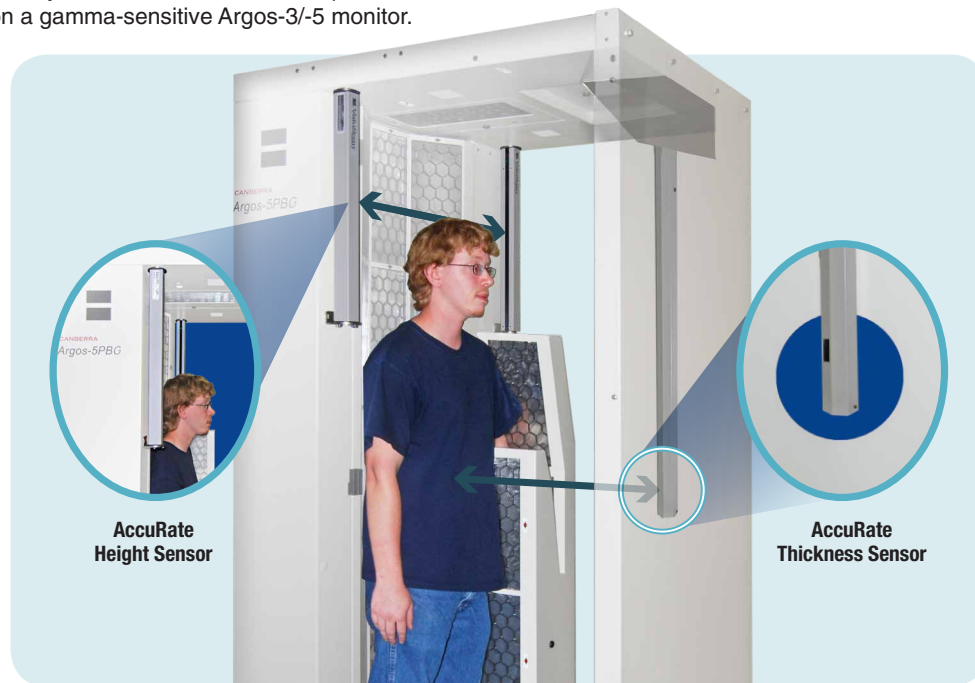


AccuRate Anthropometric Correction

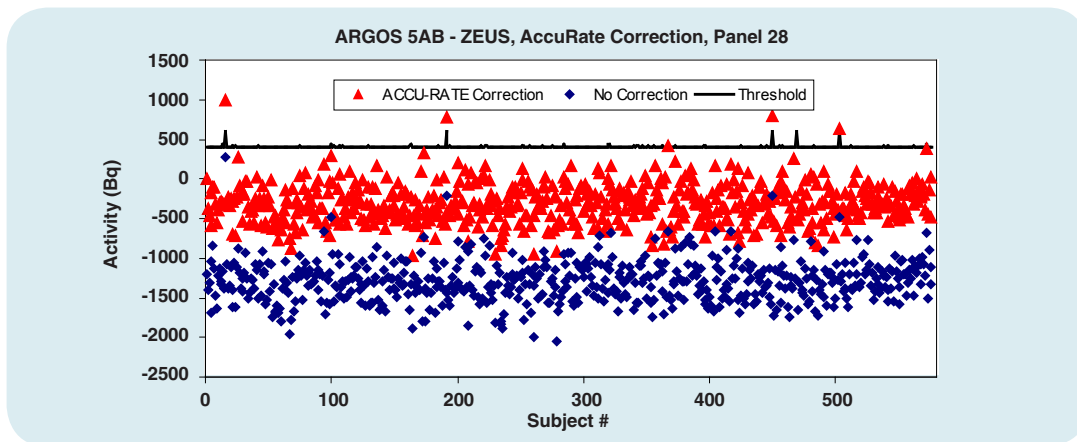
SETUP

AccuRate requires a set of two sensors for thickness and height measurements (pair of emitter/detector); unless a Moveable Head Detector mechanism is in place; then only the thickness sensor is required to be installed on a gamma-sensitive Argos-3/-5 monitor.

The installation can be done at the time of order (factory installed) or retrofitted on existing units (field installed). The calibration process and correction algorithm can be activated on the MONITOR.EXE software starting from Version 8.04.



Specifications (Typical)



Typical Activity Correction for a ZEUS panel in a 100 nGy/h background.
See text for details, and results may vary from site to site.

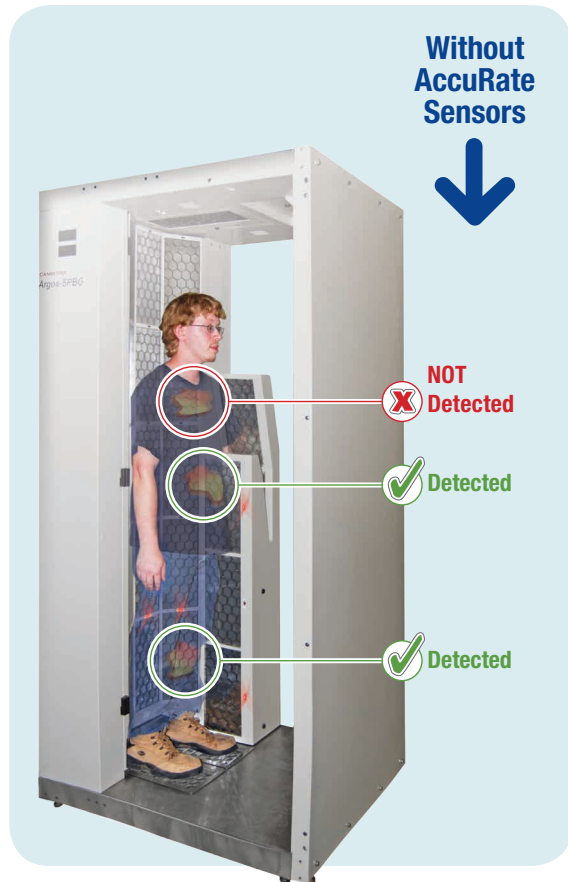
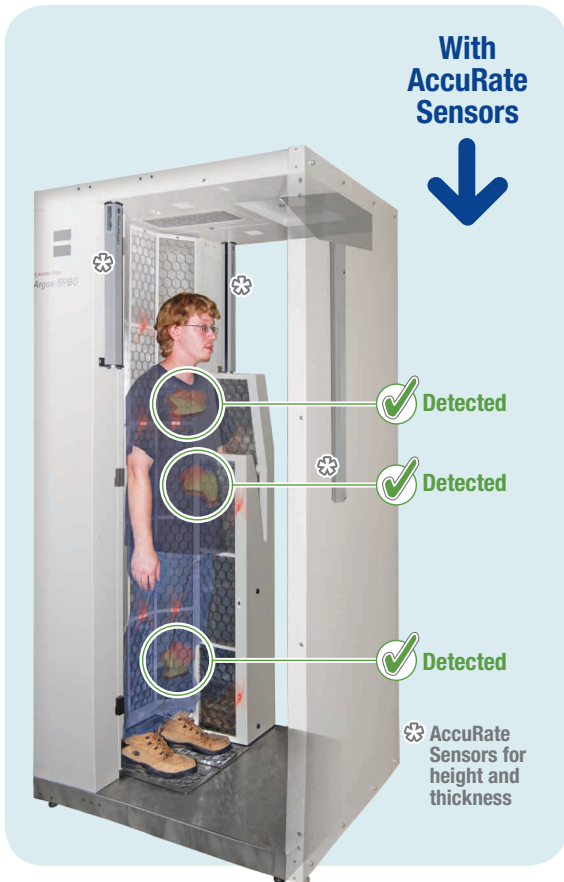
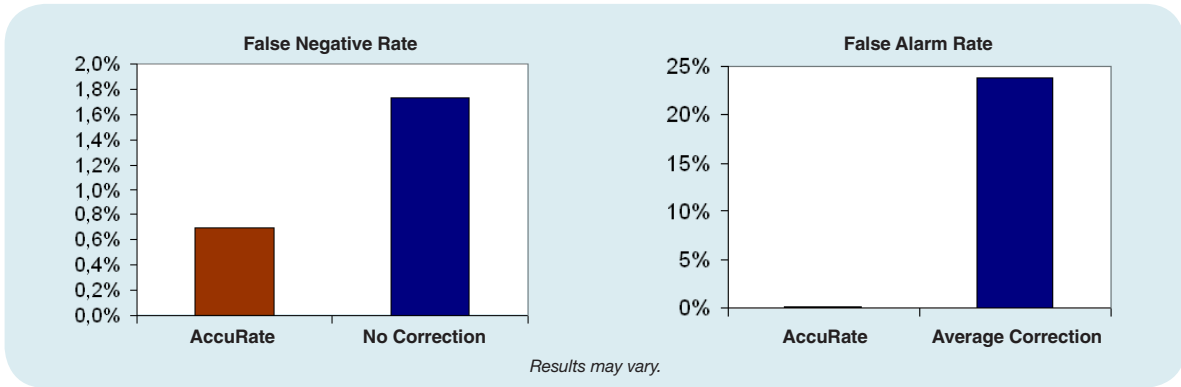
The above graph displays the reported activity from AccuRate and No Correction for the center ZEUS™ Panel (Detector 28) at the EDF nuclear plant in Cattenom (100 nGy/h background level). The activity corresponds to a single step (back to detector array), and the typical count time is 20 seconds. The efficiency

of the panel is 6.21%, measured 15 cm from the detector grid. The Alarm Activity was set to 600 Bq in this situation. Optimal AccuRate settings minimize false alarms, and in this example, show a net increase in sensitivity of approximately 1000 Bq. Results may vary depending site conditions and system parameter values.

AccuRate Anthropometric Correction

AccuRate contributes to reduce the false negative rate by 60% in typical conditions compared to standard operation. In this analysis, a false negative is defined as any alarm which was detected by a beta channel, but missed by the gamma detectors.

AccuRate also reduces the false alarm rate when compared to an average correction using the same subjects for calibration (nine in this situation). In this analysis, a false alarm is defined as a gamma-only alarm with no significant net count rate in the corresponding beta channel.



Comparison of detection coverage with and without AccuRate (700 Bq source placed in various body parts, natural background, 600 Bq alarm level).

AccuRate Anthropometric Correction

Ordering Information

MODEL	DESCRIPTION
AccuRate-PBG	Anthropometric Corr. Opt.;Argos-3/-5PBG – Factory installed mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5PBG.
AccuRate-ZEUS	Anthropometric Corr. Opt.;Zeus-3/-5G – Factory installed mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5(P)(A)B with Zeus-3G/-5G.
AccuRate-PBG-MHD	Anthrop.Corr.Opt.Argos-3/-5PBG,MHD – Factory installed mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5PBG with Moveable Head Detector Option (SCN 7062338) installed at same time.
AccuRate-ZEUS-MHD	Anthropometric Corr. Opt.;Zeus-3/-5G,MHD – Factory installed mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5(P)(A)B with Zeus-3G/-5G and Moveable Head Detector Option (SCN 816653 or SCN 7062338) installed at same time.
AccuRate-PBG-KIT	Anthrop.Corr.Opt.;Argos-PBG,Fld U/G Kit – Field installable upgrade kit with mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5(P)(A)B with Zeus-3G/-5G. Must have Version 8.04 or above of Monitor software installed to ensure compatibility with hardware. Contact local CANBERRA Service affiliate for assistance.
AccuRate-ZEUS-KIT	Anthrop.Corr.Opt.;Zeus-3/-5G,Fld U/G Kit – Field installable upgrade kit with mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5PBG. Instructions and drill templates provided. Must have Version 8.04 of Monitor software installed to ensure compatibility. Contact local CANBERRA Service affiliate for assistance.
AccuRate-PBGKITMHD	Anthrop.Corr.Opt.Arg-PBG,Fld U/G Kit,MHD – Field installable upgrade kit with mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5PBG with Moveable Head Detector Option (SCN 7062338) installed. Must have Version 8.04 or above of Monitor software installed to ensure compatibility with hardware. Customer to provide serial number of monitor(s) to be upgraded to determine if Motor Control Board Assembly (SCN 816825) is compatible or if it requires replacement with later version. Contact local CANBERRA Service affiliate for assistance.
AccuRate-ZEUSKITMHD	Anthrop.Corr.Opt.;Zeus,Fld U/G Kit,MHD – Field installable upgrade kit with mounting hardware and electronics to enable Anthropometric Correction on an Argos-3/-5(P)(A)B with Zeus-3G/-5G and Moveable Head Detector Option (SCN 816653 or SCN 7062338) installed. Must have Version 8.04 or above of Monitor software installed to ensure compatibility with hardware. Customer to provide serial number of monitor(s) to be upgraded to determine if Motor Control Board Assembly (SCN 816825) is compatible or if it requires replacement with later version. Contact local CANBERRA Service affiliate for assistance.



Argos, Zeus and AccuRate are trademarks and/or registered trademarks of Mirion Technologies, Inc. and/or its affiliates in the United States and/or other countries.

All other trademarks are the property of their respective owners.

©2017 Mirion Technologies (Canberra), Inc. All rights reserved.

Copyright ©2017 Mirion Technologies, Inc. or its affiliates. All rights reserved. Mirion, the Mirion logo, and other trade names of Mirion products listed herein are registered trademarks or trademarks of Mirion Technologies, Inc. or its affiliates in the United States and other countries. Third party trademarks mentioned are the property of their respective owners.

CANBERRA