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NMISA Radioactivity services for industry

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The Radioactivity Standards (RS) Section of the National Metrology Institute of South Africa (NMISA) provides traceability to the national measurement standard for radioactivity through various services offered to the nuclear industry. Services are mainly performed through our calibrated secondary instruments comprised of an ionization chamber, a High-Purity Germanium (HPGe) detector and a commercial liquid scintillation counter. With these instruments, activity measurements of radionuclides in various geometries of liquid or solid form can be performed, with typical uncertainties between 1 % and 10 %. We also provide primary measurement services with greater accuracy and smaller uncertainty. A summary of these services is provided.

Ionization chamber measurements are mostly employed for the nuclear medicine industry where accurate activity measurements of radionuclides used for calibrations/diagnostics/treatment is required. These radionuclides include I-131, Mo-99, Tc-99m, F-18, Ga-67, Co-57, Fe-59, Cs-137 and Lu-177. Using radioactive standards, hospital dose calibrator performance checks can also be performed at hospitals and new calibration factors determined if required. Calibration factors in various geometries can also be determined.

Low level activity measurements of environmental samples are performed via gamma-ray spectroscopy with the HPGe detector. Samples are most commonly analysed for the following radionuclides: Co-60, Cs-134, Cs-137 (in milk, water, black mussels/ fish, green leafy vegetables, grass, soil, sediment and sewage) and I-131 in milk. The HPGe detector is also used to measure radioactivity in consumer products.

Low level beta and alpha emission is measured with the commercial liquid scintillation counter, primarily pure beta-emitters such as H-3 in fresh surface water, C-14 and Sr-90 in milk.

In addition, radioactive sources (for detector calibration or experiments) can be prepared in various geometries such as point sources, Marinelli beakers and ampoules, through accurate weighing.

Through our primary measurement techniques known as 4πβγ coincidence counting and the triple-to-double coincidence ratio (TDCR) method we can perform high accuracy and high precision measurements with small uncertainties, usually below 1 %.

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No

Level for award
 (Hons, MSc,
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N/A

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No

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