

PRODUCTION AND USE OF OPTIMIZED GAMMA SAMPLE HOLDERS USING
COMPUTER-AIDED DESIGN, 3-D PRINTING, AND GEOMETRY MODELING
SOFTWARE

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Reproducible counting geometries are critical in the production of reliable gamma spectrometry data. It is important to constrain the positioning uncertainty of gamma-emitting samples on High-Purity Germanium (HPGe) and Sodium Iodide (NaI) detectors, while limiting the attenuation of gamma emissions from the sample.

A variety of standardized gamma sample counting geometries were produced by designing detector-specific sample holders using SolidWorks software, rapidly prototyping the holders with a 3-D printer, and modeling the expected analytical uncertainty with Canberra's Geometry Composer.

Sample holders are printed with <0.1mm precision, are extremely rugged, easily customizable, and can be produced in shapes that are not amenable to traditional machine-shop manufacturing. The resulting analytical uncertainties can be constrained to support typical laboratory uncertainty requirements.