

Radiation Protection Without Lead: Better for the Environment and the Bottom Line

Switching to lead-free Trilliant™ Healthcare Radiation Shielding Compound reduces environmental impact while lowering shielding component costs by up to 50 percent in new CT scanner line.

Situation

Siemens Healthcare, a leading multinational manufacturer, offers an innovative portfolio of products, services, and solutions for nearly every facet of a healthcare enterprise. Recently, for a new computed tomography (CT) scanner line, designers sought a replacement for lead, a material traditionally used to create internal radiation shielding components. The project also involved Reiter-HG Geiger, a highly sophisticated injection molding processor specializing in demanding applications.

The Material Technology team at Siemens Healthcare decided to switch to a lead-free solution because they wanted to stay a step ahead of an anticipated RoHS regulatory ban on lead. The team also wanted to explore the benefits of injection molding to increase productivity, eliminate machining, and increase design freedom for these components.

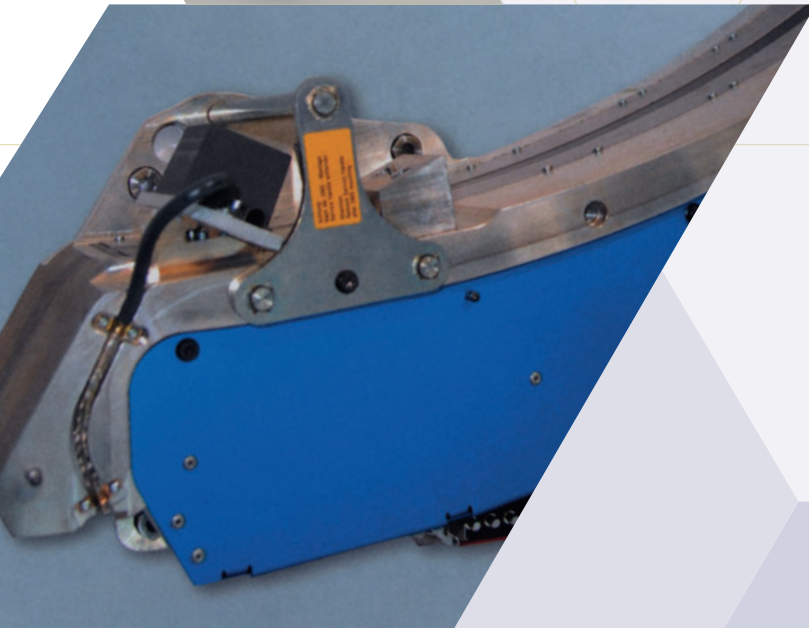
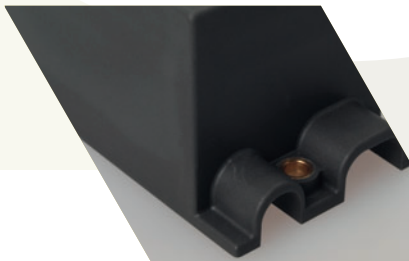
Together with Reiter-HG Geiger, the Siemens team began a search for a sustainable replacement that would effectively shield X-rays up to 140 keV while offering additional manufacturing benefits. Two different application areas were targeted initially: a PCB (Printed Circuit Board) controller unit, and shielding plates for various electronic components linked to each of the numerous detector elements.

To protect sensitive electronic components from degradation due to X-ray exposure during a CT scan, shielding elements are necessary. Traditionally, designs have required lead parts produced by machining or casting. Those lead components necessitated a great deal of care in handling, and assembly was performed via hot cure adhesive. To replace this material, the team sought an injection moldable material with equivalent radiation shielding performance to lead, one that would also provide uniform shielding with no “hot spots.”

The PolyOne Difference

PolyOne's technical team enabled the switch from lead with new designs based on a high-density, metallic filled material, Trilliant™ Healthcare Radiation Shielding Compound. This highly filled polymer, based on PolyOne's Gravi-Tech™ technology, is specifically formulated to address healthcare industry needs and regulations.

Intensive material evaluation at Siemens showed that the Trilliant™ material blocks radiation at levels equivalent to those of pure lead. Furthermore, excellent dispersion of the metallic filler eliminated “hot spots” where radiation could leak out.



Delivering a Value-Added Solution

As a result of the close collaboration between PolyOne, Siemens, and Reiter-HG Geiger, Trilliant™ Healthcare Radiation Shielding Compound enabled Siemens to reduce shielding component costs between 30 to 50 percent as compared to traditional machined metal and lead parts.

Further, in this application, Trilliant™ Healthcare Radiation Shielding Compound allowed Siemens to benefit from:

- **Reduced health and environmental impact:** RoHS-compliant, eco-conscious alternative to lead
- **System cost reduction:** Machining, assembly and regulatory costs reduced compared to lead
- **Radiation-shielding performance:** Equivalent to lead
- **Parts consolidation:** Reduced assembly requirements
- **Design freedom:** Able to shield areas more effectively than with machined parts

PolyOne offers specialized solutions, such as Trilliant™, that are targeted at helping customers meet performance and environmental goals, increase profitability, and maximize value in every way possible.

Siemens AG is a global powerhouse in electronics and electrical engineering, operating in the industry, energy and healthcare sectors. For over 160 years, the company has stood for technical achievements, innovation, quality, reliability and internationality.

Reiter-HG Geiger stands for peak performance, top quality and an extraordinary orientation to customers worldwide.

Product choices often vary by region due to differences in regulatory and agency requirements, availability and other key factors. Please contact your nearest sales office for assistance in choosing the right solution for your locale.

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