

X-ray Manufacturer Gets the Lead Out

Replacing lead with a thermoplastic-metal composite cuts costs, improves workplace safety.

Nobody likes lead and everybody would rather do without it. Xitec (East Windsor, CT), a manufacturer of x-ray fluoroscopy systems, had been using the heavy metal in its x-ray tube shield, a cylindrical part that helps to concentrate x-rays and to shield personnel from stray radiation. But safety issues and the costs involved with the use of this hazardous metal led them to search for an alternative material.

The costs and the effort involved in manufacturing the lead tube shield were continually increasing. Not only were materials suppliers passing along the rising cost of more-stringent regulatory controls, but Xitec had to beef up its safety controls and training for assembly and soldering procedures. Furthermore, the shield and especially a precision aperture at one end were prone to damage when the soft, malleable lead was handled prior to final assembly. Scrap was also a constant headache.

In his search for an alternative material, Xitec chairman Dave Malcom heard about the EcoMass thermoplastic metal composite from PolyOne (Cleveland). The material is part of a new family of high-density composites that can be used as nonhazardous alternatives to lead and other high-gravity metallic materials in many applications.

Randy LaValley, Xitec's mechanical design engineer, followed up with Robert Durkee of Ideas to Market (Austin, TX), a technology-transfer firm that brought EcoMass to market and owns the patent. LaValley and Durkee worked together to develop a shield that could be manufactured using conventional thermoplastic molding equipment.

By using a thermoplastic

"Robert Durkee helped us by designing and commissioning the molds for the part," says LaValley. "EcoMass composite has turned out to be the perfect answer to our needs." A mounting ring is molded into the part, removing several processes from assembly. "Best of all," says LaValley, "the radiation performance of the EcoMass material is excellent—zero rad meter at 16 in."

LaValley says that when all the costs of the material and its molding and production are considered, it saves the company 50% over the cost of using lead. "It took us less than half a year to switch from lead to EcoMass. That's six months for a total switch in material and approach, including part design, mold production, assembly training, everything."

The EcoMass composite incorporates tungsten, the heaviest of metals, as a filler. Xitec specified EcoMass NJ-96 TP, which has a specific gravity of 11 g/cm, equivalent to lead.