



# PARKER MEDICAL, INC.

High Voltage X-Ray Imaging Components

## X-Ray Shields & Collimating Devices for Image Resolution Improvement

- Medical
- Industrial
- Product Design
- CNC Machining
- Plastics Molding
- Cables & Harnesses
- Connectors
- X-Ray Tube Cooling
- X-Ray Beam Control
- Measurement Devices
- X-Ray Source Design

PMI manufactures a line of x-ray shielding products for use in x-ray tube housings and as collimation and scatter reduction devices. Design and development as well as parts production is performed at the PMI plastics molding facility. The plastics molding facility is out-fitted with equipment to run various molding operations simultaneously. The equipment allows the fabrication of a range of sizes in parts production as well as cost-efficient quantity production runs. The product range includes:

- tube mounts
- x-ray attenuation shields
- receptacle and rotor shields
- collimators
- radiation stops and blades
- scatter reduction modules.

These devices improve x-ray imaging resolution and reduce unwanted x-ray exposure. They are specified as a preferred alternative over the use of lead for both attenuation and shielding properties where hazardous material and safety compliance issues are of concern. The excellent electrical insulating property of the shield results in improved high voltage operation. A variety of materials and processing techniques are offered to meet application and design objectives.



Selection of high density x-ray shields. Top right, typical shield for a dental tube application. The 1/4-inch shield wall thickness is equivalent to 1MM of lead lining. The shield both supports the x-ray tube insert and forms the beam at the port hole. Center, radiation shield with molded grooves for lead wires. Bottom left, shielded terminal support.

### Material Specifications *(detailed properties information available by request)*

#### General Description

PMI formulates materials specifically designed for radiation shielding applications where close proximity to HV components is necessary. A variety of materials are compounded for both prototype designs and production manufacturing. Many formulations are ideal for intricate parts design. Mounting inserts and other component parts can be encapsulated in the molding process.

#### Physical Properties

- Resistant to mineral oil and most hydrocarbons up to a 155°C service temperature
- Can be used to provide mechanical support to the x-ray tube insert
- Specific gravity ranging from 4.0 to 11.0.

#### Typical Properties

INSULATIVE CAST POLYMERS	CONDUCTIVE CAST POLYMERS	CONDUCTIVE INJECTION MOLDABLE POLYMERS
<b>H253 P5</b> 5.0 (SG, g/cc) 10 <sup>15</sup> (volume resistivity @ 25°C, ohms/cm) 4.0 (dielectric constant @ 25°C, 100KC) 400-500 (dielectric strength, volts/mil) 8.7 (thermal conductivity, cal/sec/cm <sup>2</sup> /°Cx10 <sup>-4</sup> ) 48.4 (coefficient/thermal exp, in/in/°Cx10 <sup>-6</sup> ) 0.02 (dissipation factor @ 25°C, 100KC)	<b>H253 P9</b> 8.0 (SG, g/cc) <b>H253 P10</b> 11.0 (SG, g/cc)	<b>H253 P2</b> 4.2 (SG, g/cc) <b>H253 P6</b> 5.8 (SG, g/cc) <b>H253 P3</b> 7.0 (SG, g/cc) <b>H253 P7</b> 8.5 (SG, g/cc) <b>H253 P4</b> 10.0 (SG, g/cc)

PMI produces a variety of collimating devices to both control the x-ray beam field size and to reduce off-focus radiation (non-useful x-rays detract from image resolution). \*

This technique replaces the usual method of beam size control which uses a lead plate in the port window. Since the electrically-conductive plate cannot be placed close to the tube envelope, optimum effect is limited. The PMI cone can be placed in the x-ray housing in closer proximity to the x-ray focal spot allowing better definition of the beam.

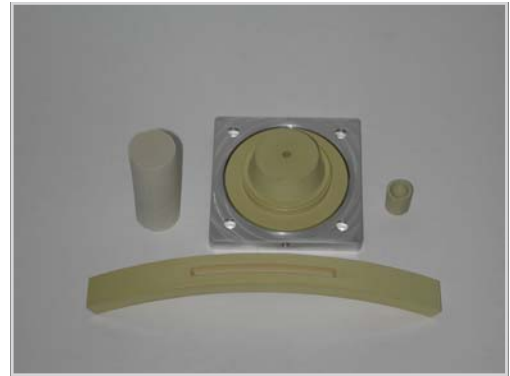
Another benefit of the PMI cone is achieved when attaching it to the tube port. Screws are located in the base plate to line up the cone aperture with the image receptor.

PMI also offers a full range of attenuation and scatter reduction devices for improving image resolution.

Engineering design and formulation development as well as parts production is performed at the PMI plastics molding facility. Utilizing our expertise in plastics technology, mold design, equipment set-up and proper material selection we are capable of molding a wall thickness of less than .010-inch. The PMI machine and parts fabrication facility supports the plastics operation and offers quick turnaround of superior mold tooling.

PMI formulations are tested by an independent agency to determine accurate material properties.

\* U.S. patent applies.



*Collimating and scatter reduction devices.*

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