

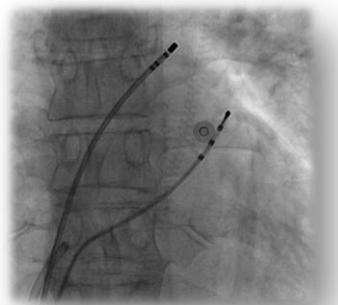
Polymer Marker Bands

For Minimally Invasive Devices and Intravascular Catheters



Putnam Plastics polymer marker bands are used for fluoroscopic illumination of catheter tips used in minimally invasive medical procedures. These bands reduce costs by eliminating traditional gold or platinum marker bands and offer greater adhesion to catheter shaft tips.

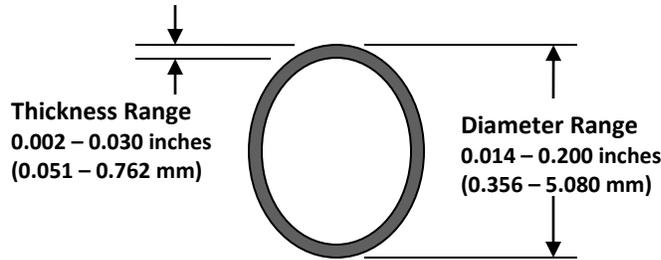
A traditional marker band is a short, thin-wall tube made from gold or platinum that is placed on the tip of a catheter shaft to provide high levels of visibility under fluoroscopy (radiopacity). This allows surgeons to precisely locate the catheter features deep within the body for deployment of balloons, stents, and other devices in blood vessels.



These metal marker bands require a multi-step forming process to create seamless small diameter tubes. Specialized manufacturing equipment is used to crimp or swage metal bands to the polymer shaft tip such that they do not fall off during the medical procedure. This process is costly and time consuming, and quality controls to ensure sufficient mechanical bonding between these dissimilar materials can be significant.

Putnam's marker bands are made from tungsten filled polymers, such as nylons, urethanes and thermoplastic elastomers. Bands are customized using the same polymer specified for the catheter shaft to allow heat bonding of the band for a more secure assembly. Putnam marker bands commonly use tungsten loadings in the range of 65% to 80% by weight to achieve optimum

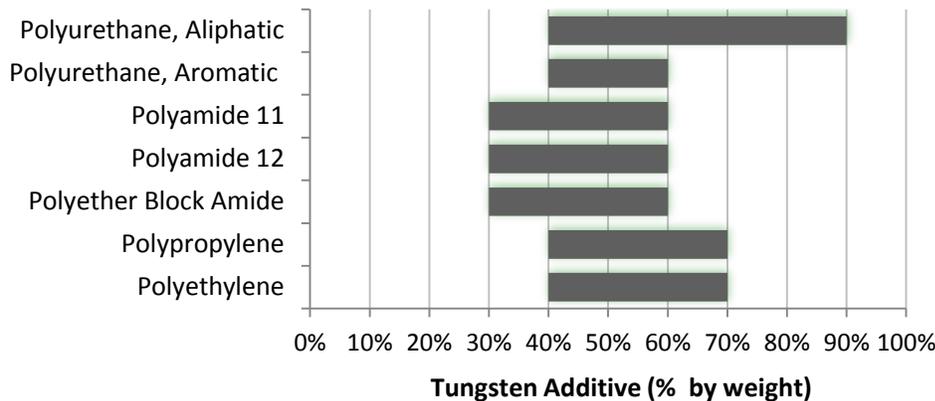
radiopacity results. Using proprietary co-extrusion technology, Putnam applies an unfilled polymeric outer surface to these bands similar to the surface of the catheter shaft to ensure minimal trauma to blood vessel walls.



Putnam Plastics offers polymer marker bands in custom diameters and wall thicknesses suitable for most catheter configurations. The most common sizes fall within the ranges shown in Figure 1.

Figure 1:
Common Polymer Marker Band Sizes

Tungsten Filler Range by Polymer



Tungsten (W) is a corrosion resistant heavy metal element. In powder form it is dark gray in color and is a filler of choice for polymers used in very thin walled applications where radiopacity is critical.

About Putnam

For over two decades, Putnam Plastics has provided comprehensive extrusion technologies for medical catheters and minimally invasive devices. Technologies include thermoplastic and fluoropolymers extrusions, polyimide tubing, printing, and tipping and machining tubes. Putnam offers development through validated manufacturing services.



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