

# PLASTICS NEWS®

## Diversified plays space-probe role

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Concept illustration courtesy of NASA and SwRI

This illustration shows what officials expect the Juno spacecraft to look like as it approaches Jupiter. The space probe was launched in August and should begin orbiting Jupiter in early July 2016.

Polyetheretherketone is out of this world — in a space probe hurtling to Jupiter.

PEEK was chosen for two components of the Jovian Auroral Distributions Experiment aboard NASA's Juno Space Probe. A nationally recognized independent research and development laboratory developed the JADE sensors for electrons and ions for the probe.

Diversified Plastics Inc. of Minneapolis molded the PEEK components, said Diversified Vice President Annette Lund.

"We were approached to produce the plastic components because of our expertise with high-performance thermoplastics and our willingness to produce high-precision, small-quantity parts," said Lund. "The customer's specifications included using polyetheretherketone and we have experience molding this thermoplastic material for our medical-device customers."

PEEK was chosen because it is stiff, strong and lightweight, said design engineer Chip Beebe in a telephone interview. It also has a low outgassing profile compared with most plastics exposed to the high vacuum of space, he added.

One part required molding PEEK around an aluminum ring and the other needed multiple aluminum inserts that were first machined and then press-fit into the molded plastics.

"We were able to perform all the operations in-house, saving our customer time and money," Lund said.

Diversified's willingness to maintain a low PEEK inventory and to do very short runs in the job helped it capture the contract, Lund said. Not counting the cost of building molds, the project only grossed about \$15,000.

The parts measure 5-7 inches in diameter. They were molded in single-cavity tools at mold temperatures of about 700° F, the company said. Diversified used unreinforced PEEK from Thornton Cleveleys, England-based Victrex plc, and 30 percent glass-reinforced, high-flow PEEK from RTP Co. of Winona, Minn.

The unreinforced part was chosen as an electrical shield to prevent arcing, Beebe said. The reinforced part has a structural function. PEEK is also resistant to ultraviolet radiation in the sun's rays.

The space probe was launched in August 2011 and is expected to begin orbiting Jupiter in early July 2016.

Diversified recently became an employee-owned firm. Lund said it boasts a higher-than-average ratio of women in management positions.



Diversified Plastics Inc. photo

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