

## **Toyota, DuPont Engineering Polymers Show Value of Composite Recycle Technology in Automotive Air Intake Manifolds**

GENEVA March 8, 2004 — DuPont Engineering Polymers and Toyota Motor Corp. confirm the feasibility of DuPont Composite Recycle Technology as a means to reclaim and reuse nylon 6 from automotive air intake manifolds and reduce the environmental footprint.

These findings are being released this week at the International Automotive Recycling Conference (IARC) in Geneva.

“DuPont Composite Recycle Technology is very important in helping us achieve our Recycle Vision,” said Yasushi Miyamoto, General manager, Organic Material Department, Material Engineering Division. “Our vision includes improving the vehicle recovery rate to 95 percent and developing new technologies that increase to 20 percent the use of plastic from recycled materials or renewable resources by 2015. We plan to continue to develop this new technology so it can be applied economically in our vehicle recycling initiatives.”

“DuPont Composite Recycle Technology delivers polymer that is from a technical standpoint equivalent to virgin, while reducing the environmental footprint,” said William Hsu, vice president and chief technical officer of DuPont Performance Materials. DuPont Engineering Polymers is a unit of the DuPont Performance Materials business platform. “The remaining challenge is in the economic factor - feedstock shortages and undeveloped collection processes suggest the economic case is still not optimal.”

In the study, DuPont Composite Recycle Technology was analyzed along the three dimensions of sustainability, including end-use component testing; life-cycle analysis to understand total environmental footprint; and economic scenarios to help focus future development activities.

Toyota and DuPont tested two identical air intake manifolds – one made from compounded virgin nylon 6; the other from compounded resin containing 100 percent recycled nylon 6. Results of end-use testing for leaks, burst and breaking strength show parts made of recycle content are within specification.

Life cycle analysis of energy usage and CO2 emissions shows the environmental footprint of Composite Recycle Technology is lower than virgin processes.

The economic comparison factored all steps associated with recycling – collection, disassembly, feedstock separation and recycling process. “Part of the challenge is that Japan has only recently adopted nylon 6 for air intake manifolds, so components in sufficient quantities won’t be available until 2010,” said Hsu. “Can we use nylon 6 from wheel covers, fans and shrouds and beauty covers – it’s a possibility worthy of investigation. Different regions of the world are at different stages of using nylon 6 and of collecting landfill parts – this aspect of the process remains a significant variable.

“The key step is to improve the total cost of the overall process,” said Hsu. “Joint programs with companies along the value chain are helping to clarify the development so that in the end we all create a sustainable solution – technically, environmentally and economically.”

DuPont Composite Recycle Technology, a closed-loop nylon recycling process, can convert parts made of glass- or mineral-filled nylon 6 or 66 into resin that is essentially equivalent to virgin. Composite Recycle dissolves used polyamide then filters away contaminants and fillers. The molecular weight of the recovered polyamide is increased to whatever level is desired for the final application.

DuPont Engineering Polymers has led the industry in developing new mechanical and chemical technologies to help manage the lifecycle of plastics. “Through years of discovery and breakthrough, we realize there is no single, silver bullet as it relates to recycling nylon and engineering plastics,” said Hsu. “Our vision is to collaborate with companies along the value chain to understand what needs to be done and then employ technology and lifecycle tools to develop materials solutions that are safe, economically sustainable and reduce overall environmental footprint.”

Part of the drive to sustainable recycling solutions stems from the European Union ELV directive that requires 85 percent of a vehicle, measured by weight, be capable of recovery and reuse. The current figure for recycling is about 75 to 80 percent.

DuPont is a science company. Founded in 1802, DuPont puts science to work by solving problems and creating solutions that make people's lives better, safer and easier. Operating in more than 70 countries, the company offers a wide range of products and services to markets including agriculture, nutrition, electronics, communications, safety and protection, home and construction, transportation and apparel.

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