DuPont Automotive

Innovation Spotlight: DuPont™ Zytel® XT and DuPont™ Vamac®

Turbocharger Twin Outlet T-joint

Application

A lightweight, cost-effective twin turbocharger outlet T-joint engineered using molded plastic, replacing the cast aluminum/thermoset rubber incumbent material. Developed by Hyundai and Hwaseung R&A Co., Ltd., for use in a Hyundai luxury sedan.

Unmet Need

Turbocharger components offer an area of focus for vehicle lightweighting, but material choices must be capable of enduring significant physical stresses, including vibration, extreme heat and aggressive chemicals.

Challenges

- Meet severe flow load, static/dynamic engine load, chemical resistance and vibration performance requirements
- Reduce cycle time

Solution

The injection-molded plastic outlet was assembled using a novel combination of infrared and vibration welding to reduce cost and minimize potential contamination in the finished component. Concentrated stress areas including bolting, leg were designed using an optimized rib pattern.

The T-joint:

- Enables significant weight and cost reductions
- Reduces air flow pressure drop rate through optimized design
- Enables NVH performance gains, including lower radiation noise versus aluminum, in a wide frequency range

DuPont Materials Chosen and Why

DuPont™ Zytel® XT was chosen for the T-joint component of this application because it offers:

- High strength
- Broad temperature toleration
- Stiffness and fatigue resistance over a wide range of temperatures, chemicals and moisture exposure

DuPont™ Vamac® was chosen for the hose components of this application because it provides:

- Flexibility
- Longevity in powertrain and air management applications
- Resistance to chemical exposure over a broad temperature range

For more information on the Assisted Positive Locking Junction Box and other SPE award winners and finalists, visit the SPE Automotive Innovation Awards website.

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