Robotic extrusion of Santoprene™ TPV for cost and weight reduction

With vehicle weight and cost reduction a key focus for the automotive industry, ExxonMobil and KUKA Industries GmbH & Co. KG (formerly Reis Group Holding) have jointly developed a robotic extrusion process for Santoprene™ thermoplastic vulcanizates (TPVs) that enables the cost-effective production of small to medium quantities of non-glass seals.

The robotic extrusion process allows the extrusion of a flexible Santoprene TPV seal onto a substrate which can be made from a range of materials, such as plastic, metal, glass and nonwovens.

Robotic extrusion is well suited for applications such as:
- cut line seals
- cowl vent grille seal & other weatherseals
- hoses & tubes
- door module seals

**Production flexibility**
Robotic extrusion technology delivers high levels of production flexibility. The seal can be extruded quickly and effectively and part design changes can be accommodated by simply changing the die and process program, saving time and money.

**Ease of processing**
This patent-protected technology enables production in one fully automatic step. The elimination of stages used in traditional systems - which can include mixing, extrusion, curing, profile shipment, handling glue/clips and assembly of the profile onto the substrate - reduces assembly and logistics costs through integration and elimination of adhesives or mechanical attachment mechanisms. As no gluing or curing time is required, the parts can be handled and transported almost as soon as the robot has moved away, saving tack/cure time.
Robotic extrusion process example

Cost comparison example
Cowl vent grille (CVG) seal (cowl to hood)

Objective
Cost comparison for 3 different production systems
• The seal design is optimized depending on process and material specifics

Calculation cases
• Case 1: assembled EPDM rubber-based seal to molded PP carrier
• Case 2: robotic extrusion (RE) of Santoprene™ 121-50E500 TPV-based seal on PP carrier
• Case 3: 2-component (2K) injection molded (IM) Santoprene TPV-based seal integrated to PP carrier

Benefits of robotic extrusion of Santoprene TPV
Part cost reduction
• RE delivers ~10% part cost saving vs. TSR (EPDM) system solution for low and medium quantity production runs
• RE similar part cost vs. 2K-IM at high production quantities

Weight saving
• ~70% vs. EPDM rubber

High design freedom
• High design freedom of profile geometry with Santoprene TPV
• 3D bulb and lip seal geometries possible with RE

Robotic extrusion process example

CVG part cost comparison

Machine and tool investment
• Highest investment with 2K-IM
• Lower RE line investment and pay back after 2-3 projects

Tool investment options
Tool investment comparison at 50,000 units/year at max. 2K-IM production line capacity

Contact us for more information:
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