Santoprene™ TPV vs. EPDM
Value in use for glass run channel applications
Value in use of Santoprene™ TPV vs. EPDM

~70% Investment reduction
~70% Space reduction
~50% Energy cost reduction
TPV requires a reduced capital investment

**EPDM**
- EPDM
- Carbon black
- Oil
- Filler

**TPV**
- Santoprene™ TPV pellets

<table>
<thead>
<tr>
<th><strong>TPV line</strong></th>
<th><strong>vs.</strong></th>
<th><strong>EPDM line</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment:</td>
<td>1</td>
<td>X ~ 3 (excl. mixer)</td>
</tr>
</tbody>
</table>
TPV’s smaller footprint reduces capital and energy costs

**EPDM extrusion length**
- High energy consumption
- Hot air tunnel: 38 to 100°C, 125 to 375 kgs/hr
- Cooling: 200 to 250°C, 2 to 3 min
- Cutting

**TPV extrusion length**
- Cooling: 210°C, 200 to 400 kgs/hr
- Cutting
- Inspection: ~25m

~100 to 120 m

~70% Less investment (excl. cutting)
~70% Less space required
~50% Less energy cost

Source: ExxonMobil assessment based on GRC roof profile
Global quality and supply security
High quality and supply security support global OEM growth

<table>
<thead>
<tr>
<th></th>
<th>Santoprene™ TPV</th>
<th>EPDM comp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material production</td>
<td>PP + EPDM fully cured</td>
<td>Compound</td>
</tr>
<tr>
<td></td>
<td>Continuous</td>
<td>Batch process</td>
</tr>
<tr>
<td><strong>QUALITY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality system</td>
<td>High (Global specifications)</td>
<td>Less (Compounder dependent)</td>
</tr>
<tr>
<td>Production quality standard</td>
<td>Global, highly consistent</td>
<td>Compounder dependent</td>
</tr>
<tr>
<td><strong>SUPPLY - RAW MATERIAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply security</td>
<td>Global supply</td>
<td>No information</td>
</tr>
<tr>
<td>Raw material availability</td>
<td>Back integrated</td>
<td>Not back integrated</td>
</tr>
<tr>
<td>Global storage (raw material)</td>
<td>Long shelf time</td>
<td>Short shelf time</td>
</tr>
</tbody>
</table>

Source: ExxonMobil assessment.
*Indicative directions
At same hardness e.g. 70 Shore A:

- Many possible formulation result in compound quality variations
  - Sealing and mechanical properties
  - Impact to formulation costs

**Compression set**
Variations of EPDM content e.g. 70A

**Tensile strength**
Variations of EPDM compound: e.g. 70A

Source: ExxonMobil. Graphs for illustration purposes.

**Santoprene™ TPV : Consistent global quality**
Cost savings through design optimization
Design optimization with TPV

Santoprene™ TPV vs. EPDM:
• Up to 35% weight reduction
• Thinner wall thickness & density
• Same functionality maintained
  • CLD and strain level

Reduced weight
Design optimization with TPV

Source: ExxonMobil assessment.
*Indicative directions

Optimized materials use
Reduced cost, investment
Weight reduction with TPV

Header profile

EPDM part: 750g
Santoprene™ TPV part: 350g

Metal clamping replaced with PP

~55%*

weight reduction through design optimization vs. original EPDM design

Source: ExxonMobil assessment.
*Based on Skoda Fabia GRC case
Better aesthetics with system integration

Glass encapsulation integration with belt line seal

- Low weight
- Proven sealing performance
- Color / gloss harmonization
- Easy assembly

Source: ExxonMobil assessment.
*Based on Skoda Fabia GRC case
Santoprene™ TPV:
Proven performance in glass run channels

Sustainable choice vs. EPDM

~ 70% lower investment
~ 70% less production space
~ 50% less energy
~ 50% lower weight
- Opportunity for Recycling

Superior aesthetics with system integration
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