This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology; the development of new substitute materials, methods, and processes; and other factors discussed herein (and in Item 1A of ExxonMobil’s latest report on Form 10-K or information set forth under “factors affecting future results” on the “investors” page of our website at www.exxonmobil.com). This material is not to be reproduced without the permission of ExxonMobil Corporation.

proven performance

Santoprene™ TPV
general introduction

Energy lives here

Global Polymers Technology
Shanghai Technology Center, 2014

Outline

- Santoprene™ thermoplastic vulcanize (TPV) – the engineered TPE
- Santoprene TPV product portfolio
- Santoprene TPV typical markets
- Conclusions
Overview of polymer categories

- **Polymers**
  - Elastomers
  - Thermoplastics

- **Elastomers**
  - EPR
  - EPDM
  - NBR
  - SBR
  - CR

- **Thermoplastics**
  - PE
  - LDPE
  - LLDPE
  - HDPE
  - EVA
  - PP

- **Thermoplastic Elastomers (TPV)**

**Elastomeric properties**
- Flexibility

**Engineered properties**
- Rigidity

What is Santoprene™ TPV?

- Chemically crosslinked (vulcanized) rubber encapsulated in thermoplastic matrix
- Properties like thermoset rubber but melt-processable like thermoplastic
- Homogeneous dispersion of small particle-size rubber provides good tensile strength
- Locked-in morphology provides stable physical properties
Santoprene™ TPV - key benefits

- Enhanced performance
  - Durable sealing performance combined with upgraded aesthetics of the finished part
- Reduced part/system costs
  - Simplified processing and design flexibility, allowing for the manufacture of complex parts
- Sustainability opportunities
  - Through part weight reduction, end-of-life recycling and sustainable manufacturing

Santoprene TPVs are engineered TPVs that have proven to be the most dependable polymer of choice for flexible part applications requiring long term performance.

ExxonMobil
Outline

• Santoprene™ thermoplastic vulcanizate (TPV) – the engineered TPE
  • Santoprene TPV product portfolio
  • Santoprene TPV typical markets
  • Conclusions

Broad product portfolio

Santoprene™ TPVs

General Purpose
Flame Retardant
UV Resistant
Medical
Food & Water Contact
Specialty Molding/Extrusion
Other Specialty Grades
Bonding
Outline

• Santoprene™ thermoplastic vulcanizate (TPV) – the engineered TPE
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  • Santoprene TPV typical markets
• Conclusions
**Santoprene™ TPV automotive end-uses**

**Interior**
- Door trim skins
- Flapper door seals
- Steering column cover
- Mats and cup holders
- Handles and grips
- IP to windshield gap fillers

**Exterior**
- Air guides and dams
- Fuel filler housing seals
- Electrical housing seal
- Head light seals
- Wiper systems
-Spoilers and trims

**Under Hood**
- Air duct systems
- Plugs, bumpers and grommets
- Tubes and connectors
- Fuel line systems

**Under Chassis**
- Steering boots
- Suspension boots
- Control cables

**Weatherseals for:**
- Glass run channel
- Encapsulated quarter light
- End cap and corner molding
- Inner belt line
- Outer belt line
- Cowl vent/Hood to cowl
- Cut line
- Gap filler
- Tailgate trunk
- Windshield
- Sunroof
- Roof line

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**Santoprene™ TPV industrial and consumer end-uses**

**Industrial**
- Appliance Seals & Rings
- Syringe Plunger Tips
- Wiring Connectors
- Solar Panel Elements

**Consumer**
- Mouse Grip
- Power Tools
- Garden Tools
- Consumer Electronics

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Outline

- Santoprene™ thermoplastic vulcanizate (TPV) – the engineered TPE
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Santoprene™ TPV: your flexible material of choice

- Expanding global presence of sales, marketing and technical service capabilities
- Strong commitment to automotive and renewable industries
- High dedication to continuous improvement in quality consistency and reliability
- Integrated cross-regional value chain coverage
- 30 years of commercial successes in increasing number of automotive weatherseals systems/parts
- Experienced technical resources
  - Part development and design assistance
  - Processing support
  - Troubleshooting
Santoprene™ TPV: your flexible material of choice (cont.)

- Broad range of engineered properties
  - Cost effective part solutions
  - Good sealing performance
  - Weight reduction and design flexibility through function integration
    - Low specific gravity vs. TSR
  - Long term aging durability
  - Excellent UV and ozone resistance
  - Chemical/fluid resistance
  - Faster cycle times compared to TSR and tighter tolerances

Tell us what you need…
### Santoprene™ TPV portfolio for injection molding

<table>
<thead>
<tr>
<th>Santoprene™ TPV Grade</th>
<th>Color*</th>
<th>Hardness Reference</th>
<th>Features</th>
<th>Target Application/Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>101-xx/103-xx</td>
<td>B</td>
<td>55A – 50D</td>
<td>General purpose grades</td>
<td>Basic molding</td>
</tr>
<tr>
<td>201-xx/203-xx</td>
<td>C</td>
<td>55A – 50D</td>
<td>Highest level of elastomeric properties (e.g., lowest compression/tension set)</td>
<td>Hard grades (&gt;85A) ideal for blow molding</td>
</tr>
<tr>
<td>8201-xx</td>
<td>C</td>
<td>60A – 90A</td>
<td>Enhanced colorability</td>
<td>Basic molding</td>
</tr>
<tr>
<td>121-xxM100</td>
<td>B</td>
<td>50A – 85A</td>
<td>Improved flow for easier processability</td>
<td>Specialty molding</td>
</tr>
<tr>
<td>121-xxM200</td>
<td>B</td>
<td>60A, 75A</td>
<td>Best flow for superior aspect parts with mold surface</td>
<td>Glass encapsulation</td>
</tr>
<tr>
<td>8211-xx</td>
<td>C</td>
<td>35A – 75A</td>
<td>Improved flow for easier processability</td>
<td>Specialty molding</td>
</tr>
<tr>
<td>8221-xxM300</td>
<td>C</td>
<td>55A – 30D</td>
<td>Improved flow for easier processability</td>
<td>Automotive interior</td>
</tr>
<tr>
<td>121-70M350</td>
<td>B</td>
<td>70A</td>
<td>Improved scratch and mar resistance</td>
<td>Specialty molding</td>
</tr>
<tr>
<td>8211-85M350</td>
<td>C</td>
<td>85A</td>
<td>'Comfort touch'</td>
<td>Interior skins</td>
</tr>
</tbody>
</table>

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### Santoprene™ TPV portfolio for extrusion

<table>
<thead>
<tr>
<th>Santoprene™ TPV Grade</th>
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<th>Target Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>101-xx/103-xx</td>
<td>B</td>
<td>55A – 50D</td>
<td>General purpose grades</td>
<td>Basic extrusion</td>
</tr>
<tr>
<td>201-xx/203-xx</td>
<td>C</td>
<td>55A – 50D</td>
<td>Highest level of elastomeric properties (i.e., lowest compression/tension set)</td>
<td>Automotive weatherseals</td>
</tr>
<tr>
<td>8201-xx</td>
<td>C</td>
<td>60A – 90A</td>
<td>Enhanced colorability</td>
<td>Basic extrusion</td>
</tr>
<tr>
<td>121-xxW175</td>
<td>B</td>
<td>58A – 50D</td>
<td>Designed and released against specific extrusion performance criteria</td>
<td>Automotive weatherseals</td>
</tr>
<tr>
<td>123-52W242</td>
<td>B</td>
<td>52D</td>
<td>Low coefficient of friction</td>
<td>Auto weatherseals slip coat</td>
</tr>
<tr>
<td>9101-80E</td>
<td>B</td>
<td>80A</td>
<td>Optimal system cost performance</td>
<td>Automotive glass run channel foot</td>
</tr>
<tr>
<td>121-50E500</td>
<td>B</td>
<td>50A</td>
<td>Controlled rheology for robotic extrusion</td>
<td>Robotic extrusion</td>
</tr>
<tr>
<td>691-xxW175</td>
<td>C</td>
<td>65A, 73A</td>
<td>Designed and released against specific extrusion performance criteria</td>
<td>Residential seals</td>
</tr>
</tbody>
</table>

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## Santoprene™ TPV bonding grades

<table>
<thead>
<tr>
<th>Santoprene™ TPV Grade</th>
<th>Color*</th>
<th>Hardness Reference</th>
<th>Features</th>
<th>Target Application/Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>121-xxW233</td>
<td>B</td>
<td>65A, 79A</td>
<td>• Bonds to EPDM</td>
<td>• Automotive corner molding</td>
</tr>
<tr>
<td>121-65B200</td>
<td>B</td>
<td>65A</td>
<td>• Bonds to EPDM • Higher gloss for surface matching</td>
<td>• Dynamic automotive corner molding</td>
</tr>
<tr>
<td>121-xxB230</td>
<td>B</td>
<td>65A, 79A</td>
<td>• Bonds to TPV, EPDM and PP • Lower CoF to reduce friction</td>
<td>• Automotive corner molding</td>
</tr>
<tr>
<td>8211-5SB100 8191-5SB100 291-xxB150</td>
<td>C B C</td>
<td>55A 55A 60A, 75A</td>
<td>• Bonds to PC, ABS, PS and other engineering thermoplastics (ETPs) • B100 grades also bond to PP</td>
<td>• Insert or 2 shot molding</td>
</tr>
<tr>
<td>8291-8STL</td>
<td>C</td>
<td>85A</td>
<td>• Bonds to metal and PP</td>
<td>• Extrusion</td>
</tr>
</tbody>
</table>

* Black/Colorable

## Santoprene™ TPV other specialty grades

<table>
<thead>
<tr>
<th>Santoprene™ TPV Grade</th>
<th>Color*</th>
<th>Hardness Reference</th>
<th>Features</th>
<th>Target Application/Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>251-xxW232</td>
<td>C</td>
<td>70A – 92A</td>
<td>• Flame retardant (UL 94 V-0 rated)</td>
<td>• Electrical</td>
</tr>
<tr>
<td>151-xxW256</td>
<td>B</td>
<td>70A</td>
<td>• Flame retardant (UL 94 5VA rated)</td>
<td>• Electrical</td>
</tr>
<tr>
<td>101-xxW255 201-55W255</td>
<td>C B</td>
<td>45A, 55A 55A</td>
<td>• Stabilized for protection against copper and other metal-catalyzed degradation</td>
<td>• Residential dishwasher</td>
</tr>
<tr>
<td>241-xx 241-xxW236</td>
<td>C C</td>
<td>55A, 64A 73A,80A</td>
<td>• NSF certified • W236 grades stabilized against copper and other metal-catalyzed degradation</td>
<td>• Potable water contact</td>
</tr>
<tr>
<td>8221-xx</td>
<td>C</td>
<td>60A, 70A</td>
<td>• UV resistant</td>
<td>• Residential seals</td>
</tr>
<tr>
<td>201-67W171</td>
<td>C</td>
<td>67A</td>
<td>• Water or chemical foaming agents can produce low density foam</td>
<td>• Low density foamed profile extrusions</td>
</tr>
<tr>
<td>201-xxW222</td>
<td>C</td>
<td>73A, 80A</td>
<td>• Low CoF (coefficient of friction)</td>
<td></td>
</tr>
<tr>
<td>171-xx</td>
<td>B</td>
<td>64A, 73A</td>
<td>• FDA non-fatty food contact</td>
<td>• Non-fatty food contact</td>
</tr>
<tr>
<td>271-xx</td>
<td>C</td>
<td>55A – 87A</td>
<td>• NSF 51 Food Contact</td>
<td></td>
</tr>
<tr>
<td>8281-xxMED</td>
<td>C</td>
<td>35A – 90A</td>
<td>• USP Class VI certified</td>
<td>• Medical</td>
</tr>
</tbody>
</table>

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## Santoprene™ medical grades

ExxonMobil Chemical selected PolyOne GLS to be its primary marketing specialist for thermoplastic vulcanizate (TPV) medical products made using ExxonMobil Chemical’s Santoprene™ TPV. ExxonMobil Chemical supplies Santoprene TPV feedstock to PolyOne GLS Thermoplastic Elastomers for the manufacture of customer compounded medical grade formulations marketed and sold globally by PolyOne under its GLS brands. PolyOne GLS has also been appointed the authorized distributor for ExxonMobil Chemical’s medical grades. View [www.polyone](http://www.polyone) for more information.

<table>
<thead>
<tr>
<th>Santoprene™ TPV Grade</th>
<th>Color</th>
<th>Hardness Reference</th>
<th>Features</th>
<th>Target Application/Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>181-55MED B</td>
<td>B</td>
<td>55A</td>
<td>• Meets USP Class VI requirements for plastics • Drug master file maintained with the FDA</td>
<td>• Medical soft touch grips • Seals and gaskets • Tubing</td>
</tr>
<tr>
<td>281-55MED C</td>
<td>C</td>
<td>55A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8281-xxMED C</td>
<td>C</td>
<td>35A - 90A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Black/Colorable

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## Bonding grades - licensed technology

Additional bonding products based on Santoprene™ TPVs are available. View the manufacturers' website for more information.

<table>
<thead>
<tr>
<th>RTP Company Grade Designation</th>
<th>Features</th>
<th>Corresponding Discontinued Santoprene™ TPV grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTP 6091-55A BLK</td>
<td></td>
<td>191-55PA</td>
</tr>
<tr>
<td>RTP 6091-70A BLK</td>
<td></td>
<td>191-70PA</td>
</tr>
<tr>
<td>RTP 6091-85A BLK</td>
<td></td>
<td>191-85PA</td>
</tr>
<tr>
<td>RTP 6091-55A NAT</td>
<td></td>
<td>8291-55PA</td>
</tr>
<tr>
<td>RTP 6091-70A NAT</td>
<td></td>
<td>8291-70PA</td>
</tr>
<tr>
<td>RTP 6091-85A NAT</td>
<td></td>
<td>8291-85PA</td>
</tr>
<tr>
<td>RTP 6091 B-60A BLK</td>
<td>Bond to nylon 6, nylon 6 (30% glass filled), nylon 6,6 and PP</td>
<td>8191-60B500</td>
</tr>
<tr>
<td>RTP 6091 B-60A NAT</td>
<td></td>
<td>8291-60B500</td>
</tr>
<tr>
<td>RTP 6091 B-85PA12 BLK</td>
<td>Bonds to nylon 12, nylon 6, nylon 6 (30% glass filled), nylon 6,6 and PP</td>
<td>191-85PA12</td>
</tr>
</tbody>
</table>
Electrical grades – licensed technology

Additional products for the electrical market based on Santoprene™ TPVs are available. Contact the manufacturers’ website for more information.

<table>
<thead>
<tr>
<th>T&amp;T Marketing Grade Designation</th>
<th>Features</th>
<th>Corresponding Discontinued Santoprene™ TPV grade</th>
</tr>
</thead>
</table>
| TPE 5187                      | Flame retardant, stabilized against copper and other metal-catalyzed degradation  
                                  UL QMTT2 cable jacket (105°C) and wet-location (75°C) listed | 8451-87W232                                     |
| TPE 5345                      | Flame retardant, stabilized against copper and other metal-catalyzed degradation  
                                  UL QMTT2 cable jacket (90°C) and wet-location (75°C) listed | 8453-45W232                                     |
| TPE 6187                      | Stabilized against copper and other metal-catalyzed degradation             
                                  UL QMTT2 cable jacket (105°C) listed               | 8261-87                                         |
| TPE 453-45                    | UL QMTT2 cable jacket (105°C) and wet-location (75°C) listed               
                                  UL 94 V-0 rated                                   | 453-45                                           |