**Powertrain**

Powertrain applications include generating, distributing, transforming and controlling power as well as limiting NVH. Saint-Gobain Seals are co-developers in a wide variety of applications in engine systems, drivetrain and exhaust management, which are critical to increasing fuel efficiency and reducing CO₂ emissions through our OmniSeal®, Rulon® and Meldin® solutions.

Within Powertrain, we provide solutions for Engine Systems, Drive Train, Emission Control, Air Management and Thermal Management.

<table>
<thead>
<tr>
<th>Products</th>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meldin® Seal Rings</td>
<td>• Reduced friction</td>
<td>• Increased system efficiency</td>
</tr>
<tr>
<td>Meldin® Thrust Washers</td>
<td>• Predictable, low and constant leakage</td>
<td>• Improved performance</td>
</tr>
<tr>
<td>Precision Parts</td>
<td>• Reduced drag losses</td>
<td>• Reduced part complexity</td>
</tr>
<tr>
<td>OmniSeal® Lip Seals and Rulon® Cup Seals</td>
<td>• Rapid seal activation</td>
<td>• Simplifies assembly</td>
</tr>
<tr>
<td></td>
<td>• Reduced noise</td>
<td>• Customized design – reduced time to market</td>
</tr>
<tr>
<td></td>
<td>• Drop-in replacement (i.e., metal)</td>
<td>• Contributes to reduce CO₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reduced TCO</td>
</tr>
</tbody>
</table>

**Active Safety**

Active safety systems play an increasingly important role to minimize and avoid collisions and accidents. Saint-Gobain Seals supplies high precision parts in brake assist and actuation systems, which are critical components within these active safety systems. With current global trends moving toward electrification and autonomous driving, advanced technology in brake systems are increasingly important.

For many years, Saint-Gobain Seals has been a strategic development partner to Tier 1 leaders. Our Meldin® components assist in reducing weight, achieving a compact design, increasing performance/efficiency, and lowering NVH. Our critical applications can be found in actuation as well as hybrid and integrated systems.

<table>
<thead>
<tr>
<th>Products</th>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meldin® Booth Retainers</td>
<td>• High precision components</td>
<td>• Increased system reactivity</td>
</tr>
<tr>
<td>Meldin® Poppets / Springs</td>
<td>• 0 ppm – 100% visual control</td>
<td>• Smaller packaging space</td>
</tr>
<tr>
<td>Meldin® Spring Package</td>
<td>• Compact design</td>
<td>• Reduced noise</td>
</tr>
<tr>
<td>Plugs</td>
<td>• Drop-in replacement (i.e., metal)</td>
<td>• Reduced TCO</td>
</tr>
<tr>
<td>Precision Parts</td>
<td></td>
<td>• Contributes to reduce CO₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Weight reduction</td>
</tr>
</tbody>
</table>
CRITICAL PARTS MAKING THE DIFFERENCE

Proven in the Past...
Saint-Gobain has a proven track record supplying the automotive and transportation industry. For more than 40 years, we have been a reliable partner to Tier 1 and Tier 2 companies as well as OEMs. Innovation is one of our key strategic pillars, ensuring a continuous development for main automotive challenges such as emission reduction, fuel efficiency and electrification.

With the acquisition of LS Kunststofftechnologie GmbH, Saint-Gobain Seals strengthened its position in the automotive sector, specifically for the powertrain and transmission segments. Our OmniSeal®, Rulon® and Meldin® products reduce friction, leakage, wear, noise, and emission as well as contribute to increase energy efficiency.

The automotive market is always on the move to find new materials and solutions to accelerate technical innovations, meet new environmental and safety legislation, and satisfy emerging customer needs. Using cutting-edge expertise in design, tooling, testing and processing of high-temperature polymers, we are successful at producing injection molded seal rings and thrust washers, precision components, brake system components and bearings that put our customers in the driver seat.

Proven in the Past...
Saint-Gobain has a proven track record supplying the automotive and transportation industry. For more than 40 years, we have been a reliable partner to Tier 1 and Tier 2 companies as well as OEMs. Innovation is one of our key strategic pillars, ensuring a continuous development for main automotive challenges such as emission reduction, fuel efficiency and electrification.

... Prepared to Help Drive the Future
Driving Comfort

Driving comfort is becoming more important as consumers are spending more time in their cars and want as much of a smooth and comfortable ride as possible. Whether it is heated seats, a roomy and soft interior, a quiet engine or a suspension system that feels like you may not be driving at all, automotive OEMs understand this is a key selling point that cannot be overlooked.

Aside from providing sensory enjoyment to the driver, these comfort features also affect the overall safety by reducing driver fatigue on long journeys.

Saint-Gobain Seals supplies Meldin® key components for the steering and suspension systems as well as climate control to support OEMs who want to give their drivers added peace of mind both physically and mentally.

<table>
<thead>
<tr>
<th>Products</th>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meldin® Ball Joints</td>
<td>• Precise fit</td>
<td>• Improves NVH</td>
</tr>
<tr>
<td>OmniSeal® Lip Seals</td>
<td>• Less free play</td>
<td>• Reduced TCO</td>
</tr>
<tr>
<td>Meldin® Seal Rings</td>
<td>• Less creep</td>
<td>• Simplifies assembly</td>
</tr>
<tr>
<td>Precision Parts</td>
<td>• 0 ppm – 100% visual inspection</td>
<td>• Weight reduction</td>
</tr>
</tbody>
</table>

Electric Drive

Electric vehicles were first introduced in the mid-19th century and were a viable mode of transportation versus the gasoline vehicles available at that time as they provided more comfort and ease of operation. During the last few decades, environmental factors and foremost legislations have made hybrid and electric vehicles a more popular alternative. Saint-Gobain Seals offers sealing solutions for the battery cooling and brake systems in these vehicles with reduced to zero emission and fluid acceleration.

We have collaborated with several of the key players in order to develop high-tech polymer components used in the brakes and cooling devices.

<table>
<thead>
<tr>
<th>Products</th>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OmniSeal® Lip Seals</td>
<td>• Precise fit</td>
<td>• Weight reduction</td>
</tr>
<tr>
<td>Collector Pipes</td>
<td>• Reduced friction</td>
<td>• Reduced TCO</td>
</tr>
<tr>
<td>Magnet Support</td>
<td>• High precision components</td>
<td>• Contributes to reduce CO₂</td>
</tr>
<tr>
<td>Precision Parts</td>
<td>• Drop-in replacement (i.e., metal)</td>
<td>• Reduced part complexity</td>
</tr>
<tr>
<td></td>
<td>• 0 ppm – 100% visual inspection</td>
<td></td>
</tr>
</tbody>
</table>
**Products**

<table>
<thead>
<tr>
<th><strong>Main Features</strong></th>
<th><strong>Products</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Temperatures from -253°C to +365°C (-424°F to +690°F)</td>
<td><strong>High-Performance Spring-Energized Seals</strong></td>
</tr>
<tr>
<td>• Pressure: Vacuum up to 3,448 bar (50,000 psi)</td>
<td></td>
</tr>
<tr>
<td>• Low and controlled friction</td>
<td></td>
</tr>
<tr>
<td>• Broad chemical resistance</td>
<td></td>
</tr>
<tr>
<td>• Temperatures from -53°C to +232°C (-65°F to +450°F)</td>
<td><strong>High-Performance PTFE Rotary Lip Seals</strong></td>
</tr>
<tr>
<td>• Shaft speed up to 60 m/s and beyond in special cases</td>
<td></td>
</tr>
<tr>
<td>• Pressures up to 35 bar (508 psi)</td>
<td></td>
</tr>
<tr>
<td>• Temperatures from -268°C to +316°C (-450°F to +600°F)</td>
<td><strong>High-Performance PTFE Filled Compounds</strong></td>
</tr>
<tr>
<td>• Low friction, high wear life and broad chemical resistance</td>
<td></td>
</tr>
<tr>
<td>• Temperatures from cryogenic through +316°C (+600°F) intermittently up to +482°C (+900°F)</td>
<td><strong>High-Performance Thermoplastic Materials</strong></td>
</tr>
<tr>
<td>• Superior strength and rigidity combined with self-lubrication properties</td>
<td></td>
</tr>
</tbody>
</table>

**Critical Parts Protecting Automotive Core Systems**

Our unique experience allows us to design sealing, material and injection molded solutions that comply with the continuously increasing performance requirements in the automotive industry.

Our Key Competencies include:

- Maintenance-free solutions
- Lightweight components
- Low friction materials
- Vibration control
- Noise reduction
- Excellent chemical resistance
- Low and high pressure sealing
- Low and high temperature resistance
- High speed sealing
- Metal replacement
Manufacturing and sales locations

- 7301 Orangewood Ave. Garden Grove, CA USA  92841
  Phone: +1-800-544-0080
- 386 Metacorn Avenue Bristol, RI USA  02809
  Phone: +1-401-253-2000
- Industria Aeroespacial 3601 Parque Industrial Saltillo-Ramos Ramos Arizpe, Coahuila, Mexico 25900
  Phone: +52-844-866-1200
- Am Nordkanal 37
  47877 Willich, Germany
  Phone: +49 2154-600
- Am Herrnberg 8
  98724 Neuhaus am Rennweg, Germany
  Phone: +49 3679 7913-0
- Dertinger Weg 10
  97877 Wertheim
  Germany
  Phone: +49 9342 9266-0
- Heiveldeken 22
  2550 Kontich, Belgium
  Phone: +32 3-458-2828
- Av. Independencia, 7031-Jd. Sao Matheus Sao Paulo, Vinhedo, Brazil  13280
  Phone: +55 19-2127-8521
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  Phone: +34 941-29-20-53
- ul. Norton 1
  62-600 Kolo, Poland
  Phone: +48 63-26-17-281
- 10801-5, Haramura
  Suwa, Japan 391-0106
  Phone: +81 266-79-6400
- 13th FL., Dongshin Bldg, 141-28 Samsung-Dong, Kangnam-Ku Seoul, South Korea, 135-090
  Phone: +82-2-554-8041
- 1468 Kun Yang Road
  Minhang Development Zone
  Shanghai, China
  Phone: +86 21-5472-1568

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www.seals.saint-gobain.com

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