Saint-Gobain has a rich tradition of excellence that dates back over 345 years. Today, it is one of the world’s top 100 industrial corporations and a leader in the development and production of engineered components and materials.

In 1665 Louis XIV signed the letters patent, leading to the creation of the Saint-Gobain Group on an industrial basis. One of the earlier and more notable projects was manufacturing the 357 mirrors for the Hall of Mirrors in the Palace of Versailles. From these glassmaking origins, Saint-Gobain continues its long history of developing new and innovative materials and products through arduous research.

With over 195,000 employees, operations in 64 countries and 20 R&D centers, Saint-Gobain provides complete and thorough service to our customers, starting with our experienced design engineering team, moving to our high-tech labs, testing and research and development, and onto the manufacturing floor.

We believe that “the future is made of Saint-Gobain” and have devoted much of our resources to creating strong research and development centers and establishing partnerships with prestigious universities and laboratories. Our commitment to innovation has resulted in the rapid progression of new Saint-Gobain products that did not exist five years ago.

Saint-Gobain is among the global leaders in each of its businesses: construction products, building distribution, packaging and innovative materials, including high-performance seals. Our seals are manufactured throughout the world with sites located in the Americas, Europe and Asia.

With a strong history of innovation, Saint-Gobain Seals is dedicated to providing the most technologically advanced products on the market today and finding solutions for the future.
Saint-Gobain Seals’ global presence allows us to manufacture OmniLip™ and DynaLip® throughout the world, with sites located in Garden Grove, California, USA; Kontich, Belgium; Kolo, Poland; Willich, Germany; Minhang, Shanghai, China; Suwa, Japan and Vinhedo, Brazil. To further support your needs we also have a technical office available in Agrate Brianza, Italy. The majority of our products are custom-designed through careful and detailed collaboration with each customer, giving them access to the market-leading engineering, research and customer service expertise of our organization. We also understand that there are times when simplicity is the best solution and offer standard profiles, which are shown on pages 18-19.

We are proud of our more than 50 years of experience in manufacturing, along with our spirit of continuous improvement utilizing WCM, 5S, Kaizen and Six Sigma, which leads to superior process control, high product quality and consistent performance. As a result of our dedication to excellence, our worldwide facilities are ISO 9001 certified. Our sites in Garden Grove, Kontich, Minhang, Kolo and Willich are also ISO 14001 certified. Additionally, our Garden Grove site is certified for AS9100, the Kontich site for EN9100 and the Willich site for TS16949 and OHSAS18001.

A Tour of Our Capabilities

Design Engineering
- 3D modeling
- Finite Element Analysis (FEA)

R&D, Lab & Testing
- DMA (Dynamic Mechanical Analyzer), TMA (Thermomechanical Analyzer), TGA (Thermogravimetric Analyzer) and DSC (Differential Scanning Calorimetry)
- FTIR (Fourier Transform Infrared Spectroscopy) and SEM (Scanning Electron Microscopy), Malvern Particle Analyzer, Digital Microscopes and Surface Finish Profilometer
- Tribological Material Testing; Mechanical, Electrical and Optical Testing; and EMI/RFI Testing
- Blending & Molding, High Speed Rotary Test Rigs and High Pressure Hydraulic Test Chamber

Manufacturing
- Metal fabrication
- Multi-axis precision manufacturing
- Injection and co-injection molding, liquid injection molding, hot and cold compression molding, automatic molding, hot and cold isostatic molding
- Direct forming
- Tool design and fabrication
- Coiling/winding and punching
- Casting and coating
- Skiving and sintering
- Rapid prototyping
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- Application Data Form  

- Product Line and Market Summary
When Our Lip Seals Journey Began

Innovation Is Our Business

OmniLip™ was introduced in the early 1970s and DynaLip® was created in the late 1980s. The seals were designed to bridge the gap between conventional elastomer lip seals and mechanical face seals. The ability to perform in hostile environments such as extreme temperatures, aggressive media, high surface speeds, high pressure and lack of lubrication are important features of Saint-Gobain Seals’ PTFE lip seals. They provide the designer with a significant improvement in performance over elastomer lip seals while delivering value-added benefits. Both lip seals are used in a variety of applications in different industries.

OmniLip™ and DynaLip® Options

› Primary element
› Extension spring
› Secondary element
› Rebuildable
› Dust excluder
› O-Ring

Successful OmniLip™ and DynaLip® Applications

› Pumps
› Gearboxes
› Motors
› Turbine engines
› Compressors
› Alternators and generators
› Mixers

Proven in the Past...

Saint-Gobain Seals has proven to be the right partner for the most demanding engineering applications in multiple industries. The majority of our products are customized for each individual application, requirement and specification, and we are dedicated to assisting our partners with their emerging challenges.

...Prepared for the Future
A Closer Look at Our Metal-Cased Lip Seals

Saint-Gobain Seals offers a complete line of OmniLip™ metal-cased lip seals, which can be manufactured from a variety of materials for PTFE and PTFE-blended sealing elements.

OmniLip™ seals withstand hostile environments and other demanding conditions. They exceed the performance of elastomer lip seals in the following areas:

**Features/Benefits**

› Excellent chemical resistance
› Low friction (leads to long life)
› Capable of surface speeds in excess of 35 m/s
› Capable of handling wide temperature ranges: -53°C to 232°C
› High pressure in excess of 35 BAR
› Has extended seal life in dry or abrasive media
› Unlimited shelf life
› Large diameter capability with custom designs available

These lip seals are used in dynamic rotary sealing applications such as turbine engines, APU, RAT, pumps, compressors, robotics, diesel engines, pharmaceutical processing, food processing, blowers, mixers, heavy industry and steel mills.

1. Outer case
2. Gasket
3. Dust excluder
4. Secondary element
5. Washer
6. Primary element
7. Inner case
8. Extension spring

*See page 17 for material selection
A Closer Look at Our PTFE Lip Seals

Our DynaLip® seals offer similar performance to our OmniLip™ seals in that they possess excellent chemical resistance and handle high pressure and temperatures. Based on our experience through the years, we have been able to assist our customers in determining when a DynaLip® seal would be more effective than an OmniLip™ seal.

The soft surface of the seal’s outer diameter prevents damage of the housing and allows the seal to be easily installed and removed. These seals are used most often in applications that require seal removal in order to be changed or cleaned such as in medical or pharmaceutical instrumentation and devices. Furthermore, our DynaLip® seals are usually composed of one material, manufactured with an elastomer O-Ring on the outer diameter, and do not use a metal casing, while our OmniLip™ seals are composed of three or more different materials that are enclosed in a metal casing.

Due to the simple but still powerful design of our DynaLip® seals, they are much more economical and cost less in smaller quantities. Saint-Gobain Seals recommends that DynaLip® seals are retained in the gland as shown on page 26.

Features/Benefits
› Excellent chemical resistance
› Low friction
› Capable of surface speeds in excess of 35 m/s
› Works to temperature extremes: -29°C to 160°C
› Handles pressure up to of 8 BAR
› Has extended seal life in dry or abrasive media
› Extended shelf life
› Large diameter capability with custom designs available

9 Seal material*  
10 Extension spring (stainless steel 302/304)  
11 O-Ring (fluorocarbon)  
12 Metal support case*  
*See page 17 for material selection
Where Our Lip Seals Achieve the Greatest Heights

At Saint-Gobain Seals, quality and innovation are of the utmost importance. We have extensive experience in meeting sealing requirements for various aerospace applications. We have seals in commercial, military, fixed wing and rotary wing aircrafts, as well as spacecraft. Our design engineering team and technical staff provide customized solutions that meet your needs. This process includes developing a prototype, testing the solution, manufacturing the part to specifications and delivering it on time.

Our product quality and capabilities are the reason we are the preferred supplier for many large aerospace corporations.

Features/Benefits

› Elastomer coating for easy installation without damaging the mating hardware surface  
› Wide range of sizes and materials  
› Custom designs available (e.g. Puller feature for easy seal removal)  
› Resistance to abrasive or corrosive material  
› Excellent chemical resistance  
› Capable of handling wide temperature ranges: -53°C to 232°C  
› Functions well under high pressure in excess of 34 BAR  
› Withstands high speed in excess of 35 m/s  
› Low friction (leads to long life)

Successful Aerospace Applications

› Turbine engines  
› Starters  
› Alternators/generators  
› Fuel pumps  
› RAT (Ram Air Turbine)  
› Flap actuators
Case Studies

OMNILIP™ AEROSPACE

Application: Turbine Engine Aircraft Accessory Gearbox

Product: OmniLip™
Typical Shaft Speed: In excess of 20,000 RPM
Typical Shaft Size Range: 13 to 51 mm
Typical Surface Velocity: 10 to 20 m/s
Typical Pressure: 0 to 1.7 BAR
Typical Temperature: -53°C to 177°C
Media: Turbine Oils, all types

- Improves performance over elastomer seals
- Reduces leakage
- Provided with installation tool and extraction feature
- Available with elastomeric seal case coating to prevent damage to the mating housing bore
- Requires less space than mechanical carbon face seal

Application: Flap Actuator

Product: OmniLip™
Typical Shaft Speed: Intermittent
Typical Shaft Size Range: 13 to 127 mm
Typical Surface Velocity: Intermittent
Typical Pressure: 0 to 1 BAR
Typical Temperature: -53°C to 121°C
Media: Rainwater, De-icing Fluids, Dust, Greases and Oils

- Provides zero measurable leakage over life of actuator
- Reduces torque generated by seal
- Configured as a face seal to fit space provided for seal
- Extends seal life, eliminating actuator corrosion caused by moisture ingress
Why Our Lip Seals Are Forged to Last

Saint-Gobain Seals designs rotary shaft seal solutions for many demanding applications within the industrial and manufacturing markets. In most cases, this requires lip seals capable of enduring extreme speeds, pressures and temperatures. Our innovative designs, combined with high-quality lip materials and product capabilities at extreme conditions, make us the right partner to help you meet your dynamic sealing requirements.

Features/Benefits

› Excellent chemical resistance
› Can endure abrasive media
› Can perform with poor/limited lubrication
› Custom designs available
› Wide range of seal case materials available
› High PV
› Low friction (leads to long life)
› Capable of handling wide temperature ranges: -53°C to 232°C
› Functions well under high pressure in excess of 34 BAR
› Withstands high speed in excess of 35 m/s

Successful Industrial Applications

› Vacuum pumps
› Blowers
› Encoders and alternators
› Chemical pumps
› Drilling and tapping spindles
› Rotary compressors
› Air conditioning recovery pumps
› Electric motor shafts
› Hydraulic motors and pumps
## Case Studies

### OMNILIP™ INDUSTRIAL

### Application: Freon Recovery Pump

<table>
<thead>
<tr>
<th>Product</th>
<th>OmniLip™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Shaft Speed</td>
<td>500 to 3,000 RPM</td>
</tr>
<tr>
<td>Typical Shaft Size Range</td>
<td>10 to 19 mm</td>
</tr>
<tr>
<td>Typical Surface Velocity</td>
<td>0.3 to 3 m/s</td>
</tr>
<tr>
<td>Typical Pressure</td>
<td>0 to 27 BAR</td>
</tr>
<tr>
<td>Typical Temperature</td>
<td>-18°C to 121°C</td>
</tr>
<tr>
<td>Media</td>
<td>Freon, Freon Oil</td>
</tr>
</tbody>
</table>

- Meets strict EPA leakage requirements
- Seals will last life of the pump
- Accommodates small space for seal
- Ease of installation
- Compatible with a wide range of oils and refrigerants

### Application: Screw Compressor

<table>
<thead>
<tr>
<th>Product</th>
<th>OmniLip™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Shaft Speed</td>
<td>1,000 to 6,000 RPM</td>
</tr>
<tr>
<td>Typical Shaft Size Range</td>
<td>38 to 127 mm</td>
</tr>
<tr>
<td>Typical Surface Velocity</td>
<td>2 to 40 m/s</td>
</tr>
<tr>
<td>Typical Pressure</td>
<td>Vacuum to 27 BAR</td>
</tr>
<tr>
<td>Typical Temperature</td>
<td>-35°C to 163°C</td>
</tr>
<tr>
<td>Media</td>
<td>Oil and Air</td>
</tr>
</tbody>
</table>

- Seal life in excess of 15,000 hours
- Reduces warranty claims
- Tight leakage control
- Able to run in a wide range of lubricants
What Our Lip Seals Protect

Reliable performance in abrasive media is a prerequisite for a seal to be successful in Life Science applications. OmniLip™ continues to perform under severe conditions while easily complying with FDA requirements, and we offer a wide range of FDA, USDA and USDA-3A compliant materials. The extraordinary sealing functionality of OmniLip™, combined with its low friction capabilities and extended seal life in dry or abrasive media, provides customers with unrivaled performance and value.

Features/Benefits

› Excellent chemical resistance
› Withstands abrasive media
› FDA, USDA and USDA-3A compliant materials
› Custom designs available
› Works in poor/limited lubrication conditions
› Low friction (leads to long life)
› Available in white and other colors
› Ease of removal for cleaning
› Flush mounting to eliminate pockets
› Capable of handling wide temperature ranges: -53°C to 232°C
› High pressure in excess of 8 BAR
› High speed in excess of 35 m/s

Successful Life Science Applications

› Dispensing equipment
› Pharmaceutical and food processing equipment
› Medical drills
› Pharmaceutical mixers
› Medical devices
› Chemical processing equipment
› Compressors and pumps
Case Studies

OMNILIP™ & DYNALIP®
LIFE SCIENCES

Application: Pharmaceutical Mixer

<table>
<thead>
<tr>
<th>Product</th>
<th>OmniLip™/DynaLip®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Shaft Speed:</td>
<td>25 to 350 RPM</td>
</tr>
<tr>
<td>Typical Shaft Size Range:</td>
<td>38 to 190 mm</td>
</tr>
<tr>
<td>Typical Surface Velocity:</td>
<td>0.05 to 18 m/s</td>
</tr>
<tr>
<td>Typical Pressure:</td>
<td>0 to 1.7 BAR</td>
</tr>
<tr>
<td>Typical Temperature:</td>
<td>1.7°C to 65°C</td>
</tr>
<tr>
<td>Media:</td>
<td>Various Powders</td>
</tr>
</tbody>
</table>

**Our Added Value**

- Seal materials comply with FDA, USDA and USDA-3A requirements
- Seals able to run in dry and abrasive environments
- Tight leakage control

Application: Air Compressor (oxygen intensifier)

<table>
<thead>
<tr>
<th>Product</th>
<th>DynaLip®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Shaft Speed:</td>
<td>Linear</td>
</tr>
<tr>
<td>Typical Shaft Size Range:</td>
<td>19 to 102 mm</td>
</tr>
<tr>
<td>Typical Surface Velocity:</td>
<td>2.5 to 10 m/s</td>
</tr>
<tr>
<td>Typical Pressure:</td>
<td>1 to 9 BAR</td>
</tr>
<tr>
<td>Typical Temperature:</td>
<td>1.7°C to 121°C</td>
</tr>
<tr>
<td>Media:</td>
<td>Air</td>
</tr>
</tbody>
</table>

**Our Added Value**

- Over 15,000 hours of extended seal life
- Low friction seal designs
- Long wear life
- Able to run dry
- Performs as a seal and bearing
How Our Lip Seals Effectively Manoeuvre and Travel

The Automotive market is always evolving, and our customers are looking for innovative solutions that meet and exceed these performance challenges. OmniLip™ is more than capable of handling these emerging technology requirements. Our seals offer light weight, high wear and temperature resistance for automotive and transportation applications.

Features/Benefits

› Capable of handling wide temperature ranges: \(-53^\circ C \text{ to } 232^\circ C\)
› Capable of surface speeds in excess of 35 m/s
› Can endure abrasive media
› Can perform with poor/limited lubrication
› Excellent chemical resistance
› High PV
› Low friction (leads to long life)
› Custom designs and wide range of seal case materials available
› High pressure in excess of 34 BAR

Successful Automotive Applications

› Superchargers
› Turbochargers
› Crankshaft and camshaft
› Oil and fuel pumps
› Axles
OMNILIP™ AUTOMOTIVE

Application: Turbocharger

Product: OmniLip™
Typical Shaft Speed: 4,000 to 36,000 RPM
Typical Shaft Size Range: 13 to 38 mm
Typical Surface Velocity: 2.5 to 71 m/s
Typical Pressure: 0 to 1.7 BAR
Typical Temperature: -40°C to 177°C
Media: Oil and Air

Our Added Value
• Able to run at high speed and temperature
• Extended seal life
• Able to run with limited lubrication

Application: Supercharger/Blower

Product: OmniLip™
Typical Shaft Speed: 4,000 to 14,000 RPM
Typical Shaft Size Range: 13 to 64 mm
Typical Surface Velocity: 2.7 to 36 m/s
Typical Pressure: Vacuum to 1.7 BAR
Typical Temperature: -40°C to 177°C
Media: Oil and Air

Our Added Value
• Able to run at high speed and temperature
• Extended seal life
• Able to run with limited lubrication
How to Order Our Standard OmniLip™ and DynaLip® Products

Part Number Example

Seal Type
(see pages 18-19)

Gland Dimensions
(see pages 20-21)
For Type 68, 78, 69 and 79,
add groove width (68-79X90X10-10XX)

Sealing Lip Material Code
(see page 17)

Case or Support Ring Material Code
(see page 17)
Always use XX for DynaLip®,
which does not have metal support cases

For standard part numbers, secondary and/or dust lip is always Fluoroloy® A16.

Should you require assistance on our seal designs, please fax or email a copy of the completed Application Data Form on page 28 to Saint-Gobain Seals at +32 3458 2669 or sealsmarketing@saint-gobain.com.
# Sealing Lip Materials

<table>
<thead>
<tr>
<th>Material Code</th>
<th>Name</th>
<th>Application Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Fluoroloy® A16 (Black Color)</td>
<td>Standard material for secondary elements and dust excluders. Good general purpose material for heat and wear resistance. Performs well on shaft surfaces with moderate hardness. Good in both lubricated and non-lubricated media (good option for sealing water).</td>
</tr>
<tr>
<td>10</td>
<td>Fluoroloy® A72 (Beige Color)</td>
<td>Superior heat and wear resistance. Non-abrasive to running shaft surfaces. Recommended for limited lubrication or non-lubricated applications where running temperatures exceed 190°C. Not recommended for use in steam or water (fair wear resistance).</td>
</tr>
<tr>
<td>36</td>
<td>Fluoroloy® A15 (Gray Color)</td>
<td>Best wearing material in oil. Requires a hardened shaft surface of 55 HRC for best performance. May cause excessive shaft scoring on soft metals (excellent wear resistance).</td>
</tr>
<tr>
<td>72</td>
<td>Fluoroloy® A46 (White Color)</td>
<td>Meets FDA requirements. Suitable for soft shafts such as 316 stainless steel. Not recommended for water service (fair wear resistance).</td>
</tr>
<tr>
<td>N6</td>
<td>Fluoroloy® A41 (Black Color)</td>
<td>Extreme wear resistance for high speed applications with extreme heat development. Very good for applications with oil. Requires a hardened shaft surface of 55 HRC.</td>
</tr>
</tbody>
</table>

# Metal Case or Support Ring Materials

<table>
<thead>
<tr>
<th>Material Code</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Low-Carbon Steel</td>
<td>Used for outer case, inner case and washers. Low cost. Limited corrosion resistance. Recommended for cast iron or steel seal housings.</td>
</tr>
<tr>
<td>M2</td>
<td>Aluminum Alloy</td>
<td>Lightweight material used for outer case, inner case and washers. Low cost. Limited corrosion resistance. Recommended for aluminum or magnesium alloy seal housings.</td>
</tr>
<tr>
<td>M3</td>
<td>Stainless Steel 304</td>
<td>Used for outer case, inner case, washers, spring and support ring. Good corrosion resistance. Recommended for stainless steel seal housings.</td>
</tr>
<tr>
<td>M4</td>
<td>Stainless Steel 316</td>
<td>Used for outer case, inner case, washers, and support ring. Excellent corrosion resistance. Recommended for stainless steel seal housings.</td>
</tr>
</tbody>
</table>

The above chart shows the most commonly used materials in a variety of applications. Please contact us if you require more information about our other materials.
## OmniLip™ Standard Seal Types

### PV = (Media Pressure in MPa x Surface Velocity in m/s)

<table>
<thead>
<tr>
<th>Seal Type</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series 10</strong></td>
<td>Series 11 are economical OmniLip™ seal designs employed in a wide range of applications. They are used in lubricated and non-lubricated environments. They can be used at shaft speeds to 25 m/s in lubricated media and pressures to 0.7 MPa. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are gearboxes and environmental seals.</td>
</tr>
<tr>
<td><strong>Series 20</strong></td>
<td>Series 21 are modifications of Series 10 and 11 which offer longer life and improved sealing of gases and abrasive media due to their higher lip load. They also offer additional runout capability. They can operate at speeds, pressure and PV as noted in Series 10 and 11. Recommended shaft hardness of 55 HRC or greater when operating at the higher PV limits. Typical applications are gearboxes, submersible pumps/motors, and mixers.</td>
</tr>
<tr>
<td><strong>Series 30</strong></td>
<td>Series 31 incorporate a threaded sealing lip which pumps the media away from the seal. These designs should only be used in lubricating media. These designs offer long life and positive sealing at shaft speeds to 30 m/s. They should not be used for pressures greater than 0.1 MPa. They are designed for clockwise shaft rotation when viewed from the atmosphere side. Typical applications are engine crank case seals and spindles.</td>
</tr>
<tr>
<td><strong>Series 40</strong></td>
<td>Series 41 are the same as Series 30 and 31 except they are designed for a counterclockwise shaft rotation when viewed from the atmosphere side.</td>
</tr>
<tr>
<td><strong>Series 50</strong></td>
<td>Series 51 offer low torque and long life. They can be used at shaft speeds to 30 m/s, but are not recommended for pressures greater than 0.2 MPa. Due to their light lip loading, these designs should not be used where a leak-tight seal is required. They are an excellent environmental seal. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are dust/dirt excluders, spindle and conveyer seals.</td>
</tr>
<tr>
<td><strong>Series 60</strong></td>
<td>Series 61 incorporate spring loading which improves sealing where shaft runout or bore/shaft misalignment exist. These designs offer positive sealing during long-term storage. They can be used at shaft speeds to 10 m/s and pressures to 0.7 MPa. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are mixers, gearboxes and augers.</td>
</tr>
<tr>
<td><strong>Series 70</strong></td>
<td>Series 71 are designed for pressures up to 3.5 MPa lubricating media, speeds up to 20 m/s. Maximum PV 10.50 lubricated, PV 1.75 non-lubricated. Typical applications are hydraulic motors, pumps, hydrostatic transmissions and other high pressure hydraulic equipment.</td>
</tr>
<tr>
<td><strong>Series 80</strong></td>
<td>Series 81 incorporate a threaded primary sealing lip with a standard secondary sealing lip. These Series are designed for sealing lubricating media at high speeds 25 m/s and pressures up to 1.5 MPa. Maximum PV 7.00 lubricated. They are designed for clockwise shaft rotation viewed from the atmosphere side. Typical applications are air compressors, refrigeration compressors and vacuum pumps.</td>
</tr>
<tr>
<td><strong>Series 90</strong></td>
<td>Series 91 are the same as series 80 and 81 except they are designed for a counterclockwise shaft rotation when viewed from the atmosphere side.</td>
</tr>
</tbody>
</table>
DynaLip® Standard Seal Types

Due to the seal’s soft sealing on the OD, it is recommended that the seal be retained in the gland as shown on page 23. DynaLip® is designed for extreme temperatures, utilizing a metallic support ring to minimize temperature’s effect on the seal. The DynaLip® seal selection chart below provides a guide on whether this metallic support is required.

<table>
<thead>
<tr>
<th>Seal Type</th>
<th>Performance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>For NORMAL Temperatures</td>
<td>For EXTREME Temperatures</td>
</tr>
<tr>
<td>Series 13</td>
<td>Series 14</td>
</tr>
<tr>
<td>Series 23</td>
<td>Series 24</td>
</tr>
<tr>
<td>Series 53</td>
<td>Series 54</td>
</tr>
<tr>
<td>Series 63</td>
<td>Series 64</td>
</tr>
<tr>
<td>Series 73</td>
<td>Series 88</td>
</tr>
<tr>
<td>Series 69</td>
<td>Series 79</td>
</tr>
</tbody>
</table>

Series 13 and 14 are economical DynaLip® designs employed in a wide range of applications. They are used in lubricated and non-lubricated environments. They can be used at shaft speeds to 25 m/s in lubricated media and pressures to 0.5 MPa. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are gearboxes and environmental seals.

Series 23 and 24 are modifications of Series 13 and 14 that offer longer life and improved sealing of gases and abrasive media due to their higher lip load. They also offer additional runout capability. They can operate at speeds, pressure and PV as noted in Series 13 and 14. Recommended shaft hardness of 55 HRC or greater when operating at the higher PV limits. Typical applications are gearboxes, submersible pumps/motors, and mixers.

Series 53 and 54 offer low torque and long life. They can be used at shaft speeds up to 30 m/s. They are not recommended for pressures greater then 0.2 MPa. Due to light lip loading, this design should not be used where a leak tight seal is required. They are excellent environmental seals. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are gearboxes, submersible pumps/motors, and mixers.

Series 63 and 64 incorporate spring loading which improves sealing where shaft runout or bore/shaft misalignment exist. These designs offer positive sealing during long-term storage. They can be used at shaft speeds to 10 m/s and pressures to 0.5 MPa. Maximum PV 2.60 lubricated, PV 1.30 non-lubricated. Typical applications are mixers, gearboxes and augers.

Series 73 is designed for pressure up to 0.9 MPa in lubricating media, speeds up to 20 m/s in lubricating media. Maximum PV 7.00 lubricated, PV 1.75 non-lubricated. Typical applications are hydraulic motors, pumps, hydrostatic transmissions and other high pressure hydraulic equipment.

Series 68 and 78 are designed for higher pressure and low speed applications where better tightness is required. The U-spring ensures positive load on the sealing lip. Temperature changes are better compensated. Standard spring material is Elgiloy®. The OD O-Ring energizer is an FKM material.

Series 69 and 79 are silicon-filled 68 and 78 designs, for food applications and those applications where solidification of the medium could interfere with the spring function. Standard silicon filling is red, the spring is made of Elgiloy®.

DynaLip® Selection Chart
## Gland Dimensions

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
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<td>9</td>
<td>22, 24, 26</td>
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<td>14</td>
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<td>17</td>
<td>28, 30, 32, 35, 40</td>
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<td>18</td>
<td>30, 32, 35, 40</td>
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<td>32</td>
<td>45, 47, 52</td>
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<td>47, 50, 52</td>
<td>7</td>
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<td>36</td>
<td>47, 50, 52</td>
<td>7</td>
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<td>38</td>
<td>52, 55, 62</td>
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<td>40</td>
<td>55, 60, 62, 72</td>
<td>8</td>
</tr>
<tr>
<td>42</td>
<td>55, 60, 62, 72</td>
<td>8</td>
</tr>
</tbody>
</table>
## Gland Dimensions

--- | --- | ---
45 | 60 62 65 72 | 8
48 | 62 65 72 | 8
50 | 65 68 72 80 | 8
52 | 68 72 | 8
55 | 70 72 80 | 8
56 | 70 72 80 | 8
58 | 72 80 | 8
60 | 75 80 | 8
62 | 80 85 90 | 10
63 | 85 90 | 10
65 | 85 90 100 | 10
68 | 90 100 | 10
70 | 90 100 | 10
72 | 95 100 | 10
75 | 95 100 | 10

--- | --- | ---
78 | 100 110 | 10 12
80 | 110 120 125 130 | 12
85 | 110 120 | 12
90 | 110 120 | 12
95 | 120 125 | 12
100 | 120 125 130 | 12
105 | 130 140 | 12
110 | 130 140 | 12
115 | 140 150 | 12
120 | 150 160 | 12
125 | 150 160 | 12
130 | 160 170 | 12 15
135 | 170 | 15
140 | 170 | 15
145 | 175 | 15
150 | 180 | 15
160 | 190 | 15
170 | 200 | 15
180 | 210 | 15
190 | 220 | 15
200 | 230 | 15

The shaft and bore diameters are based on the standard DIN 3760. Saint-Gobain Seals can manufacture non-standard sizes also. Please contact our Technical Support team at +32 3-458-2828.
Shaft Finish and Hardness Recommendations

Plunge ground surfaces are recommended at the seal-to-shaft interface locations for optimum leakage control. Plunge grinding provides a sealing surface with minimal or no lead. It is recommended to have a lead angle of zero with a tolerance of $0 \pm 0.05^\circ$. Contact Saint-Gobain Seals for methods used to measure lead angle or for additional information.

<table>
<thead>
<tr>
<th>Shaft Hardness Rockwell Hardness “HRC”</th>
<th>Recommended Shaft Surface Finish (Ra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.2 to 0.8</td>
</tr>
<tr>
<td>35</td>
<td>0.2 to 0.7</td>
</tr>
<tr>
<td>50</td>
<td>0.2 to 0.6</td>
</tr>
<tr>
<td>62</td>
<td>0.2 to 0.4</td>
</tr>
<tr>
<td>72 or greater (hard coatings)</td>
<td>0.1 to 0.2 (consult technical support)</td>
</tr>
</tbody>
</table>

Recommended Minimum Shaft Hardness

<table>
<thead>
<tr>
<th>Sealing Environment</th>
<th>2.5 m/s</th>
<th>5 m/s</th>
<th>10 m/s</th>
<th>15 m/s</th>
<th>20/35 m/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubricated Service</td>
<td>35 HRC</td>
<td>40 HRC</td>
<td>52 HRC</td>
<td>58 HRC</td>
<td>58 HRC</td>
</tr>
<tr>
<td>Dry Service</td>
<td>40 HRC</td>
<td>52 HRC</td>
<td>58 HRC</td>
<td>62 HRC</td>
<td>62 HRC</td>
</tr>
<tr>
<td>Water Service</td>
<td>40 HRC*</td>
<td>40 HRC*</td>
<td>40 HRC*</td>
<td>40 HRC*</td>
<td>40 HRC*</td>
</tr>
<tr>
<td>Abrasive Service</td>
<td>52 HRC</td>
<td>62 HRC</td>
<td>62 HRC</td>
<td>62 HRC</td>
<td>62 HRC</td>
</tr>
</tbody>
</table>

$m/s = $Shaft surface velocity

HRC = Hardness measured using the Rockwell C Scale

*Recommended maximum hardness for water service. Stainless steel materials may be required to prevent corrosion.
**Hardware Design**

**Bore Material**
- Cast iron, steel, aluminum and other commonly used metallic and nonmetallic materials are acceptable. Plastics are only acceptable for DynaLip® seals.

**Bore Surface Roughness**
- A bore finish of approximately 0.8 μ in Ra or smoother should be maintained to ensure proper sealing.

**Shaft Lead-In Chamfer**
- The shaft should be provided with a lead-in chamfer with a diametral difference of $D_1 - D_2$, and be free from burrs, sharp corners or rough machining marks.

---

**Bore and Shaft Recommendations**

**Shaft Lead-In Chamfer**

<table>
<thead>
<tr>
<th>$D_1$ (mm)</th>
<th>$D_1 - D_2$ (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10</td>
<td>1.5 MIN.</td>
</tr>
<tr>
<td>11 to 20</td>
<td>2.0 MIN.</td>
</tr>
<tr>
<td>21 to 30</td>
<td>2.5 MIN.</td>
</tr>
<tr>
<td>31 to 40</td>
<td>3.0 MIN.</td>
</tr>
<tr>
<td>41 to 50</td>
<td>3.5 MIN.</td>
</tr>
<tr>
<td>51 to 70</td>
<td>4.0 MIN.</td>
</tr>
<tr>
<td>71 to 100</td>
<td>4.5 MIN.</td>
</tr>
<tr>
<td>101 to 130</td>
<td>5.0 MIN.</td>
</tr>
<tr>
<td>131 to 180</td>
<td>6.0 MIN.</td>
</tr>
<tr>
<td>181 to 210</td>
<td>6.5 MIN.</td>
</tr>
</tbody>
</table>

**Bore Lead-In Chamfer**
- (DynaLip® Only)

<table>
<thead>
<tr>
<th>Bore Diameter Sizes</th>
<th>Bore Chamfer C &lt;sub&gt;1&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 100</td>
<td>1.5/2.0</td>
</tr>
<tr>
<td>100 to 200</td>
<td>2.1/2.5</td>
</tr>
</tbody>
</table>

**Bore Tolerance (H8)**

<table>
<thead>
<tr>
<th>Bore Diameter $D_1$</th>
<th>Bore Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-6</td>
<td>+ 0.018</td>
</tr>
<tr>
<td>6-10</td>
<td>+ 0.022</td>
</tr>
<tr>
<td>10-18</td>
<td>+ 0.027</td>
</tr>
<tr>
<td>18-30</td>
<td>+ 0.033</td>
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<tr>
<td>30-50</td>
<td>+ 0.039</td>
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<tr>
<td>50-80</td>
<td>+ 0.046</td>
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<td>80-120</td>
<td>+ 0.054</td>
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<tr>
<td>120-180</td>
<td>+ 0.063</td>
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<tr>
<td>180-250</td>
<td>+ 0.072</td>
</tr>
<tr>
<td>250-315</td>
<td>+ 0.081</td>
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</table>

**Shaft Tolerance (h11)**

<table>
<thead>
<tr>
<th>Shaft Diameter $D_1$</th>
<th>Shaft Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-6</td>
<td>- 0.075</td>
</tr>
<tr>
<td>6-10</td>
<td>- 0.090</td>
</tr>
<tr>
<td>10-18</td>
<td>- 0.110</td>
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<tr>
<td>18-30</td>
<td>- 0.130</td>
</tr>
<tr>
<td>30-50</td>
<td>- 0.160</td>
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<tr>
<td>50-80</td>
<td>- 0.190</td>
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<td>80-120</td>
<td>- 0.220</td>
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<tr>
<td>120-180</td>
<td>- 0.250</td>
</tr>
<tr>
<td>180-250</td>
<td>- 0.290</td>
</tr>
<tr>
<td>250-315</td>
<td>- 0.320</td>
</tr>
</tbody>
</table>
OMNILIP™ RS

Rebuildable Lip Seal

With its patented-design rebuildable seal, Saint-Gobain Seals has designed a seal to eliminate higher replacement costs and material waste associated with throwaway metal-cased seals. This rebuildable seal was created for customers who use equipment that requires rebuilding and overhauls and large diameter seals, and who were searching for a product to bridge the gap between conventional elastomer seals and more costly mechanical face seals. Customers can now quickly unscrew the metal case, replace the worn components and reassemble the seal without any special installation tools, and not worry about damaging the seal or mating hardware (a common problem that we set out to solve). Because the seal is essentially “a one-time buy,” downtime is minimized and housing rework is non-existent. The seal, which comes in standard sizes as well as custom designs, is best suited for applications in the electronics, industrial and life science markets such as chemical processing equipment, encoders, radar and thermal optical devices, mixers, pharmaceutical and food processing equipment, heavy industry equipment, steel mills, hot melt equipment and paint spraying equipment.

Features/Benefits

› Rebuildable seal design reduces seal replacement cost
› Interchangeable with other standard seals
› Can be rebuilt without removing main seal body from housing bore, thus reducing replacement cycle time
› Temperature ranges: -58°C to 232°C
› Surface speeds in excess of 35 m/s
› Vacuum to 34 BAR pressure differentiation
› Broad chemical resistance PTFE
› Extended life in abrasive media or dry running
› Custom designs available
Lip Seal Installation

Seal Installation
Care must be taken not to damage the sealing lip during the installation of the shaft through the seal. It is much easier to install the seal if the shaft enters the seal from the atmosphere side. If this is not possible, or if the seal must be installed on a shaft which has a keyway or splines, please contact the factory. We can help with the design and manufacture of simple tooling to assure that the seal is installed without damage. OmniLip™ and DynaLip® seals should be pressed into the bore evenly. A tool, as shown below, simplifies this operation.

Installation Tooling
Care is essential in the installation of OmniLip™ and DynaLip® seals onto the shaft. If sufficient chamfer (below I.D. of seal lip element) is not possible, and/or if lip must pass over spline or keyway, a tapered installation sleeve (shown below) is necessary. Sleeve design information is available on request.
Sealing Lip Extension: OmniLip™ seals, incorporating two sealing lips or a dust excluder, may have seal lip extensions as shown. This must be considered when designing a seal gland.

**Hardware Variations**

Non-Standard Lip Seal Configurations

- Metallic spring energizer used for static sealing of internal seal components.
- For extreme temperature applications.

- Metallic spring energizer used for static sealing of internal seal components.
- Flange design for exact seal positioning.
- For extreme temperature applications.

- Elastomer coating on the seal outside diameter.
- The elastomer coating protects the housing bore while providing tight sealing between the seal outside diameter and the customer’s housing bore.

- High pressure seal design configured for extreme pressures and temperatures.
Non-Standard Lip Seal Configurations

- High pressure seal design configured for extreme pressures and temperatures.
- Seal extraction feature for ease of seal removal.
- Elastomer O-Ring on seal outside diameter for tight static sealing.
- Seal flange for positive seal positioning.
- Patented rotary shaft seal designed for extreme shaft runout.
- Seal wear occurs inside of the seal components, preventing shaft surface wear.
- DynaLip® seal configured for applications with a static shaft and rotating housing bore.
- The seal can be installed and removed without tools.
- DynaLip® seal configured to allow a purging system to be utilized or to allow fluid to flow from the stationary seal housing bore through a port located in the rotating shaft.
- DynaLip® seal is ideal for applications that require periodic cleaning.
- The flush design minimizes pockets that can trap solids.
- The seal is ideal for use in FDA and pharmaceutical equipment.
APPLICATION DATA FORM

Company Name _______________________________ Street Address _______________________________
City ________________________________________ State _______________________________
Individual name ______________________________ Zip code _______________________________
Title ________________________________________ Email address ______________________________
Phone number ________________________________ Fax _______________________________
Project name ________________________________

Application Information and Conditions

Device sealed (Please attach drawing if available) ________________________________
Number of units/year ___________________________ Number of seals/unit ___________________________
Type of motion: ❑ Rotary ❑ Oscillating ❑ Reciprocating ❑ Static ❑ Dither
Media/fluid _________________________________
Amount in seal area: ❑ Full head ❑ Half shaft ❑ Splash
Operating pressure (units) __________________ Proof pressure (units) __________________ Burst pressure (units) __________________
Temperature (units): ❑ High ❑ Low ❑ Operating
RPM _________________________________
Direction or shaft rotation (as viewed from air side or low pressure of side seal): ( ) CW ( ) CCW
Allowable leakage (define units) __________________
Friction torque (units): __________________________ Breakaway __________________________ Running __________________________
Life requirement ______________________________
Duty cycle ______________________________
Type of seal evaluation: ❑ Bench ❑ Field ❑ Both ❑ Explain _______________________________

Hardware Data

Can gland hardware be changed? ________________________________
Bore DIA (include TOL) ___________________________ Shaft DIA (include TOL) ___________________________
Bore depth ___________________________ X-section ___________________________
Bore/shaft misalignment (T.I.R.) ___________________________ Shaft runout (T.I.R.) ___________________________
Material: Bore ___________________________ Shaft ___________________________
Finish: Bore ___________________________ Shaft ___________________________
Hardness: Bore ___________________________ Shaft ___________________________
Direction which rod/shaft enters element: ( ) Air side or low pressure side ( ) Media side
Will sealing element be required to make contact with keyway, spline, etc.? ❑ Yes ❑ No
If “Yes” explain: ________________________________

Is installation tooling required? ❑ Yes ❑ No ❑ Saint-Gobain Seals to design ❑ Supply

Please fax or email a copy of the completed Application Data Form to:
Saint-Gobain Seals
Fax: +32 3458 2669
Email: sealsmarketing@saint-gobain.com
Product Line and Market Summary

As a business unit under Saint-Gobain Performance Plastics’ Engineered Components division, Saint-Gobain Seals not only offers the rotary lip seals that you see in this product handbook, but a wide range of other innovative sealing and polymer solutions.

Our main family of products includes:

› OmniSeal® (Spring-Energized Seals)
› OmniLip™ (PTFE Rotary Shaft Seals)
› OmniFlex™ (Fluoroelastomer Seals)
› Rulon® (High-Performance Fluoropolymer Compounds)
› Meldin® 7000 (Thermoset Polyimide Materials)
› Meldin® HT (High-Performance Thermoplastic Materials)

Other products in our portfolio include Fluoroloy® (high-performance custom-formulated compounds), cup seals, hydraulic seals, metal boss seals, v-packings, piston rings, Marathon® (valves and vacuum pump diaphragms), Transband® (PTFE creepage band), custom parts, polymer bearings and stock shapes.
Product Line and Market Summary

The majority of the seals and polymer components we manufacture are custom designed and matched with the best materials to optimize their performance in various applications and markets, and under the most extreme and critical conditions.

Saint-Gobain Seals products are extensively used in key markets such as Oil & Gas, Automotive, Life Sciences and Aerospace. We have also been instrumental in the Electronics and Industrial industries, providing energy-efficient and environmentally friendly designs. Our solutions reflect our business model, which focuses on co-development relationships and engineer-to-engineer direct collaboration. More than 93% of our products are custom engineered to the customer’s application. Please feel free to contact us at sealsmarketing@saint-gobain.com to request one of our handbooks or brochures, or if you have any questions. Our global team is happy to assist you with your sealing and polymer needs.