INNOVATIONS IN GASKET SEALING AND ENGINEERED COMPOSITE MATERIALS

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Let’s Talk Performance
“Interface custom-designs barriers that act as interfaces between imperfect or incompatible parts and surfaces. But our promise to the global marketplace exceeds product functionality. It mandates providing technical reliability, dependable supply and the lowest total cost solution to our customers.”

Meeting the Challenge

Whether you are an OEM or an OEM supplier, you can expect increasing market demands for improved performance, reduced costs and operational certainty.

In the critical areas of gasket sealing and composite material applications, including electrical and thermal barriers, as well as flooring felts, Interface Performance Materials, Inc. (Interface) delivers solutions that meet industry’s demands.

Our solutions are good for business. They satisfy engineering requirements with technical reliability. In a world of supply uncertainty, they incorporate product availability and dependable on-time delivery. They contain costs by cutting warranty claims. And they help our customers meet environmental regulations, emission standards and fuel efficiency guidelines.
Innovation
When you turn to Interface, you engage the support of a company whose lineage of engineering excellence dates back over 100 years. During this time, the company that is today known as Interface Performance Materials, Inc. has brought to market products that changed the landscape of sealing technology.

Our achievements include the development and introduction of rubber-edge composite sealing systems, a new class of sealing technology branded by Interface as Select-a-Seal®. And they include affordable, 100% asbestos- and solvent-free gasketing materials, which are steadily gaining acceptance in global markets and contributing to the safety of our environment.

Value in Final Use
At Interface, our overriding concern is to provide the solution that yields the greatest customer value in end use. To achieve this, we determine the product that will accomplish the assigned task and yield performance benefits that deliver a total lowest-cost payback.

This typically involves reducing costs associated with maintenance, repair and warranties, and it is made possible through Interface’s engineering experience and resources. As global requirements become more aggressive, and as standards for cost reduction, performance improvement and certainty of operation increase, you can turn to Interface with confidence that our products will pay back throughout the life of the application.

Interface customers include:
- Briggs & Stratton Corp.
- Carrier
- Caterpillar Inc.
- Cummins Eng."
Sealing Systems

With a wide range of non-asbestos, solvent-free gasketing materials in our product lineup and our novel Select-a-Seal system that permits designers to select an optimum balance of performance characteristics, Interface is uniquely equipped to meet your sealing needs with cost-efficient, environmentally-friendly solutions.

Select-a-Seal gaskets employ a rubber (polymer) edge on a composite body to create a highly durable sealing system. Rubber-edge composite (REC) is an entirely new category of sealing technology developed at Interface’s Lancaster, Pa., research facilities. With Select-a-Seal, Interface delivers to OEMs a reliable alternative to conventional solutions, such as rubber-edged metal and rubber-coated steel, at extremely competitive costs.

Investments in new generations of Select-a-Seal have yielded innovative variants to the original concept. For example, Select-a-Seal can now provide a highly conformable controlled adhesion edge. The patent-pending offering is meant for automotive and diesel applications characterized by excessive joint movement, or those where rough surfaces or long bolt spans present difficult sealing challenges. The system proved its technical reliability by surpassing 2,000 hours in thermal cycling tests on transmission pans and other components with unsteady joint mating characteristics.

**Rubber Edge:**
Compression + Conformable Controlled Adhesion Edge = Superior Sealing

**Compressible Base:**
Engineered to deliver compression, tensile and shear strength where they are needed most.
Encore™ Hydro-fused® metal core gasket materials provide excellent sealing performance, load retention, chemical resistance, structural strength and clean release characteristics upon disassembly.

MicroPore® materials with reduced pore size supply exceptional permeation resistance to liquids and gases. MicroPore products exhibit outstanding durability, thermal stability and compressive strength while sealing against diverse media.

Thermo-Tork® materials are fully cured binder, highly compressed gasketing products with good tensile strength, low creep relaxation, and excellent fuel and oil resistance. Thermo-Tork materials are recommended for high flange pressure applications with intermittent operating temperatures up to 400°C (750°F).

Syntheseal® UL-listed gasket materials have a reinforced fiber and nitrile binder composition with outstanding sealing characteristics. They offer excellent oil resistance and are recommended for applications with intermittent operating temperatures up to 180°C (350°F).

Applications
Interface sealing technology can address nearly any application where mating surfaces require a sealing interface. Much of our work today centers on diesel, small engine, vehicular, and motorcycle applications. Challenges abound, because in efforts to achieve greater fuel efficiency, designers globally are building engines that are smaller and lighter, and that run hotter. This makes sealing more difficult, but solutions are available even for the toughest sealing tasks.

Interface gasketing systems guard against leakage in:
- Compressors
- Light trucks
- Gasoline engines
- Diesel engines
- Motorcycles
- Oil pans
- Water pumps
- Hydraulics pumps
- Accessory drive covers
- Small engines
- Lawn mowers
- Transmissions
- Transfer cases
- Thermostats
- Water manifolds
- EGRs
- ...and much more

Select-a-Seal Success Stories

- At an international automotive original equipment manufacturer, Select-a-Seal gasketing technology guards against coolant leaks in SUVs and pickup trucks. The application involves an oval aluminum tube that serves as the fluid outlet for the intake manifold. Previously, a silicone compound was used as a sealant, but it would sometimes wipe off during installation, threatening the risk of leaks. Based on extensive testing, Select-a-Seal gaskets are a big improvement in terms of reducing leaks and enhancing customer satisfaction.

- At a major diesel-engine OEM, Select-a-Seal gaskets have proven a reliable, cost-effective solution in accessory drive cover applications in heavy-duty automotive engines. During 500-hour thermal cycle testing, Select-a-Seal was the clear winner over conventional fiber-on-metal-core gaskets. Select-a-Seal gaskets have since entered production, and the engine manufacturer reports a high level of automotive OEM customer satisfaction.
Barrier Materials and Flooring Felts

Interface brings to industry three product specialties: 1) sealing systems, 2) electrical barrier and thermal insulation materials, and 3) flooring felts—all of which deliver superior performance at affordable cost.

**Electrical and Thermal Barrier Materials**

**Voltoid®** Electrical Barrier and Insulation Materials provide OEMs and fabricators with some of the most advanced barrier solutions on the market. Designed for ease of fabrication, the line features materials with superior mechanical properties and a wide range of electrical, thermal and fire-resistance capabilities. The materials meet both original-equipment and aftermarket requirements in durable consumer goods, electronic products, transformers, motors and electrical fixtures.

Excellent consistency and uniformity are product hallmarks. Fabricators will find them especially suitable for die-cutting, punching, folding and forming. These materials are manufactured for dielectric strength, heat and moisture resistance, formability, thermal aging and to have favorable mechanical properties.

**Voltoid®**

<table>
<thead>
<tr>
<th>Electrical Barrier and Insulation Materials</th>
<th>Flame Retardant Materials</th>
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<tbody>
<tr>
<td>D-800</td>
<td>D-100</td>
</tr>
<tr>
<td>High phenolic resin content for mechanical strength and rigidity. Used for support of current carrying components.</td>
<td>Widely used in appliances for its economical combination of properties, including UL 94 V-0.</td>
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</tbody>
</table>
**Thermal Millboard** products deliver superior performance to designers seeking materials with excellent insulating characteristics. With high density and outstanding compressive strength, Thermal Millboard can be used in abusive environments as refractory back-up and personnel protection. Millboard will also withstand contact with molten metals and is suitable for other applications requiring high temperature performance.

**Printing Board** products find use in:
- The flexographic printing industry in the molding of rubber relief printing plates
- The greeting card and publishing industry for embossments and bindings
- Securities and currency printers

**Flooring Felts**

Interface and its predecessor companies have been manufacturing flooring felts since the 1930s. We understand that our felt products directly influence vinyl sheet flooring production processes and ultimately affect end-user satisfaction with image fidelity and ease-of-installation.

At Interface, we continue to bring innovation, investment and improved performance to the area of flooring felt production. At our Fulton, N.Y., plant, an automated delivery system increases control over processed additives and felt production. This means greater consistency and repeatability, and fewer variations during vinyl sheet processing operations.

**Applications:**

**Electrical and Thermal Barrier:**
- Electronic products
- Transformers
- Motors
- Electrical fixtures

**Flooring Felts**
- Custom felt solutions for flooring materials

**D-225**
Superior electrical performance and flame retardance in a competitively priced barrier material.

**S-350**
Cost-effective flame retardant sheet, suitable for flat and some formed parts.

**V-090**
A medium density material used primarily as a flexible composite electrical insulator.

**HP-450**
A sheet-based material designed to provide superior flame barrier properties and dimensional stability at elevated temperatures.
Investment and return
Reliable sealing solutions require investment and expertise in application analysis, gasket design, material properties, performance prediction, and part validation techniques.

Our investments in modeling and testing technologies put us on the same platform as much of our automotive, diesel, and small engine customer base, including customers in Europe and Asia. These investments include 3D solid modeling and FEA software to help shorten the design cycle and eliminate much of the up-front bench testing of materials and sample gaskets in OEM hardware.

We have also invested in thermal cycle chamber testing as a means of pre-validating finished parts, and have recently added simultaneous thermal and vibrational testing capability. Free pre-validation testing services are provided for certain Interface product categories.

Certainty of operation
Interface’s advanced testing and analysis capabilities free our customers from time-consuming product selection and testing. They also generate the engineering data needed when investing in costly tooling or launching other activities that require engineering data.

We understand the importance of providing a high degree of technical reliability, including reliability of data accuracy, reliability of meeting data delivery dates, and reliability of performance. Having earned our customers’ confidence, we include product selection and testing services in our offering.

Solutions that lower your cost of operation
Cost pressures on OEMs are increasing. Price increases in basics such as raw materials and energy offer little room for reduction. Interface has developed ways to cut costs from areas that might otherwise be overlooked, by analyzing your total design and manufacturing procedures.

Central to the process is selecting a sealing material and construction that can remove existing or anticipated costs. For example, Interface may eliminate the need for machining operations with an alternative sealing solution. Or bypass steps such as online testing by using better performing materials. Or eliminate the need for expensive tooling compared to alternative technologies such as Rubber-Edged Metal or Rubber-Coated Steel.

The voice of the customer in every solution
Whether your application is a new sealing design or a more efficient seal for existing equipment, Interface works closely with you from the earliest project stages. Our goal is to ensure delivery of the optimum business solution. We can provide full design assistance with every application and work with personnel throughout your organization, including purchasing and sales.
Testing for predictable performance

Built into each Interface solution is a degree of predictability that OEMs can depend on when calculating equipment service life, and that fabricators can rely on for batch-to-batch product consistency.

Durability testing: We use thermal cycle chamber testing with standardized OEM-representative hardware as part of the product development process. In this way, durability in application is built into each new Interface product offering.

Physical Property testing: We use a wide range of standard and proprietary material testing techniques to characterize the behavior of Interface materials in application. This data is built into our FEA modeling process so that any Interface-approved gasket design is very likely to meet OEM validation testing requirements.

Pre-Validation testing: Using our thermal cycling chambers, vibrational test equipment and fluid circulation equipment, we can offer pre-validation services to OEMs that desire to go directly to final part validation and release.

Quality Control testing: Every Interface manufacturing location has accredited QC laboratory testing facilities and supplies test data with every shipment of product. Consistent manufacturing processes yield consistent product performance.

Rapid prototyping

Importantly, we are geared to provide fast turnaround. Select-a-Seal prototypes are delivered within 10 days from the date a customer approves our product design print.

Complete Capabilities

Testing, analysis, product samples, pre-validation—and a single point of accountability. Interface’s complete set of capabilities differentiates us in the marketplace and offers good reasons to choose us as your sealing solution provider.

Research and Development

Interface’s ability to create, refine and bring to industry products that deliver improved performance, while reducing overall total cost, begins at our world class 25,000 sq. ft. Technical Center in Lancaster, Pa. Here, engineers and scientists perform a full range of functions, including:

- Product and process development
- Advanced beater addition development
- Applications engineering and technical support
- New market development

Understanding the needs of customers, Interface’s technical team works to meet increased demands for product performance, cost and technical information. To meet dynamic application requirements, the technical team strives for continual improvement in flange design flexibility, rapid prototyping, leak-free performance, multimedia sealability, long-term durability and best value.
Production and Quality

ISO17025 that perform testing of our products in accordance with internationally recognized standards.

Our ability to deliver consistent product quality, technical reliability and dependable supply is a key component of our company’s business model and has earned our customers’ trust. OEMs receiving Interface product have come to expect consistent quality, lot-to-lot, delivered on time and then performing to specified standards.

We continue to invest each year to ensure that we have the best production equipment. Interface’s forming and raw materials preparation operations are all computer controlled and run on programs developed specifically for the converting industry. As an added quality assurance, an ABB Accuray system monitors operations on our paper machine and calendering lines. Prior to shipment, material undergoes physical property testing such as tensile strength, compressibility and recovery, and swell in oils and fuels. This process is used to provide ongoing product certification.

A culture of quality is evident everywhere at Interface. Each of our manufacturing plants shown in the table is registered to ISO 9001, while our Centerville operation is accredited to TS16949. Each plant has a dedicated quality manager, charged with ensuring that every order conforms to customer specifications. Interface maintains three labs accredited to
### Plant Capability Analysis

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<thead>
<tr>
<th></th>
<th>FULTON</th>
<th>LEWIS</th>
<th>HOOSICK FALLS</th>
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<tbody>
<tr>
<td><strong>Plant Size</strong></td>
<td>500,000 Sq. Ft. (50,000 m²)</td>
<td>150,000 Sq. Ft. (15,000 m²)</td>
<td>100,000 Sq. Ft. (10,000 m²)</td>
</tr>
<tr>
<td><strong>Processing Line</strong></td>
<td>Fulton #1</td>
<td>Fulton #3</td>
<td>Lewis #4</td>
</tr>
<tr>
<td><strong>Products</strong></td>
<td>Backing for Resilient Flooring</td>
<td>Fiber Gasket Materials</td>
<td>Thermal Papers</td>
</tr>
<tr>
<td><strong>Equipment/Capabilities</strong></td>
<td>151&quot; (4 m) wide Fourdrinier</td>
<td>84” (2 m) wide Fourdrinier</td>
<td>Fiber Gasket Materials</td>
</tr>
<tr>
<td></td>
<td>Off-line Calendering, Curing, Laminating, Coating, Branding and Packaging</td>
<td>84” (2 m) wide Fourdrinier</td>
<td>113” (3 m) wide Double Cylinder Machine</td>
</tr>
<tr>
<td><strong>Key Customers</strong></td>
<td>Armstrong World Industries</td>
<td>Dana Corp. Dong-A Cooper Mfg. Federal Mogul Hoosier Gasket TFK</td>
<td>Dana Corp. Federal Mogul Freudenberg-NOK Talbros Vellumoid</td>
</tr>
<tr>
<td></td>
<td>Dana Corp. Federal Mogul Freudenberg-NOK Talbros Vellumoid</td>
<td>Thermal Ceramics Dana Corp. Die Cut Technologies Dong-A Hoosier Gasket Square D (electric papers)</td>
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</table>
Support for Business Partners

Fabricator Programs
Interface supports its fabricator partners with an array of business programs, training and marketing support to help them bring our solutions to customers.

The Value Added Network (VAN) Program
Fabricators looking for ways to enhance their business appreciate the financial incentives and efficiency of one-stop shopping when they participate in Interface’s Value Added Network incentive and growth program.

Product and Sales Training for Fabricators
At Interface technical and sales training seminars, VAN members learn to identify opportunities to provide value to the customer, to deliver Interface engineering assistance where needed, and to present Interface’s performance benefits.

The Value Grade Business Advantage
VAN fabricators working with OEMs who specify products from Interface’s Value Grade line of gasket materials are assured of 100% availability, reduced lead times, pricing commitments and custom application analysis. The Value Grade line consists of 10 high-performance gasket materials, each of which has unique performance characteristics and is among the most effective materials in its class. Together, these materials handle over 90% of the most common gasketing applications.

Marketing Support
Interface has published product literature, catalogs, videos, price sheets and technical data sheets for use during customer meetings or as part of direct mail campaigns.

Global Loyalty Program
Interface offers a special program to companies willing to commit to using only genuine Interface Performance Materials 100% asbestos and 100% solvent-free materials in the products they provide to aftermarket customers. These materials can be sold with confidence into any market in the world. Interface builds even more confidence by providing members of the program with high-level technical support and special market opportunities for our inherently safe and environmentally-friendly fiber gasket materials.