
Greene Tweed
SOLUTIONS FOR THE
CHEMICAL PROCESSING INDUSTRY
BEGIN >

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Greene Tweed: An Overview

For more than 150 years, Greene Tweed's customers have relied on the company's materials expertise and collaborative approach to the design and manufacture of elastomeric, thermoplastic, and thermoplastic composite solutions. Our products deliver proven performance in chemical plant processes that include aggressive media such as hydrocarbons and aromatics, strong oxidizing acids, alcohols, sour gases, and amines.

Greene Tweed's industry-experienced design and application engineers solve the toughest sealing and wear applications through a deep understanding of materials science, equipment knowledge, and customer requirements. They evaluate and offer solutions for high pressure, broad temperature ranges, chemical compatibility, efficiency, reliability, and emissions through the innovative use of Greene Tweed's best-in-class materials portfolio.

In-house design capabilities include 3D-modeling, rapid prototyping, and finite element analysis (FEA), including computational fluid dynamics (CFD) and dynamic, thermal and thermo-mechanical analysis, and material flow modeling.

Greene Tweed's materials and product testing labs are ISO 17025 accredited with world-class testing capabilities. We test our raw material production batches in accordance with strict compliance standards to ensure mechanical and other properties. We routinely test our materials to 37 internationally recognized test methods. We have test equipment for materials characterization, processing properties, accelerated fluid aging, corrosion, rapid gas decompression (RGD), static pressure testing up to 42,000 psi (2896 bar) and 600°F (315°C), vibration and shock testing up to 300g, and more. We can perform custom-designed tests upon customer request and use independent third-party labs for certain certification tests and capabilities as needed.

As an ISO 9001-certified organization, Greene Tweed adheres to the strictest of manufacturing standards at all of our global facilities. Among other capabilities, we offer compression and injection molding, CNC milling, and waterjet and surface grinding processes. For applications where required, Greene Tweed offers cleanroom manufacturing in class 100 and 1000 environments.

Greene Tweed has been pushing the limits of materials science for decades to develop high-performance solutions for the chemical processing industry. Chemraz® perfluoroelastomers lead the way for critical sealing applications, while our patented Arlon® 3000 XT promises to raise the bar in performance for key thermoplastics components. Greene Tweed's presence in the Americas, Europe, and Asia ensures local responsiveness that enables our customers' technologies around the world.

Greene Tweed has been pushing the limits of materials science for decades to develop high-performance solutions for the chemical processing industry.

Elastomers

An elastomer is a polymer chain with viscoelasticity, meaning that it can be stretched and retracted. Elastomers make excellent sealing materials. Because elastomers are self-energizing, they provide a sealing force response when compressed. Elastomeric seals are flexible, durable, and easy to install. Elastomers also conform well against many different surfaces.

Our elastomers lead the market because they are durable and withstand aggressive chemicals, high temperature, thermal cycling, pressure cycling, compression set, and RGD.

Greene Tweed's high-performance, proprietary, elastomeric offerings for the chemical processing industry include our flagship Chemraz® FFKM, Fusion™ FKM, Xyfluor®, and Fluoraz® FEPM. We also offer EPDM, HNBR, and NBR materials for less extreme application requirements.

Chemraz®

For more than 30 years, Greene Tweed's Chemraz® perfluoroelastomers have provided reliability in harsh environmental conditions. Chemraz® FFKM is the ultimate elastomeric material. Its perfluorelastomers are made from fluorinated monomers, including tetrafluoroethylene and perfluorovinylether, and a cure site monomer for crosslinking.

Chemraz® offers the broadest chemical resistance of any elastomeric material, combining the resilience and sealing force of an elastomer with chemical resistance approaching that of PTFE while withstanding a wide range of temperatures (-40°F to 615°F, -40°C to 324°C).

Chemraz®'s distinctive chemical composition makes it well suited for a range of applications. Because of its low compression set, outstanding physical properties, and universal chemical resistance, Chemraz® provides an incredibly high sealing force.

The Chemraz® product portfolio includes:

- Chemraz®505 – broad chemical compatibility for use in a wide range of harsh applications
- Chemraz®526 – provides excellent resistance to extrusion in applications with high differential pressure; qualified for RGD resistance by a third party
- Chemraz®555 – offers superior high-temperature capability and excellent compression set and steam resistance
- Chemraz®585 – Cream-colored FFKM optimized for use in applications where contamination is a concern
- Chemraz®605 – low compression set and excellent performance in high temperatures and steam
- Chemraz®678 – specially designed for improved low-temperature capabilities; qualified for RGD resistance by a third party
- Chemraz®694 – best-in-class performance in hot steam environments

Go to: **Fusion™** | **Fluoraz®** | **Xyfluor®**

Elastomers

Fusion™

Fusion™ FKM elastomers have excellent compression set resistance at temperatures up to 450°F (232°C) and are compatible with a broad range of chemicals, including hydrocarbons, inorganic acids, and aromatic solvents such as benzene, toluene, and xylene. FKMs are generally not recommended for strong bases or strong organic acids. We have formulated specialty compounds for RGD resistance, low temperatures, low electrical conductivity, and improved resistance to polar solvents such as methanol.

FKM is a fluorinated elastomer of the polymethylene type that uses vinylidene fluoride as a co-monomer and has substituent fluoro, alkyl, perfluoroalkyl, or perfluoroalkoxy groups on the polymer chain, with or without a cure site monomer. FKM elastomers are classified into different types based on the monomer used to manufacture the polymers.

Fluoraz®

Fluoraz® FEPM elastomers deliver excellent chemical resistance against acids and bases such as methanol, amines, ammonia, urea, hydrochloric acid, and steam at temperatures up to 450°F (232°C) Fluoraz® is generally not recommended for aromatic hydrocarbons.

Xyfluor®

Xyfluor® is a proprietary, highly fluorinated elastomer. Xyfluor®'s chemical compatibility surpasses that of an FKM and can handle amines, ketones, and hydrofluoric acid for static applications in temperatures ranging from -76°F (-60°C) to 450°F (232°C), making Xyfluor® an excellent option for applications requiring both low-temperature capability and aggressive chemical resistance.

Our Fusion™ product portfolio includes:

- Fusion™ 731 – a widely-specified general-purpose compound
- Fusion™ 927 – a reliable solution for high-pressure sealing applications
- Fusion™ 935 – formulated for improved low-temperature performance and chemical compatibility
- Fusion™ 938 & 944 – provide superior RGD resistance, having both successfully passed stringent ISO 23936-2 & NORSOK M-710 test protocols; both received a perfect score (0-0-0-0) for RGD resistance, showing no cracks, voids, or blisters

Our Fluoraz® product portfolio includes:

- Fluoraz® 790A – aramid-fiber-reinforced material
- Fluoraz® 797 – general purpose applications
- Fluoraz® 799 – for improved extrusion resistance in applications with high differential pressure

Our Xyfluor® product portfolio includes:

- Xyfluor® 860 – Excellent chemical compatibility and offers a wide temperature range from -76°F (-60°C) to 450°F (232°C)
- Xyfluor® 870 – Dependable balance of physical properties at temperatures as low as -76°F (-60°C) and as high as 450°F (232°C)

Go to: **Chemraz®**

Thermoplastics

Advanced engineered thermoplastics are the ideal solution when operating conditions preclude the use of elastomeric or metallic parts. Thermoplastics can withstand common chemical processing environments, including aggressive chemicals, extreme pressures, and severe temperatures. Thermoplastic compounds deliver structural integrity despite environmental conditions such as wear, abrasion, shock, and vibration.

Advanced thermoplastics are used:

- As valve seats in demanding valve applications
- In valve assemblies in high-temperature reciprocating compressors
- As housings, isolators or wetted parts in instrumentation like level transmitters or conductivity sensors
- Many other applications

Arlon®

Arlon® materials are proprietary PAEK (polyaryletherketone) thermoplastic compounds, which include the PEEK (polyetheretherketone) and PEK (polyetherketone) subsets of compounds that provide high strength, wear resistance, and are well suited for use in highly dynamic applications.

The operating temperature range of our Arlon® portfolio extends from subzero temperatures to 500°F (260°C). With excellent thermal stability, low wear, and high-impact resistance, Arlon® is suitable for tough applications requiring long life.

Arlon® materials are resistant to a wide range of chemicals including common fluids found in chemical processing applications. These characteristics, combined in a material with a high strength-to-weight ratio, make Arlon® an optimal choice for the most demanding chemical processing applications. Some of our Arlon® compounds provide superior wear resistance and has been used successfully in a range of bushing and bearing applications.

Our Arlon® product portfolio includes:

- Arlon® 1000 – recognized as the leading proprietary PEEK in the oil & gas and petrochemical markets; offers a unique combination of mechanical, thermal, chemical, and electrical properties; ISO 23936-2 certified for fluid aging by an independent third-party laboratory
- Arlon® 1260 – a high-performance, carbon-filled thermoplastic ideal for applications requiring corrosion resistance and dimensional stability (highest strength and modulus of all Arlon® grades)
- Arlon® 1330 – ideal for applications requiring exceptional wear resistance and chemical compatibility; provides good dimensional stability without the addition of carbon fibers
- Arlon® 1555 – excellent high-load-bearing material
- Arlon® 3000 XT – a patented and ISO-23936-2-certified cross-linked PEEK that provides highly improved mechanical properties in high-pressure, high-temperature applications and enhanced performance in electrical applications

Go to: **Avalon®**

Thermoplastics

Avalon®

Avalon® fluoropolymer materials provide superior low friction when used in a wide variety of seal types including MSE®s, backup rings for the G-T® ring, v-rings for v-packings, and valve seats. We offer a range of virgin and blended Avalon® fluoropolymers. The base fluoropolymer material provides excellent lubricity while additives provide enhanced chemical resistance, greater high-pressure and high-temperature performance, and outstanding wear characteristics.

Avalon® is suitable for a variety of applications including those requiring nonabrasive contact surfaces, high-temperature wear resistance, low deformation under load, excellent chemical resistance, and high-surface speeds.

- Avalon® 01 – an unfilled grade of PTFE, suitable for a variety of applications, including metal spring energized (MSE®) seals and bushings, and within seal assemblies
- Avalon® 09 – a graphite-filled PTFE; provides good wear and extrusion resistance and can be used in MSEs and v-rings, in a service temperature range of -436° to 500°F (-260° to 260°C)
- Avalon® 11 – carbon- and graphite-filled PTFE; provides extrusion resistance and can be used as backup rings
- Avalon® 89 – lubricated and carbon-filled grade of PTFE; certified to ISO 23936-2 for fluid aging by an independent third-party laboratory; exhibits high creep and wear resistance

Additional grades of Avalon® are available and may be recommended depending on the requirements of your application.

Avalon® is suitable for a variety of applications including those requiring nonabrasive contact surfaces, high-temperature wear resistance, low deformation under load, excellent chemical resistance, and high-surface speeds.

Go to: **Arlon®**

Thermoplastic Composites

Fiber-reinforced composites are engineered when a thermoplastic resin is used to bind and support the reinforcing fibers. Together, the thermoplastic resin and fibers act in synergy to become a material with properties that are superior to the individual constituents.

Greene Tweed offers three families of thermoplastic composite materials: WR® (Wear Resistant) and AR® (Abrasion Resistant) materials, and Xycomp® containment shells. Many of these materials are available in a variety of assemblies, finished parts, and stock shapes. Finished parts include wear rings, bearings, bushings and thrust pads.

WR® Materials

The WR® (Wear Resistant) line offers excellent wear and friction properties, along with superior non-galling and non-seizing performance. The WR® material portfolio enables extended MTBR and improved reliability. WR® materials operate in cryogenic temperatures to 525°F (274°C).

Offering extended dry-run performance and exceptional chemical resistance, our WR® materials enable clearance reduction up to 50 percent in many cases. These reduced clearances minimize recirculation, which maximizes rotor stability (reducing vibration) and overall efficiency.

WR® 300 is suitable for general wear resistance and is often used for wear rings, bearings, and bushings. WR® 525 provides solutions for wear rings, bearings, and bushings in stationary and rotating applications. Components manufactured from WR® 575, such as thrust pads and hydrodynamic bearings, are used in a variety of equipment, including pumps, turbines, and compressors. WR® 650 & 600 wear rings, bearings, and bushings provide extended dry run capability and universal chemical compatibility in critical applications.

Greene Tweed offers three families of thermoplastic composite materials: WR® (Wear Resistant) and AR® (Abrasion Resistant) materials, and Xycomp® containment shells.

AR® Materials

Greene Tweed's AR® (Abrasion Resistant) line offers superior abrasion resistance and is less harsh to mating hardware compared to competing materials. The AR® line extends the service life of pumps and reduces downtime for pumps handling media-containing abrasives such as sand, coal ash, and other solids, which can wreak havoc in pumps.

AR® 1 provides general abrasion resistance and is particularly suitable for vertical pumps, while AR® HT is suitable for high-temperature, abrasive-resistant applications, such as vertical water intake pumps in nuclear facilities.

Go to: **Xycomp®** | **Thermoplastic Composite Materials Portfolio**

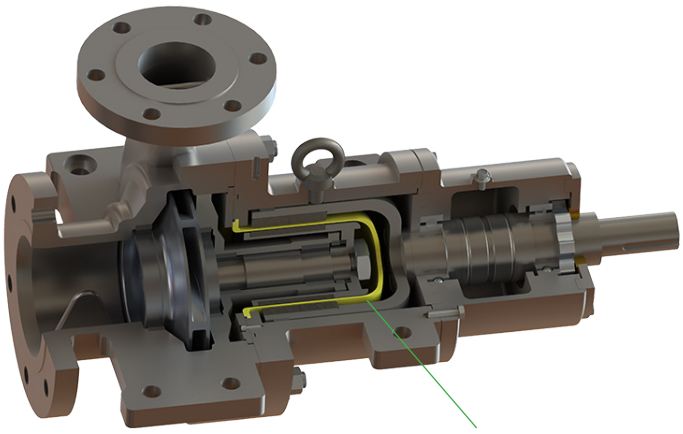
Thermoplastic Composites

Xycomp® Materials

Xycomp® materials deliver high strength, low weight, corrosion resistance, and dimensional stability. Solutions manufactured from Xycomp® materials may be used in high-temperature and high-pressure applications up to 40 bar (580 psi) at 350°F (177°C) for continuous service conditions. Xycomp® is ideally suited to replace metallic or ceramic shells in Mag-drive pump applications.

Xycomp® offers significantly reduced energy and maintenance costs to keep pumps running longer and more efficiently. From improved chemical and impact resistance to excellent post-molding machinability, this innovative material offers a wide range of benefits for challenging chemical, petrochemical and power applications..

Using Xycomp® as containment shells eliminates eddy current losses in magnetically driven pumps for dramatic energy savings and improved efficiencies.



Xycomp®
Containment Shell

Xycomp® is ideally suited to replace metallic or ceramic shells in Mag-drive pump applications.

Go to: **WR®** | **AR®** | **Thermoplastic Composite Materials Portfolio**

Thermoplastic Composite Materials
Portfolio

Click on the product name to access additional information.

WR® 300
- **Material:** PEEK reinforced with short, random carbon fibers
- **Temperature:** Subzero/275°F (135°C)
- **Application:** General wear resistance

WR® 525
- **Material:** PEEK reinforced with continuous hoop-wound carbon fibers
- **Temperature:** Subzero/525°F (274°C)
- **Application:** Stationary and rotating applications

WR® 575
- **Material:** PEEK-reinforced woven carbon fiber
- **Temperature:** Subzero/482°F (250°C)
- **Application:** Thrust pads for high-speed machinery

WR® 600
- **Material:** Carbon fiber-filled PFA
- **Temperature:** Cryogenic temperatures/500°F (260°C)
- **Application:** Excellent thermal shock resistance; universal chemical compatibility

WR® 650
- **Material:** Carbon fiber-filled PFA
- **Temperature:** Cryogenic temperatures/500°F (260°C)
- **Application:** Extended dry run capability; universal chemical compatibility

AR® 1
- **Material:** Filled PTFE
- **Temperature:** Subzero/120°F (49°C)
- **Application:** General abrasive resistance

AR® HT
- **Material:** Proprietary blend of PTFE and PEEK
- **Temperature:** Subzero/250°F (121°C)
- **Application:** Higher temperature, abrasive resistance

Arlon® 4020
- **Material:** A proprietary PEEK thermoplastic material specifically developed for labyrinth seal applications
- **Temperature:** Subzero/392°F (200°C)
- **Application:** Labyrinth Seals

Xycomp®
- **Material:** Discontinuous and continuous carbon-fiber and PEEK composite
- **Temperature:** Cryogenic temperatures/350°F (177°C)
- **Application:** Containment shells and pressure vessels

Go to: WR® | AR® | Xycomp® | Thermoplastic Composite Materials Portfolio

Sealing Solutions

Seals prevent fluids, liquids and gases or debris, from migrating from one location into another or into the environment. A damaged seal on a safety valve that allows toxic or harmful emissions to escape may lead to fines from environmental agencies and a host of health, safety, and environmental issues. A seal failure in a critical service application can shut down an entire production facility, resulting in millions of dollars of lost revenue.

Greene Tweed manufactures our seals from proprietary elastomeric and thermoplastic materials in designs ranging from standard o-rings to custom-engineered seal stacks for complex applications. We primarily offer five core types of seals for the chemical industry: o-rings, G-T® rings, MSE® seals, seal stacks, and capped seals. We also offer other engineered seals for niche applications.

Greene Tweed manufactures our seals from our proprietary elastomeric and thermoplastic materials in designs ranging from standard o-rings to custom-engineered seal stacks for complex applications.

O-Rings

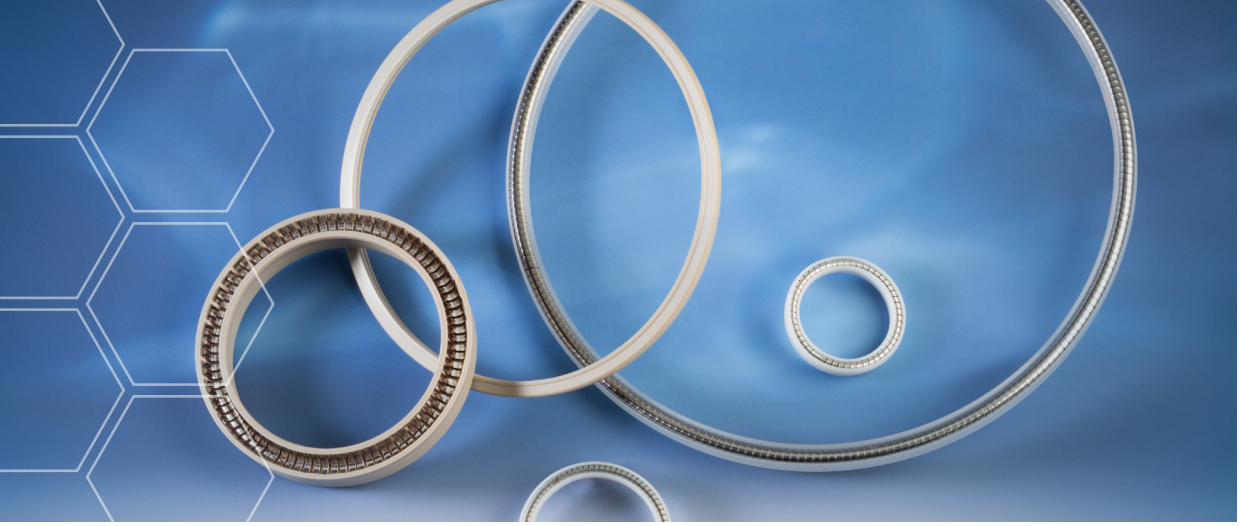
The o-ring, the most universally recognized seal design, has a simple geometry made from an elastomeric material. O-rings are used in mechanical seals, as standalone seals in static applications, or as an energizer in capped seals. Greene Tweed may recommend a precision-machined thermoplastic backup ring for extrusion resistance in high-pressure applications.

We offer o-rings in AS568 or ISO 3601-1 standard sizes, and design and manufacture them in non-standard sizes to meet individual customer needs.

G-T® Rings

Greene Tweed invented the G-T® ring in the 1960s. The design, now commonly known as a t-seal, is widely used throughout the chemical industry as well as many other industries. The t-shaped elastomeric seal element provides more stability and eliminates roll and spiral failure in dynamic applications compared to o-rings. Integrated thermoplastic backup rings provide pressure-activated extrusion resistance in a compact design that has a smaller footprint than an o-ring with separate backup rings. The G-T® ring provides a bi-directional seal. We also offer the GTL™ ring, which is a unidirectional version of the G-T® ring.

Go to: **MSE®** | **Seal Stacks** | **Capped Seals** | **Labyrinth Seals**



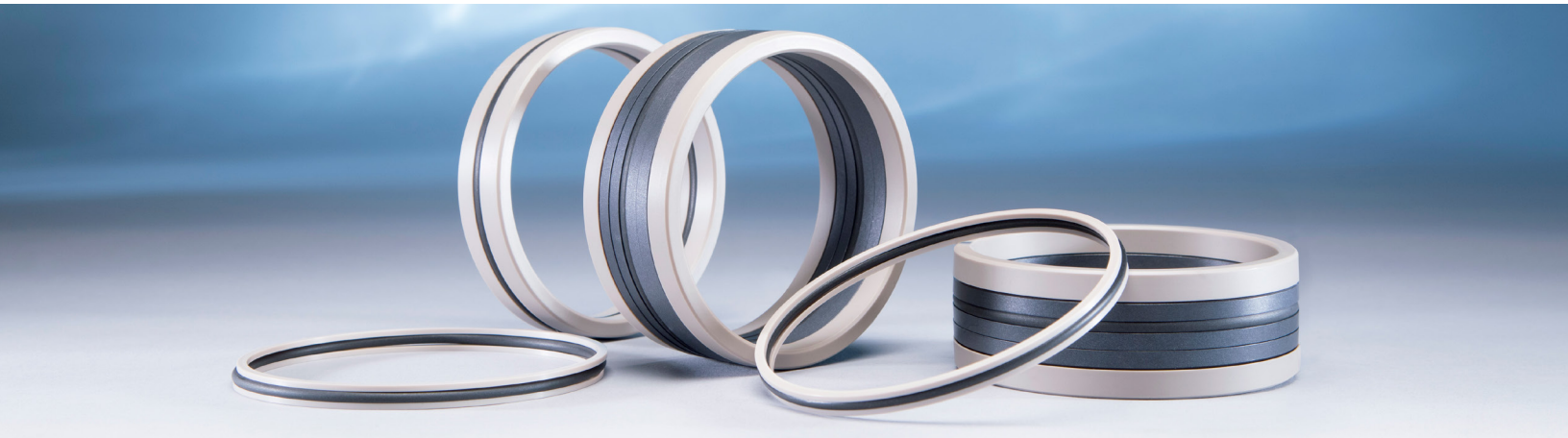
Sealing Solutions

MSE®s

MSE® seals are unidirectional seals that are well suited for reciprocating or rotary dynamic applications that require sealing force at both low and high pressures, such as for tools that undergo pressure cycling. They are also applicable for cryogenic operations below the temperature capabilities of elastomeric seals. MSE® seal assemblies consist of a thermoplastic jacket energized with a corrosion-resistant metallic spring. Greene Tweed has extensive experience with this type of seal, having engineered thousands of MSE®s.

Seal Stacks

Seal stacks are a custom-designed sealing solution for complex applications, such as port crossing hardware configurations, with multiple redundant sealing elements including v-rings, adapters, load rings, and MSE®s. Greene Tweed's extensive portfolio of elastomeric and thermoplastic materials enables us to balance requirements for wear resistance, low friction, extrusion resistance, and other challenges to design a customized sealing solution. For example, a seal stack may contain an MSE® for reliable sealing force at low pressures, with backing elastomeric v-rings for additional tight sealing against gas, along with thermoplastic v-rings for superior wear resistance under high dynamic cycling.



Go to: **O-Rings** | **G-T Rings®** | **Capped Seals** | **Labyrinth Seals**

Sealing Solutions

Capped Seals

Capped seals contain an elastomeric energizing element with a thermoplastic cap on the sealing face. The thermoplastic cap provides lower breakaway and running friction and better wear resistance than an elastomer alone in high dynamic, reciprocating, or rotary applications. Capped seal assemblies may include thermoplastic backup rings for resistance to extrusion in high-pressure applications. Greene Tweed offers three main types of capped seals:

- The Advancap™ is our simplest capped seal design for general-purpose duty cycles. The curved cap design resists roll and spiral failure of the o-ring energizer compared to traditional rectangular-shaped cap components.
- The Ener-Cap® seal cap geometry provides improved stability compared to the Advancap™ and eliminates roll and spiral failure. The elastomeric energizer's profile provides more evenly distributed loading to the sealing cap for improved wear life in high duty cycle applications.
- The capped G-T® ring, a capped version of the GT® ring, consists of a t-shaped elastomeric energizer fitted with a contoured sealing cap and integrated pressure-activated backup rings.

Go to: **O-Rings** | **G-T Rings®** | **MSE®** | **Seal Stacks** | **Labyrinth Seals**

Solutions by Equipment

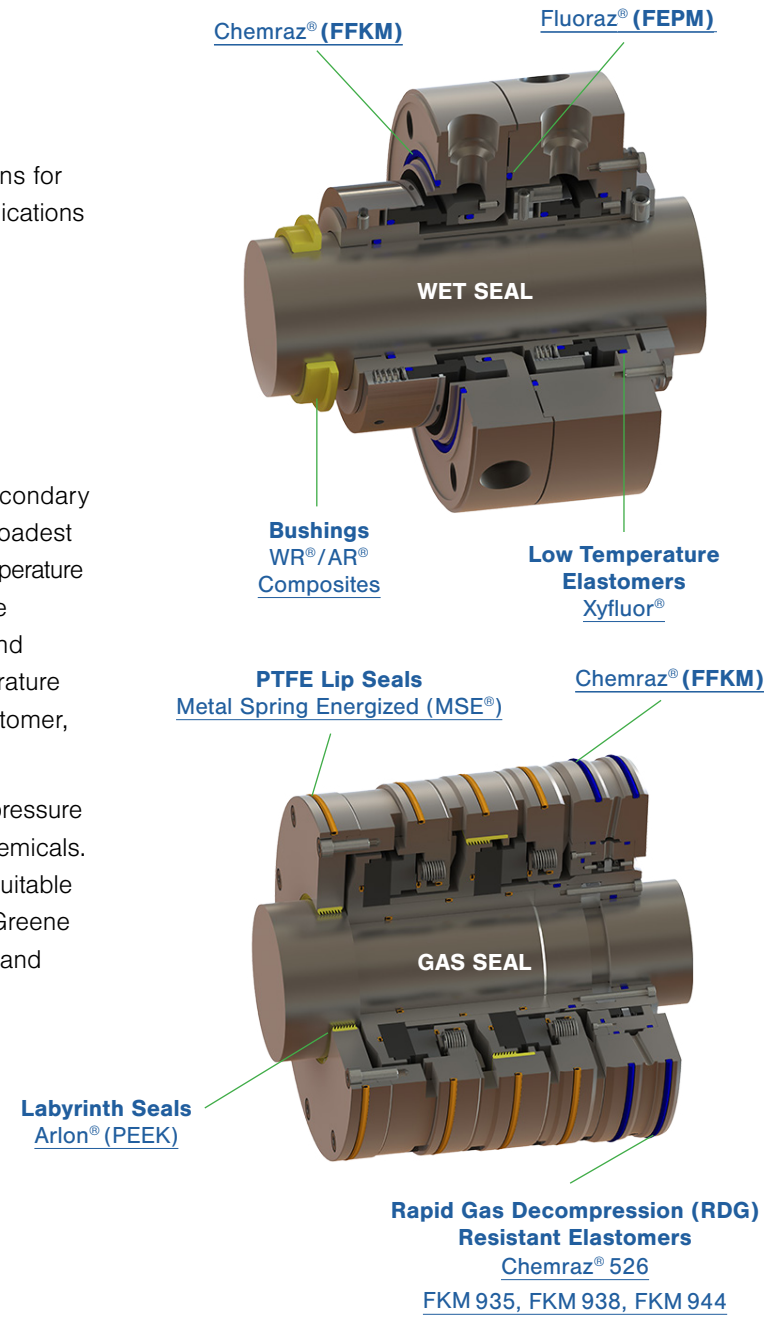
Mechanical Seals

Greene Tweed has a long history providing reliable solutions for mechanical seals. Our applications engineers evaluate applications and make recommendations that:

- Increase overall equipment reliability
- Withstand upset conditions
- Enable standardization
- Reduce total cost of ownership

We offer a variety of elastomers for the o-rings used as secondary seals within a mechanical seal. Chemraz® provides the broadest chemical compatibility range of all elastomers, with a high temperature capability up to 615°F (324°C). Fusion® and Fluoraz® are typically chosen for chemical compatibility performance and temperatures to up to 450°F (232°C) while for low-temperature performance, Xyfluor®, a proprietary highly fluorinated elastomer, offers best-in-class performance down to -76°F (-60°C).

Lip seals and MSE® seals may be recommended for high-pressure applications that require robust resistance to a variety of chemicals. In dry gas seals, an Arlon 4020 labyrinth seal could be a suitable solution to eliminate sealing problems due to corrosion. A Greene Tweed engineer can recommend the appropriate material and secondary seal geometry.



Go to: **Valves** | **Pumps** | **Centrifugal Compressors** | **Reciprocating Compressors** | **Instrumentation**

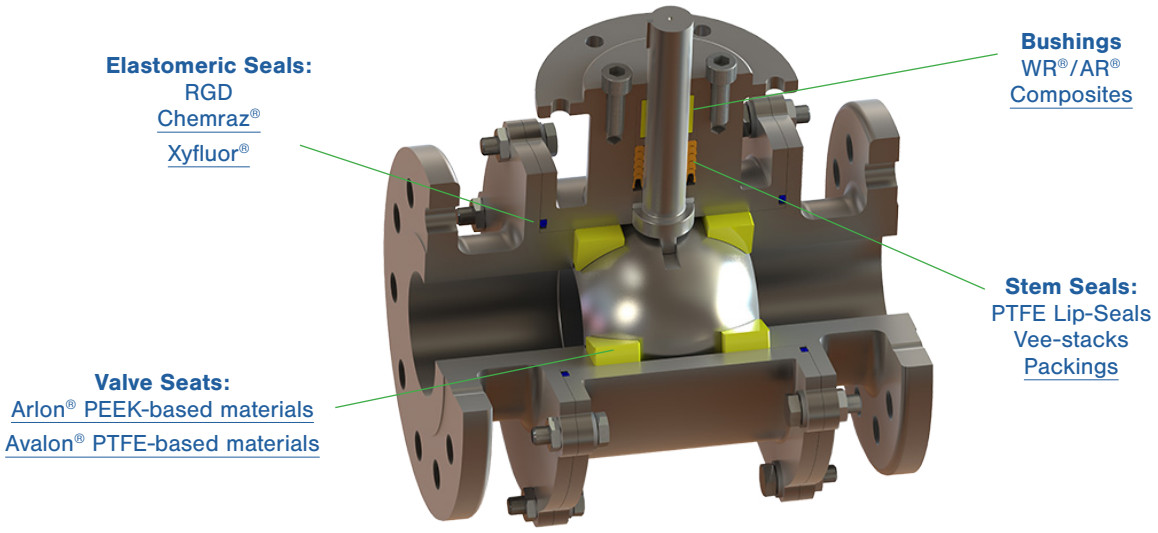
Solutions by Equipment

Valves

Backed by more than 30 years of experience in designing solutions that reduce leakage and fugitive emissions in valves, Greene Tweed engineers components to optimize a valve's performance – taking media, temperature, and pressure, among other factors – into consideration.

We offer elastomeric seals, valve seats, bushings, and stem seals, engineered for a variety of valve types including ball valves, needle nose valves, gate valves, globe valves, check valves, instrumentation valves, and more.

Greene Tweed's Arlon® and Avalon® materials are extensively used as valve seats in demanding valve applications. Our knowledge of these materials and their behavior during molding and machining processes allows us to produce parts with consistent material characteristics and very close dimensional tolerances. This results in parts with lower deformation under load (creep), lower leakage rates, and higher temperature ratings.



Go to: **Mechanical Seals** | **Pumps** | **Centrifugal Compressors** | **Reciprocating Compressors** | **Instrumentation**

Solutions by Equipment

Pumps

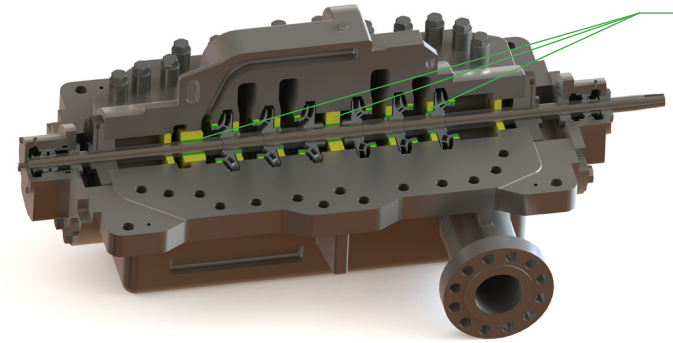
In addition to a variety of sealing options, Greene Tweed offers pump components engineered from our high-performance thermoplastic composite materials for centrifugal pumps and seal-less (magnetic drive and canned motor) pumps. End users specify our products to increase reliability and efficiencies in chemical plants, refineries, petrochemical plants, and power generation plants worldwide.

In challenging chemical processing environments, components must withstand aggressive media across a wide range of application parameters including abrasive and/or corrosive liquids. These fluids can cause damage that leads to machinery failure and costly downtime.

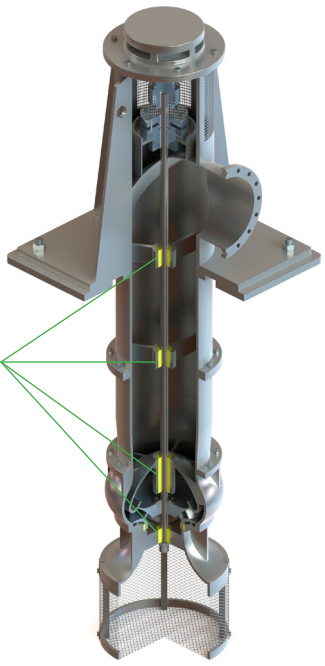
In centrifugal pumps, wear materials act as a buffer between rotating and stationary parts that are traditionally metallic. To avoid galling and possible equipment seizure, dynamic metal clearances are set at a generous minimum as an industry standard. Non-metallic wear parts, such as those manufactured from Greene Tweed's thermoplastic composites, enable smaller dynamic clearances. A smaller dynamic clearance has two distinct advantages. First, the reduced clearance restricts the recirculation of process media, thereby improving system efficiency. Second, the reduced clearance generates increased fluid pressure around the shaft, resulting in shaft stabilization and reduced system vibration.

For more than two decades, our best-in-class thermoplastic composite WR® and AR® components have performed successfully in chemical processing environments to extend MTBR and have been used in most API and ANSI pump configurations..

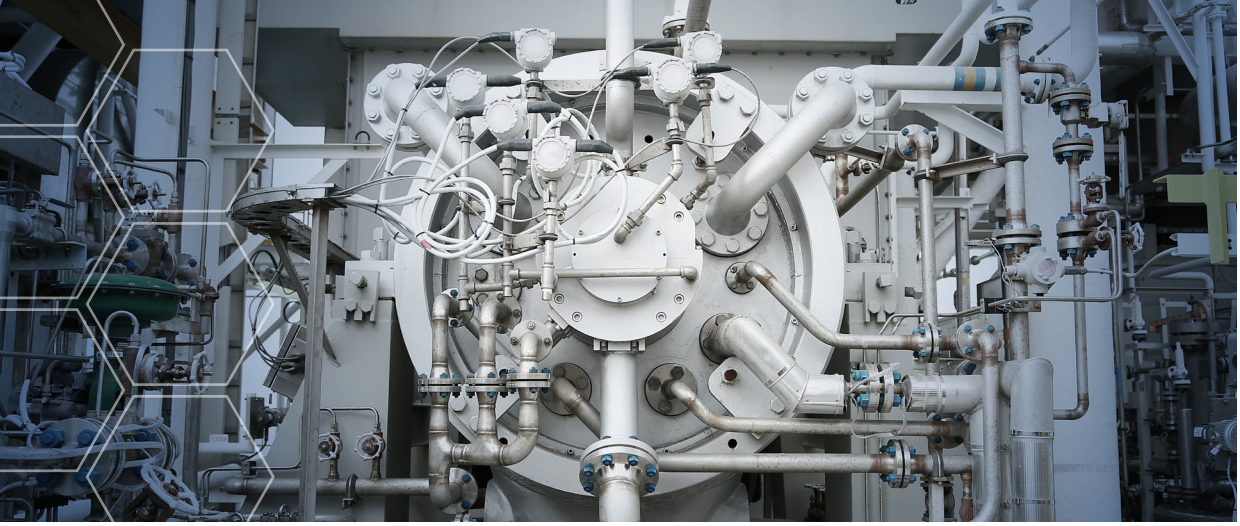
Advanced thermoplastics are used: In pumps to replace metallic parts such as bearings, bushings, wear rings, and sleeves



Wear Rings, Bushings
WR®/AR® Composites



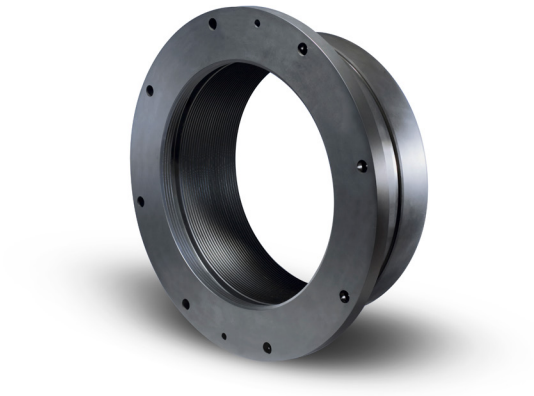
Go to: **Mechanical Seals** | **Valves** | **Centrifugal Compressors** | **Reciprocating Compressors** | **Instrumentation**

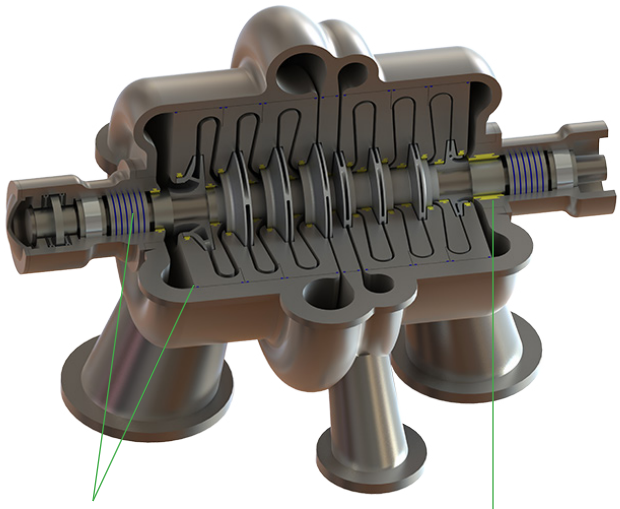


Solutions by Equipment

Centrifugal Compressors

Our seals portfolio features a variety of geometries including MSE® lip seals, labyrinth seals, and O-rings. Through careful material selection, we can optimize for chemical resistance and temperature condition to minimize the likelihood of unplanned downtime. In addition, we offer materials qualified for Rapid Gas Decompression (RGD) under the ISO 23936-2 testing standard.





Casing Seals, Cartridge Seals, and Mechanical Seal Solutions:
RGD
Chemraz®
Xyfluor®
MSE®s

Labyrinth Seals
Arlon® (PEEK)

Labyrinth Seals

Non-contacting labyrinth seals deliver leakage reduction in centrifugal pumps and compressors by restricting flow through a sequence of chambers formed between the rotating element and the teeth. Traditional metallic labyrinth seals require large clearances to avoid potential heat generation, deformation, and galling and can suffer from corrosion and erosion in certain environments. Greene Tweed makes labyrinth seals from our thermoplastic materials, incorporating a tooth profile design that creates a more controlled flow pattern and higher dimensional stability, allowing for cyclic flex-and-return motion to withstand contact during critical speeds. This allows for tighter clearances, which dramatically increase the efficiency and reliability compared to metallic labyrinth seals.

Go to: **Mechanical Seals** | **Valves** | **Pumps** | **Reciprocating Compressors** | **Instrumentation**

Solutions by Equipment

Reciprocating Compressors

We offer machined Arlon® and Avalon® parts for use in reciprocating compressors.

Piston and rider rings

Avalon® and Arlon® materials are selected for piston and rider ring applications because of their ability to increase reciprocating compressor efficiency. Carbon-filled scarf-cut or step-cut PTFE rings work well in nonlubricated natural gas compressors because they accommodate thermal expansion and provide full bearing contact between piston groove and bore, reducing the amount of wear and improving the ring lifetime.

Valve Plates

Arlon® is used for high-temperature plate valves in reciprocating compressors. Plate valves offer maximum flow area at lower lift, thus providing increased efficiency while maintaining excellent reliability. Arlon®'s resistance to a variety of chemicals and gases, as well as its high heat resistance, deliver improved dependability under harsh service conditions. These features, combined with Arlon®'s outstanding fatigue endurance, enable Arlon® to improve plate durability and reduce the risk of failure. In some instances, Arlon® parts have performed better than traditional metal plates.

Valve Poppets

Valve poppets offer a streamlined gas path; larger flow holes, and spring vent holes that minimize entrapment of impurities compared to plate valves. Poppets in high-temperature reciprocating compressor applications require the heat resistance and impact and fatigue performance that our Arlon® thermoplastics provide. Arlon's outstanding characteristics improve the durability and reliability of valves. In addition, the material's features increase component strength by 30 percent and flow efficiency by 15 percent. In some applications, horsepower values have been lowered by 10 percent.

Go to: **Mechanical Seals** | **Valves** | **Pumps** | **Centrifugal Compressors** | **Instrumentation**

Solutions by Equipment

Instrumentation

Greene Tweed offers a complete portfolio of high-performance materials for the instrumentation market. Our solutions are found in pressure transducers, level or temperature transmitters, flow meters and liquid analytical instruments like conductivity sensors, DO or ORP sensors.

Greene Tweed's engineered thermoplastics product line includes more than 20 different Arlon® PEEK-based compounds, including our Arlon® 3000XT that can extend temperature capabilities beyond PEEK limit. Our materials can be used in a wide variety of instruments. Solutions include support rings, clamping rings, support bodies, housings, and insulators, among other products.

Measuring Cell Diaphragm Gaskets
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