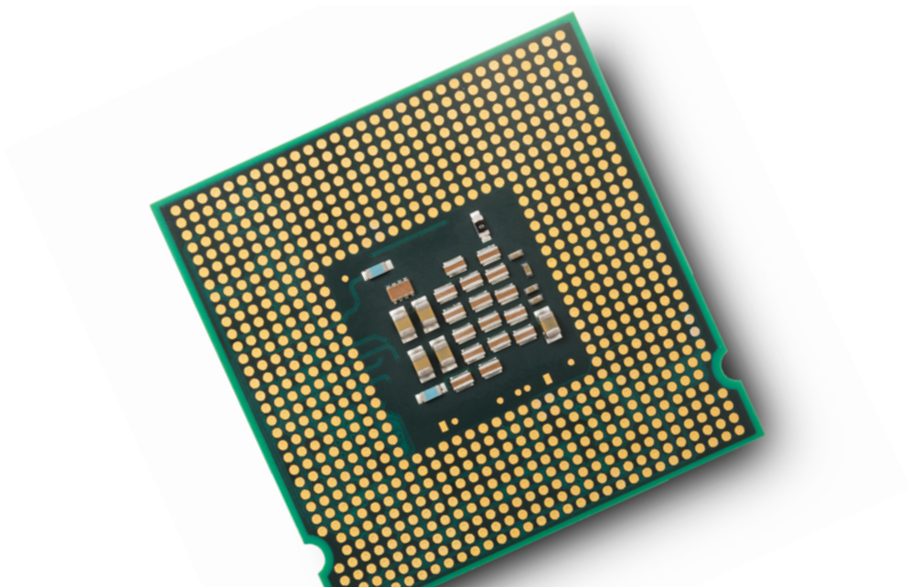
Solutions for the Semiconductor Industry

WHO WE ARE, WHAT WE DO.

We are scientists, engineers, thinkers, technologists, collaborators, and creators who understand critical details in materials technology.

Greene Tweed solutions deliver proven performance for leading semiconductor fabs, foundries, and OEMs.



Unparalleled Performance for Semiconductor Fabrication

Greene Tweed remains an innovator, keeping pace with the explosive advancements of the semiconductor industry. Chemraz® seals withstand the plasmas used in cutting-edge deposition and etch wafer processing. ONX® 600 composite components resist harsh chemicals used in semiconductor manufacturing. Our expert solutions include bonding, encapsulation, and coating capabilities for extra protection.

In addition to designing seals and composites that enable the manufacture of chips to power next-generation mobile devices, we also create:

Landing gear seals relied upon in 80%+ of commercial aircraft

Elastomeric seals which withstand 35,000+ pound per square inch (PSI) under 3 miles of ocean in deep water oil & gas wells

Composite wear parts that increase pump reliability to keep oil refineries running

Custom-designed structural components that reduce aircraft weight to improve fuel efficiency

Electrical and fiber optic connectors which reliably transmit signals in the harshest environments

1,900 employees across 11 countries support the most advanced global companies.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

WHO WE ARE, WHAT WE DO.

Greene Tweed sealing solutions are built to resist the industry's harshest chemicals and most extreme temperatures.

No matter how demanding the environment or niche the application, Greene Tweed offers customizable, high-performance sealing solutions in both industry standard and non-standard sizes and materials.

ADDITIONAL RESOURCES

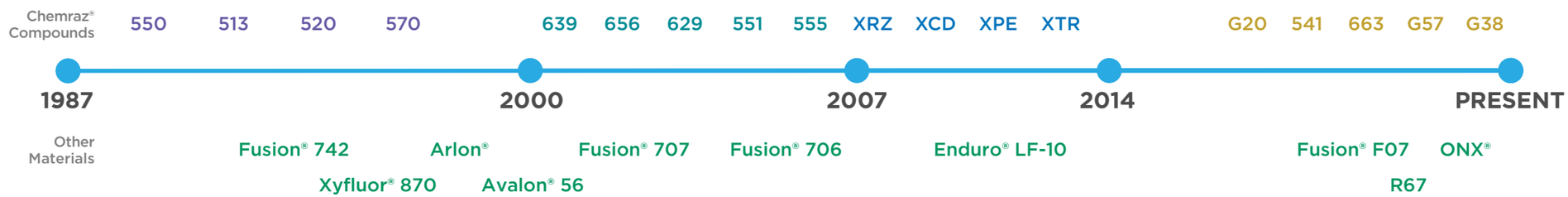
Seal Handling Training

Chemical Compatibility Guide

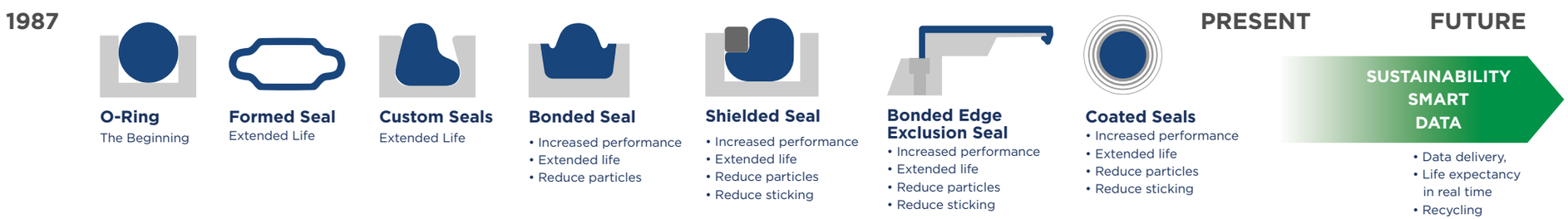
History of Semiconductor Customer Solutions:

Material and Design Innovations – Enabling Moore's Law

Semiconductor Materials



Seal Design



Semiconductor – Moore's Law

Moore's Law – Decreasing Transistor Size

As Moore's Law has created extreme challenges in the Semiconductor Industry, GT has come along side our customers and developed innovative materials and designs that have met our customer's needs. We continue to do it today. Come and let Greene Tweed help you enable your processes.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

WHY GREENE TWEED?

Greene Tweed designs and manufactures components, materials, and solutions that perform in the harshest environments. We engineer for conditions where equipment failure is not an option. Our products are made for extreme temperatures, pressure, chemical corrosion, and mechanical wear.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

MARKETS WE SERVE

Greene Tweed enables customers to operate efficiently and safely in the world's most demanding environments. We design, manufacture, and deliver innovative products with trusted performance for markets where failure is not an option.

ADDITIONAL RESOURCES

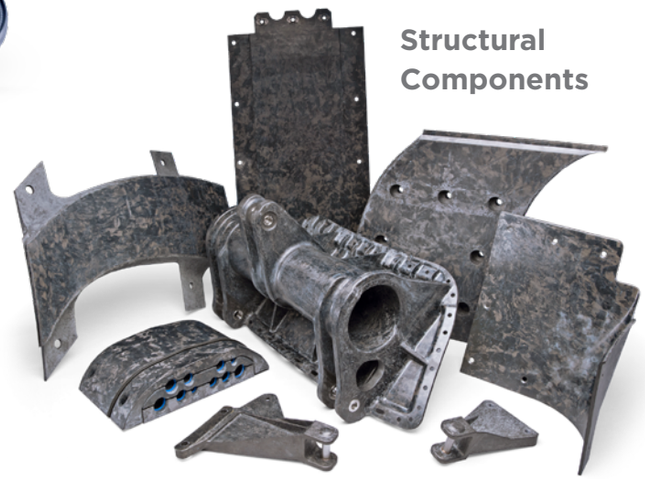
Seal Handling Training

Chemical Compatibility Guide

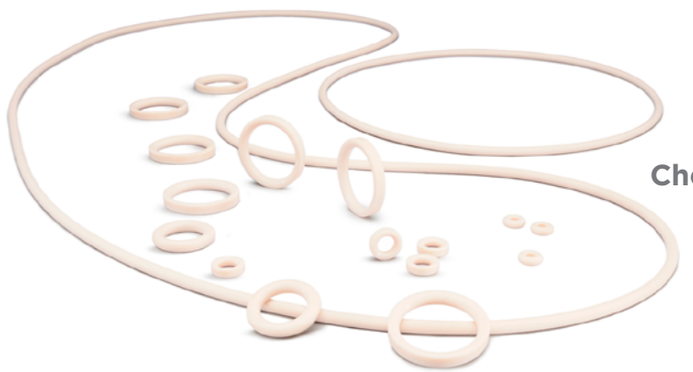
PRODUCTS WE MANUFACTURE

Sealing Solutions

Structural Components

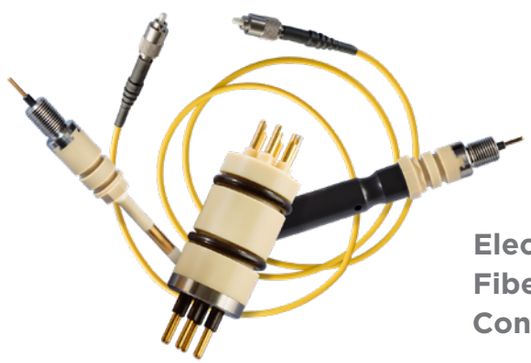


Chemraz®



Engineered Wear Components

Electrical & Fiber Optic Connectors



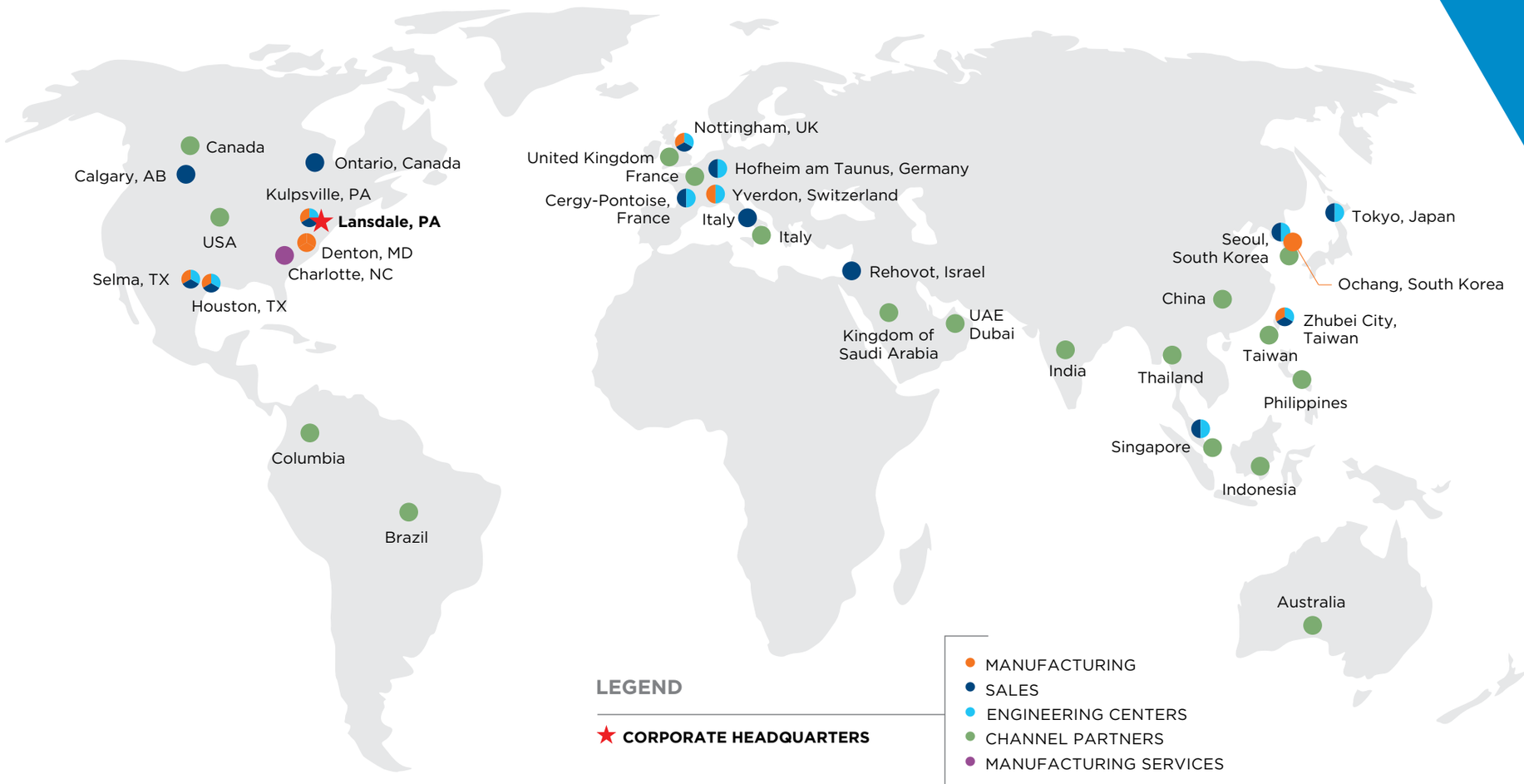
ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Global Presence with Local Support – 1,900 Employees Across 11 Countries

WHERE WE ARE



ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

gtweed.com

MANUFACTURING

Facilities
United Kingdom, United States, Switzerland, Taiwan, Korea

Certifications
ISO 9001:2015
ISO/IEC 17025:2017
ISO 14001:2015
AS9100:2016
EN9100:2018

Cleanrooms
Class 100 & 1000

Compression and injection molding capabilities

Materials Lab
Quality control of raw materials

Plasma Lab
Semiconductor parts testing using process gases

Accredited Testing Lab
ISO/IEC 17025:2017

Product Testing Lab
Pump wear rig, landing gear rig, sealing pressure vessel test rig, structural composites testing

Finite Elements Analysis (FEA)

CHAMBER SOLUTIONS

When purity is a must, Greene Tweed offers a range of solutions for the dry etch vacuum environment.

Expert Innovation

Greene Tweed sealing solutions combat the harsh plasmas and chemicals in wafer fabrication processes, resisting wear and tear from cleaning, patterning, and deposition.

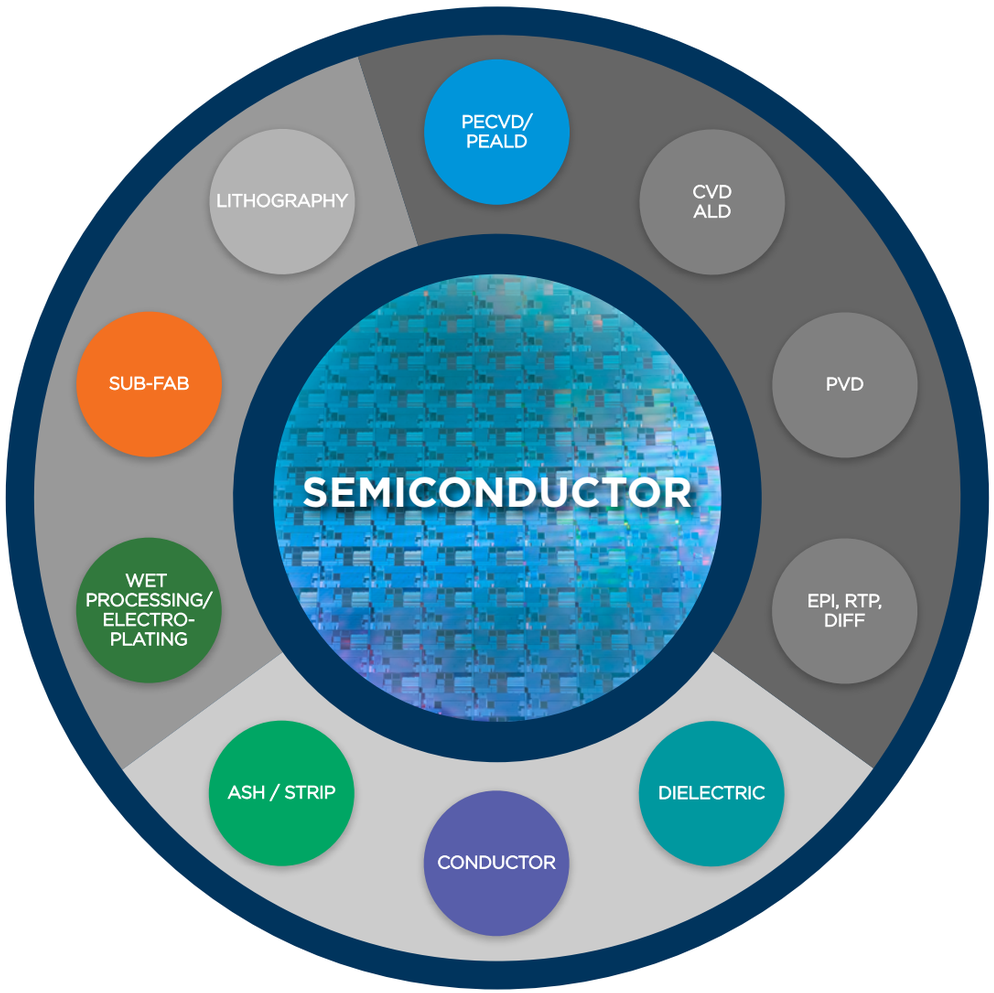
ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

SOLUTIONS BY PROCESS AREA

Explore the various solutions Greene Tweed offers for each process area.



DEPOSITION

ETCH

OTHER SEGMENTS

Click on the colored circles to jump to the solutions for those process areas.

The process areas indicated as gray circles will be activated in future versions of this guide.

ADDITIONAL RESOURCES

Seal Handling Training

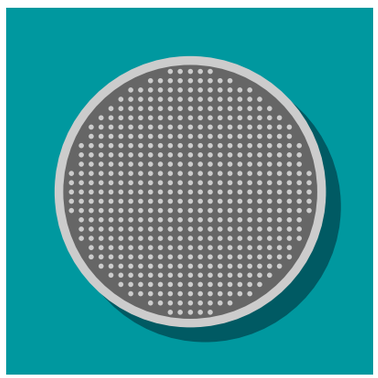
Chemical Compatibility Guide

In dielectric etch tools, seals are typically used in chambers, gas entry/exhaust ports, chamber doors, and wafer chucks. Protection against oxygen-infused plasma is key in many etch chamber environments, which often break down non-resistant materials and cause harmful particulation, resulting in defective chips.

DIELECTRIC ETCH SOLUTIONS

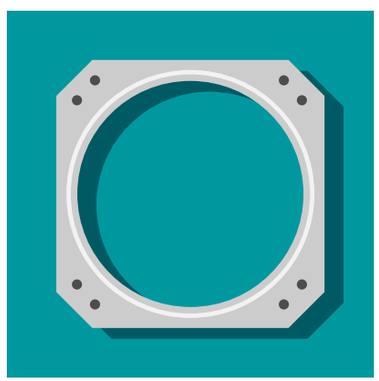
Our seals offer superior chemical resistance, minimal particle generation in plasma, and long service life to minimize maintenance and downtime.

Slit Valve Solutions



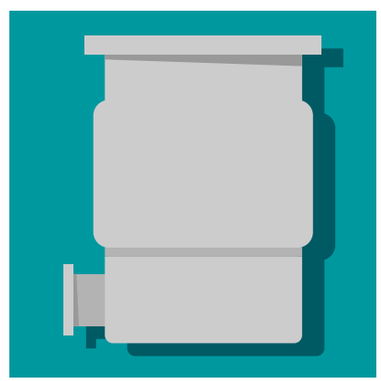
Electrostatic Chuck (ESC) Solutions

End Effector Solutions



Chamber Seal Solutions

Pendulum Valve Solutions



Turbomolecular Pump Solutions

ADDITIONAL RESOURCES

Seal Handling Training

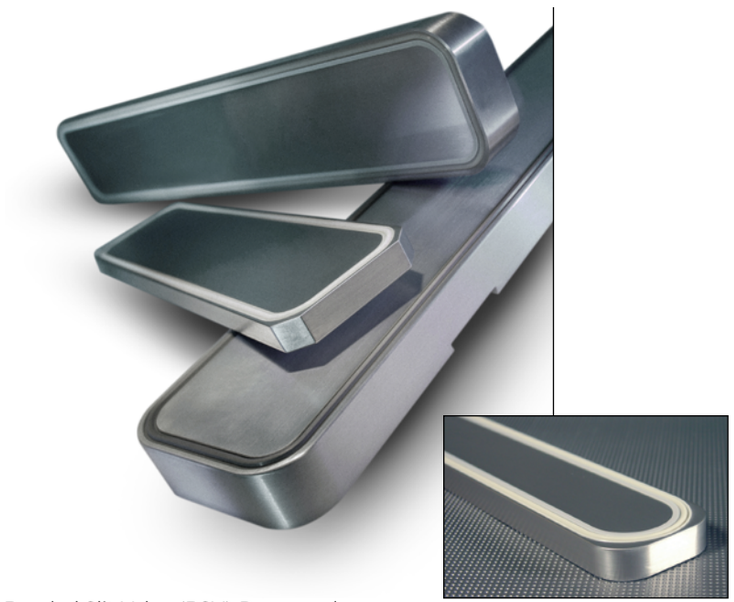
Chemical Compatibility Guide

Slit Valve Solutions

The Shielded-Bonded Slit Valve Door (SBSV) and Bonded Slit Valve Door (BSV) significantly increase the life expectancy and performance of the door's seal during semiconductor plasma processing. Made from Greene Tweed's proprietary high-purity PTFE compound, Avalon® 56 HP, the SBSV shield enhances our unique BSV (Bonded Slit Valve) door design.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Bonded Slit Valve (BSV) Doors and
Shielded-Bonded Slit Valve (SBSV) Door (inset)

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® XPE | Chemraz® 629
Chemraz® E38 | Chemraz® G38

SEAL DESIGN EVOLUTION

O-Ring / Gland

Custom Slit Valve Seal Solutions

Bonded Slit Valve Door BSV

Shielded-Bonded Slit Valve Door SBSV

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

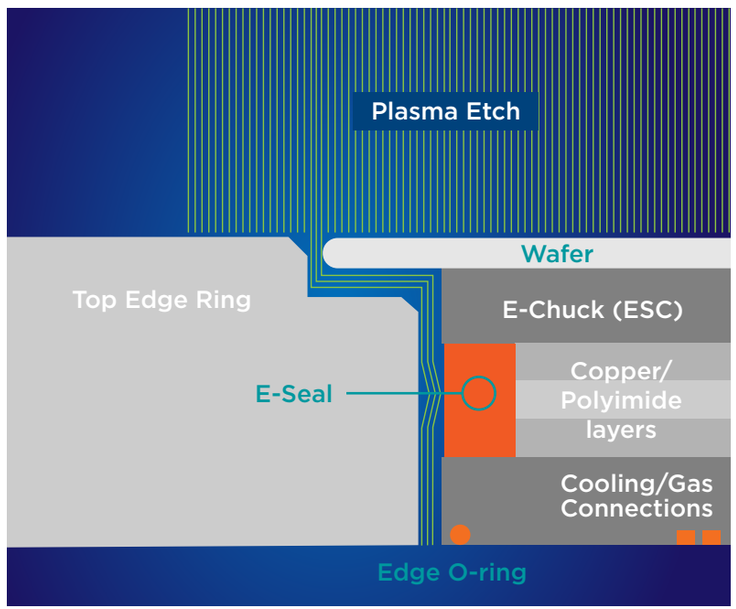
gtweed.com

Electrostatic Chuck (ESC) Solutions

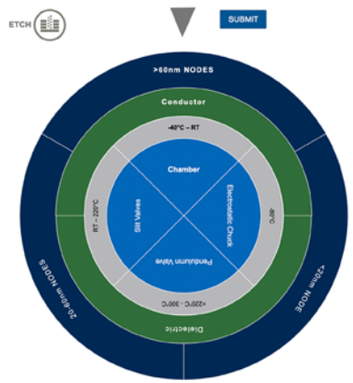
E-seal refers to the electrostatic chuck seal application. Made from Greene Tweed's proprietary high-purity Chemraz® elastomers and Avalon® 56 HP PTFE fluoroplastics compounds, the e-seal significantly increases the life expectancy of the electrostatic chuck by protecting the outside diameter of the chuck from plasma erosion. To enable extreme cooling of the e-chuck, Greene Tweed provides custom MSE cryogenic seals that seal down to -150°C. Chemraz® 663 allows sealing down to -40°C.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



E-Seal solution to protect the E-Chuck



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XPE | Chemraz® 663 | Avalon® 56 HP

MSE® Cryogenic | Chemraz® 629

SEAL DESIGN SOLUTIONS

Small cross-sections, critical, high-precision

O-Ring (All Glands)

Elastomer (All Glands)

Plastic (All Glands)

Plastic Encapsulated O-ring (All Glands)

MSE (low temp) (All Glands)

Installation Fixtures

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

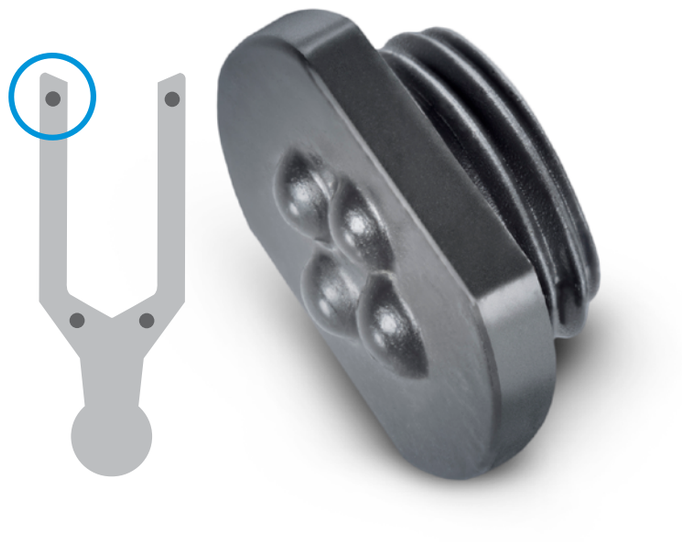
Seal Handling Training
Chemical Compatibility Guide
Related Videos

Wafer Transfer Robot End-Effector Solutions

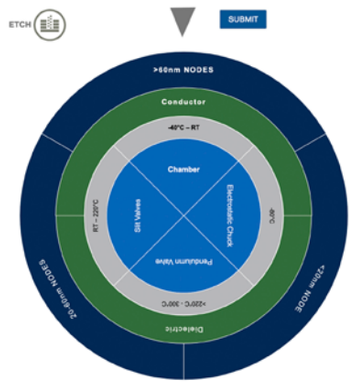
Greene Tweed offers end effector solutions (wafer handling/robot blade applications) including o-rings. Greene Tweed provides custom Chemraz® elastomer and Arlon® high-temperature thermoplastic solutions. A combination of material performance and engineering design optimizes wafer handling. This enhances slip resistance, wear resistance, and low sticking properties.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Arlon 3000XT® End-effector pad



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XCD | Arlon® | Arlon 3000XT®

DESIGN SOLUTIONS

Custom Surface Finishes | Custom Surface Design | Extremely Small O-rings | Custom Bonded Designs | Custom Elastomer Pad Designs | Custom Plastic Pad Designs

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

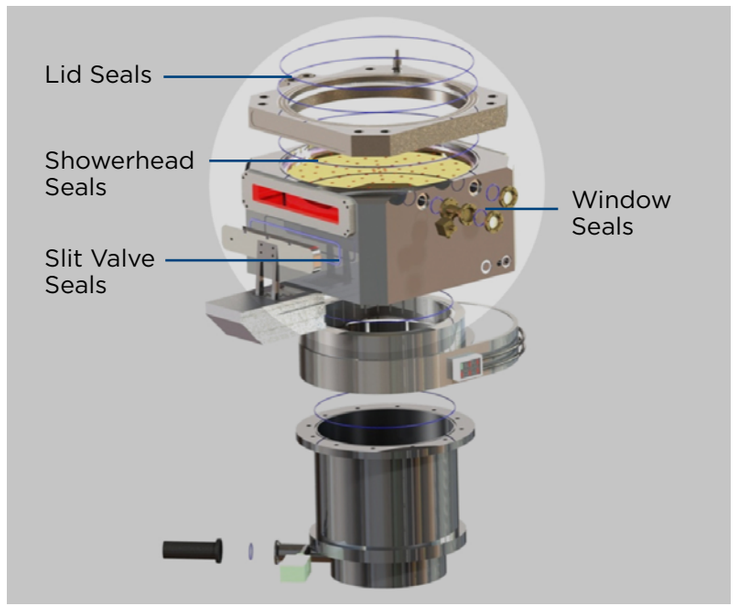
gtweed.com

Chamber Seal Solutions

Chemraz® seals provide excellent performance in plasma etch process chambers. In particular they are compatible with fluorine and oxygen plasmas and are less susceptible to cracking. Seal design also needs to be considered to optimize seal performance.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Typical process chamber.

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® XPE | Chemraz® XCD
Chemraz® 629 | Chemraz® E38 | Chemraz® G38

SEAL DESIGN SOLUTIONS

O-Ring (All Glands)
Dovetail Seal (Dovetail Gland)
Glandlock® Seal (Half Dovetail Gland)
Formed Seal
Barrel Seal (All Glands)
Shielded Seal (All Glands)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

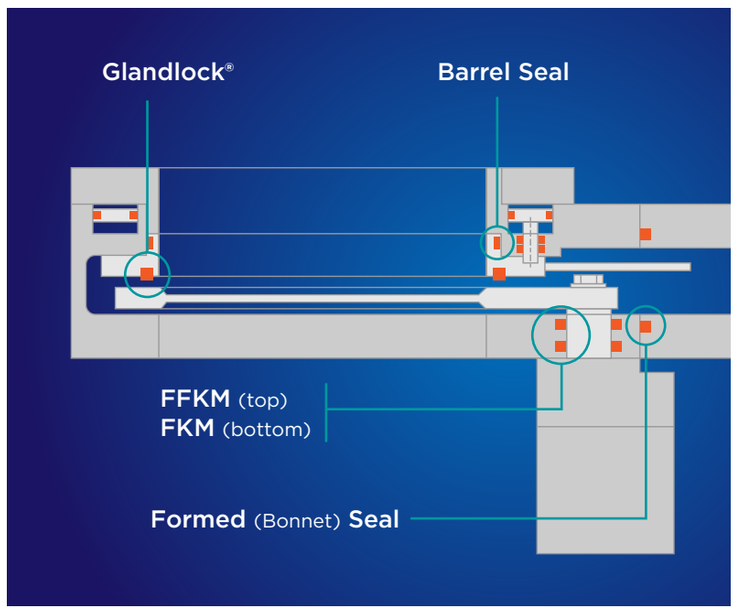
gtweed.com

Pendulum Valve Solutions

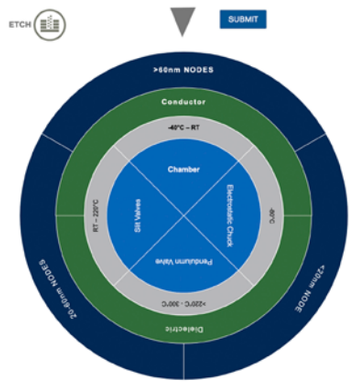
Our pendulum valve solutions significantly increase the life expectancy and performance of the gate valves during semiconductor plasma processing. These solutions are designed to eliminate premature failures caused by chemical and mechanical degradation.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Seal placement in the pendulum valve.



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® G38 | Chemraz® XCD
Chemraz® 629 | Chemraz® E38 | Enduro® LF10

SEAL DESIGN SOLUTIONS

O-Ring (Dynamic Actuator)
Glandlock® Seal (Plate)
Barrel Seal (Body)
Formed Seal (Bonnet)
Bonded Seal (Paddle)
Coated Seals (Dynamic Actuator)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

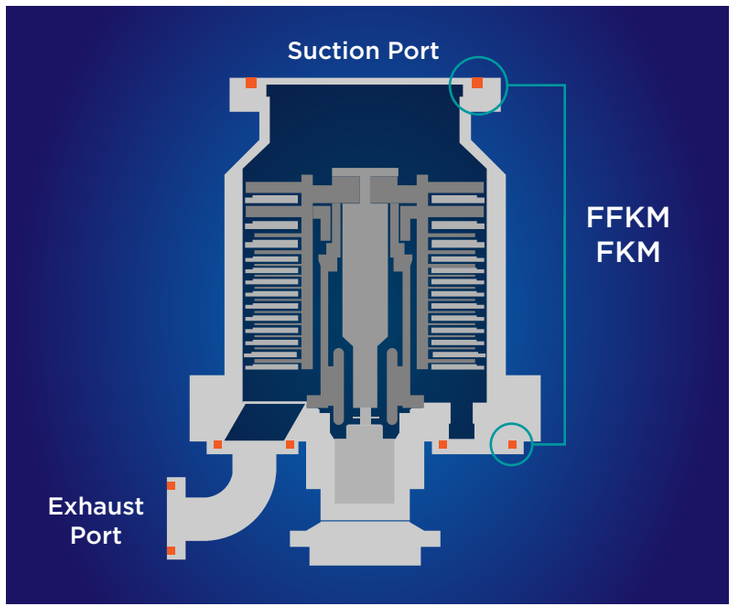
Seal Handling Training
Chemical Compatibility Guide

Turbomolecular Pump Solutions

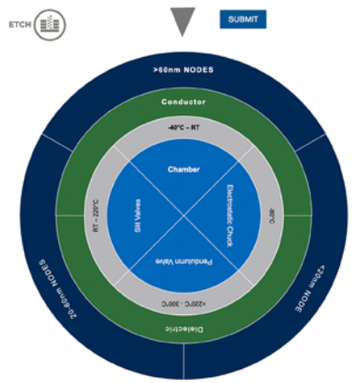
Chemraz® and Fusion® solutions can be used in turbomolecular pump applications up to 300°C and are compatible with deposition and etch process gases such as fluorine and oxygen. The combination elastomer material and seal design provides solutions that are less susceptible to cracking and overfill.

DIELECTRIC ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Seal locations on a turbomolecular pump



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57

SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

Custom Seal Design
(Glandlock® Seal)

Custom Design Seal
(Barrel Seal)

O-ring Kits

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

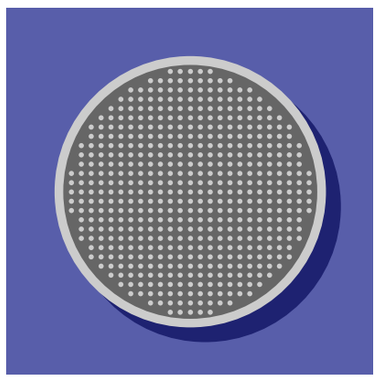
gtweed.com

In conductor etch tools, seals are typically used in chambers, gas entry/exhaust ports, chamber doors, and wafer chucks. Protection against oxygen and fluorine infused plasma is key in many etch chamber environments, which often break down non-resistant materials and cause harmful particulation, resulting in defective chips.

CONDUCTOR ETCH SOLUTIONS

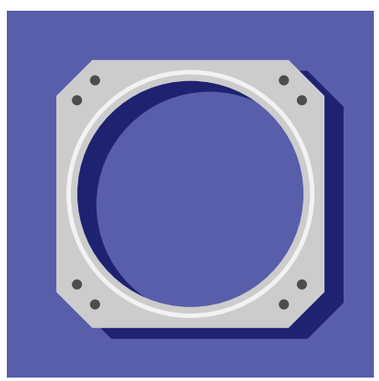
Our seals offer superior chemical resistance, minimal particle generation in plasma, and long service life to minimize maintenance and downtime.

Slit Valve Solutions



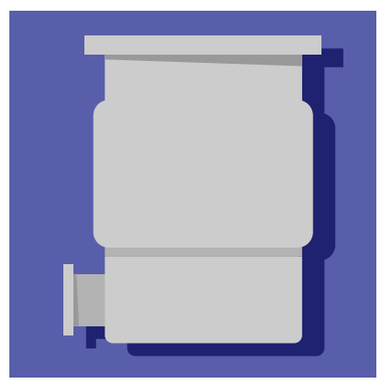
E-Seal Solutions

End Effector Solutions



Chamber Seal Solutions

Pendulum Valve Solutions



Turbomolecular Pump Solutions

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Slit Valve Solutions

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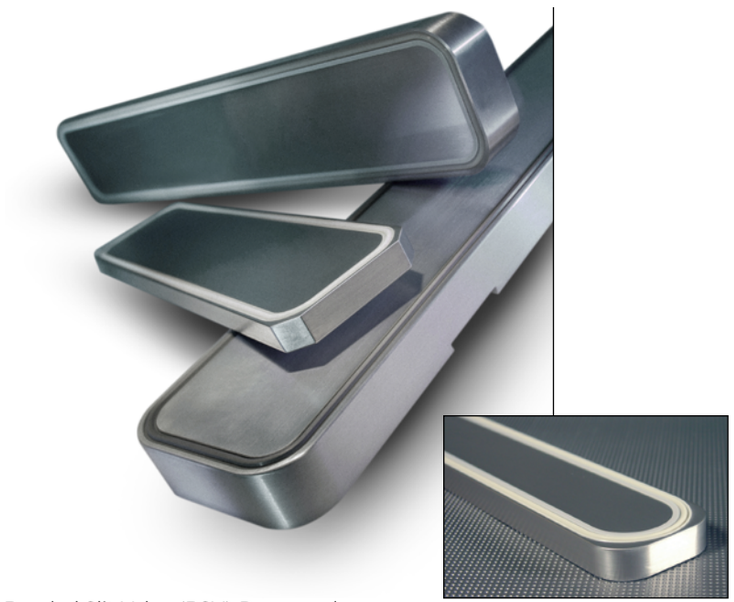
CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Bonded Slit Valve (BSV) Doors and
Shielded-Bonded Slit Valve (SBSV) Door (inset)

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® XPE | Chemraz® 629
Chemraz® E38 | Chemraz® G38

SEAL DESIGN EVOLUTION

O-Ring / Gland

Custom Slit Valve Seal Solutions

Bonded Slit Valve Door BSV

Shielded-Bonded Slit Valve Door SBSV

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Electrostatic Chuck (ESC) Solutions

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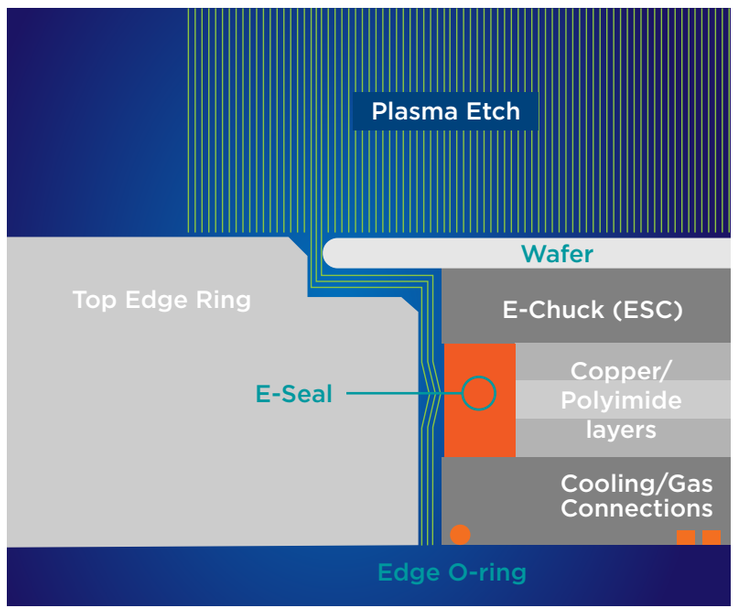
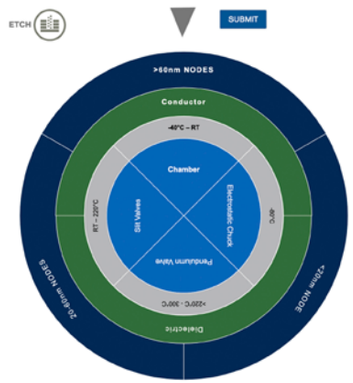
CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



E-Seal solution to protect the E-Chuck



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XPE | Chemraz® 663 | Avalon® 56 HP

MSE® Cryogenic | Chemraz® 629

SEAL DESIGN SOLUTIONS

Small cross-sections, critical, high-precision

O-Ring (All Glands)

Elastomer (All Glands)

Plastic (All Glands)

Plastic Encapsulated O-ring (All Glands)

MSE (low temp) (All Glands)

Installation Fixtures

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Related Videos

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gtweed.com

Wafer Transfer Robot End-Effector Solutions

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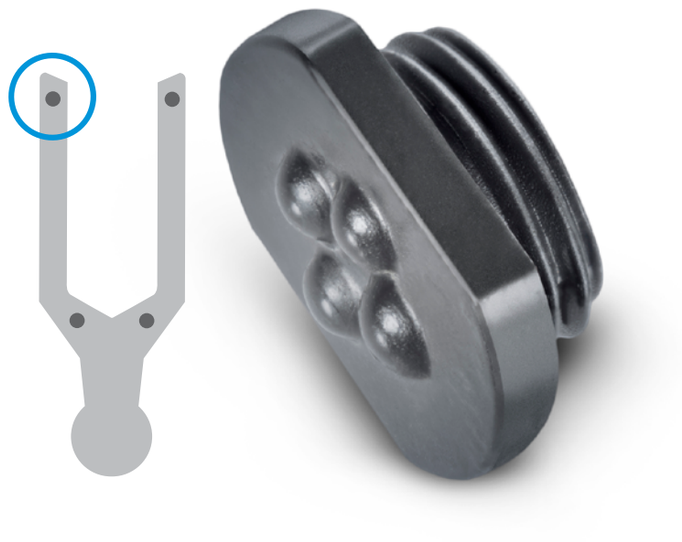
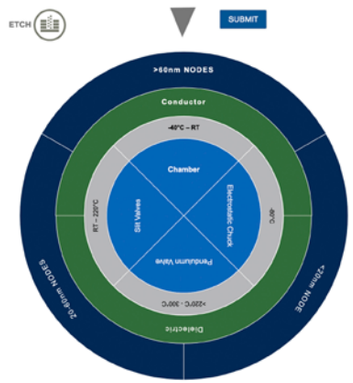
CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Arlon 3000XT® End-effector pad



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XCD | Arlon® | Arlon 3000XT®

DESIGN SOLUTIONS

Custom Surface Finishes
Custom Surface Design
Extremely Small O-rings
Custom Bonded Designs
Custom Elastomer Pad Designs
Custom Plastic Pad Designs

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

gtweed.com

Chamber Seal Solutions

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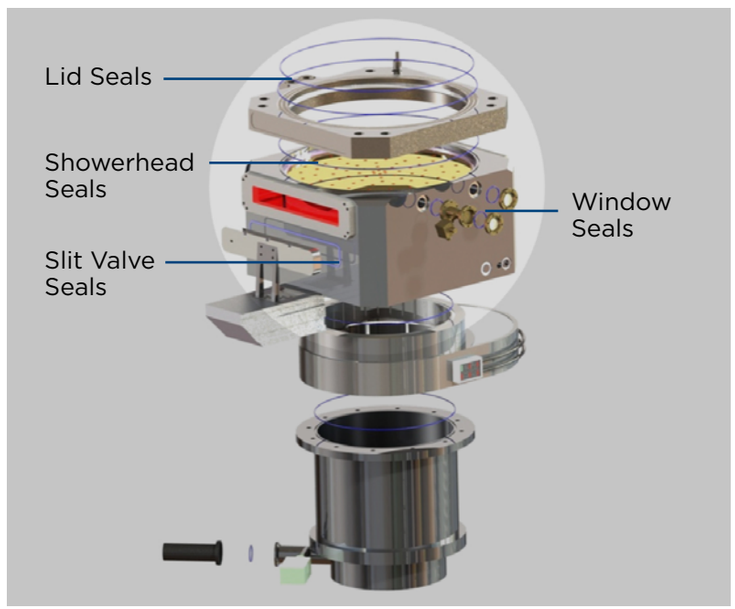
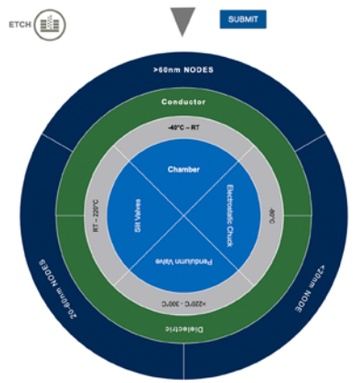
CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Typical process chamber.



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® XPE | Chemraz® 629

Chemraz® E38 | Chemraz® G38

SEAL DESIGN SOLUTIONS

O-Ring (All Glands)
Dovetail Seal (Dovetail Gland)
Glandlock® Seal (Half Dovetail Gland)
Formed Seal
Barrel Seal (All Glands)
Shielded Seal (All Glands)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

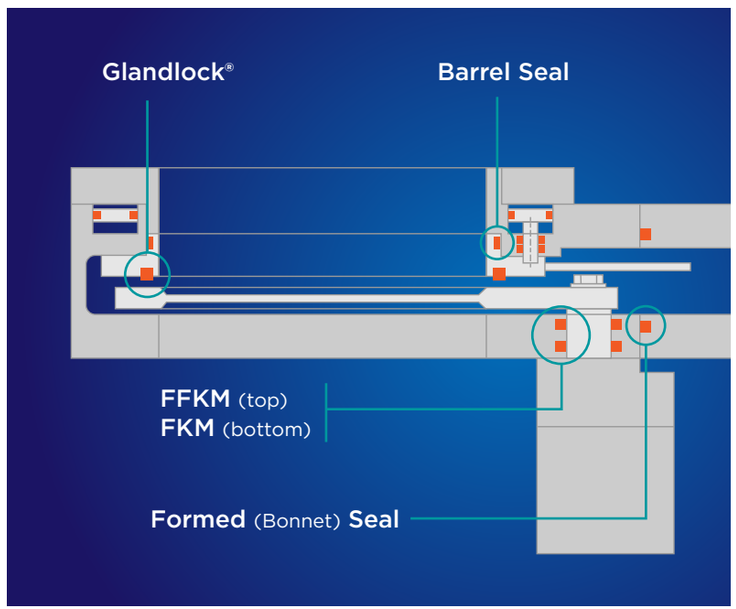
gtweed.com

Pendulum Valve Solutions

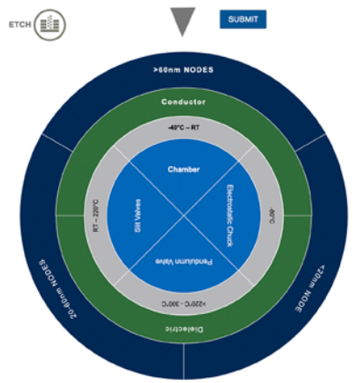
Our pendulum valve solutions significantly increase the life expectancy and performance of the gate valves during semiconductor plasma processing. These solutions are designed to eliminate premature failures caused by chemical and mechanical degradation.

CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Seal placement in the pendulum valve.



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G57 | Chemraz® G38 | Chemraz® 629

Chemraz® E38 | Enduro® LF10

SEAL DESIGN SOLUTIONS

O-Ring (Dynamic Actuator)
Glandlock® Seal (Plate)
Barrel Seal (Body)
Formed Seal (Bonnet)
Bonded Seal (Paddle)
Coated Seals (Dynamic Actuator)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

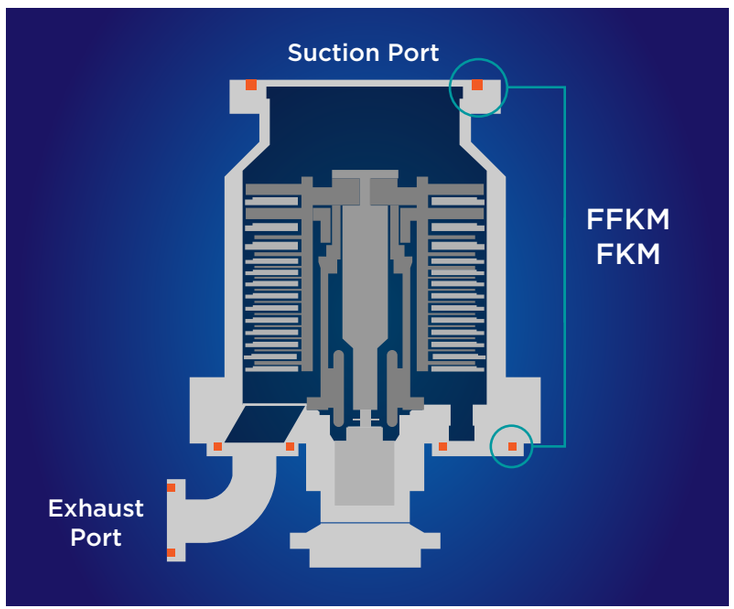
gtweed.com

Turbomolecular Pump Solutions

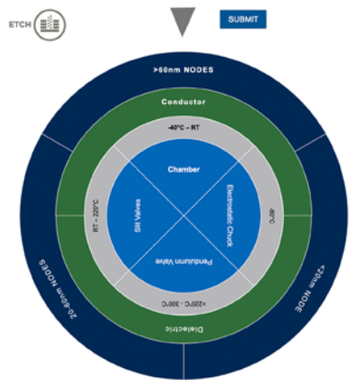
Chemraz® and Fusion® solutions can be used in turbomolecular pump applications up to 300°C and are compatible with deposition and etch process gases such as fluorine and oxygen. The combination elastomer material and seal design provides solutions that are less susceptible to cracking and overfill.

CONDUCTOR ETCH SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Seal locations on a turbomolecular pump



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G38

SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

Custom Seal Design
(Glandlock® Seal)

Custom Design Seal
(Barrel Seal)

O-ring Kits

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

gtweed.com

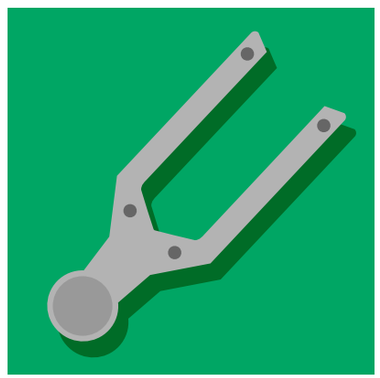
ASH/STRIP SOLUTIONS

In ash/strip tools, seals are typically used in chambers, gas entry/exhaust ports, chamber doors, and wafer chucks. Protection against oxygen and hydrogen infused plasma is key in many ash/strip chamber environments, which often break down non-resistant materials and cause harmful particulation, resulting in defective chips.

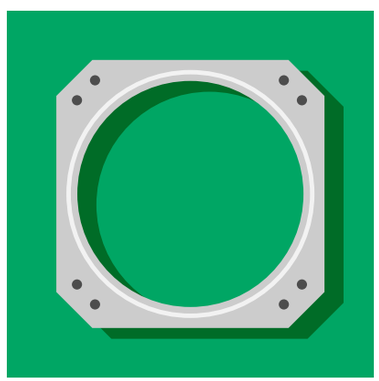
Our seals offer superior chemical resistance, minimal particle generation in plasma, and long service life to minimize maintenance and downtime.

Slit Valve Solutions

Pendulum Valve Solutions

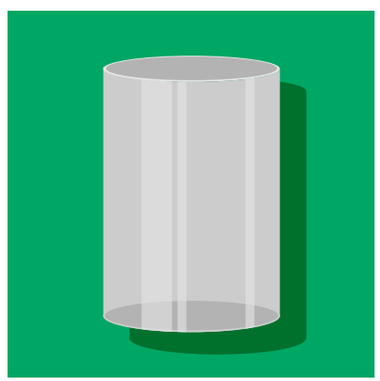


End Effector Solutions



Chamber Seal Solutions

Bell Jar Solutions



Plasma Tube Solutions

ADDITIONAL RESOURCES

Seal Handling Training

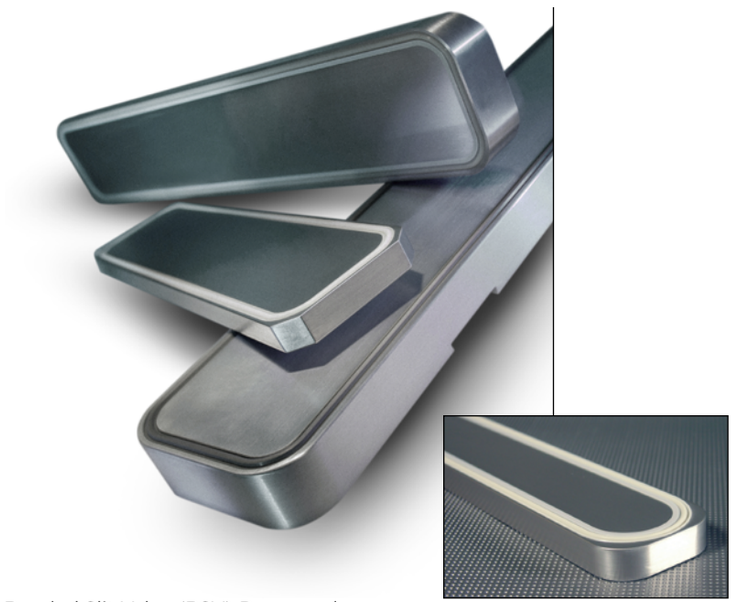
Chemical Compatibility Guide

Slit Valve Solutions

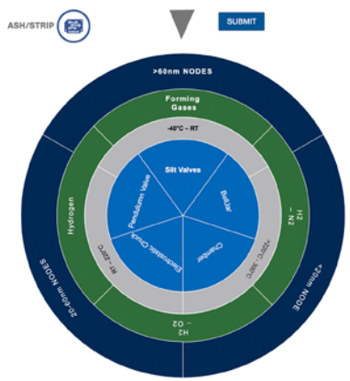
The Shielded-Bonded Slit Valve Door (SBSV) and Bonded Slit Valve Door (BSV) significantly increase the life expectancy and performance of the door's seal during semiconductor plasma processing. Made from Greene Tweed's proprietary high-purity PTFE compound, Avalon® 56 HP, the SBSV shield enhances our unique BSV (Bonded Slit Valve) door design.

ASH/STRIP SOLUTIONS

Slit Valve Solutions
Pendulum Valve Solutions
End Effector Solutions
Chamber Seal Solutions
Bell Jar Solutions
Plasma Tube Solutions



Bonded Slit Valve (BSV) Doors and
Shielded-Bonded Slit Valve (SBSV) Door (inset)



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 629

SEAL DESIGN EVOLUTION

O-Ring / Gland

Custom Slit Valve Seal Solutions

Bonded Slit Valve Door BSV

Shielded-Bonded Slit Valve Door SBSV

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

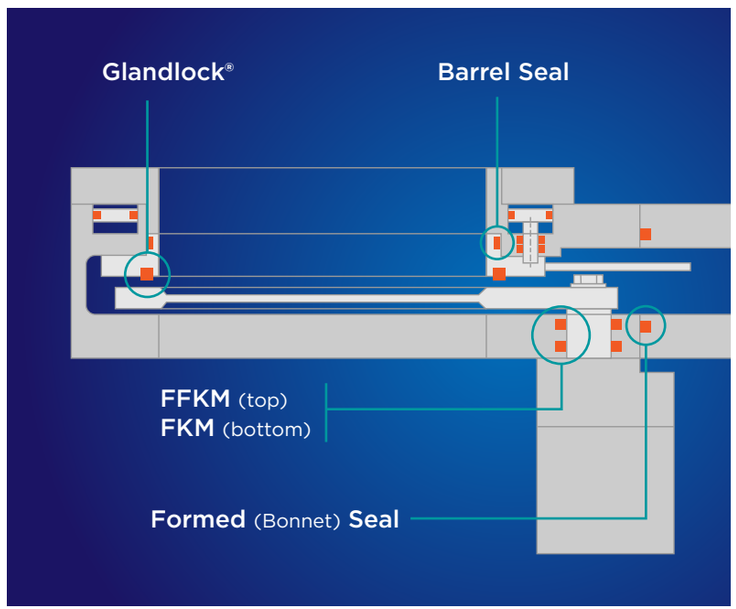
gtweed.com

Pendulum Valve Solutions

Our pendulum valve solutions significantly increase the life expectancy and performance of the gate valves during semiconductor plasma processing. These solutions are designed to eliminate premature failures caused by chemical and mechanical degradation.

ASH/STRIP SOLUTIONS

Slit Valve Solutions
Pendulum Valve Solutions
End Effector Solutions
Chamber Seal Solutions
Bell Jar Solutions
Plasma Tube Solutions



Seal placement in the pendulum valve

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 629

SEAL DESIGN SOLUTIONS

O-Ring (Dynamic Actuator)
Glandlock® Seal (Plate)
Barrel Seal (Body)
Formed Seal (Bonnet)
Bonded Seal (Paddle)
Coated Seals (Dynamic Actuator)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

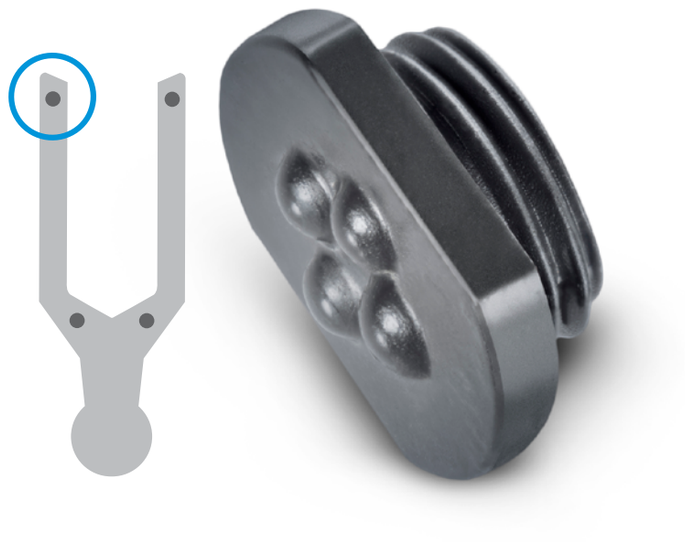
gtweed.com

Wafer Transfer Robot End-Effector Solutions

Greene Tweed offers end effector solutions (wafer handling/robot blade applications) including o-rings. Greene Tweed provides custom Chemraz® elastomer and Arlon® high-temperature thermoplastic solutions. A combination of material performance and engineering design optimizes wafer handling. This enhances slip resistance, wear resistance, and low sticking properties.

ASH/STRIP SOLUTIONS

Slit Valve Solutions
Pendulum Valve Solutions
End Effector Solutions
Chamber Seal Solutions
Bell Jar Solutions
Plasma Tube Solutions



Arlon 3000XT® End-effector pad

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XCD | Arlon® | Arlon 3000XT®

DESIGN SOLUTIONS

Custom Surface Finishes
Custom Surface Design
Extremely Small O-rings
Custom Bonded Designs
Custom Elastomer Pad Designs
Custom Plastic Pad Designs

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

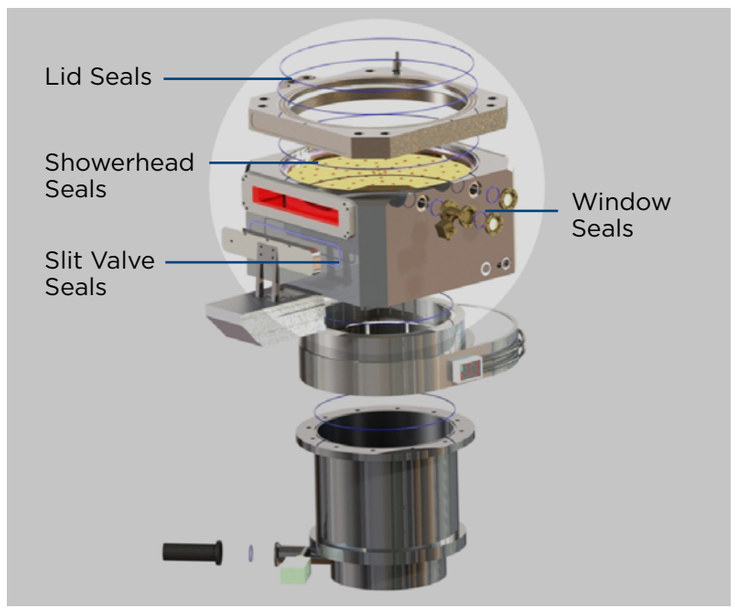
gtweed.com

Chamber Seal Solutions

Chemraz® seals provide excellent performance in plasma etch processes. In particular they are compatible with fluorene and oxygen plasmas and are less susceptible to cracking. Seal design also needs to be considered to optimize seal performance.

ASH/STRIP SOLUTIONS

Slit Valve Solutions
Pendulum Valve Solutions
End Effector Solutions
Chamber Seal Solutions
Bell Jar Solutions
Plasma Tube Solutions



Typical process chamber.

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XPE | Chemraz® G57 | Chemraz® 629

Chemraz® E38 | Chemraz® G38

SEAL DESIGN SOLUTIONS

O-Ring (All Glands)
Dovetail Seal (Dovetail Gland)
Glandlock® Seal (Half Dovetail Gland)
Formed Seal
Barrel Seal (All Glands)
Shielded Seal (All Glands)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

gtweed.com

Bell Jar Solutions

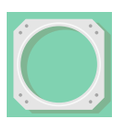
Our bell jar/quartz sealing solutions significantly increase performance including life expectancy and particulation in this application. Custom Chemraz® and seal design optimize performance of the bell jar during semiconductor plasma processing. These solutions are designed to eliminate premature failures caused by chemical and mechanical degradation and prevent quartz to metal contact.

ASH/STRIP SOLUTIONS


Slit Valve Solutions

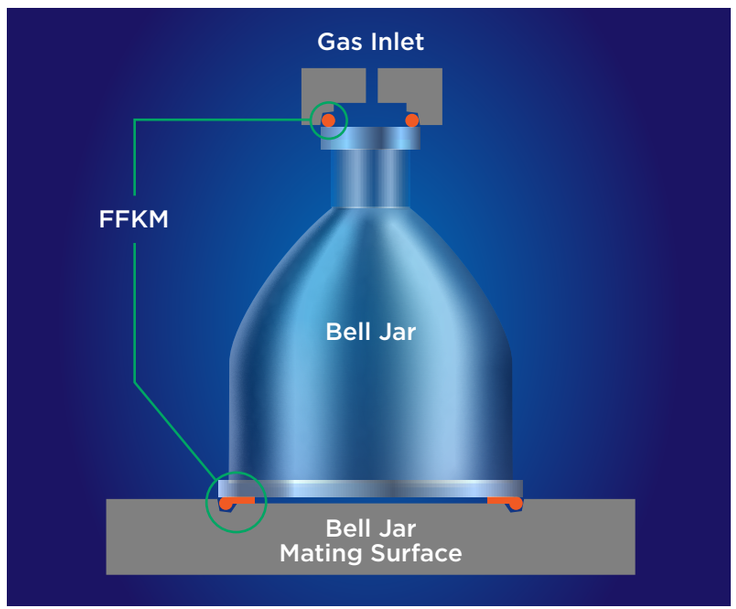

Pendulum Valve Solutions


End Effector Solutions


Chamber Seal Solutions


Bell Jar Solutions


Plasma Tube Solutions



Bell Jar application showing elastomer placement.

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 629

SEAL DESIGN SOLUTIONS


O-Ring


Custom Seal Design

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

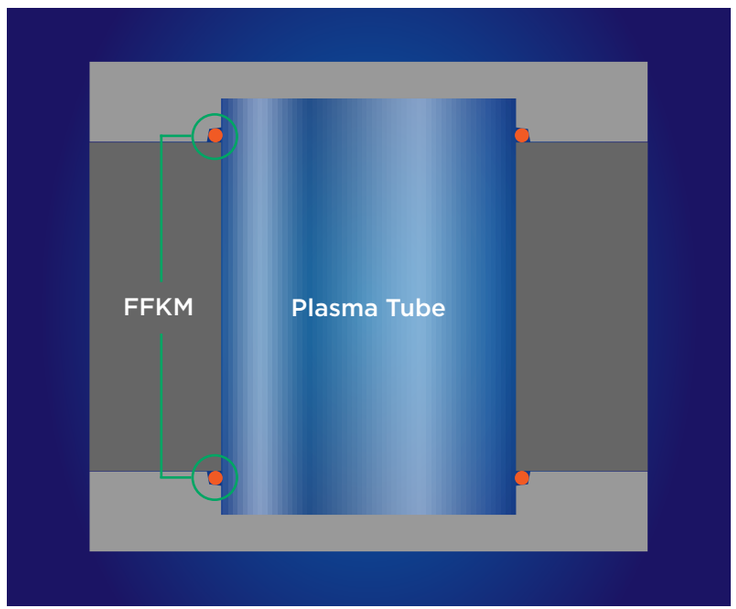
gtweed.com

Plasma Tube Solutions

Our plasma tube solutions significantly increase life expectancy in this application. Custom Chemraz® and seal design optimize performance including high-temperature capability, reduced mechanical stress, and less sticking. Shielded designs also extend life expectancy in this application. Typical shield materials include Aluminum 6061-T6 and Avalon® 56 HP.

ASH/STRIP SOLUTIONS

Slit Valve Solutions
Pendulum Valve Solutions
End Effector Solutions
Chamber Seal Solutions
Bell Jar Solutions
Plasma Tube Solutions



Plasma tube with seal placement.

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XRZ

SEAL DESIGN SOLUTIONS

O-Ring

Custom Seal Designs

Shielded Seal Design

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

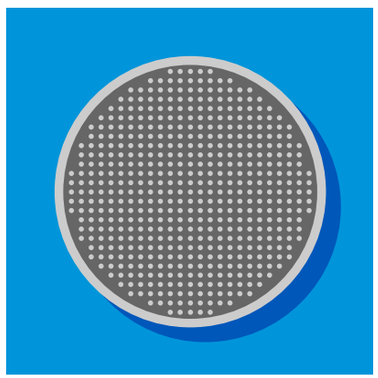
gtweed.com

In CVD tools, seals are typically used in chambers, gas entry/exhaust ports, chamber doors, and wafer chucks. Protection against oxygen and fluorine infused plasma is key in many CVD chamber environments, which often break down non-resistant materials and cause harmful particulation, resulting in defective chips.

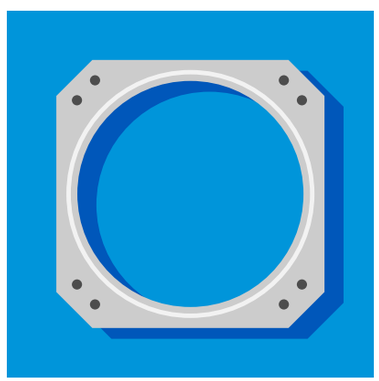
PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS

Our seals offer superior chemical resistance, minimal particle generation in plasma, and long service life to minimize maintenance and downtime.

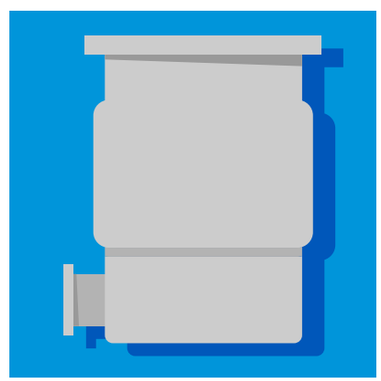

Slit Valve Solutions


E-Seal Solutions


End Effector Solutions


Chamber Seal Solutions


Pendulum Valve Solutions


Turbomolecular Pump Solutions

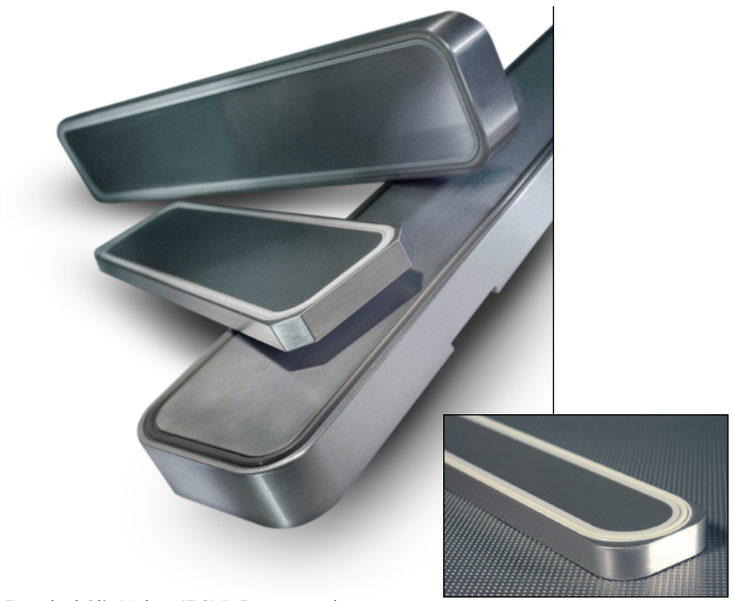
ADDITIONAL RESOURCES
Seal Handling Training
Chemical Compatibility Guide

Slit Valve Solutions

The Shielded-Bonded Slit Valve Door (SBSV) and Bonded Slit Valve Door (BSV) significantly increase the life expectancy and performance of the door's seal during semiconductor plasma processing. Made from Greene Tweed's proprietary high-purity PTFE compound, Avalon® 56 HP, the SBSV shield enhances our unique BSV (Bonded Slit Valve) door design.

PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Bonded Slit Valve (BSV) Doors and Shielded-Bonded Slit Valve (SBSV) Door (inset)

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XRZ | Chemraz® G20 | Chemraz® 629

Chemraz® G13

SEAL DESIGN EVOLUTION

O-Ring / Gland

Custom Slit Valve Seal Solutions

Bonded Slit Valve Door BSV

Shielded-Bonded Slit Valve Door SBSV

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Electrostatic Chuck (ESC) Solutions

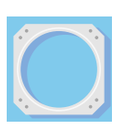
E-seal refers to the electrostatic chuck seal application. Made from Greene Tweed's proprietary high-purity Chemraz® elastomers and Avalon® 56 HP PTFE fluoroplastics compounds, the e-seal significantly increases the life expectancy of the electrostatic chuck by protecting the outside diameter of the chuck from plasma erosion. To enable extreme cooling of the e-chuck, Greene Tweed provides custom MSE cryogenic seals that seal down to -150°C. Chemraz® 663 allows sealing down to -40°C.

PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS


Slit Valve Solutions

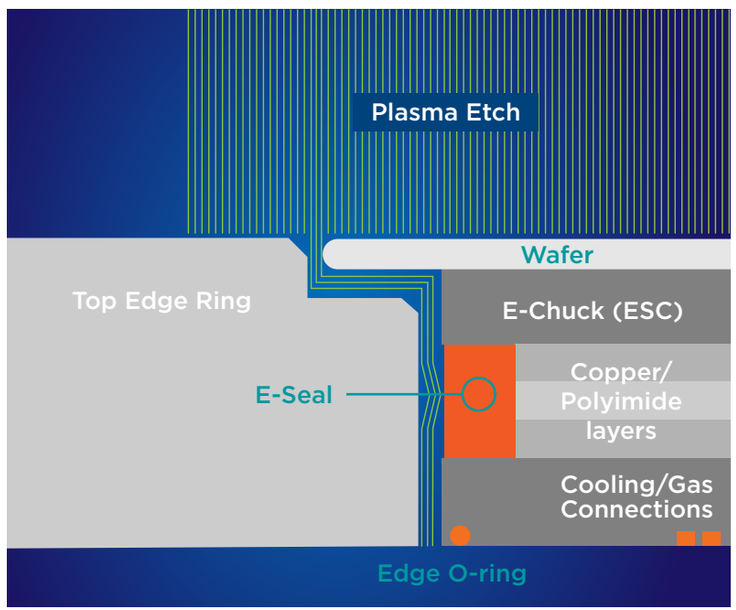

Electrostatic Chuck Solutions


End Effector Solutions


Chamber Seal Solutions


Pendulum Valve Solutions


Turbomolecular Pump Solutions



E-Seal solution to protect the E-Chuck

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XPE | Chemraz® 663 | Chemraz® 629

Avalon® 56 HP | MSE® Cryogenic

SEAL DESIGN SOLUTIONS
Small cross-sections, critical, high-precision


O-Ring
(All Glands)


Elastomer
(All Glands)


Plastic
(All Glands)


Plastic Encapsulated O-ring
(All Glands)


MSE (low temp)
(All Glands)


Installation Fixtures

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Related Videos

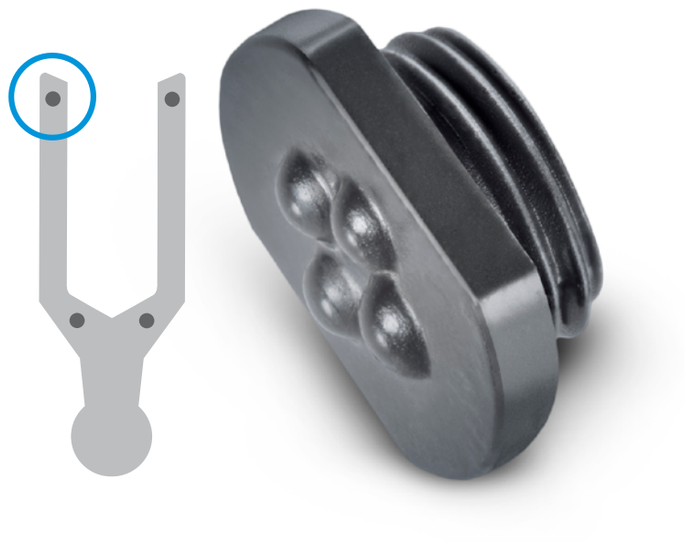
gtweed.com

Wafer Transfer Robot End-Effector Solutions

Greene Tweed offers end effector solutions (wafer handling/robot blade applications) including o-rings. Greene Tweed provides custom Chemraz® elastomer and Arlon® high-temperature thermoplastic solutions. A combination of material performance and engineering design optimizes wafer handling. This enhances slip resistance, wear resistance, and low sticking properties.

PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS

Slit Valve Solutions
Electrostatic Chuck Solutions
End Effector Solutions
Chamber Seal Solutions
Pendulum Valve Solutions
Turbomolecular Pump Solutions



Arlon 3000XT® End-effector pad

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XCD | Arlon® | Arlon 3000XT®

DESIGN SOLUTIONS

Custom Surface Finishes | Custom Surface Design | Extremely Small O-rings | Custom Bonded Designs | Custom Elastomer Pad Designs | Custom Plastic Pad Designs

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

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gtweed.com

Chamber Seal Solutions

Chemraz® seals provide excellent performance in plasma etch processes. In particular they are compatible with fluorene and oxygen plasmas and are less susceptible to cracking. Seal design also needs to be considered to optimize seal performance.

PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS


Slit Valve Solutions


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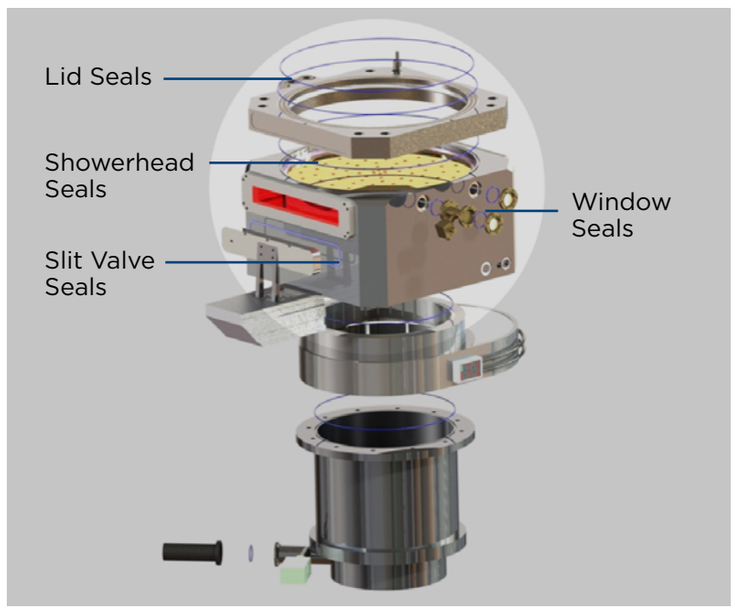

Typical process chamber.

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XRZ | Chemraz® G20 | Chemraz® 629

Chemraz® G13 | Enduro® LF10

SEAL DESIGN SOLUTIONS


O-Ring
(All Glands)


Dovetail Seal
(Dovetail Gland)


Glandlock® Seal
(Half Dovetail Gland)


Formed Seal


Barrel Seal
(All Glands)


Shielded Seal
(All Glands)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

gtweed.com

Pendulum Valve Solutions

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PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS


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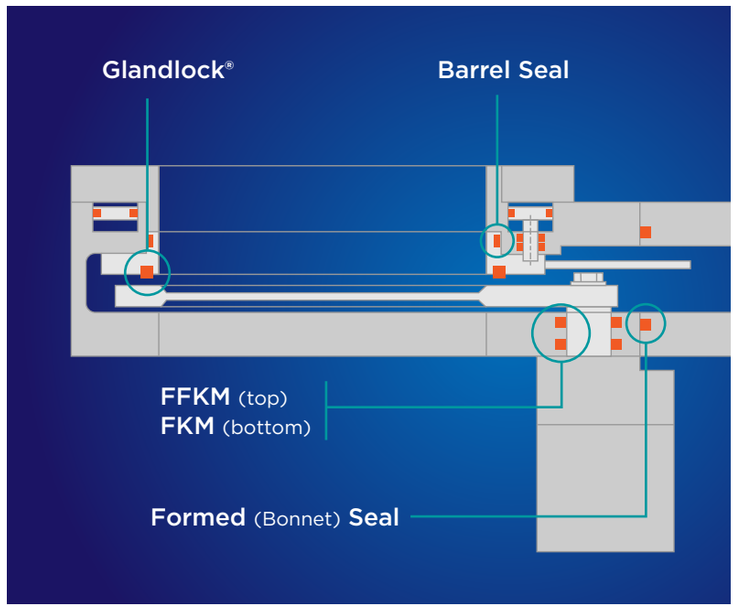


Seal placement in the pendulum valve

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® XRZ | Chemraz® G20 | Chemraz® 629

Chemraz® G13 | Enduro® LF10

SEAL DESIGN SOLUTIONS


O-Ring
(Dynamic Actuator)


Glandlock® Seal
(Plate)


Barrel Seal
(Body)


Formed Seal
(Bonnet)


Bonded Seal
(Paddle)


Coated Seals
(Dynamic Actuator)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

gtweed.com

Turbomolecular Pump Solutions

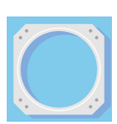
Chemraz® and Fusion® solutions can be used in turbomolecular pump applications up to 300°C and are compatible with deposition and etch process gases such as fluorine and oxygen. The combination elastomer material and seal design provides solutions that are less susceptible to cracking and overfill.

PECVD/PEALD SOLUTIONS
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION AND ATOMIC LAYER DEPOSITION SOLUTIONS


Slit Valve Solutions

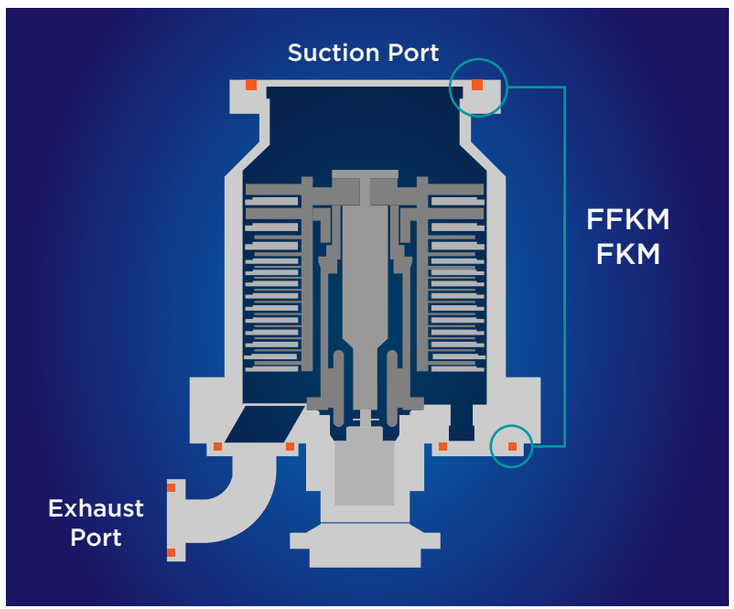

Electrostatic Chuck Solutions


End Effector Solutions


Chamber Seal Solutions


Pendulum Valve Solutions


Turbomolecular Pump Solutions



Seal locations on a turbomolecular pump

Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® G20

SEAL DESIGN SOLUTIONS


O-Ring
(All Glands)


Custom Seal Design
(Glandlock® Seal)


Custom Design Seal
(Barrel Seal)


O-ring Kits

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

gtweed.com

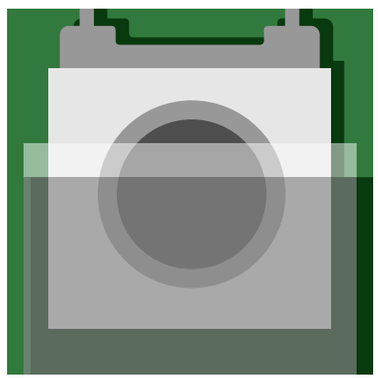
In wet wafer processing tools, seals are typically used in wet chambers, electroplating, filter cartridges, and chillers. Sealing against a wide variety of chemistries including, acids, DI water, and electroplating solutions. High material compatibility and purity ensures cleanliness in the systems.

WET PROCESSING SOLUTIONS

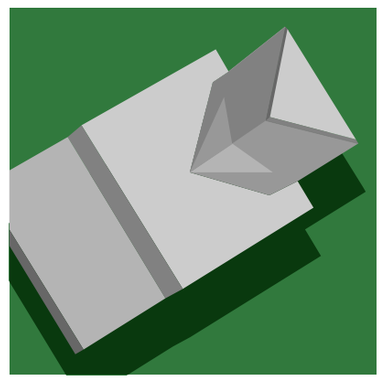
DI WATER
WET ETCH
WAFER CLEANS

Our seals offer superior chemical resistance, minimal particle generation in plasma, and long service life to minimize maintenance and downtime.

Filter Cartridge Seals

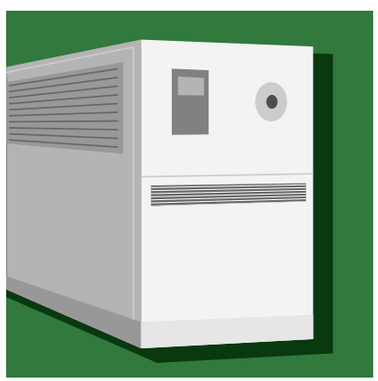


Electroplating



Engineered Components

Wet Chamber Seal Solutions



Chillers

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

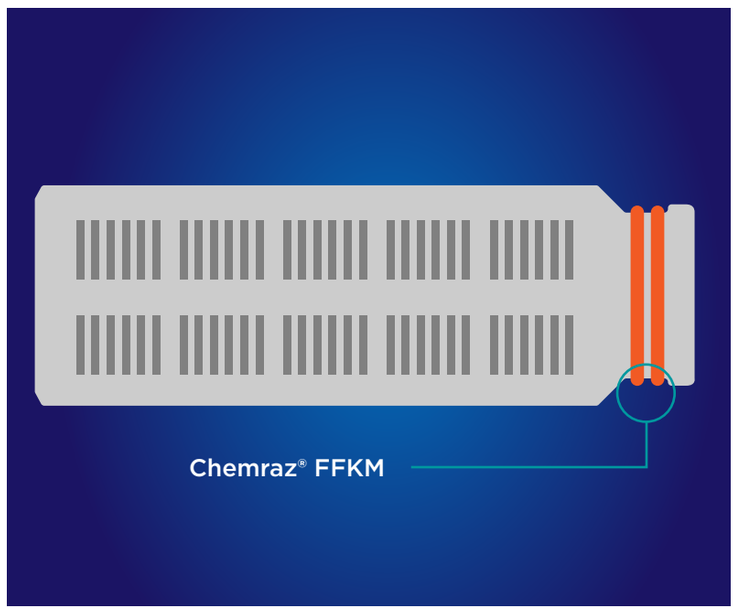
Filter Cartridge Seal Solutions

Chemraz® seals provide excellent performance in wet chemistries. In particular they are compatible with water, wet etch, and wafer clean chemistries and can handle these processes at high temperatures of 200°C or more. Chemraz® seals show low TOCs (Total Oxidizable Carbon), low leachable trace metals, and low ionic contamination in wet processing environments. Chemraz® materials have excellent resistance in these applications.

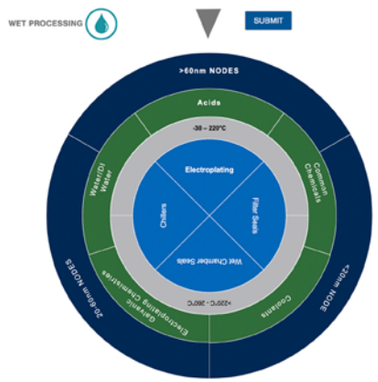
WET PROCESSING SOLUTIONS

DI WATER
WET ETCH
WAFER CLEANS

Filter Cartridge Seals
Electroplating Seal Solutions
Engineered Component Solutions
Wet Chamber Seal Solutions
Chillers



Seal placement on a filter cartridge



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 551 | Chemraz® 570

UltraClean Chemraz® post cleaning process

SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

Custom Seals
(All Gland)

Plastic Encapsulated O-ring
(All Glands)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

gtweed.com

Electroplating Seal Solutions

Chemraz® seals provide excellent performance in electroplating chemistries. These include, WLP–wafer level packaging, TSV–thru silicon via, and BEOL–back end of line–interconnect applications and processes at temperature of 200°C or more. Enduro® coatings extend seal life by allowing effective part cleaning and resisting plate-up on seal surfaces.

WET PROCESSING SOLUTIONS

DI WATER
WET ETCH
WAFER CLEANS

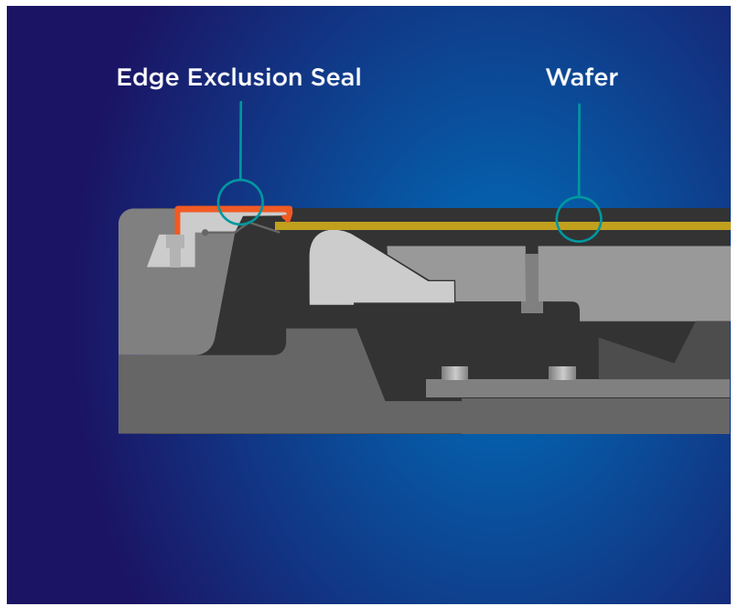

Filter Cartridge Seals


Electroplating Seal Solutions

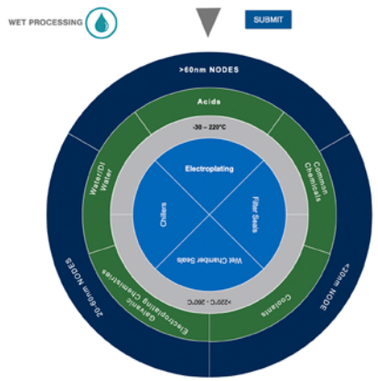

Engineered Component Solutions


Wet Chamber Seal Solutions


Chillers



Typical process chamber.



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 570 | Enduro® LF10

UltraClean Chemraz® post cleaning process

SEAL DESIGN SOLUTIONS


O-Ring
(All Glands)


Custom Seals
(All Gland)


Bonded Edge Exclusion Seal


Coated Seals
(Dynamic Actuator)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

Engineered Component Solutions

Engineered component solutions include custom designed and make to print chamber components like wafer holders, pins or screws. Materials highlighted are: Avalon® 56 HP & ONX® 600.

Avalon® fluoroplastic grades provide excellent purity and chemical compatibility. Precision components made from Avalon® 56 HP versus standard PTFE can increase component service life.

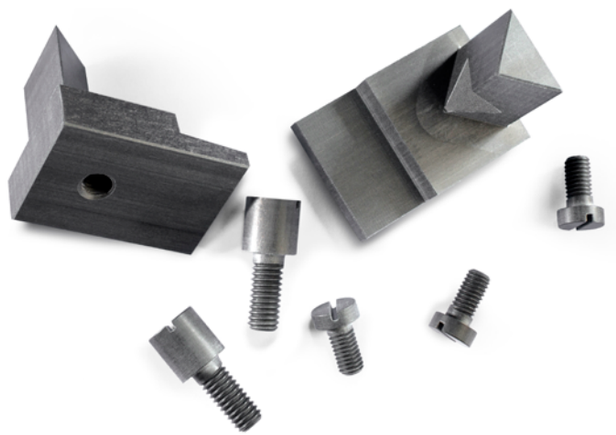
ONX® 600 fluoroplastic composites can be useful in a range of applications offering benefits such as excellent mechanical strength, ESD protection in aggressive conditions, high purity and chemical resistance. Large diameter disks are available for ONX® 600 (capability up to 508mm) as well as turnkey manufactured components.

In addition to providing low ion contamination and low metal extractables, these engineered thermoplastic and composite solutions enhance overall tool performance.

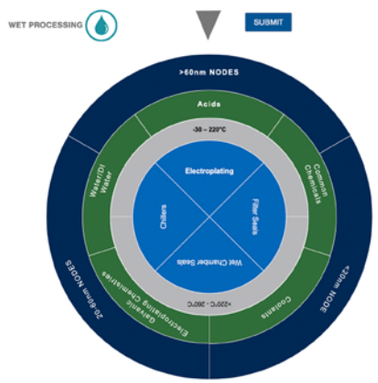
WET PROCESSING SOLUTIONS

DI WATER
WET ETCH
WAFER CLEANS

Filter Cartridge Seals
Electroplating Seal Solutions
Engineered Component Solutions
Wet Chamber Seal Solutions
Chillers



ONX® 600 wafer chucks and screws

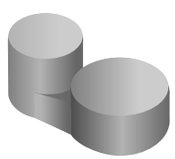


Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Avalon® 56 HP | ONX® 600

DESIGN SOLUTIONS



Wafer Holder Chuck

Chamber Component

ADDITIONAL RESOURCES

Seal Handling Training
Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

Wet Chamber Seal Solutions

Chemraz® seals provide excellent performance in wet chemistries. In particular they are compatible with water, wet etch, and wafer clean chemistries and can handle these processes at high temperatures of 200°C or more. Chemraz seals show low TOCs, low leachable trace metals, and low ionic contamination in wet processing environments. Chemraz materials have excellent resistance in these applications.

WET PROCESSING SOLUTIONS

DI WATER
WET ETCH
WAFER CLEANS

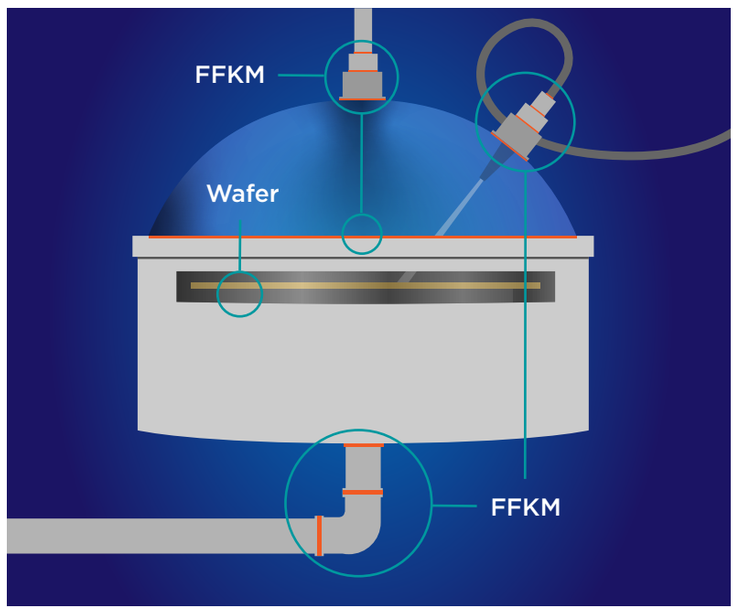
Filter Cartridge Seals

Electroplating Seal Solutions

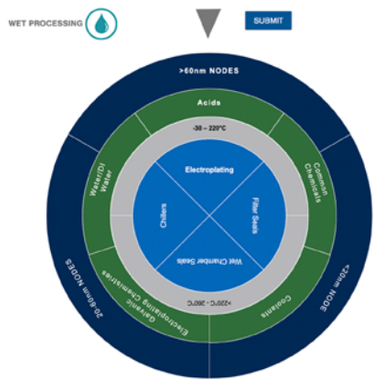
Engineered Component Solutions

Wet Chamber Seal Solutions

Chillers



Wet etch, wet clean chambers.



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 551 | Chemraz® 570

UltraClean Chemraz® post cleaning process

SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

Custom Seals
(All Gland)

Plastic Encapsulated O-ring
(All Glands)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

Chiller Seal Solutions

Chemraz® seals provide excellent performance in heat exchange systems including chillers. In particular they are compatible with water, heat exchange fluids, and coolants. This includes ethylene glycol and fluorinated coolants. Chemraz® can handle processes at high temperatures of 200°C or more.

WET PROCESSING SOLUTIONS

DI WATER
WET ETCH
WAFER CLEANS

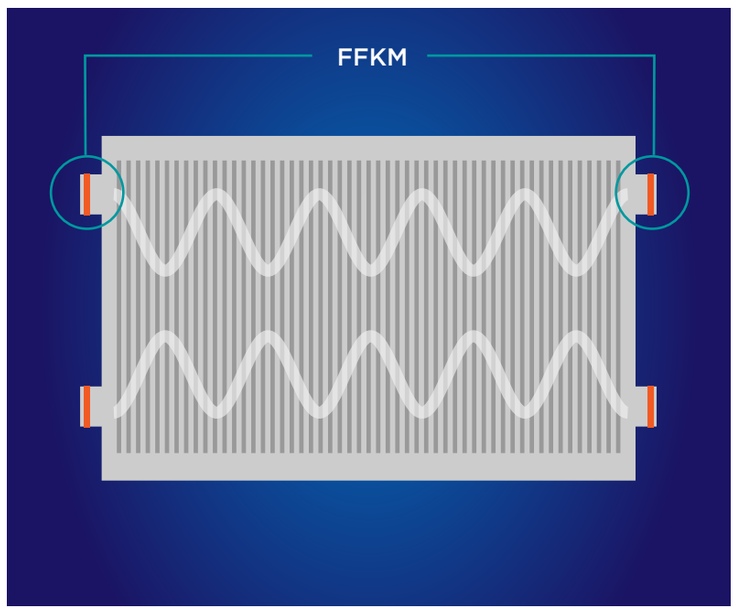
Filter Cartridge Seals

Electroplating Seal Solutions

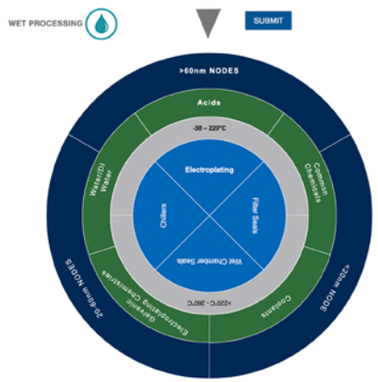
Engineered Component Solutions

Wet Chamber Seal Solutions

Chillers



Heat exchanger



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 551 | Chemraz® 570

SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

Custom Seals
(All Gland)

Plastic Encapsulated O-ring
(All Glands)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

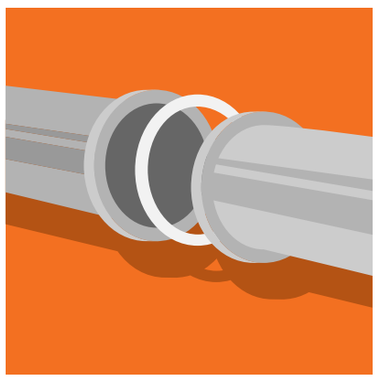
Chemraz® SubFab is a first-to-market total sealing solution that is specifically designed to withstand the highly corrosive environments that are commonly seen in today's SubFab applications.

SUBFAB SOLUTIONS

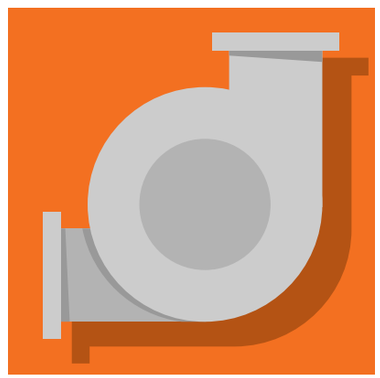
Complex chemistries in semiconductor processes require robust seals in the SubFab

Greene Tweed's Chemraz® sealing solutions can provide customers the following benefits:

- Increased MTBR (mean time between replacement)
- Improved reliability
- Enhanced repeatability
- Maximum system uptime
- Lower cost of ownership

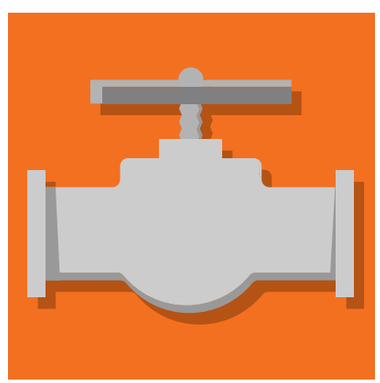


Vacuum Line Solutions



Pump Solutions

Abatement Solutions

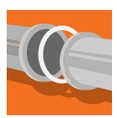


Gate Valve Solutions

Vacuum Line Solutions

As shown in the graphic below, Chemraz® solutions can be used in vacuum line applications up to 300°C and are compatible with deposition and etch process exhaust (fluorene and oxygen). Greene Tweed also offers Aluminum 6061-T6 and stainless steel kits in this application.

SUBFAB SOLUTIONS

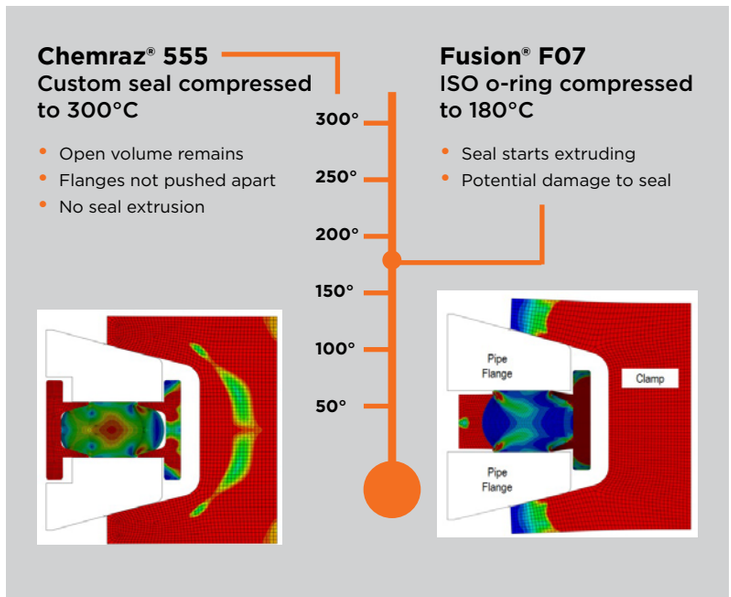


Vacuum Line Solutions

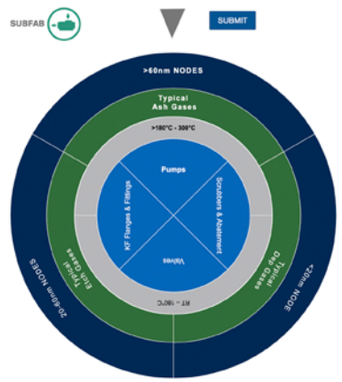
Pump Solutions

Abatement Solutions

Gate Valve Solutions



Product comparison by temperature resistance



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 555 | Fusion® F07

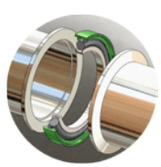
SEAL DESIGN SOLUTIONS

O-Ring
(All Glands)

KF Custom Seals
(High Temp)

KF Standard and Custom O-ring

O-ring Kits



Custom Kits
(All components in one kit)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

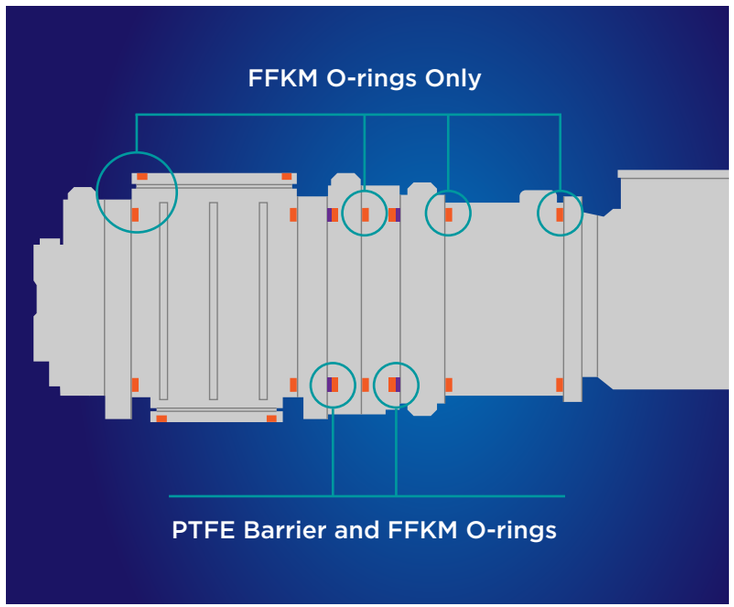
Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

Pump Solutions

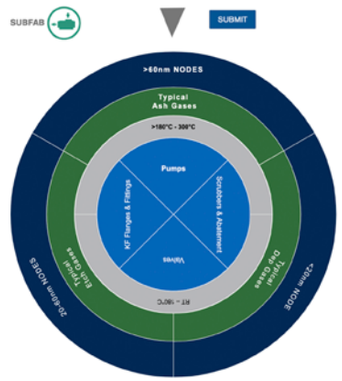
Chemraz® solutions can be used in vacuum pump applications up to 300°C and are compatible with deposition and etch process exhaust gases such as fluorine and oxygen. They are also compatible with fluorinated lubricants commonly used in semiconductor rough pumping applications.

SUBFAB SOLUTIONS

Vacuum Line Solutions
Pump Solutions
Abatement Solutions
Gate Valve Solutions



Seals within a EH mechanical booster pump



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 555 | Fusion® F07

SEAL DESIGN SOLUTIONS


O-Ring
(All Glands)


O-ring Kits


Custom Seal Design
(Scroll Seal)


Shielded Seal
(All Glands)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

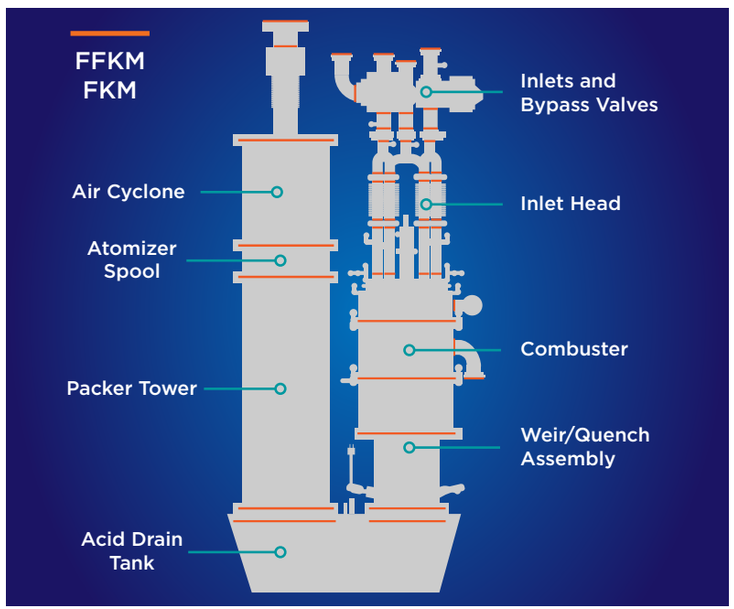
gtweed.com

Abatement Solutions

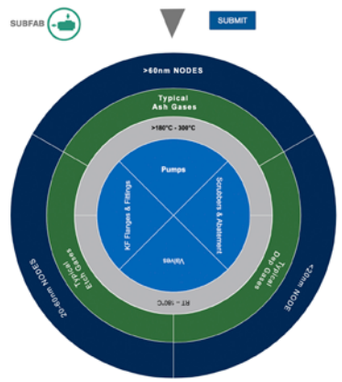
Chemraz® solutions can be used in thermal abatement applications up to 300°C and are compatible with deposition and etch process exhaust gases such as fluorine and oxygen. They also have high resistance to water vapor and residual acids formed by the abatement process.

SUBFAB SOLUTIONS

Vacuum Line Solutions
Pump Solutions
Abatement Solutions
Gate Valve Solutions



Abatement system components and seal locations



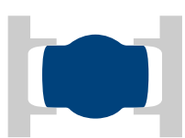
Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 555 | Fusion® F07

SEAL DESIGN SOLUTIONS

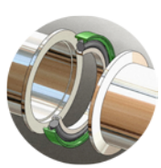
O-Ring
(All Glands)



KF Custom Seals
(High Temp)

KF Standard and Custom O-ring

O-ring Kits



Custom Kits
(All components in one kit)

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

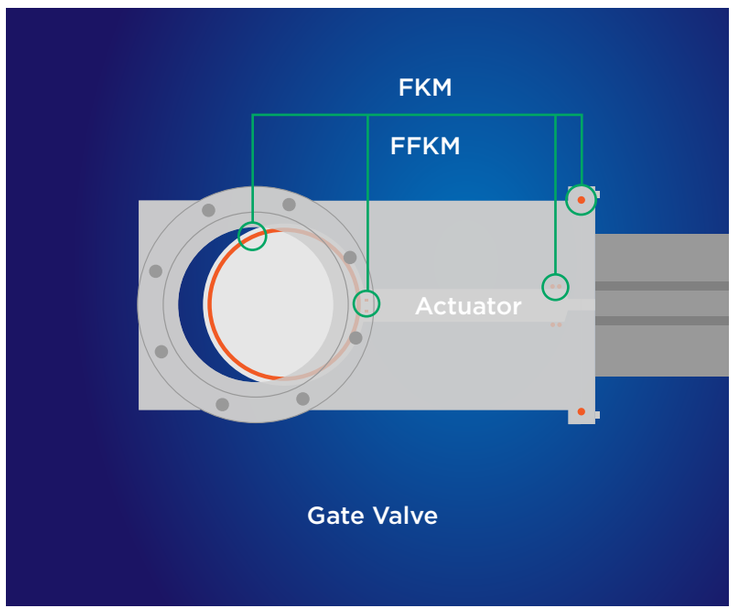
gtweed.com

Gate Valve Solutions

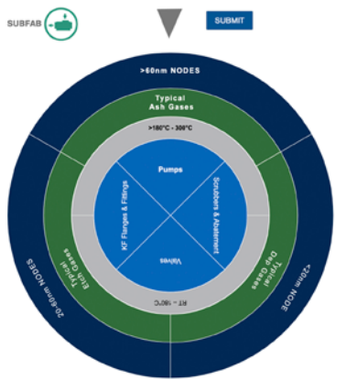
Chemraz® and Fusion® materials are compatible with deposition and etch process exhaust gases such as fluorine and oxygen and deliver cost of ownership and reliability.

SUBFAB SOLUTIONS

Vacuum Line Solutions
Pump Solutions
Abatement Solutions
Gate Valve Solutions



Elastomer locations on a gate valve



Click on the Elastomer Selection Wheel to explore other Chemraz® material options

Click on the compound for more information.

Chemraz® 555 | Fusion® F07

SEAL DESIGN SOLUTIONS

O-Ring
(Plate/Bonnet)

Custom Seals
(Plate)

Formed Seal
(Bonnet)

ADDITIONAL RESOURCES

Seal Handling Training

Chemical Compatibility Guide

Contact a Greene Tweed sealing solutions engineer to learn how we can help solve your application concerns.

gtweed.com

Greene Tweed
1684 South Broad Street | Lansdale, PA 19446 | Phone: (+1) (215) 256-9521

< back