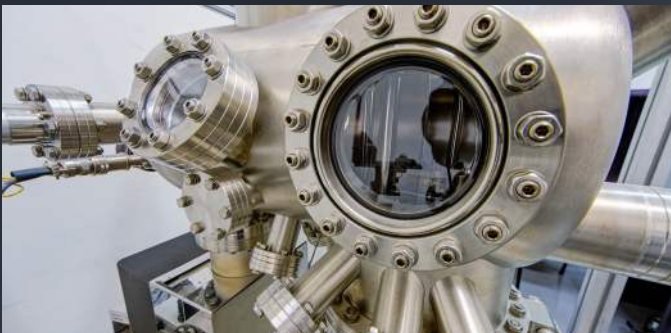
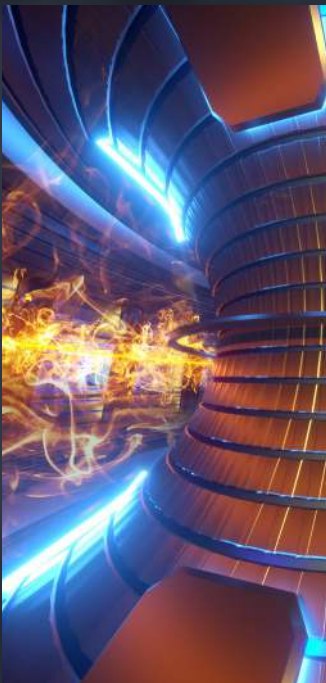


CONFIDENCE FOR CRITICAL APPLICATIONS

Highly Engineered Solutions in the Most Demanding Environments



METAL SEALS

HELICOFLEX®

The HELICOFLEX® seal is a high performance, flexible metal seal that has exceptional compression and elastic recovery properties. This seal is composed of a close wound helical spring surrounded by one or more metal jackets.



FEATURES AND BENEFITS

- Useful elastic recovery up to 0.5 mm (0.02 in)
- Corrosion resistance to all media (acids and bases)
- Pressure: from ultra high vacuum to 2,500 bar (36,259 PSI)
- Temperature from -273°C to 800°C (-460°F to 1472°F)
- Lifetime: above 100 years
- Leak tightness 1×10^{-9} std cc/sec He
- Range of materials (aluminum, silver, copper, stainless steel, INCONEL® and other exotic metals)
- Design can be adapted to any type of assembly
- Good creep resistance

APPLICATIONS INCLUDE:

- Nuclear: reactor pressure vessels, control rods, primary pumps, pressurizers, spent fuel casks
- Valves: body/bonnet sealing, seat sealing
- Oil and gas: hydraulics, subsea couplings, subsea christmas trees, subsea compressors, electronic submersible pumps, flow meters
- Life sciences: imaging & scanning systems
- Ultra high vacuum: accelerators & fusion research
- PVD/CVD/etch equipment
- Gas/chemical delivery systems
- Automotive: engine, exhaust gas



WATCH NOW

HELICOFLEX® DELTA

The HELICOFLEX® DELTA seal is a member of the HELICOFLEX® family of spring-energized seals. It is a unique sealing solution using a small ridge, or “Delta,” on the top and bottom of the seal. The load required to plastically deform the jacket material is greatly reduced by concentrating the compression load on the Deltas.



FEATURES AND BENEFITS

- Highest sealing level performance on the market, depending on the seal jacket, the cavity/flange finish, the bolting, the hardware robustness and the cleanliness level
- Ø 1.9 to 6.4 mm (0.075 to 0.25 in) cross-section
- Adaptable to all types of sealing surfaces
- Adaptable to all flange standards (PNEUROP, ANSI, ISO, and more): no limitation on flange materials, allowing the seals to be used on metal flanges as well as ceramic, glass-lined and glass flanges
- Wide material choices: from standard to specific and rare (see details below in “Specifications” section)

APPLICATIONS INCLUDE:

- Ultra-high vacuum
- Space
- Semiconductor



METAL SEALS

O-FLEX™

O-FLEX™ metal O-rings are designed to provide a sealing option for high-pressure/high-temperature applications that require minimal spring back. The O-FLEX™ metal O-ring is made from high strength metal tubing that is coiled, cut and welded to size.



FEATURES AND BENEFITS

- Cross section and wall thickness designed to control loading
- Available for internal and external pressure
- Styles: regular and vented/pressure balanced
- Pressure: from high vacuum to 500+ bar (7,252+ PSI)
- Temperature from -273°C to 650°C (-460°F to 1200°F)
- Range of materials (SS 321, Alloy 600, X750, 718) - others available
- Platings and coatings: silver, gold, nickel, PTFE (others available)
- Custom shapes and sizes available

APPLICATIONS INCLUDE:

- Nuclear: reactor pressure vessels, control rods, spent fuel casks
- Plastics/film: extrusion, spinnerets, filters, hot runners
- Industrial: compressors, waste heat
- Automotive: head/cylinder sealing
- Defense/military: MS O-rings



C-FLEX™

The sealing design of C-FLEX™ metal C-rings is based on the elastic deformation of a metal “C” substrate which, during the compression cycle, gives a contact point on each sealing surface. The substrate characteristics determine the compressive load of the seal.



FEATURES AND BENEFITS

- Pressure energized
- Cross section and wall thickness designed to control loading
- Available for internal, external and axial pressure
- Pressure: from medium vacuum to 2,000 bar (29,008 PSI)
- Temperature from -273°C to 730°C (-460°F to 1350°F)
- Range of materials (Alloy X750, 718, Waspaloy and other exotic metals)
- Platings and coatings: silver, gold, PTFE (others available)
- Custom shapes and sizes available

APPLICATIONS INCLUDE:

- Oil & gas: down hole drilling/MWD
- Industrial turbines: fuel systems/nozzles
- Valves: body/bonnet, back seat sealing
- Aerospace/space: turbo pump, fuel systems, nozzles/injectors, cryogenics
- Automotive: turbo chargers, exhaust



METAL SEALS

E-FLEX™

E-FLEX™ metal E-rings are designed to have a low load, high spring back performance for high-pressure/high-temperature applications. In service, E-FLEX™ metal E-rings are pressure energized by the system which increases the contact stress and further minimizes leakage.



FEATURES AND BENEFITS

- High springback/low load
- Seal profile and wall thickness designed to control loading and springback
- Available for internal and external pressure
- Large and segmented diameters available (>2000 mm/>78.74 in)
- Pressure: 100+ bar (1,450 PSI)
- Temperature from -273°C to 730°C (-460°F to 1350°F)
- Range of materials (Alloy X750, 718, Waspaloy and other exotic metals)
- Tribological wear resistant coatings available
- Custom profiles and sizes available

APPLICATIONS INCLUDE:

- Aerospace: bleed air systems, AS1895/7
- Industrial turbines: casings, end covers, segmented sections



MACHINED METAL SEALS

K-PORT, ULTRATECH SERIES, NAFLEX, SEAL SAVER

Technetics offers a diverse range of machined metal sealing solutions for extremely demanding environments. We can design and manufacture from any machinable material at our state-of-the-art manufacturing facilities that are equipped with machining centers and coordinated measurement systems to ensure world quality precision.



FEATURES AND BENEFITS

- Suitable for applications that require a metal seal that is difficult to manufacture in certain sizes or require a special geometry profile
- Pressure up to 241 bar (3,495 PSI)
- Temperature up to 1,200°C (2,200°F)
- Platings and coatings: silver, gold, PTFE

APPLICATIONS INCLUDE:

- Aerospace: fuel systems, pumps, valves, standard fittings (AS-933 for fluid fittings, AS-5202 for boss ports)
- Extremely corrosive and radioactive environments
- Replacement or repair seal for hydraulic tube fittings



ELASTOMER & INFLATABLE SEALS

CEFIL'AIR® & BIO-GUARDIAN®

Our elastomer molded seals, profiles and pneumatic inflatable seals are used where a custom sealing solution is required, such as when there can be variation during the assembly. These seals can remove the need for custom tooling for sealing profiles, which is particularly useful during an R&D phase when the final sealing shape is uncertain.



FEATURES AND BENEFITS

- Large selection of elastomers and materials to suit a wide range of applications and environments
- Can accommodate a large compression tolerance. Easily connected and disconnected for fast line replacement
- No seal stress during opening and closing phases
- Highly-flexible design: available in a large selection of shapes and sizes
- Ideal for moving, handling, holding or clamping particularly large, fragile or complex objects
- Fire-proof performance
- Wear resistant for locations where debris abrasion is an issue
- BIO-GUARDIAN® elastomers prevent the development of bacteria and biofilm formation

APPLICATIONS INCLUDE:

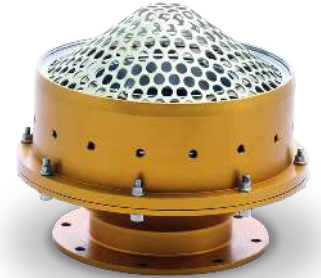
- Aerospace
- Defense
- Industrial
- Oil & Gas
- Nuclear
- Pharmaceutical



BURST DISCS

SAFE-SHEAR™

When extreme conditions demand the best components, second best won't do. Technetics Group SAFE-SHEAR™ Burst Discs are second-to-none in delivering reliable, consistent performance in the most extreme conditions such as hard vacuum, high pressure, cryogenic and high temperatures.



FEATURES AND BENEFITS

- High level of accuracy and dependability ($\pm 1\%$ full scale) regardless of pressure and temperature cycles, dynamic environments and harsh media
- Burst setting 100% verifiable and adjustable by nondestructive testing
- Achieves leak tightness of $<1.00 \times 10^{-9}$ sccs He, considerably better than pressure relief valves alone
- Allows continuous pressure cycling up to 95% of set burst pressure
- Impervious to high shock and vibration levels: does not cause premature rupture or reduced life

APPLICATIONS INCLUDE:

- Human spaceflight – Meet NASA Fracture Critical Requirements – e.g. ISS, Orion, etc.
- Autonomous space vehicles – Extensive pedigree that began in the time of the Mercury Missions
- Cryogenic fluid management – Orbital refueling (e.g. NASA RRM3 Mission)
- Deep space applications – 20+ year Cassini Mission to Saturn – Prevented Boil-off leakage for over two decades
- Sensitive rail cargo – Vapor phase piping system where LNG or ethylene is being transported
- Transport aircraft fuel systems



[WATCH NOW](#)

SEALING SYSTEMS

QDS, KENOL®, BOLTED FLANGES, TRI-CLAMPS

Your applications are facing demanding environments, but Technetics Group's sealing systems and sub-assemblies give you the peace of mind you need. Precision engineered, time-saving and reliable, our solutions give you the confidence when you need it most.



FEATURES AND BENEFITS

- Quick tightening
- Space saving
- Easy assembling
- Remote handling
- Temperatures from -196°C to 600°C (-321°F to 1112°F)
- Pressure: from vacuum to high pressure (500 bar/ 7,252 PSI)
- Standard and engineering design
- Extensive life time (over 10 years)
- Complete validation of assembly with FEA (Finite Element Analysis)
- Non-magnetic (optional)
- No twisting torque on pipe
- Large dimension range from pipe DN 10 to DN 600

APPLICATIONS INCLUDE:

- Nuclear: primary loop, filters, thermocouple nozzles, removable, flanges for cavity filling
- Ultra-high vacuum: accelerators & fusion research
- PVD/CVD/etch equipment
- Gas/chemical delivery
- Pressure vessels: design of pressure equipment closings



ACOUSTIC MEDIA

FELTMETAL™

When noise is an issue, Technetics Group's acoustic media quietly does the job. Our FELTMETAL™ Acoustic Media provides enhanced noise control for applications such as inlet and exhaust for both APU and propulsion engines. FELTMETAL™ is also used in environment control systems to reduce noise and control moisture inside the cabin.



FEATURES AND BENEFITS

- High temperature resistance – enables hot gases to be expanded gradually, reducing turbulence and the amount of noise generated
- Optimum performance – Accomplished through acoustic impedance matching
- Readily cleanable
- Excellent erosion resistance – Long service life
- Low non-linearity factors – Very effective resistance to high pressure waves/distortions
- Exceptional performance at high frequencies – Able to target nuisance frequencies
- Corrosion resistant – Resistant to aggressive cleaning agents
- Reliable performance in wet conditions – Porosity allows the sound waves to push out any trapped liquids

APPLICATIONS INCLUDE:

- Commercial and Business Aircraft – APU inlet/exhaust and ECS ducting
- Human Spaceflight: Acoustics and Noise Control in Space Crew Compartments
- Industrial: Manufacturing Machinery and Heavy-duty HVAC Systems



GRAPHITE SEALS

ORIGRAF®

Optimize your total cost of ownership with higher safety and better performance. Our ORIGRAF® graphite pressure seals are designed to excel in extreme thermal and pressure cycles.



FEATURES AND BENEFITS

- Elastic recovery up to 50% of the compression
- Low creep and relaxation
- Temperature from -196°C up to 2,500°C (-321°F to 4,532°F) (inert atmosphere)
- Pressure up to 400 bar (5,802 PSI)
- Good resistance to radiation (nuclear application)
- Chemical resistance
- Withstand differential radial motion

APPLICATIONS INCLUDE:

- Steam generator, pressurizer
- Shut off valves, adjustment and regulation in linear movement, and quarter rotation
- Heat exchanger
- Piping connecting flange and boiler devices
- Piping shutters
- Rotating machinery: interior of pumps and compressors
- Device closings with autoclave systems
- Hot air and other gas circuit
- Cryogenic applications
- Valves: body/bonnet sealing, seat sealing



MECHANICAL SEALS

QUALISEAL®, GULLIVER®, CEFILAC GPA®

With trusted brands such as QUALISEAL®, GULLIVER® and CEFILAC GPA®, we deliver extended life and low leakage while accommodating a wide range of sizes, speeds, pressures and temperatures in both dry and wetted applications.



FEATURES AND BENEFITS

- Pressure up to 20 bar (290 PSI), rotating speed up to 100 m/s (328 ft/s)
- Temperature up to 200°C (392°F)
- Unique design for abrasive, corrosive and clogging media
- No additional lubrication required
- Reliable and durable solution
- High quality materials

APPLICATIONS INCLUDE:

- Alumina processing
- Mining
- Paper industry
- Mixers
- Agitators
- Centrifugal pumps
- Water pumps
- Bottling machines
- Chemical pumps
- Hydraulic turbines
- Gearboxes
- Sprayers
- Cooling pumps
- Propulsion engines
- APU's
- Gearboxes
- Generators
- Compressors



POROUS TRANSPORT LAYER (PTL)

FELTMETAL™

Technetics is taking over 50 years of experience manufacturing FELTMETAL™ products for the Aerospace industry and “transporting” it to Green Hydrogen. Through partnerships with universities and industry partners, we are developing various Porous Transport Layer materials to meet the needs of various applications.



FEATURES AND BENEFITS

- Voltage required to produce 1A/cm² (refer to table below).
- Low contact and ohmic resistance.
- Low variation in steady-state (operational stability) response over time.
- Can tailor porosity and thickness to your application needs (find the right balance between “bubble” removal and contact resistance, length of diffusion and mechanical strength).
- Smooth surface allows for better contact with catalyst layer.
- Longer life in highly corrosive environment compared to carbon paper.

APPLICATIONS INCLUDE:

- Hydrogen production: Electrolyzer stack



PEEK

RINGS, PLATES, DISCS, CUSTOM SHAPES

The unique properties of PEEK components make them ideal for challenging applications in numerous industries. Our PEEK components and shapes can be modified to achieve special properties to meet customer requirements.



FEATURES AND BENEFITS

- Large dimension range from diameter 787 mm to 5,000 mm (from 31 in to 196.85 in)
- Excellent high temperature performance
- High abrasion and cut through resistance combined with a low coefficient of friction
- Withstands a wide range of acids, bases, hydrocarbons and organic solvents
- Low moisture absorption, resistant to steam, water and sea water, with low permeability
- Electrical properties; wide frequency and temperature range
- Inherently flame retardant without the use of additives. Low toxicity of combustion gases
- Lightweight, fully recyclable, halogen-free, RoHS compliant

APPLICATIONS INCLUDE:

- Large diameter rings for FPSO swivel stacks & other oil & gas applications
- Back-up rings
- Connectors
- Housings and covers
- Pumps
- Bearings
- Cogwheels
- Medical components and tools
- Formula 1 racing components
- Aerospace components
- Wind turbine components
- Inserts for seal reinforcement and easier installation



BRUSH SEALS

METAL & HELICOCARB® CARBON BRUSH SEALS

Brush seals work by absorbing radial deflections from the rotor during transient operations. The seal then follows the rotor back to the steady state operating position to maintain minimum leakage. Each metal seal's brush pack is composed of thousands of finely packed wire bristles.



FEATURES AND BENEFITS

- Reduced wear rate means longer life
- Consistent flow provides predictable performance
- Higher-pressure operation yields flexibility in design
- Reduced heat generation ensures a cooler rotor
- More than 5 times less leakage than labyrinth seals; carbon brush seals provide 90% less leakage
- Pressure balanced design reduces force and prevents bristle pack “hang up” following a radial excursion
- Repairable and insert-only options are available

APPLICATIONS INCLUDE:

- Gas turbine engines
- Steam turbine engines:
 - Main shafts
 - Gearbox
 - Compressors
 - APUs
 - Bearing seals
 - Centrifugal pumps
 - Industrial air fan



ABRADABLE SEALS

FELTMETAL™

Abradable seals, when applied to stationary engine parts, allow for the complete sealing of blade tips and interstage labyrinth seal knife edges through the full 360° arc of rotation while minimizing or eliminating wear on the expensive rotating hardware.



FEATURES AND BENEFITS

- Built for extreme temperatures: Technetics Group FELTMETAL™ Abradable Seal material provides superior clearance control in blade tip and labyrinth seal applications up to 1400° F (760° C)
- Wide variety of customization: Technetics Group FELTMETAL™ Abradable Seal material can be manufactured to virtually any size or thickness, and can be rolled, formed, or machined to its final configuration

APPLICATIONS INCLUDE:

- Gas turbine manufacturers for flow path efficiency improvements
- Aerospace and industrial turbine applications, where our FELTMETAL™ Abradable Seals are used in blade outer seals, blade inner seals and labyrinth seals



BELFAB® METAL BELLOWS

EDGE-WELDED METAL BELLOWS

Edge-welded metal bellows provide superior stroke capabilities and more precise spring rates than formed bellows, giving you greater flexibility and control in the smallest possible spaces.



FEATURES AND BENEFITS

- Permit flexible engagement and misalignment with positive spring force machined bellows
- One-piece construction (flanges included)
- High spring rate, very low tolerance for axial displacement
- Variable wall thickness and thick wall possible

APPLICATIONS INCLUDE:

- Aerospace: reservoirs, toggle switches, cold plate assemblies, fuel drains, engine kiss seals
- Oil & Gas: actuators, connectors, couplings, feed throughs, gas lines, reservoirs, sensors
- Semiconductor: actuators, beam lines, connectors, feed throughs, leak detectors, sensors, wafer handlers
- Medical: batteries, cardiovascular devices, implants, drug delivery, monitoring devices, vacuum pumps, valves



CUSTOM DESIGN AND ENGINEERING FOR WHEN CRITICAL SOLUTIONS MATTER MOST

Fueled by a passion to succeed where others cannot, propelled by a commitment to research and development, and inspired by continual collaboration, Technetics Group provides effective custom seal design and component design for critical applications.



GRADE A EXCELLENCE

Our engineers hold master's degrees, Ph.D.s, and the know-how only experience can deliver. Their degrees include concentrations in:

- Materials Science
- Corrosion
- Physics
- Failure Analysis
- Coatings
- Fluid Computation

CRITICAL APPLICATIONS DESERVE THE HIGHEST QUALITY SOLUTIONS

From component manufacturing to seal manufacturing, at Technetics Group we are committed to delivering the highest quality products, which means striving for continual improvement and innovation.



CERTIFICATIONS ACROSS THE ORGANIZATION INCLUDE:

- ISO 9000
- AS 9100
- Title 10 CFR 50 Appendix B
- ANSI / ASME N45.2
- Favorable Audits by NUPIC Members
- ANSI / ASME NQA-1
- KTA 1401
- NADCAP HEAT TREATING
- NADCAP WELDING
- NADCAP FLUID DISTRIBUTION SYSTEMS
- QCE 228*

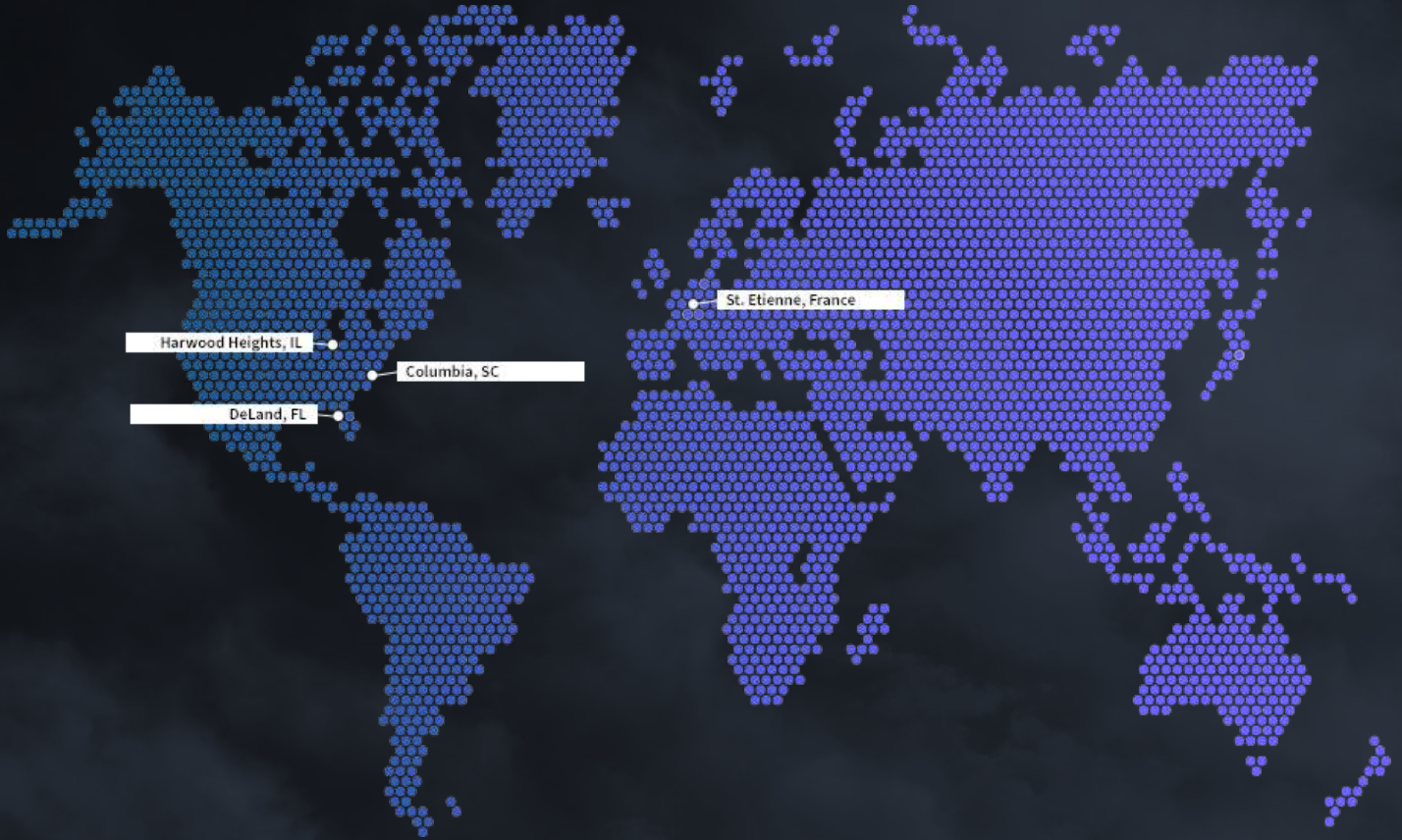
AT THE LEADING EDGE OF INNOVATION

Continuously testing, creating and finding new engineered sealing solutions to meet your most demanding applications.

We take a multi-scale scientific approach, combining tests, characterization and simulation in order to develop performance seals and other sealing solutions that meet not only today's needs but tomorrow's.



MEETING THE MOST DEMANDING CHALLENGES WORLDWIDE



**GLOBAL
MANUFACTURING
LOCATIONS**



**ONSITE
ENGINEERING
AND DESIGN**



**GLOBAL
LABORATORIES**



**GLOBAL RESEARCH
AND DEVELOPMENT
CENTERS**

For more information on how Technetics Group supports high performance sealing technology, visit [technetics.com](https://www.technetics.com)

