



THE ROLE OF CUSTOM GASKETS & INSULATION KITS IN HARSH ENVIRONMENTS

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When you're designing equipment that must operate in unforgiving environments—where heat, pressure, chemicals, vibration, and corrosion are constant factors—off-the-shelf solutions often fall short.

For engineers working in military systems, oil and gas equipment, or power generation assets, sealing and protection aren't just specs to meet. They're essential to long-term reliability, safety, and uptime.



WHY STANDARD GASKETS FAIL

Commercial-grade gaskets may be suitable for controlled environments, but they frequently break down when exposed to extreme conditions. Common failure points include:

- Loss of compression set at high temperatures
- Chemical degradation in contact with fuels or solvents
- Material fatigue due to vibration and pressure cycling
- Dimensional instability that leads to leaks or part misalignment

For teams designing mission-critical components, those weaknesses can turn into costly system failures, warranty claims, and even safety risks.

UNDERSTANDING COMMON GASKET SPECIFICATIONS FOR HARSH ENVIRONMENTS

When designing for harsh environments, there isn't a one-size-fits-all approach to sealing. Engineers often evaluate gasket options based on the specific performance requirements of their application. Three common examples include:

Military-Spec Gaskets

Used in defense and aerospace applications, military-spec gaskets must maintain sealing integrity through temperature extremes, vibration, moisture, and exposure to fuels or oils. They are precisely cut from high-performance materials and produced to tight tolerances for complex assemblies.

Automotive-Grade Gaskets

Engineers in automotive, industrial, and power generation sectors often turn to rugged gasket materials that tolerate heat, pressure changes, and chemical exposure. These are ideal for cost-sensitive but demanding applications such as battery compartments, fluid systems, and enclosures in high-vibration environments.

Commercial Off-the-Shelf (COTS) Gaskets

For less extreme applications, standard COTS gaskets may suffice. However, they are not engineered for high-performance use. When conditions exceed anticipated exposure, these solutions can fail—leading to maintenance issues or redesigns.



CUSTOM GASKETS: DESIGNED FOR PERFORMANCE, BUILT FOR YOUR ENVIRONMENT

Custom die-cut gaskets offer engineers more than just a perfect fit. They allow for the use of specialized materials selected for the exact conditions of the application. At TXG, we help OEMs choose from a wide range of high-performance materials, including:

- > Closed-cell foams that resist compression set for long-term reliability
- > Silicone blends with high thermal stability for high-temperature environments
- > Adhesive-backed materials for streamlined assembly and alignment
- > Chemically resistant elastomers for fluid sealing in contact with oils, fuels, and solvents
- > Electrically conductive foams and fabrics for EMI and RFI shielding
- > Thermally conductive pads and gap fillers to dissipate heat in power electronics
- > Low-outgassing materials for aerospace, electronics, and medical applications
- > UV-, moisture-, and weather-resistant foams and films for outdoor conditions
- > Multi-layer laminate constructions that combine heat resistance and chemical stability

Our custom components are converted to exact tolerances, so they perform consistently even in rugged, high-stress environments.



SPECIALIZED SEALING SOLUTIONS: CATHODIC INSULATION KITS

In addition to gaskets, many mission-critical systems—particularly in the oil and gas industry—must also be protected against galvanic corrosion, a silent but serious threat to long-term reliability.

Cathodic insulation kits are engineered to interrupt the flow of electrical current across flanged connections, preventing galvanic action between dissimilar metals. These kits combine insulating gaskets, sleeves, and washers into a complete barrier system.

WHY THEY MATTER IN HARSH ENVIRONMENTS

Corrosion Prevention

Isolates flanges to mitigate galvanic corrosion in buried pipelines, offshore rigs, and refineries.

Safety & Compliance

Supports regulatory standards for cathodic protection, ensuring both operational safety and asset protection.

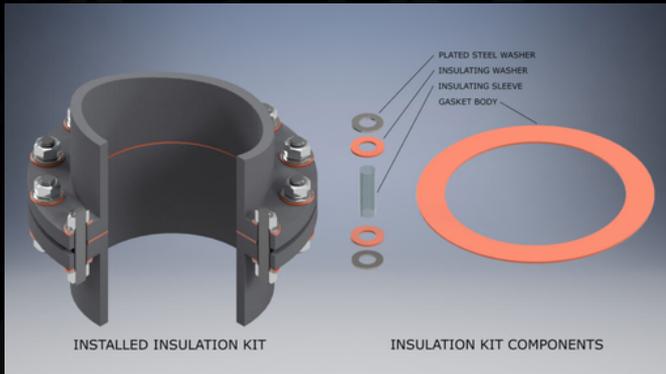
Reliability

Maintains joint integrity in environments with high moisture, saltwater, or aggressive chemicals.

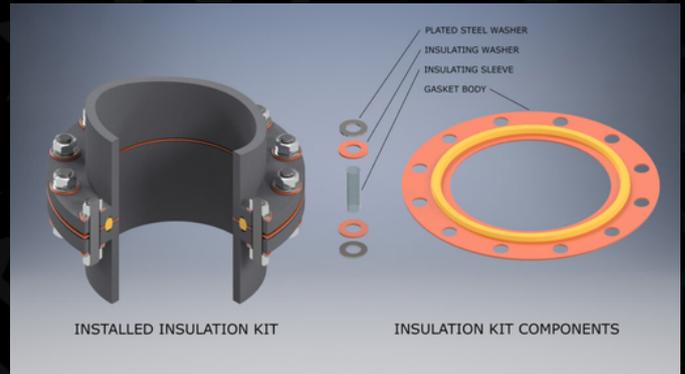


TYPES OF CATHODIC INSULATION KITS

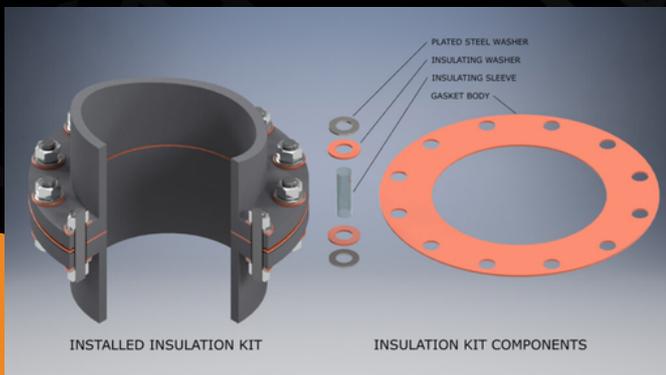
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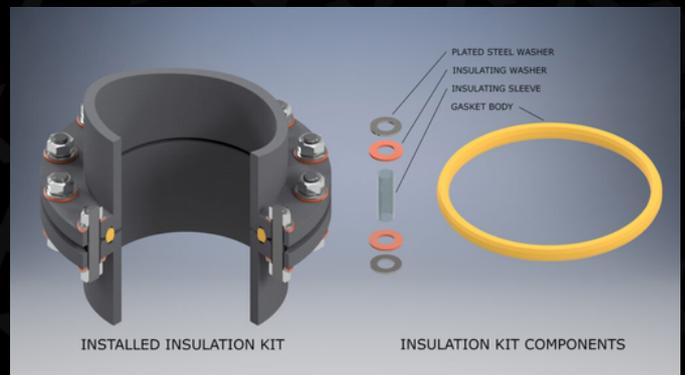
TYPE EDC



TYPE E



TYPE D



CATHODIC INSULATION KITS WITH SEAL



More Info

Read the details at:
<https://txgind.com/products/cathodic-insulation-kits> ↗

APPLICATIONS ACROSS INDUSTRIES

Oil & Gas

Protecting upstream, midstream, and downstream infrastructure from corrosion-related failures

Petrochemical & Refining

Isolating flanged connections in corrosive, high-risk chemical environments

Water & Wastewater

Extending service life of joints in municipal and industrial piping systems

APPLICATIONS ACROSS CRITICAL INDUSTRIES

Whether using custom gaskets or cathodic insulation kits, TXG's solutions support reliability across sectors where failure is not an option:

Military

Protecting enclosures, electronics, and field systems from environmental stressors

Oil & Gas

Ensuring both sealing and corrosion isolation in pipelines and processing equipment

Power Generation

Maintaining uptime in high-vibration and high-temperature systems





CONCLUSION

Standard components have their place, but when your equipment must endure the harshest environments, a custom solution is often the only reliable path forward. From precision-engineered gaskets to complete cathodic insulation systems, TXG Industries and Tape Innovations deliver solutions that perform under pressure—helping you achieve long-term reliability, safety, and success.

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