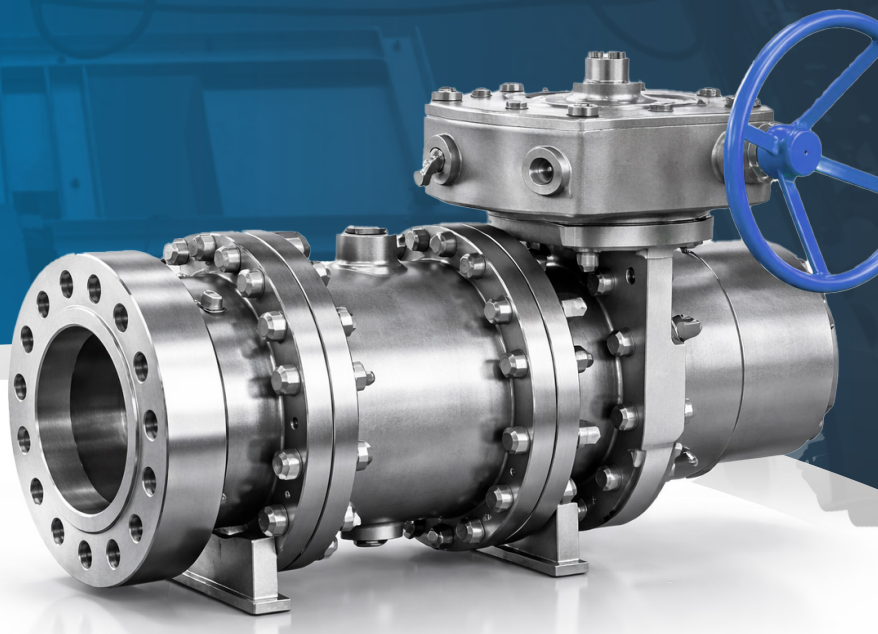
Engineering
Quality
Supply Chain
Assembly
Aftermarket & Production Kitting
Vendor Managed Inventory

Industrial Valve Sealing Systems

Engineered Sealing Systems for Critical Valve Performance

For Critical Sealing, Wear Control, &
Pressure Containment Across Valve Platforms



ESP
ENGINEERED
SEAL PRODUCTS®
100% Employee-Owned

espint.com

DESIGNED FOR THE WORLD'S TOUGHEST VALVE ENVIRONMENTS

Valve systems face extreme and often conflicting demands. ESP sealing systems are engineered to perform under:

- **Extreme high & low temperatures**
- **High pressure & cyclic loading**
- **Chemically aggressive & corrosive media**
- **Abrasion, vibration, & cavitation**
- **Emissions control & leak-prevention requirements**

By engineering each sealing element as part of an integrated system, ESP helps customers mitigate leakage, reduce wear, simplify designs, and improve long-term operational reliability.

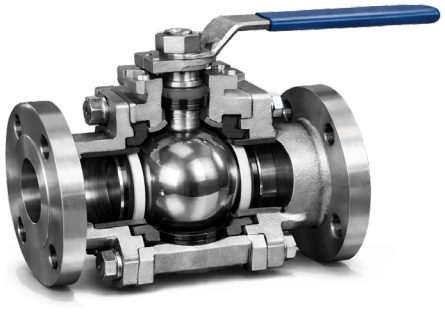
SYSTEMS-LEVEL ENGINEERING APPROACH

In most industries, valve failures rarely result from a single component. Issues such as leakage, emissions, wear, and reduced service life often stem from mismatched materials, incompatible sealing technologies, or components not designed to function together.

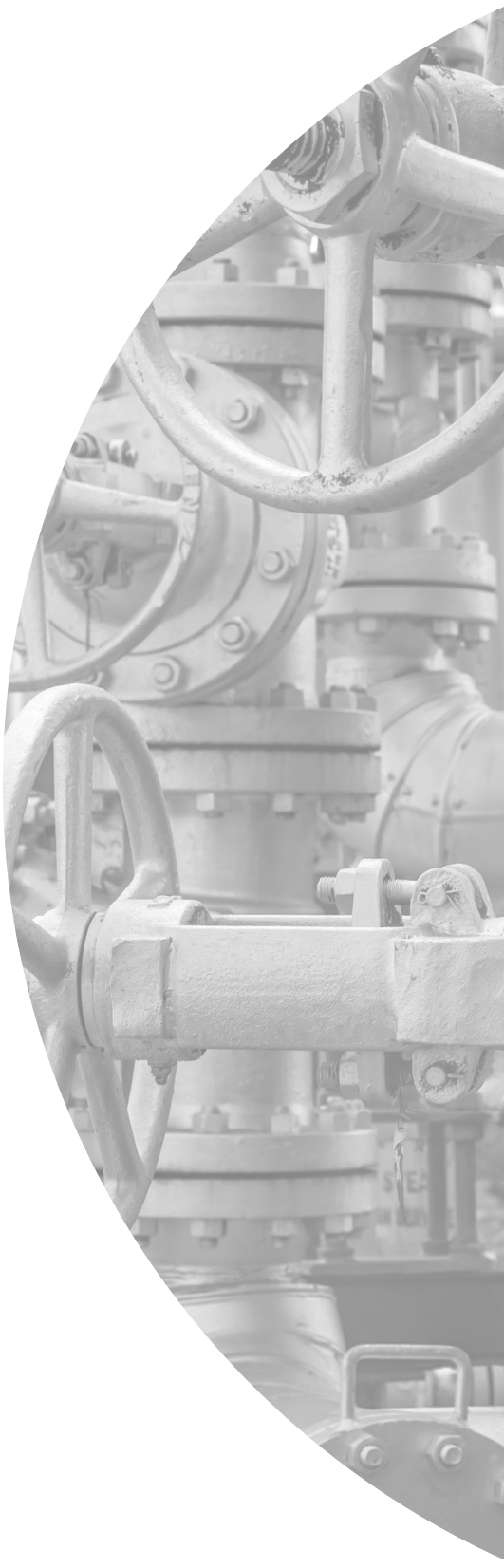
ESP uses a systems-level engineering approach, assessing how each sealing element interacts within the valve assembly. By designing plastics, elastomers, gaskets, and bearings as an integrated solution, ESP enables customers to:

- **Reduce leakage and fugitive emissions**
- **Improve reliability under extreme pressure and temperature conditions**
- **Extend service life and maintenance intervals**
- **Lower total cost of ownership**

ESP sealing systems are engineered for demanding environments, including cryogenic service, high pressure and temperature, chemically aggressive media, abrasive flow, and high-cycle operation.



SUPPORTING VALVE OEMS
ACROSS CRITICAL INDUSTRIES



Oil & Gas

Sealing systems engineered for high-pressure, high-temperature service and aggressive media. Oilfield and valve environments regularly experience extreme differential pressure, including fracturing operations exceeding 10,000 to 15,000 psi. Seat and stem sealing stacks are designed to endure pressure and thermal cycling while resisting extrusion.

Chemical Processing

Sealing components engineered for compatibility with aggressive chemicals and elevated temperatures in corrosive process environments. Valve gland leakage is a major contributor to fugitive emissions, making robust stem sealing and packing performance a primary design requirement.

Agriculture

Durable sealing solutions for irrigation and fluid-control equipment operating outdoors under pressure fluctuation and continuous duty. Valve reliability is supported through optimized stem sealing architectures using multi-part designs and geometry refinement to improve leakage control and repeatability.

Aerospace

Precision sealing solutions for systems requiring tight tolerances, material stability, and consistent performance across temperature extremes and dynamic motion. Aerospace valve programs require strict traceability and qualification controls supported by ESP CAGE Codes 5F263, 5G090, and 4K660.

Food & Beverage

Sealing solutions designed for hygienic processing and packaging equipment with frequent washdown and high-cycle operation. Valve seals must withstand CIP and SIP cycles, including caustic and acidic cleaners and steam sterilization at approximately 250°F or higher, while maintaining sanitary integrity and resisting thermal fatigue.

HIGH-PERFORMANCE
VALVE MATERIALS

Plastic Limits = Pressure + Wear + Creep Resistance
Elastomer Limits = Temperature + Chemical Compatibility

Thermoplastics

- PTFE & filled PTFE
- PEEK
- Engineered Nylons
- UHMW-PE

Optimized for:

- Load-bearing seat applications
- Anti-extrusion support
- Low friction torque control
- Dimensional stability under pressure
- Wear resistance in high-cycle valves

Elastomers

- FKM (Viton®) / FFKM
- NBR / HNBR
- EPDM

Engineered for:

- Sour gas compatibility
- High-temperature resilience
- Chemical resistance
- Compression set control
- Dynamic stem sealing performance

● = Suitable
●● = Strong Option
●●● = Optimal Choice
Limited = Application dependent

	PTFE	Filled PTFE	PEEK	HNBR	FKM	FFKM
Primary Soft Seat	●	●●	●●●	–	–	–
Anti-Extrusion Backup	●	●●●	●●●	–	–	–
Thrust Washer	●	●●	●●●	–	–	–
Static O-Ring Sealing	–	–	–	●●	●●●	●●●
Dynamic Stem Sealing	–	–	–	●●●	●●	●●
High Pressure Load Support	●	●●	●●●	–	–	–
Sour Gas Service	●	●	●●	●●●	●●	●●●
Cryogenic	●●	●	●	Limited	Limited	Moderate
High Temperature (400°F+)	Limited	Limited	●●●	●	●●●	●●●
Extreme Chemical Exposure	●	●	●●	●	●●	●●●

Material & Industry Compliance Support

ESP materials support valve designs requiring compliance with industry standards including:

- **API material requirements for oil & gas valves**
- **NORSOK specifications for harsh offshore environments**
- **FDA compliant materials for sanitary processing equipment**
- **NSF compatible compounds for potable water systems**

SEALING COMPONENTS
FOR VALVE SYSTEMS

Industrial valves require multiple sealing interfaces to ensure containment, minimize friction, and support long-term reliability. Engineered Seal Products provides precision elastomer and high-performance polymer components for critical valve sealing applications.

Stem Sealing

Stem sealing prevents process media from escaping along the valve stem while allowing smooth actuation and repeated movement.

- **Designed to maintain leak prevention, low actuation torque, and durability during repeated operation.**

Seat Sealing

Seat seals form the primary interface between the valve closure element and the valve body, ensuring tight shutoff and reliable containment.

- **Engineered to provide low friction, wear resistance, and consistent sealing performance during extended valve cycling.**

Body & Bonnet Sealing

Body seals ensure pressure containment between valve body sections and other static interfaces.

- **Well-designed body seals provide pressure containment, chemical compatibility, and long-term sealing stability.**

Wear & Support Components

Wear components reduce friction and protect critical valve parts from mechanical wear during operation.

- **Help maintain dimensional stability, reduce friction, and extend service life in demanding valve systems.**

Integrated Sealing Systems

In many valve designs, multiple sealing components function together as an integrated system. ESP collaborates with valve OEMs to ensure proper material selection, compatibility, and system performance across all interfaces.

ENGINEERING SUPPORT & PRECISION MANUFACTURING

Engineered Seal Products collaborates with valve OEMs to develop sealing solutions that meet strict performance standards. We support projects from initial design consultation through production, assisting manufacturers in selecting optimal materials, geometries, and manufacturing methods for their applications.

By combining engineering expertise with flexible manufacturing, ESP helps OEMs enhance sealing performance and streamline sourcing and production.

Engineering Support

- Material selection based on pressure, temperature, and chemical exposure
- Seal geometry and profile optimization
- Performance considerations for friction, wear, and actuation torque
- Application guidance for dynamic and static sealing interfaces
- Recommendations for extrusion resistance and long service life

Manufacturing Capabilities

- Custom compression-molded seals and gaskets
- Precision-machined plastic components
- Injection molded elastomer components
- Short-run and prototype production
- High-volume production manufacturing

Supporting OEM Production

- Rapid response production
- Flexible order quantities
- Consistent component quality
- Reliable supply for production schedules
- Kitting & Assembly

INTEGRATED KITTING & ASSEMBLY

Simplifying Equipment Manufacturing

Engineered Seal Products provides integrated kitting and sub-assembly services designed to simplify production and improve assembly efficiency for equipment manufacturers across multiple industries.

By delivering organized seal kits and pre-assembled component groups, ESP helps customers reduce inventory complexity, streamline assembly processes, and ensure the correct sealing components are installed at every stage of production.

Integrated Kitting

- Simplify assembly processes by delivering components organized for installation
- Reduce inventory complexity by consolidating multiple sealing components into a single supply source
- Improve production efficiency by minimizing handling and part sorting
- Ensure correct component installation at each stage of assembly
- Support consistent sealing performance across equipment builds

Pre-Assembled Subassembly Options

For valve platforms requiring tighter installation control and repeatable seal stack performance, we provide engineered sub-assemblies configured to your exact valve architecture. These assemblies reduce variability at the point of build and improve long-term sealing consistency in severe service.

- Pre-stacked and compressed stem packing sets
- Pre-configured seat stacks (seat + energizer + backup ring assemblies)
- Integrated thrust washer and bushing assemblies
- Matched body seal systems
- Valve-model-specific labeled kits with orientation control

Each subassembly is:

- Dimensionally verified
- Material traceable
- Matched for pressure class and service envelope

By controlling the sealing architecture before it reaches your production floor, we help ensure predictable torque, extrusion resistance, and sealing integrity across every build.

WHY ESP

- Systems-level seal engineering
- Deep valve OEM collaboration
- Material + geometry optimization together
- Production-ready kitting and assemblies
- Compliance-driven material traceability

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