





STEIN SEAL

Our Foundation

For over 50 years, Stein Seal Company has been a leading provider of custom designed seals and precision components for use in a wide variety of industrial applications. Starting in a rented space with five employees, Stein Seal steadily grew into the recognized industry leader we are today. In 1987, we moved into our own modern manufacturing plant, and with building additions over the years, now have over 100,000 square feet in this highly specialized facility.

As a privately owned company, we have remained focused on our long-term growth strategy regardless of economic and market fluctuations. With over 200 employees and manufacturing facilities strategically located both inside and out of the United States, Stein Seal, along with its affiliated companies, is ideally positioned to provide design, development, sales and service worldwide.

Stein Seal's expertise lies in the design, testing and manufacture of seals and precision components for the demanding and critical applications in military and commercial aircraft engines, power generation equipment, pumps, compressors, centrifuges, and both the military and commercial marine industry. Surpassing our customers' expectations by setting the highest standards for design proficiency and originality, constantly investigating new materials and processes, and refining our ability to manufacture to rigorous tolerances have made us the premier supplier of seals and specialty machined components.

Building Excellence With Teamwork

Our proven ability to work side-by-side with our customers as a team is the foundation for our continued success and growth. collaborative style Our means that we are able to deliver innovative solutions of significant value. This cooperative approach, our commitment to technological proficiency, and our wide-range of application experience have earned us the leadership position on which we are building for tomorrow.

Only The Best

The key to maintaining our competitive edge is our investment in creative, technically expert employees as well as in the tools they need to perform at consistently high levels. Our employees



have that special combination of solid qualifications, education, and years of hands-on experience to ensure our customers get the best. Additionally, we encourage our engineering staff, the leading talent in their specialized fields, to continue to add to their skills and knowledge. The results of this investment are evident in the many design patents and advanced degrees held by our employees.

Only the best tools will suffice as well. Significant annual investment in manufacturing equipment, CAD/CAM and COSMOS/M software systems, machining centers, custom fixturing and testing devices. combined with efficient manufacturing techniques, such as 5S and Lean and Cellular Manufacturing, guarantees that we can meet our customers' current and future design and manufacturing requirements.

Whether our customers' applications require complex manufacturing using state-of-the-art equipment available in our US facilities, or more standard machining processes available economically through our offshore facilities, our customers are assured of only the highest quality products, and costeffective pricing in the fastest 'to-market' time available.







Priceless

The opportunity to design solutions for an increasingly diverse base of applications in all types of industries has given us an advantage not available from other companies. So, whether you are dealing with materials such as carbon, titanium, or alloy steels with their unique properties, or rotating pressures. speeds, high extreme temperatures and tolerances within millionths of an inch, Stein Seal has both the experience and expertise for the job.















Dynamic Testing Ensures Peak Performance

Our test lab includes over 20 dynamic test rigs, including two inter-shaft rigs. Each of these rigs has been custom designed to meet not only our high standards, but they can also be quickly reconfigured for multiple programs to provide fast, concurrent, and cost-efficient testing for our customers. This gives Stein Seal the unique ability to provide additional testing services outside the realm of our own business needs.

Our testing expertise and equipment are available to our customers so that they may validate their own designs, or test non-seal related components and systems. Our test rigs can handle diameters up to 24 inches; run shaft speeds up to 70,000 rpm; oil pressures to 4,000 psi; gas pressure to 3,000 psi and temperatures as high as 1,000°F. Being able to simulate the extreme limits of operating conditions allows us to accurately predict and verify performunder the ance most rigorous conditions.

For example, by extensively testing the design of our circumferential hydrogen generator seal, we were able to demonstrate that both leakage and shaft rub damage had essentially been eliminated. For the high demands of the power industry, this represented an enormous bonus in terms of efficiency and maintenance requirements.

Using the Right Materials

The materials used in the manufacture of our sealing systems are as varied as the wide-ranging applications in they are which used. Successful utilization of these materials requires a comprehensive knowledge of their properties as well as an understanding of their reaction under standard and extreme operating conditions. Our extensive experience includes working in environments that are corrosive, volatile, abrasive or flammable and this knowledge and experience ensure that we can provide vou with the best solution.

Stein Seal has maintained a strong proficiency in the use and application of various materials including alloy steels such as stainless and standard metals, including aluminum, brass, and carbon steel. We are committed to the continuous research and analysis of new and better materials. This commitment has resulted in developing expertise in materials such as inconel, titanium, tantalum, as well as silicone nitride and silicone carbide.

Our ability to understand the characteristics of these materials and then develop the manufacturing techniques and precision machining processes to successfully use them in our seals and other components have allowed us to offer increasingly diverse solutions. For our customers, this means we continue to provide innovative products whose life cycle, reliability, maintenance, and performance can meet the challenges of ever changing application requirements.

For example, the titanium used in critical military aircraft engines, such as the F/A-22 Raptor fighter, must be welded in a vacuum with precise control of the penetration of the weld to prevent it becoming work hardened or warped. Our manufacturing techniques and processes allow us to successfully control these demanding procedures. Stein Seal has the experience and engineering know-how to meet and exceed our customers' sealing requirements in design, materials, and manufacturing techniques.



Quality Built Into the Process

The result of our building quality controls into each step of the process, from design through manufacturing, is that our products will not only meet, but will surpass the most rigorous industry standards. Due to our own stringent procedures, we often end up manufacturing to tighter tolerances than were specified.

We identify all quality requirements up-front, and then institute quality checks and inspections through each phase of the process. Our adherence to all quality requirements for dimensions, tolerances, finishes and other specifications ensures we maintain the highest quality, whether we are manufacturing parts with high or low tolerances.

For example, by combining our precision machining capability with our quality control procedures, we are able to hold flatness to approximately .000023 of an inch on the face of the mating ring that comes into contact with face seals. This capability allows the seals to operate at extreme presspeeds. sures. and temperatures with minimal leakage and rubbing wear. These benefits are especially important in compressor and pipeline applications as

well as high-performance aircraft seals.

In support of our quality efforts, we have proudly achieved a wide range of certifications, some of which include ISO 9001:2000, AS9100:01, National Aerospace and Defense Contractors Accreditation for Fluorescent Penetrant Inspection and Magnetic Particle Inspection (NAD-CAP-FPI-MPI). We are rated a Self-Release Supplier for most of our aerospace customers and are certified to perform our own audits.

To meet our customers' quality requirements Stein Seal has established manufacturing quality processes, such as Six Sigma, including the concepts of Statistical Process Control, Design for Manufacturability, and Modes Effects Failure and Criticality Analysis (FMECA).



Leading Into the Future

As technology advances and expands, Stein Seal is dedicated to remain at the forefront of innovation. We will draw on our extensive technological and industry application experience to deliver unparalleled value in both products and services to exceed our customers' expectations. As new markets emerge and traditional markets evolve, our customers can continue to rely on us as their partner in future growth and success.





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