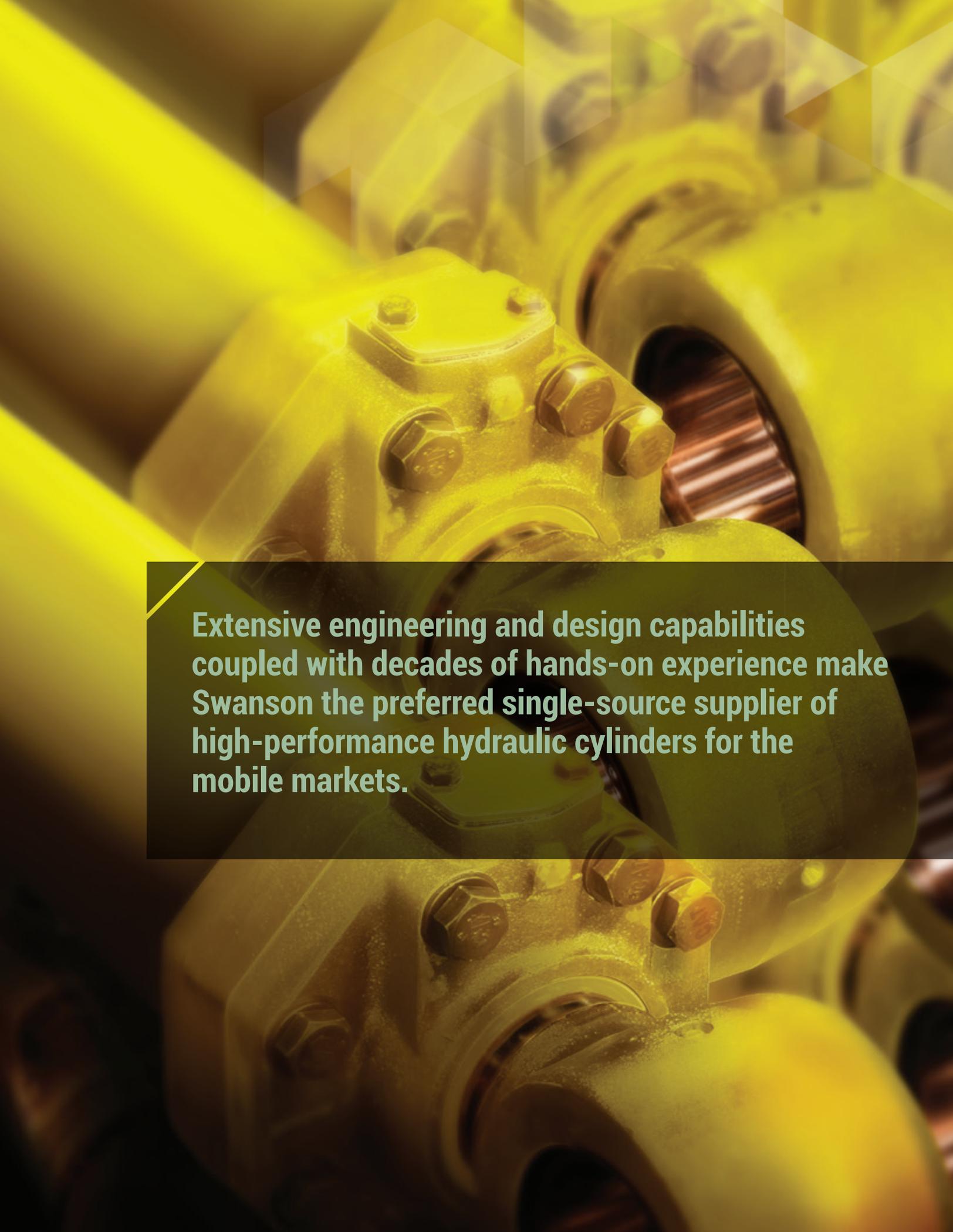




SWANSON[®]
INDUSTRIES



**Hydraulic Cylinder
Custom Design | Manufacturing**
Highly-Engineered to OEM Standards for Rigorous
Applications In the Mobile, Industrial, Marine
and Offshore Markets



Extensive engineering and design capabilities coupled with decades of hands-on experience make Swanson the preferred single-source supplier of high-performance hydraulic cylinders for the mobile markets.

Swanson is a leader in designing, prototyping and manufacturing highly engineered hydraulic cylinders for OEMs with rigorous application requirements and challenging operating environments.

QUALITY ASSURANCE



- ✓ ISO-9001:2008
- ✓ Controlled Environment for Testing and Assembly
- ✓ Test equipment oil cleanliness maintained to 16/13 (ISO 4406) or better
- ✓ Every Cylinder is Pressure and Function Tested Before Shipment
- ✓ Certified Welders and Qualified Weld Procedures

All cylinder production and assembly is performed in-house at Swanson's state-of-the-art facilities:

- Single Acting
- Double Acting
- Welded Rod Cylinders
- Telescopic Cylinders
- Threaded or Bolted Head
- Long Stroke / Large Bore
- Position Feedback

Integrated Valve Options

- Counterbalance
- Pilot-operated check
- Regenerative
- Thermal relief protection
- Overload protection
- Sequencing
- Solenoid control

Hydraulic Cushions

- Rod and piston cushions
- Integrated free return flow
- Progressive deceleration profiles



Best-practice manufacturing and scheduling enables Swanson to target 100% on-time delivery.

When the application demands a heavy-duty cylinder that works at pressures above 3500 psi, Swanson's well-qualified engineers and seasoned machine operators deliver high-performance units that customers expect from a leader.

Hydraulic Cylinder Specifications

In an increasingly complex and competitive market, value for money is a priority. At Swanson, all cylinders are manufactured using LEAN cellular processes in a culture of continuous improvement, giving our product a competitive advantage. The machining and welding capabilities we have developed to support our production lines means high-quality components that meet—and exceed—operating specifications:

- Horizontal power hone: 33-inch (83.82 centimeters) diameter by 30-foot (9.144 meters) long
- Cylinder assembly machine: 30-foot (9.144 meters)
- Stroke up to 60 feet (18.288 meters)
- Steel construction standard (aluminum, cast iron and stainless steel options available)
- Mounting: Cross tube, clevis, flange, trunnion, spade, pin or custom designs
- Rod materials and coatings that include chrome, stainless steels and nickel over chrome
- Swanson proven designs for pistons and glands or custom designs per customer specifications
- Advanced seal options: low, medium and high pressures
- Valve Blocks: Machined for your specified cavities and mounting configuration
- Integrated position sensing options
- Cushioning on both ends of the stroke

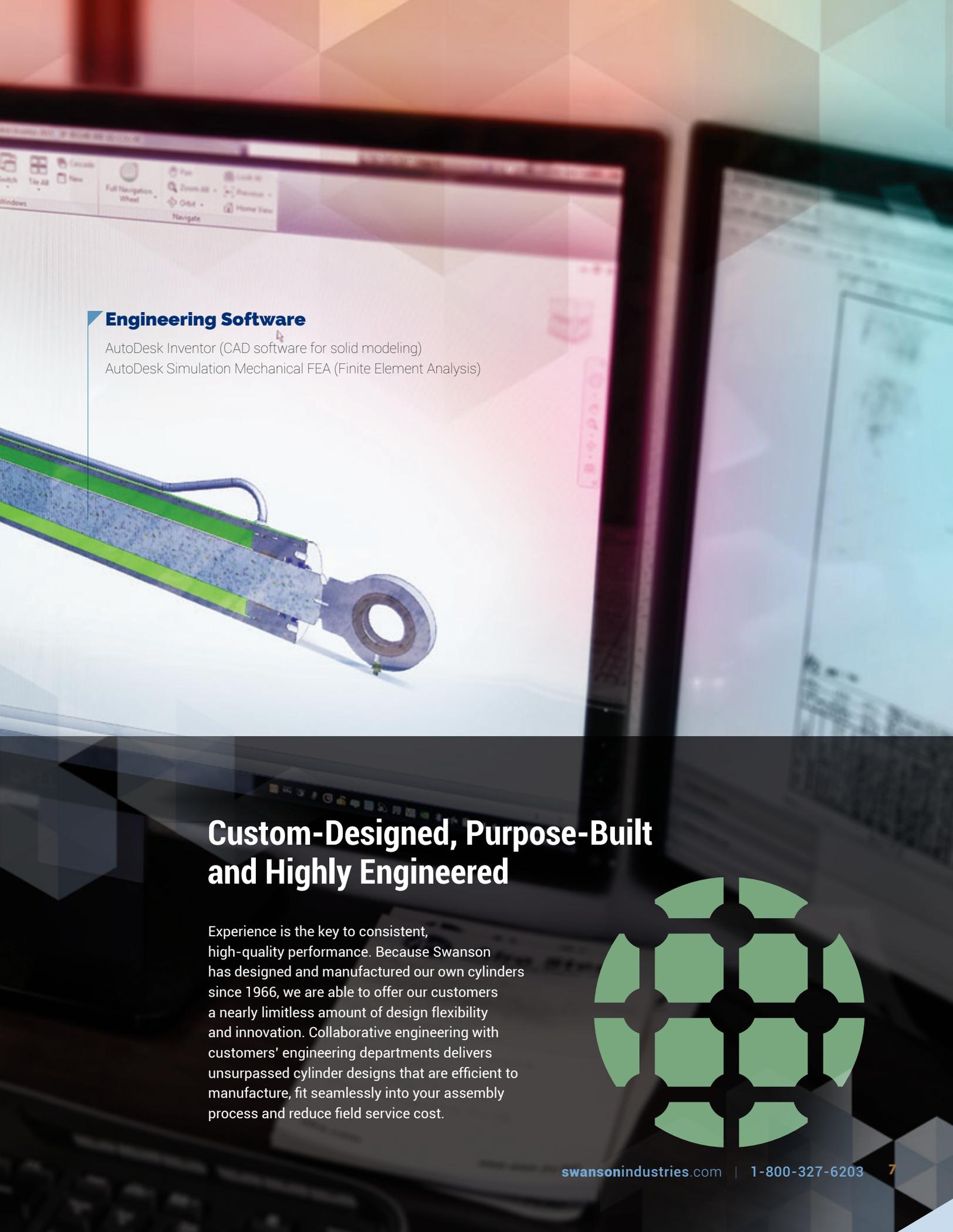


Cylinder fabrication up to 42 inches (106.68 centimeters) in diameter

- Porting as required; NPT, S.A.E. O-Ring BSP, Tubelines and Specials
- Operating pressures of up to 10,000 psi
- Rods up to 120 feet (36.576 meters) long
- Fully equipped for machining and building to metric dimensions
- Certified Inertia Welding on Rods 1" to 8.5" in diameter for single-piece manufacturing that adds strength and durability







Engineering Software

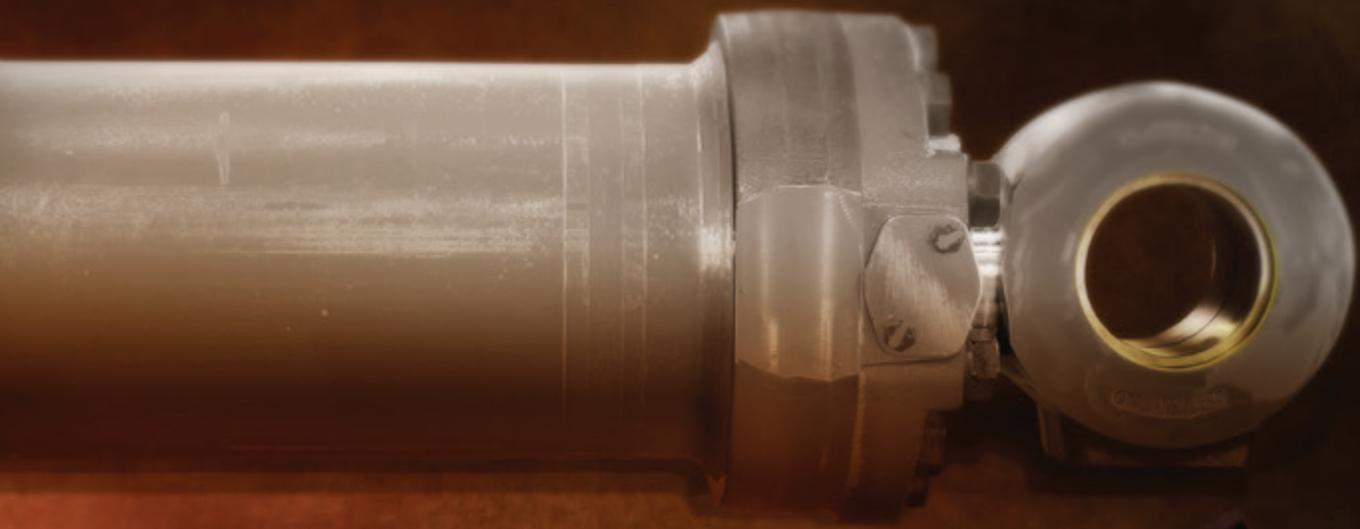
AutoDesk Inventor (CAD software for solid modeling)

AutoDesk Simulation Mechanical FEA (Finite Element Analysis)

Custom-Designed, Purpose-Built and Highly Engineered

Experience is the key to consistent, high-quality performance. Because Swanson has designed and manufactured our own cylinders since 1966, we are able to offer our customers a nearly limitless amount of design flexibility and innovation. Collaborative engineering with customers' engineering departments delivers unsurpassed cylinder designs that are efficient to manufacture, fit seamlessly into your assembly process and reduce field service cost.





Innovative Approaches

The depth of our cylinder manufacturing knowledge, together with the right people and the right equipment, translates into performance that customers expect from a leader.

We put a constant emphasis on improving our manufacturing processes and on equipment upgrades.

Swanson is staffed by an experienced team of professionals that push the boundaries of current technology. Our design, manufacturing, sales and customer service teams are focused on meeting the specific needs of the OEM. By using advanced 2-D and 3-D CAD systems that support collaborative engineering, employ strategic material management to reduce lead times, and implement LEAN manufacturing systems that are built for efficiency, Swanson delivers innovative solutions that OEMs can trust.

Our expertise is with you from concept, through design, prototypes and testing, to production and on-time delivery.

Facilities

With more than 385,000 square feet of manufacturing space between three production facilities in the United States and China, Swanson is able to respond quickly to any inquiry or situation.

A flexible workforce allows Swanson to maximize production to meet the current demands of the marketplace.

- Small enough to be innovative and flexible
- Large enough for volume production





100%

**Assembled product that is
100% functional tested**





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