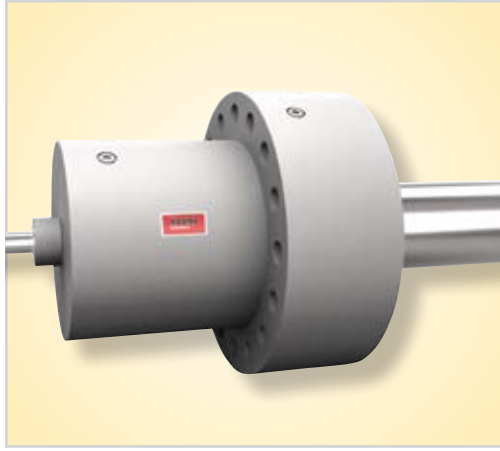


# HANNA

Cylinders

DESIGNING AND MANUFACTURING CUSTOM CYLINDERS FOR OVER 100 YEARS.



See how  
our cylinders  
work in the world

# Designed and built for the demanding applications of the 21st Century

**Today, many industrial applications demand more from hydraulic and pneumatic cylinders than ever before.**

Greater pressures. Higher speeds. Closer tolerances. Zero leakage performance. Servo/proportional system response. Meeting these high performance demands requires true premium-quality cylinders... such as the product line offered by Hanna Cylinders.

**For over a century Hanna has earned a reputation as industry innovators.** We continually strive to stay on the leading edge of motion control technology by utilizing the latest in state-of-the-art designs and materials in our products. What's more, only Hanna Cylinders offers a single source for tie-rod, mill-type and rotating cylinders, as well as custom welded units.

**Capabilities.** Hanna has over 100 years of experience in engineering and manufacturing custom cylinders. There is no cylinder too big or too small - from 1.5 to 40 inch bore to 400 inch stroke and high pressure applications up to 10,000 psi. In house painting, specialty coatings, large machining centers, boring mills and honing equipment. 3D modeling, stress calculations, special materials, special seals, ASME U Stamp, 10CFR 50, harsh environment applications and complex cylinders. Every cylinder is 100% tested. In our 170,000 square foot facility with 25 ton crane capacity, state-of-the-art ERP and quality systems, ***we can handle all of your cylinder requirements.***

## N.F.P.A. Tie-Rod Cylinders

*Hanna Cylinders' tie-rod cylinders have set industry standards for quality, reliability and long life in both air and hydraulic service.*



### ADVANCE-DESIGN FEATURE INCLUDE:

- The unique Duralon rod bearing that lasts five times longer than traditional bearings, sustains much higher compression loads, and requires no lubrication to the bearing surface.
- Polyurethane U-cup piston rod seal for outstanding wear resistance and near zero-leakage performance.
- Glyd-Ring and wear strip piston sealing system that provides sealing capabilities of U-cup seals with wear performance approaching metal piston rings.
- Fatigue-resistant piston-to-rod connection for optimum strength.

### OUR TIE-ROD CYLINDERS INCLUDE:

**Series 3L Medium-Duty Hydraulic.** Service to 1,800 p.s.i. 24 mounting styles, 1.50" through 6.00" bore sizes.

**Series 2H Heavy-Duty Hydraulic.** Service to 3,000 p.s.i. and beyond, 22 mounting styles, 1.50" through 14.00" bore sizes.

**Series 3H Large Bore, Heavy-Duty Hydraulic.** Pressure rated at 3,000 p.s.i., seven mounting styles, 10.00" through 24.00" bores.

**Series 3A and 3AN Heavy-Duty Pneumatic.** Air service to 250 p.s.i., 22 mounting styles, 1.50" through 14.00" bore sizes. For non-lube service, select Series 3AN cylinders.

**Modifications and specials are our specialty.**



## Rotating Cylinders

### Series RT Rotating Cylinders

Hanna Cylinders' heavy-duty hydraulic rotating cylinders provide optimum performance wherever rotation and linear actuation interface. Applications include recoilers, uncoilers, tension reels, transfer line spindles and power chucking on machine tools. Designed for up to 500 RPM, with p.s.i. ratings to 1,500. Available flush or flange mounted, with standard bore sizes from 4.0" through 24". 20 GPM and 45 GPM couplings are standard, as well as larger GPM specials to 95 GPM.



## Mill-Type Cylinders

### Series MT Mill-Type Cylinders

Extra-heavy-duty hydraulic & pneumatic units specifically designed and built for extra-demanding applications. Engineered for 5,000 psi service, Hanna Series MT cylinders are offered in 7 mounting styles and 12 standard bore sizes ranging from 2.00" through 24.00" with 14 standard rod sizes. Non catalogued metric bore and rod sizes are available (consult factory). This wide range of rod and bore options means you can more accurately and economically size the cylinder to meet specific application requirements.





## Offshore/Marine Cylinders

### FORCE 10 Marine Cylinders

Designed, engineered and built to withstand the rigors of marine, offshore and subsea service. That's why they are the cylinders of choice for critical applications such as:

- Riser Tensioners
- Motion Compensation
- Stab & Hinge-Over Connectors
- Collet Connectors
- TLP Tie-Back Connectors
- Mooring Systems
- Subsea Control Pod Actuators
- Subsea Leveling Jacks
- Rig Skidders, and More
- Accumulators

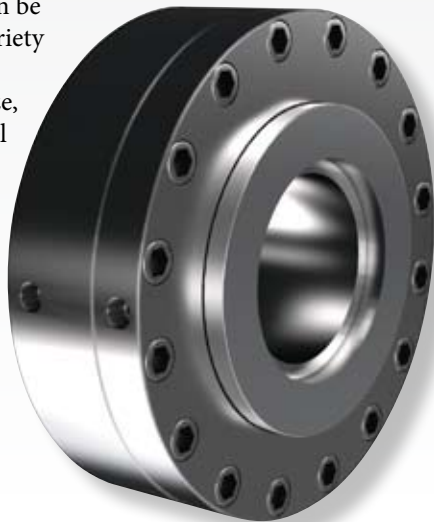
### DESIGN STANDARDS (PARTIAL LIST)

- ASME Sec VIII, Div 1
- ABS
- Det Norsk Veritas
- API
- UK-DEn
- USCG



## Press Cylinders

Hanna Cylinders offers a complete line of custom actuators designed for the rigorous applications required in the **PRESS INDUSTRY** including squeeze, load, centermech, & SMO cylinders. Hydraulic service cylinders with pressures up to 5000 psi, and water service cylinders with pressures up to 500 psi. These cylinders can be constructed out of a variety of corrosion resistant materials such as bronze, brass, and stainless steel as well as a variety of plating processes (electro-less nickel plating, zinc plating, and Nitrotec®). Tire presses, blow molding, metal stamping, etc.



## Corrosion-Resistant Cylinders

### Series CA Composite Air Cylinders

Corrosion resistance combined with affordability make CA cylinders ideal for many low-pressure (150 p.s.i.) air applications in harsh environments. 11 mounting styles, bore sizes from 1.50" through 6.00". Available to meet AWWA specifications.

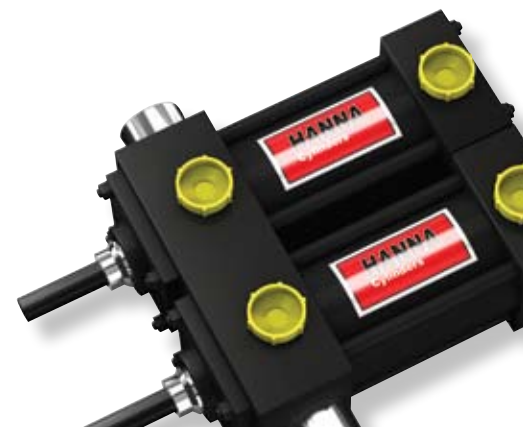
*Hanna offers many other cylinder solutions for service in corrosive environments, incorporating a wide range of corrosion resistant materials, special coatings and heat treatments.*



## Special Cylinders

### Beyond the Catalog Cylinders

Hanna Cylinders has long experience in designing and manufacturing "beyond-the-catalog" special cylinders – on a one-of-a-kind basis as well as production runs. Our "specials" may involve extra-large bore or rod sizes, extra-long strokes, high pressure ratings, special seal design and/or materials, custom mountings, corrosion protection or other unique requirements. We welcome these opportunities to solve difficult motion control problems for our customers.



We specialize in custom-design and built cylinders, whether one piece or 50,000 cylinders per year.

## Military Cylinders

Designed for extreme duty applications, Hanna's military cylinders help support vehicles required in a variety of applications. Whether replacement or new, we have the expertise and knowledge required to provide you with the solution that you seek.

We are a small business (cage code# 4WZP7), and we can construct in accordance to MIL-I-45208, MIL-Q-9858, and AS9100 specifications.



## Mobile Custom Welded

### Heavy-Duty Customer Welded Cylinders

Construction and mining machinery, heavy-duty forklifts, material handling equipment, manlifts, mobile cranes, off-road vehicles, military equipment, marine and off-shore drilling rigs – and more – are some of the tough applications for Hanna's heavy-duty, custom-welded cylinders. Standard sizes through 12.00" bores. We also have the capability to produce cylinders with bore sizes to 30.00", and stroke lengths of 25' and beyond.



## Double-Welded Cylinders

### DW Series Lift & Steering Cylinders

Widely used on high-quality, high-volume consumer and commercial lawn and garden equipment, Hanna's DW Series hydraulic cylinders are also ideal for material handling equipment, industrial cleaning machines, agricultural and many other "off-road" applications. Pressure ratings up to 3,000 p.s.i. are available. Standard bore sizes are 1.00" through 3.00" with larger sizes available if required.



# Nuclear Actuators

Hanna Cylinders' quarter turn and rising stem nuclear actuators are constructed to withstand severe duty applications. All of our nuclear actuators are manufactured in accordance to the standards of our 10CFR50 appendix B quality assurance program. Hanna supplies all 3 sections (cylinder, center mechanism {scotch yoke design}, and spring pack) which allows us to be unique in the marketplace.

1. Our quarter turn mechanisms are manufactured in (3) frame sizes with torque values ranging from 1,000 ft/lbs ~ 150,000 ft/lbs.
2. Designed for inside / outside containment & safety / non-safety related applications.
3. Qualify to IEEE 323-2003, IEEE 344-1987, & IEEE 382-1996 specifications.
4. Qualify to latest Westinghouse specifications:
  - APP-PV11-Z0-001 rev. 0 (valve specification)
  - APP-PV11-Z0R-001 rev. 0 (data sheet report)
  - APP-GW-VP-010 rev. 0 (EQ for valves)
5. High pressure direct spring actuators for rising stem valves.
6. Air and hydraulic valving panels, optional override accessories for nuclear & non-nuclear applications.



## Hanna Cylinder Repair

Hanna Cylinders is ideally suited to handle all cylinder repair requirements from strip to evaluation to rebuild. Hanna operates out of a 175,000 square foot facility with 40 foot clear height, 25 ton crane capacity and testing up to 10,000 psi. We are experts in handling large, complex cylinders from tear down to rebuild. Hanna has over 100 years of experience in the repair of cylinders from 1.5 to 40 inch bore and up to 400 inch stroke. Hanna maintains an extensive seal kit and component parts inventory. We offer rapid turnaround 24 hour delivery. Customer location chrome repair is available. Our company has dedicated in-plant repair customer service personnel and a design staff to assist in all aspects of the repair process including the cross-over obsolete cylinders. Company technical personnel will promptly provide our customers with the critical data to make an informed decision to rebuild or purchase a new cylinder. When it comes to cylinder repair there is only one choice, Hanna Cylinders.



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