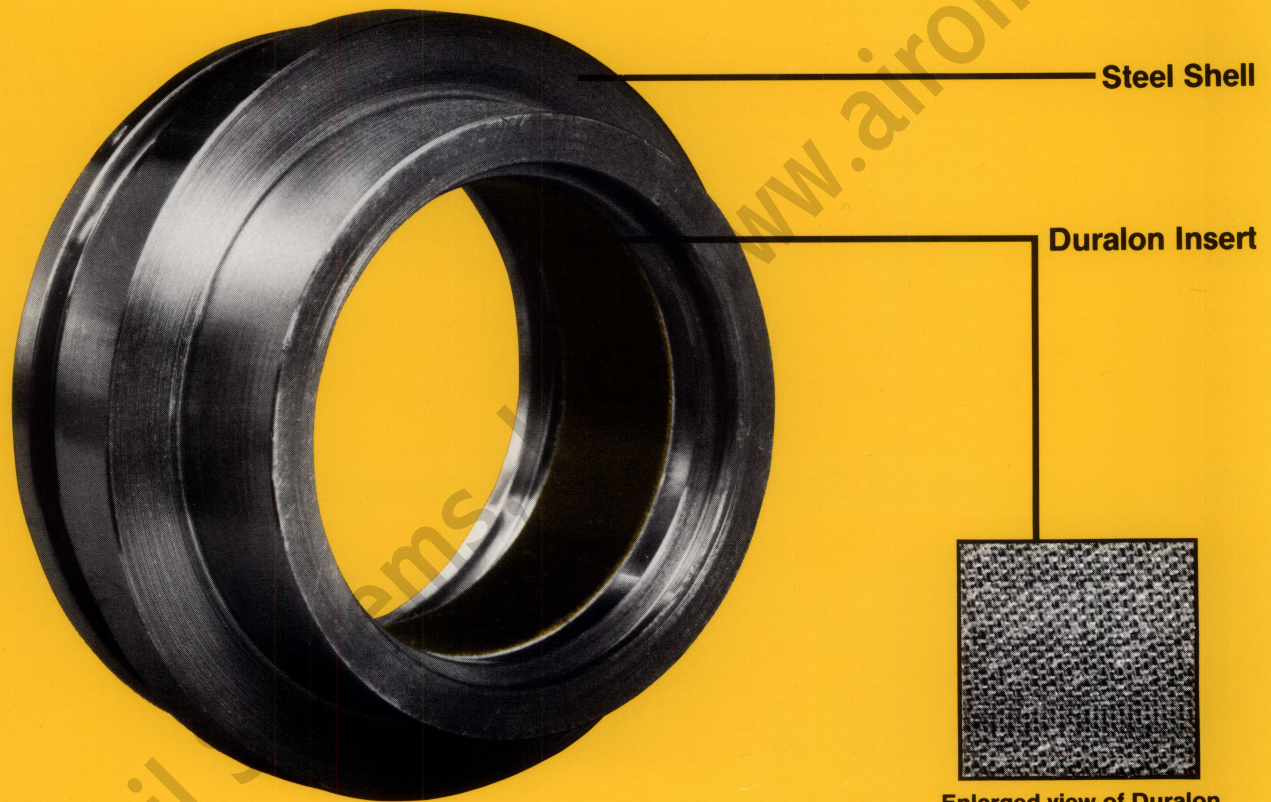


HANNA
cylinders

Duralon[®] Cylinder Rod Bearings

Outlast conventional rod bearings 5 to 1!



Advantages

- Standard on all Rod Diameters
- Sustain Much Higher Bearing Loads
- No Lubrication Required — Maintenance-Free
- Decreased Bearing Wear Minimizes Galling and Scoring
- Increased Seal Life
- Lowest Coefficient of Friction
- Compatible with Most Known Fluids
- Operating Temperature Range of -65° to 325°F
- Eliminate Galvanic Corrosion Problems

High-Tech Duralon Rod Bearing — an Exclusive Feature on Hanna N.F.P.A. Air and Hydraulic Cylinders

The useful life of any hydraulic or pneumatic cylinder is determined by the performance of the piston rod bearing. It is responsible for true alignment of the piston rod to the cylinder bore, and must carry the forces generated by both external and internally-generated eccentric loads.

Most cylinder rod bearings are made of bronze or cast iron. These bearings require constant lubrication to help minimize friction and resultant wear. Once the cylinder rod bearing begins to wear, the piston moves off true center of the cylinder bore, thus shortening cylinder life. Additionally, the wear pattern accelerates, causing deterioration in the piston rod wiper, letting contaminants into the cylinder, and in the piston rod seal, causing fluid leakage.

Hanna Cylinders has addressed – and solved – this critical design problem with the unique, non-metallic Duralon® bearing. An exact combination of woven Teflon® and Dacron® fibers bonded to a fiberglass shell, Duralon bearings are capable of sustaining

much higher compressive loads than either bronze or cast iron, while eliminating “cold-flow” associated with Teflon. In addition, Duralon bearings have an extremely low coefficient of friction, and require no lubrication to the bearing surface.

As a result, cylinders with Duralon bearings are ideal for use in heavy-duty applications, servo systems requiring minimal actuator friction, and totally non-lubricated air cylinder service. Because of the low coefficient of friction, little heat generation occurs, thereby prolonging both bearing and seal life.

Duralon bearings are compatible with most known fluids, including water, water glycols, standard petroleum-based fluids, phosphate esters and oil/water, water/oil fluids. They can operate in environments ranging from -65°F to +325°F.

Hanna Series 2H, 3H, 3L and MT hydraulic, and Series 3A, 3AN and CA air cylinders are equipped with the Duralon bearing as a standard feature.

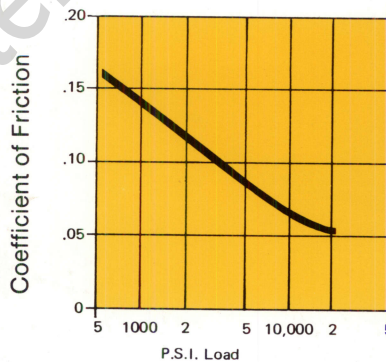
How Duralon outperforms the competition

COMPARISON OF NON-LUBRICATED BEARINGS AND THEIR OPERATING LIMITS	LOAD CAPACITY (PSI)
Porous Bronze } MOST CYLINDER MANUFACTURERS	4500
Porous Iron }	8000
Phenolics	6000
Nylon®	1000
TFE	500
Reinforced Teflon®	2500
TFE Fabric (HANNA Bearing)*	60,000
Polycarbonate	1000
Acetal	1000
Carbon-graphite	600
Rubber	50
Wood	2000

* Not to be used for design purposes.

Duralon is a Trademark of Rexnord, Inc.
Nylon, Teflon and Dacron are Trademarks of DuPont Company

FRICITIONAL PROPERTIES



The low friction characteristic of the Duralon bearing is due to the Teflon fabric liner. Increased loading, at constant speed, results in a marked decrease in the coefficient of friction.

COMPARISON OF FRICTION PROPERTIES OF JOURNAL BEARING MATERIALS		
	COEFFICIENT	SLIP STICK
Steel-on-Steel	.50	Yes
Bronze-on-Steel	.35	Yes
Aluminum		
Bronze-on-Steel	.45	Yes
Sintered Bronze-on-Steel (Mineral Oil)	.13	No
Bronze-on-Steel (Mineral Oil)	.16	No
Copper Lead Alloy-on-Steel	.22	Yes
Lead Film Deposited on Copper-to-Steel	.18	Yes
Copper Film Deposited on Steel	.30	Yes
Acetal-on-Steel	.20	No
Nylon-on-Steel	.32	Yes
UHMWP-on-Steel	.20	Yes
Teflon®-on-Steel	.04	No
Duralon®-on-Steel	.05-.16	No

HANNA
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1765 North Elston Avenue
Chicago, Illinois 60622
Phone: 773-384-7000
Fax: 773-384-5224
E-mail: Hanna215@msn.com
Website: www.hannacylinders.com



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