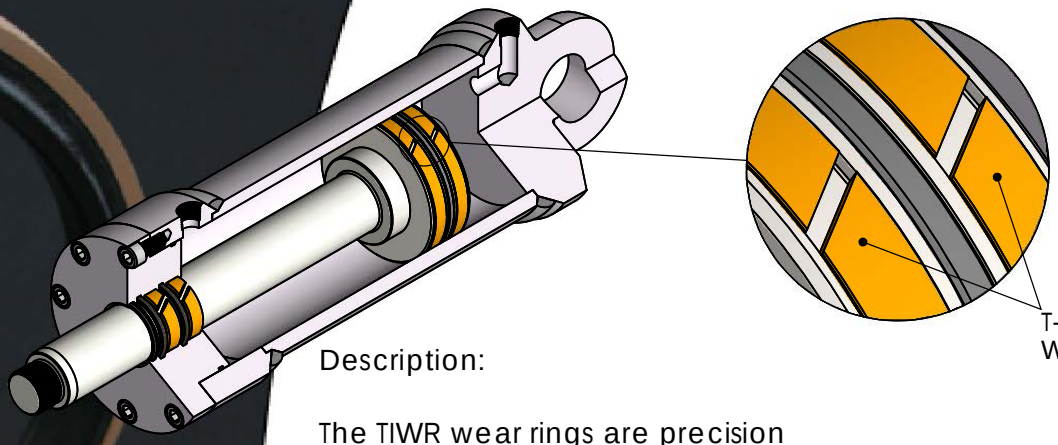
T-LON® "TIWR" Series Inch Wear Rings

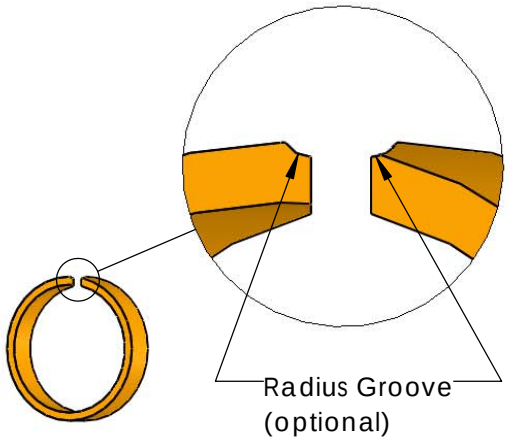


Advantages:

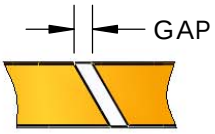
- Low Friction
- Improve Concentricity
- Prevent large extrusion gaps that cause seal failure
- Prevent Galling

Description:

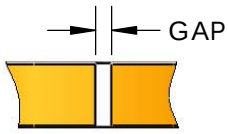
The TIWR wear rings are precision machined to guide a rod or piston to avoid metal on metal contact in dry and lubricated applications. A gap is intentionally added to the wear ring to allow fluid flow to and from the seal gland and prevent pressure trap or hydrolock between the seal and wear ring. In the case where the cut ends of the ring touch due to the high thermal expansion of PTFE, an optional radius groove is added on both ends to continue to allow fluid flow.



The standard cut is an angle (scarf) cut but TIWR rings can be ordered with a butt, step, or zee cut.



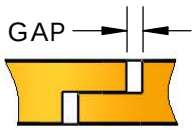
ANGLE CUT, STANDARD
- Supports radial load with end overlap



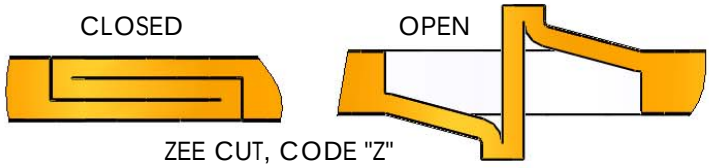
BUTT CUT, CODE "D"
- Most economical

Applications:

- Shocks and Struts
- Mobile Hydraulic Cylinders
- Pneumatic Piston Cylinders
- Agriculture Equipment
- Hydraulic Valves and Pumps
- Filling Machines
- Testing Machinery



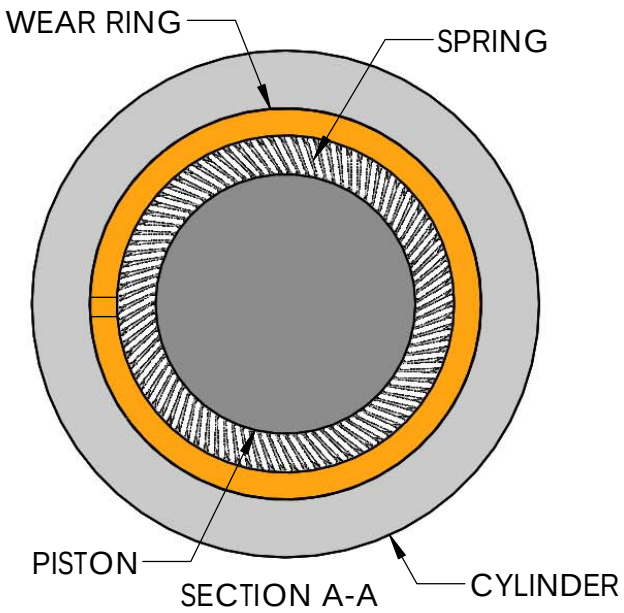
STEP CUT, CODE "K"
- Supports radial load with end overlap
- Obstructed leak path

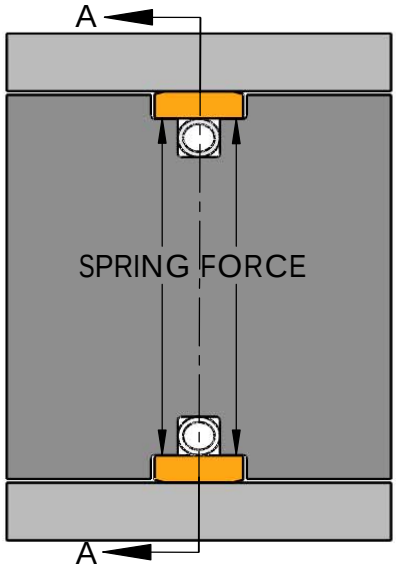


ZEE CUT, CODE "Z"
- Expands and contracts with no through cut
- No direct leak path

Spring Energized Wear Ring

Our Spring energized wear rings help prevent metel to metal contact and provide piston guidance and support. The added spring helps support the weight of the piston or rod evenly around the circumference, and it compensates for wear.





NATIONAL FLUID POWER ASSOCIATION NFPA MEMBER

Spring

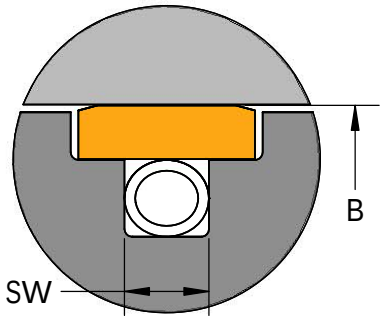
Springs Loads: Light, Medium, and Heavy.

Spring Materials:

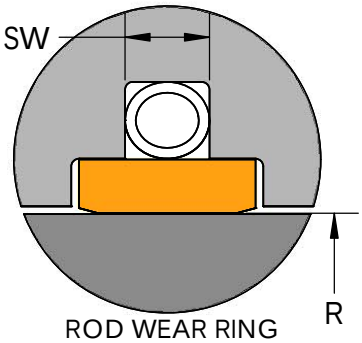
- 302 Stainless Steel
  - Media: Oil, Grease, Air, Water Steam, Solvents, Food, Drugs, Gas
- Hastelloy and 316 Stainless Steal
  - Media: Acids, Caustics

Spring Advantages:

- Minimizes eccentric condition
- Compensates for wear
- Supports piston weight
- Reduces bearing load
- Reduces cylinder scoring



PISTON WEAR RING
WITH SLANT PITCH SPRING



ROD WEAR RING
WITH SLANT PITCH SPRING

DESIGN GUIDELINE TABLE			
(1) SPRING SELECTION	SPRING SERIES	APPROXIMATE GROOVE WIDTH "SW"	AVAILABLE COMPRESSION (LBS/LINEAR INCH)
	-000	1/16"	1-18
	-100	3/32"	3-25
	-200	1/8"	6-27
	-300	3/16"	6-45
	-400	1/4"	4-48
(2) ROD/BORE	ROD DIAMETER (R) OR BORE DIAMETER (B)		
(3) LOADING	RADIAL LOAD (E.G. PISTON WEIGHT, HOUSING WEIGHT, EXTERNAL FORCE)		

Using the above table, contact us at sales@t-lon.com or connect with engineering by calling (262)367-2333 for design help

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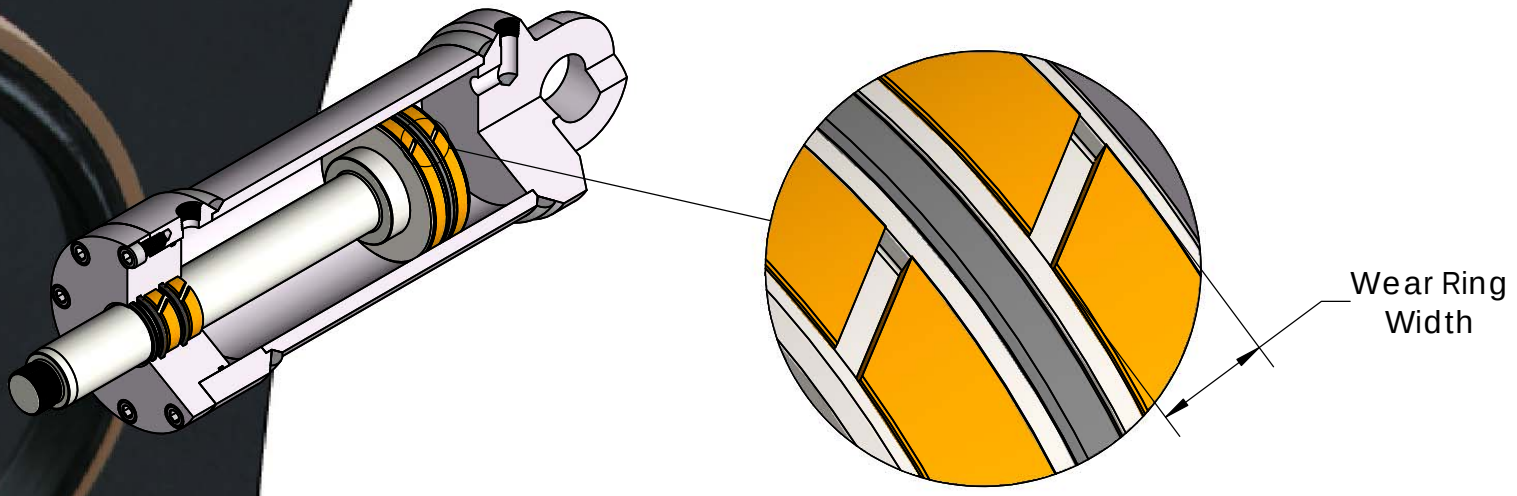

Technical Data:

The T-LON® PTFE wear ring compound and width determines allowable radial load and velocity ranges

- Velocity: Up to 50 ft/s
- Radial Load: See Calculation (Max velocity and radial load cannot be used together)
- Temp. Range: -400°F to 550°F (Above 250°F, compressive strength decreases reducing radial load capability)

Calculating Ring Width using Bearing Stress Calculation:

$$\text{Width (in)} = \frac{F \times FS}{ID \times C}$$

- F = Radial Force (lb)
- FS = Factor of Safety (2 Min. recommended)
- ID = Rod Diameter /Assembled Ring ID (in)
- C = Wear Ring Compressive Strength (psi, See Table 1)

Most Common:

BRONZE FILLED PTFE ("21" or "22")

- High compressive strength/wear resistance (More bronze content improves these properties).
- Low abrasive features

GLASS/MoS2 FILLED PTFE ("31")

- Good wear resistance for parts with rougher surface finish
- More chemical resistant and used in applications with minimal to no lubrication

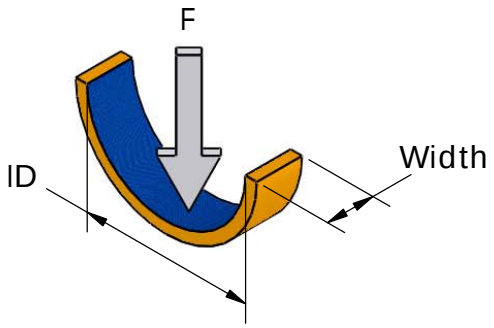

Table 1: Compressive Strengths

T-LON MAT'L		Compressive Strength "C" @ 1% Strain and 73°F (psi)
-21	40% Bronze PTFE	1200
-22	60% Bronze PTFE	1500
-31	15% Glass / 5% MoS2 PTFE	1200

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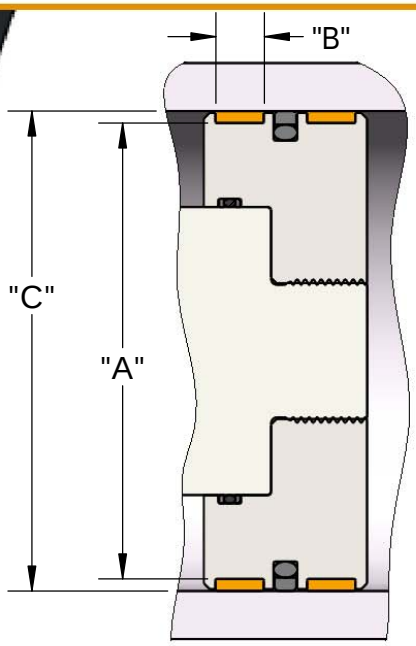

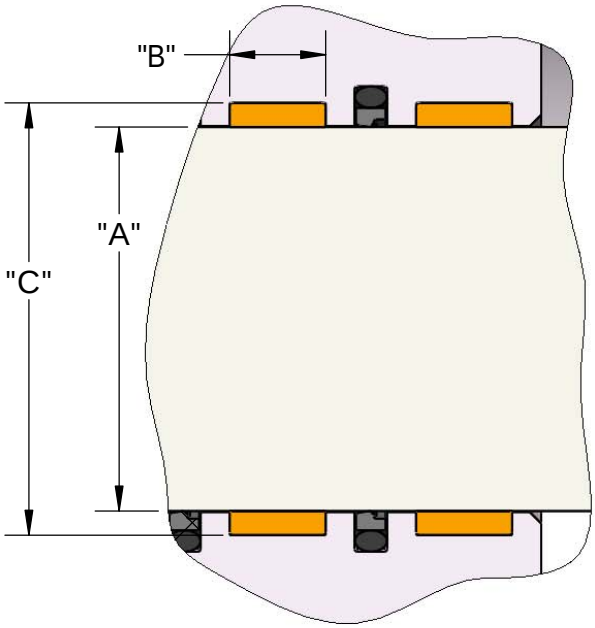

T-LON® "TIWR" Series Wear Ring Sizes (More Available Upon Request)

Groove dimensions for "TIWR" Series

Size	Dia. (C) +.002 -.000	Groove Dimension		Wear Ring Thickness Max (T)
		Dia. (A) +.000 -.002	Width (B) +.010 -.000	
TIWR-XXXXX-0250-063	XX.XXX	XX.XXX - .126	0.260	0.063
TIWR-XXXXX-0375-063	XX.XXX	XX.XXX - .126	0.385	0.063
TIWR-XXXXX-0500-063	XX.XXX	XX.XXX - .126	0.510	0.063
TIWR-XXXXX-0375-125	XX.XXX	XX.XXX - .250	0.385	0.125
TIWR-XXXXX-0500-125	XX.XXX	XX.XXX - .250	0.510	0.125
TIWR-XXXXX-0625-125	XX.XXX	XX.XXX - .250	0.635	0.125
TIWR-XXXXX-0750-125	XX.XXX	XX.XXX - .250	0.760	0.125
TIWR-XXXXX-0875-125	XX.XXX	XX.XXX - .250	0.885	0.125
TIWR-XXXXX-1000-125	XX.XXX	XX.XXX - .250	1.010	0.125
TIWR-XXXXX-1250-125	XX.XXX	XX.XXX - .250	1.260	0.125

ORDERING INFORMATION

TIWR - __ __ __ __ __ - __ __ __ __ - __ __ __ - __ __ - __ __

DIA (C)
"01500" = 1.500" DIA
"07500" = 7.500" DIA

MAXIMUM RING WIDTH
"0750" = .750" WIDTH
"2500" = 2.500" WIDTH

RING THICKNESS (T)
"063" = .061/.063 CS
"125" = .123/.125 CS

MATERIAL
"21" = 40% BRONZE PTFE
"22" = 60% BRONZE PTFE
"31" = 15% GLASS/ 5% MoS2 PTFE

CUT OPTION
OMIT FOR SOLID RING
"A" = ANGLE CUT
"D" = BUTT CUT
"K" = STEP CUT
"Z" = ZEE CUT

GROOVE OPTION
OMIT IF NO GROOVE REQ'D
"G" = ADD RADIUS GROOVE