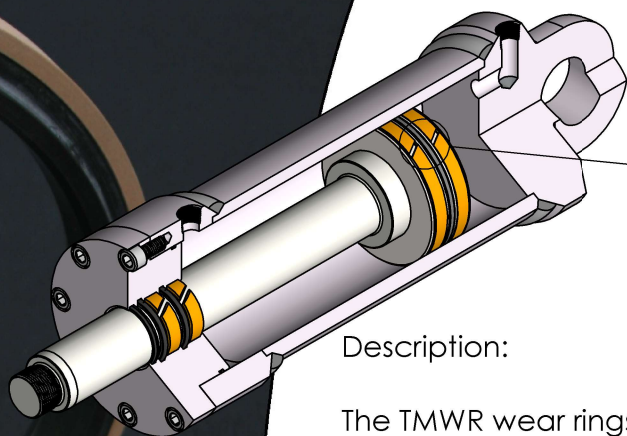
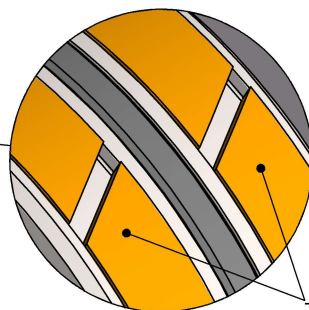




Description:

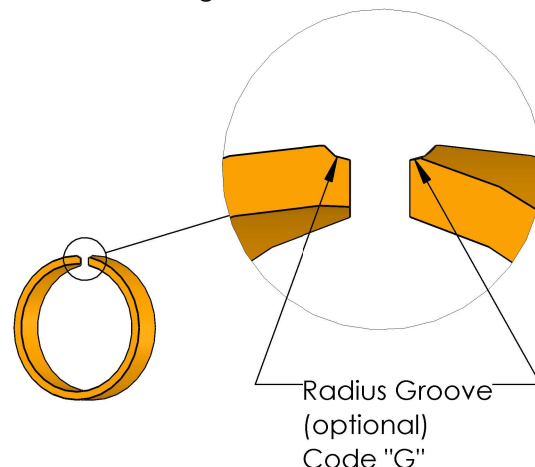
The TMWR wear rings are precision machined to guide a rod or piston to avoid metal on metal contact in dry and lubricated applications. A gap is intentionally added to the wear ring to allow fluid flow to and from the seal gland and prevent pressure trap or hydrolock between the seal and wear ring. In 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.



Advantages:

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

T-LON® "TMWR" Wear Rings

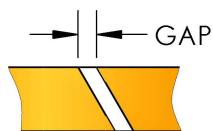


Radius Groove (optional)
Code "G"

Applications:

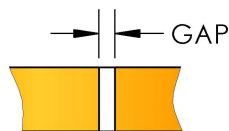
- Shocks and Struts
- Mobile Hydraulic Cylinders
- Pneumatic Piston Cylinders
- Agriculture Equipment
- Hydraulic Valves and Pumps
- Filling Machines
- Testing Machinery

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



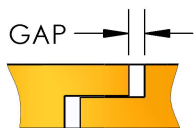
ANGLE CUT, CODE "A"

- Supports radial load with end overlap



BUTT CUT, CODE "D"

- Most economical

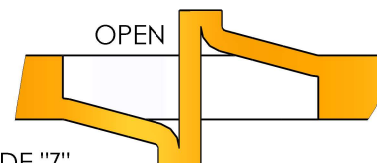


STEP CUT, CODE "K"

- Supports radial load with end overlap
- Obstructed leak path



CLOSED



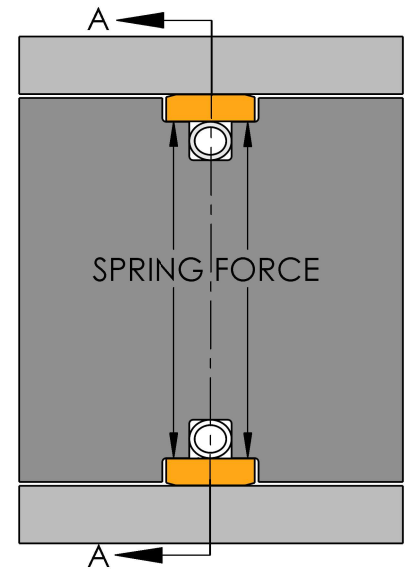
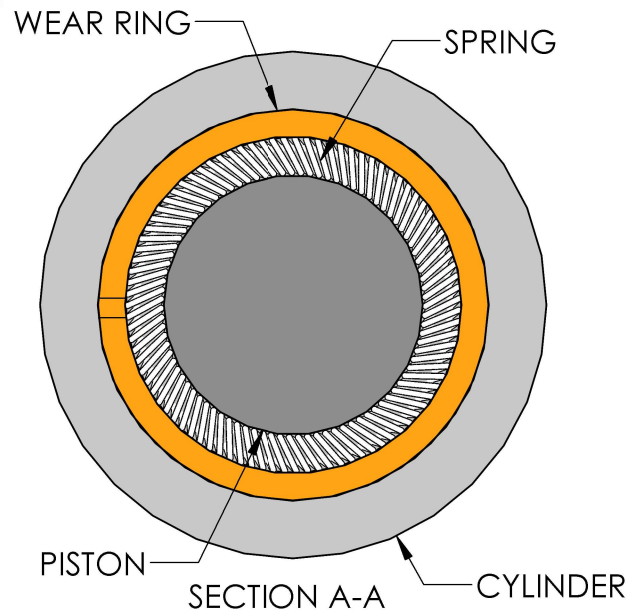
OPEN

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 metal 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.



Spring

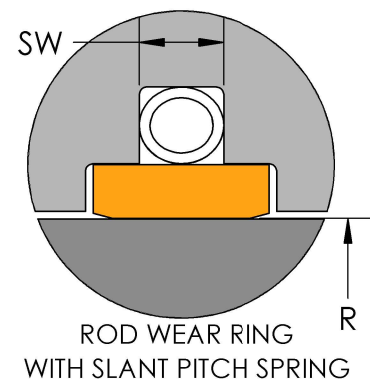
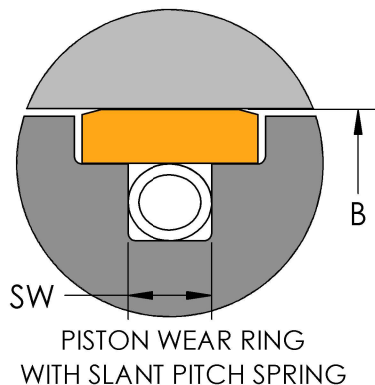
Springs Loads: Light, Medium, and Heavy.

Spring Materials:

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

Spring Advantages:

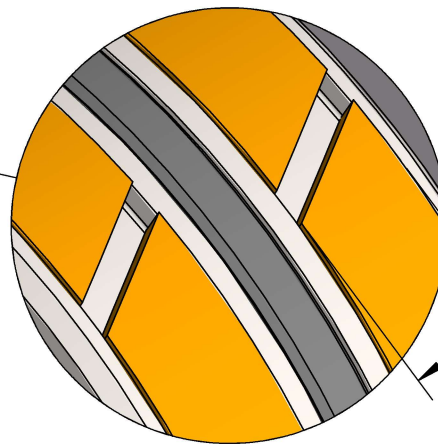
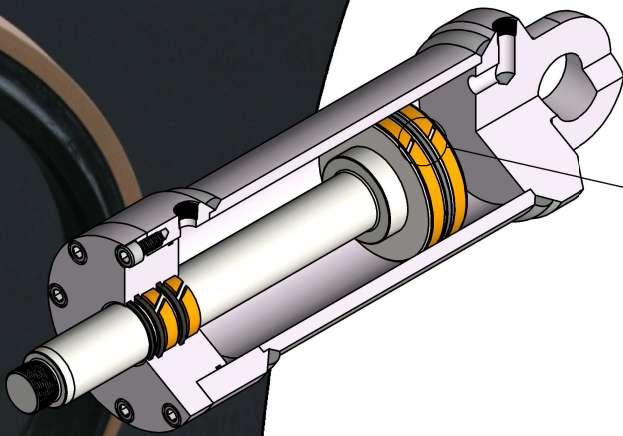
- Minimizes eccentric condition
- Compensates for wear
- Supports piston weight
- Reduces bearing load
- Reduces cylinder scoring



DESIGN GUIDELINE TABLE			
(1) SPRING SELECTION	SPRING SERIES	APPROXIMATE GROOVE WIDTH "SW"	AVAILABLE COMPRESSION (LBS/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





Wear Ring Width

Technical Data:

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

- Velocity: Up to 15 m/s
- Radial Load: See Calculation
(Max velocity and radial load cannot be used together)
- Temp. Range: -240°C to 285°C
(Above 120°C, compressive strength decreases reducing radial load capability)

Most Common:

CAR/GRAPHITE FILLED PTFE ("15")

- High compressive strength/wear resistance
- Chemical resistant and used in applications with minimal to no lubrication

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
- Chemical resistant and used in applications with minimal to no lubrication

Calculating Ring Width using Bearing Stress Calculation:

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

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

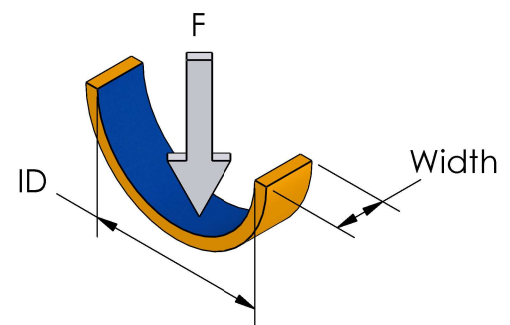
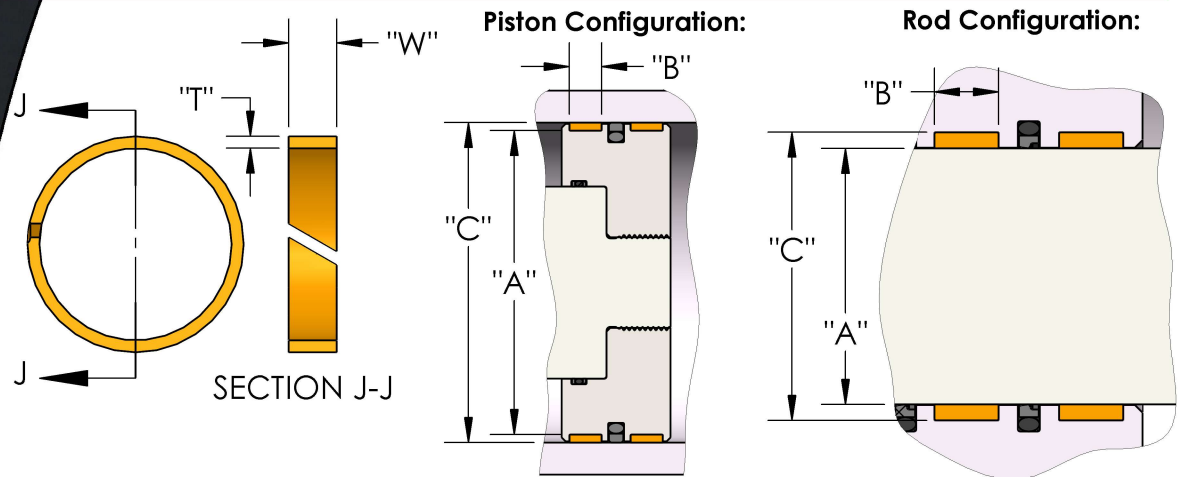


Table 1: Compressive Strengths

T-LON MAT'L		Compressive Strength "C" @ 1% Strain and 73°F (MPa)
-15	25% Carbon Graphite PTFE	9
-21	40% Bronze PTFE	8.5
-22	60% Bronze PTFE	10.5
-31	15% Glass / 5% MoS2 PTFE	8.5



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

Groove Dimensions for "TMWR" Series, Dimensions in "mm"

Size	Gland Details			Wear Ring Width Max (W)	Wear Ring Thickness Max (T)
	Dia. (C) +.05 -.00	Dia. (A) +.00 -.05	Width (B) +.20 -.00		
TMWR-XXX-025-155	XXX	XXX - 3.1	2.75	2.5	1.55
TMWR-XXX-040-155	XXX	XXX - 3.1	4.25	4.0	1.55
TMWR-XXX-056-250	XXX	XXX - 5.0	5.85	5.6	2.50
TMWR-XXX-097-250	XXX	XXX - 5.0	9.95	9.7	2.50
TMWR-XXX-150-250	XXX	XXX - 5.0	15.25	15.0	2.50
TMWR-XXX-250-250	XXX	XXX - 5.0	25.25	25.0	2.50
TMWR-XXX-250-400	XXX	XXX - 8.0	25.25	25.0	4.00
TMWR-XXX-080-400	XXX	XXX - 8.0	8.25	8.0	4.00
TMWR-XXX-097-400	XXX	XXX - 8.0	9.95	9.7	4.00
TMWR-XXX-118-400	XXX	XXX - 8.0	12.05	11.8	4.00
TMWR-XXX-148-400	XXX	XXX - 8.0	15.05	14.8	4.00

ORDERING INFORMATION

TMWR -

DIA (C)	Wear Ring Width (W)	Material	Cut Option	Groove
"090" = 90mm DIA "150" = 150mm DIA	"040" = 4.0mm "150" = 15.0mm	"250" = 2.5mm "400" = 4.0mm "15" = 25% CAR/GRAPHITE PTFE "21" = 40% BRONZE PTFE "22" = 60% BRONZE PTFE "31" = 15% GLASS/ 5% MoS2 PTFE	OMIT FOR SOLID RING "A" = ANGLE CUT "D" = BUTT CUT "K" = STEP CUT "Z" = ZEE CUT	OMIT IF NO GROOVE REQ'D "G" = ADD RADIUS GROOVE