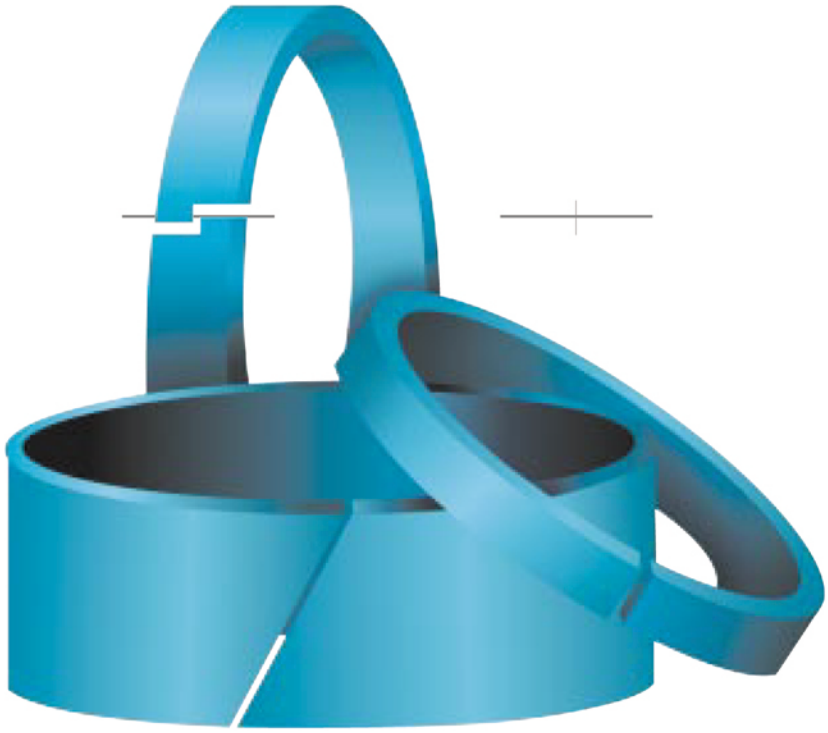


VERLON
No Swell Wear Rings

simrit®

VERLON No Swell Wear Rings

Ultra precision
±.001 tolerance
on cross section

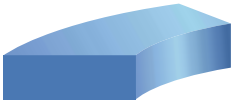
NO SWELL -
Lowest friction
Strength to 40,000 PSI

Large range of widths,
cross sections and diameters - metric too

Features & Benefits

ULTRA-PRECISION ADVANTAGES:
Modern hydraulic designs, as well as retrofitted installations, benefit from the tighter tolerances that are provided by Verco Ultra-Precision Wear Rings.

- LONG WEARING - The tough properties inherent in the exclusive Verlon formulations allow for extremely low wear.
- NON-SCORING - Because Verlon Wear Rings are non-metallic, they totally eliminate metal-to-metal contact and the consequent galling and scoring of cylinder bores and rods.
- PORT-PASSING CAPABILITY - The high strength and stiffness of Verlon Wear Rings provides special advantages in port-passing applications.
- FLUID COMPATIBILITY - Verlon compounds are compatible with all common hydraulic oils, water emulsions, water glycol, and phosphate ester fluids, as well as many others.



Verco
Ultra-Precision
Wear Ring

(very flat)

Conventional
Wear Rings

(dog bone)

Every Ultra-Precision Wear Ring is manufactured under rigid conditions that result in more uniform tolerances. As a result, Verco Ultra-Precision Wear Rings feature a cross section tolerance of ±.001". This means 30% more bearing contact area than conventionally manufactured wear rings. This process makes Verco Wear Rings FLAT.

VERLON Compound Advantages

Series 5000
VN9150 (Standard Grade)
- Virtually zero moisture swell
- +250°F continuous usage
- Highest compression strength
- Self-lubricating
- Ultra-Precision
- Long wearing

Series 6000
VN9100 (Premium Grade)
- Virtually zero moisture swell
- +250°F continuous usage
- High compression strength
- Self-lubricating
- Ultra-Precision
- Extra long wearing
- Low coefficient of friction

Series 5100
VN9154
(More flexible for easy installation)
- Virtually zero moisture swell
- Very low coefficient of friction
- Ultra-Precision
- +250°F continuous
- HTN (high temperature nylon)
- More flexible

Series 7000
VN9500
(Pneumatic & Light-Duty Hydraulic Grade)
- Low moisture swell
- Max. operating temp. 150°F
- Economically priced
- Self-lubricating, long wearing
- Ultra-Precision
- Very low friction

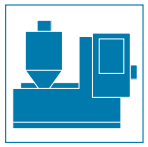
Examples of Applications


Earthmoving Equipment


Forklift


Agriculture Equipment


Truck Crane


Injection Molding Machines


Std. Hydraulic Cylinders

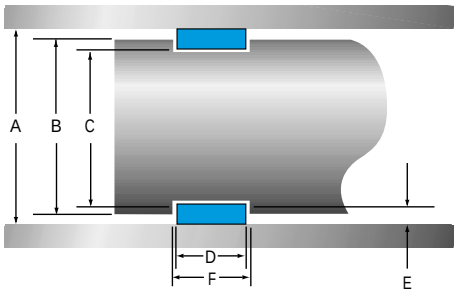

Tailgate Lift

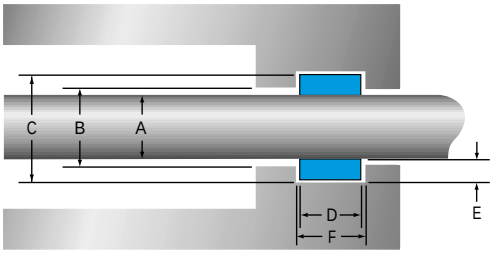
Important Notes

The technical information provided on this specification sheet is for general guidance only and values may vary with the specific parameters and other variables of an application.
For a sealing recommendation specific to your application, please contact our Engineering Department.

Verlon Wear Rings

Suggested Groove Dimensions





In finding the piston mounted wear ring groove dimensions, begin calculations by subtracting .002* from the minimum bore (**A**). Subtract twice the maximum wear ring thickness (**E** maximum). The result is the maximum groove diameter (**C** maximum). From this subtract the necessary machining tolerance to arrive at (**C** minimum). To **C** minimum add twice the minimum wear ring thickness (**E** minimum) to determine the minimum installed wear ring OD. From this figure subtract twice the desired minimum metal-to-metal radial clearance to obtain the maximum metal piston diameter (**B** maximum). Groove length (**F**) is equal to wear ring axial length **D**+.010/+.020.

EXAMPLE:

Assume a 3.000/3.003 bore (**A**). Assume we will use a wear ring with a thickness of .123/.125 (**E**), and a width of 1.000 inch. Presume we are willing to hold .005 diametral tolerance on machining the pistons.

1. 3.000 minus .002 minus (2 X .125) equals 2.748. This is our maximum wear groove diameter (**C**), tolerance is minus (thus, 2.748 + .000-.005).

2. 2.743 plus (2 X .123) equals 2.989. From this we subtract twice our desired minimum radial metal-to-metal clearance. Presuming this radial clearance is desired to be .005, we have 2.989 minus (2 X .005) equals 2.979, our maximum piston diameter (**B**). Applying tolerance minus, we obtain a **B** of 2.979 + .000 - .005.

3. Groove length (**F**) becomes (**D** +.010+.020), or 1.010/1.020.

4. The piston diameter is typically smaller than the normal piston diameter recommended in seal catalogs. Use the smaller diameter. This will result in clearances behind the seal which would have, in the past, been considered excessive from a seal extrusion point of view. Simrit has a number of excellent seal types and/or anti-extrusion devices which are unaffected by this clearance.

To determine rod wear ring groove dimensions, begin calculations by adding .002* to the maximum rod (**A** maximum). Add twice maximum wear ring thickness (**E** maximum). The result is the minimum groove diameter (**C** minimum). To this add the necessary machining tolerances to arrive at **C** maximum. From (**C** maximum) subtract twice the minimum wear ring thickness (**E** minimum) to determine the maximum installed wear ring ID. To this add twice the desired minimum metal-to-metal radial clearance to obtain the minimum clearance diameter (**B** minimum). Groove length (**F**) is equal to the wear ring axial length D +.010/+.020.

EXAMPLE:

Assume a 1.500/1.498 rod (**A**) Assume we will use a wear ring with a thickness of .123/.125 (**E**), and a width of one-half inch. Presume we are willing to hold a .003 tolerance in machining our rod gland.

1. 1.500 plus .002 plus (2 X .125) equals 1.752. This is our minimum wear groove diameter (**C**), tolerance is plus (thus, 1.752 + .003 - .000).

2. 1.755 minus (2 X .123) equals 1.509. To this we add twice our desired minimum radial metal-to-metal clearance. Presuming this radial clearance is desired to be .005, we have 1.509 plus (2 X .005) equals 1.519, our minimum rod clearance diameter (**B**). Applying tolerance plus, we obtain a B of 1.519 + .003 - .000.

3. Groove length (**F**) becomes (**D** +.010+.020), or .510/.520.

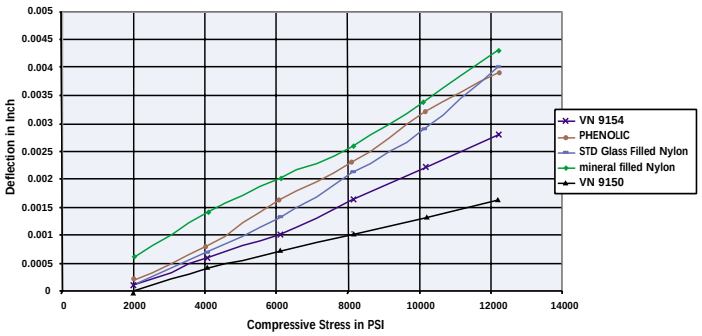
4. The rod clearance diameter typically is larger than the normal diameter recommended in seal catalogs. Use the larger diameter. This will result in clearances behind the seal which would have, in the past, been considered excessive form a seal extrusion point of view. Simrit has a number of excellent seal types and/or anti-extrusion devices which are unaffected by this clearance.

*This is an installation allowance. Due to thermal expansion of the wear ring or piston, or out-of-round conditions a greater allowances may be required for smooth operation. This must be determined to fit requirements on each individual application.

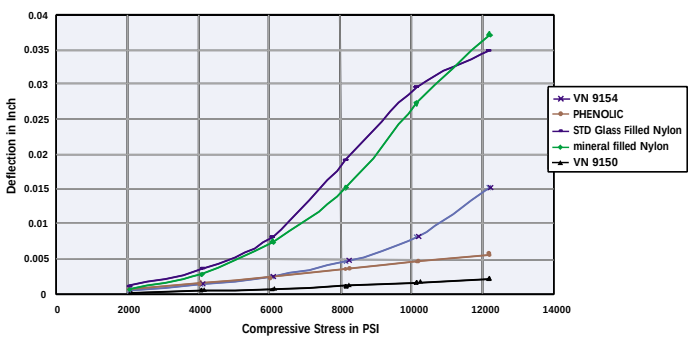
Physical Properties & Compounds

Property	Units	VN9100 Value	VN9150 Value	VN9154 Value	VN9500 Value
Hardness, Rockwell	Points	R125	R126	R125	R120
Specific Gravity		1.44	1.50	1.54	1.40
Tensile Strength	PSI	28,000	34,000	26,400	8,800
Elongation at Break	%	1.40	2.00	2.10	15
Compressive Strength	PSI	24,000	40,000	26,700	5,200
Flexural Strength	PSI	34,000	50,000	36,900	14,100
Flexural Modulus	1000 PSI	1,900	2,000	1,800	375
Deflection Temp. @ 66 psi	°F	540	540	520	277
Water Absorption, 24 hours	%	0.17	0.17	0.40	0.21
Reinforcement	%	30	40	40	0
Internal Lubricant		YES	YES	YES	YES
Wear Factor		15	25	11	65
Coefficient of Friction - Static		0.14	0.18	0.16	0.14
Coefficient of Friction - Dynamic		0.18	0.24	0.22	0.21
Thermal Expansion in/in/°F x 10-5		1.3	1.3	1.2	4.7
Generic Compound Name		Proprietary Carbon Filled	Proprietary Glass Filled	HTN Glass Filled	Acetal Co-Polymer
Trade Name		Verlon IIIc	Verlon III+	Verlon IV	Verlin

Deflection vs. Compressive Stress @ Ambient Temperature



Deflection vs. Compressive Stress @ 200° F Temperature



Who is Simrit?

Simrit is the industrial sealing products division of Freudenberg-NOK that is dedicated to serving industrial distributors and OEMs. Simrit products are manufactured within the Freudenberg and NOK Group Companies, known for their world-class quality and reliability. Simrit's manufacturing and design expertise, coupled with exceptional customer service and field engineering support, enables us to provide our customers superior sealing components and total system sealing solutions that exceed their expectations.

Simrit - Your Technology Specialist.

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