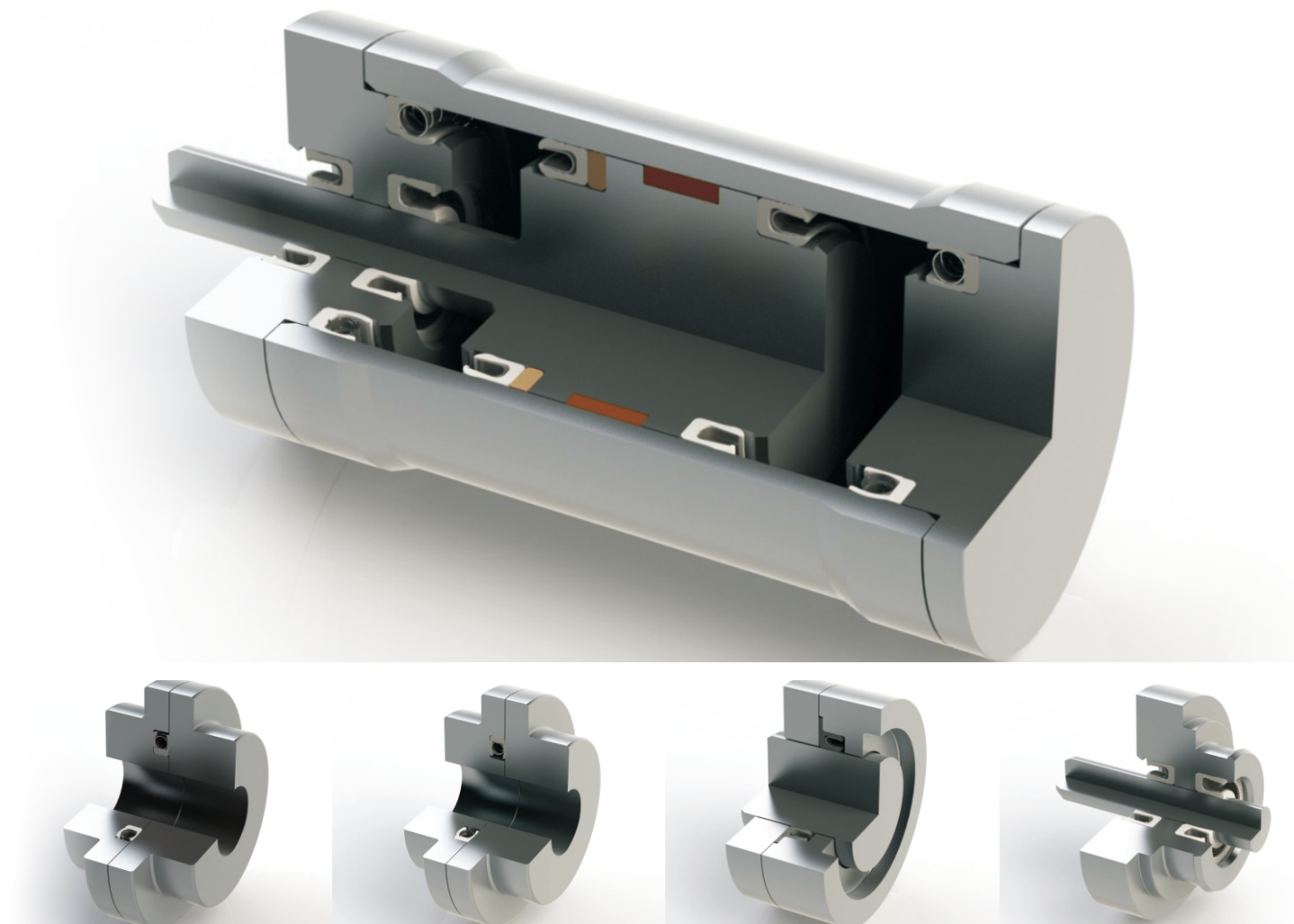




WALLE

SEALING SOLUTIONS



Win-Win Sharing

Sincere Cooperation

Dongguan Walle Sealing Technology Development Co.,Ltd.

Address: NO. 7 Lingyuan Road, Zhouwu Industrial Zone, Dongcheng District,
Dongguan City, Guangdong Province, China 523940

★ *Provide professional solutions for sealing*

★ *Reduce leakage to protect the environment*

★ *Reduce equipment operating costs*

Dongguan Walle Sealing Technology Development Co.,Ltd.

GreatSeal® in the Application field



Aerospace Engineering;
Transportation equipment (heavy trucks, automotive, marine, rail);
High-performance racing;
Construction equipment;
Food and beverage processing equipment;
Medical instrumentation; Liquid chromatography;
Semiconductor manufacturing equipment;
Petroleum and chemical process equipment;
Pumps, valves, compressors and mechanical seals;
Dieselmotoren, Compressoren;
Hydraulic and Pneumatic components, Automation Equipment;
centrifuge/metering pump/chip mounter;
metering valve/dispensing valve/dispenser;
smart robots/coating machine;
Machine tools, Rotating parts and mixers.



General

GreatSeal® are single-acting, spring-energized seals which are used for dynamic and static movements. GreatSeal® are effective in a wide range of applications. They are chosen when higher resistance to chemical media is required, if the seal is required to operate in extremes of temperature and where good extrusion and compression characteristics are needed.

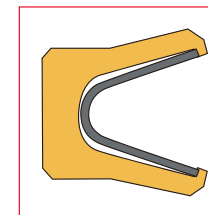
GreatSeal® have three main design characteristics:

1. Application specific U-shaped seal profile
2. Spring geometry suited to the particular application
3. Proven high-performance PTFE polymers Standard products are available from 2 mm up to 2500 mm (8' 2") in diameter along with custom manufactured intermediate sizes, inch (imperial) sizes or special geometries.

Method of Operation

All GreatSeal® included in this catalogue have the same operating principle and difference only in their profile form and type of metallic spring used.

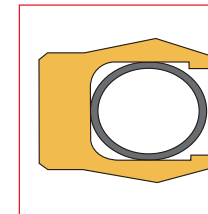
The GreatSeal® spring supplies the payload for sealing at low pressures (Figure 1). The "U" shaped allows fluid pressure to force the sealing lips, so total sealing pressure rises with increasing operating pressure (Figure 2).



V Series(Cantilever)



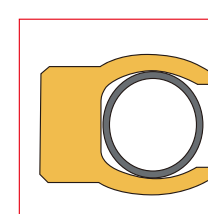
V series GreatSeal® is a single-acting seal consisting of a U-shaped jacket and a V-shaped corrosion resistant spring. V series GreatSeal® has an asymmetric seal profile. The heavy profile of its dynamic lip with an optimized front angle offers good leakage control, reduced friction and long service life.



C Series(Canted coil)



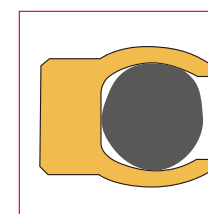
C Series GreatSeal® is a single-acting seal consisting of a U-shaped jacket and a corrosion resistant C Series spring. The C Series spring in the GreatSeal® are providing an almost constant load irrespective of hardware, tolerances, eccentricity and seal wear.



H Series(Helica)

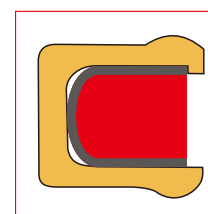


H Series GreatSeal® is a single-acting seal consisting of a U-shaped jacket and a helical wound corrosion resistant spring. The helical ribbon spring of H Series GreatSeal® has a high spring loading, which gives excellent sealing integrity at low pressure and even in vacuum. H Series GreatSeal® is suitable for static applications and ideal in low speed applications.



O RING

The GreatSeal can be ordered with optional elastomeric O-Ring energizers in place of the metallic spring. A wide variety of elastomers such as nitrile, HNBR, FKM and another rubber material.



Silicone Filled

The GreatSeal can be supplied with an FDA-approved grade of silicone filled into the spring cavity. The elastomer ensures that no contaminants can become trapped in the spring cavity, allowing the seal to be used in food processing and clean-in place applications. Other material are available.

Performance

- Excellent seal performance
- High abrasion resistance
- Highly resistant to chemical influence
- High temperature capabilities $-253 \sim +300^{\circ}\text{C}$
- Sustain up to 200MP high pressure
- Low friction
- No extrusion into gap
- Good aging resistance
- Good self-lubrication and friction performance
- Compact form, Simple installation

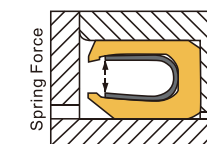
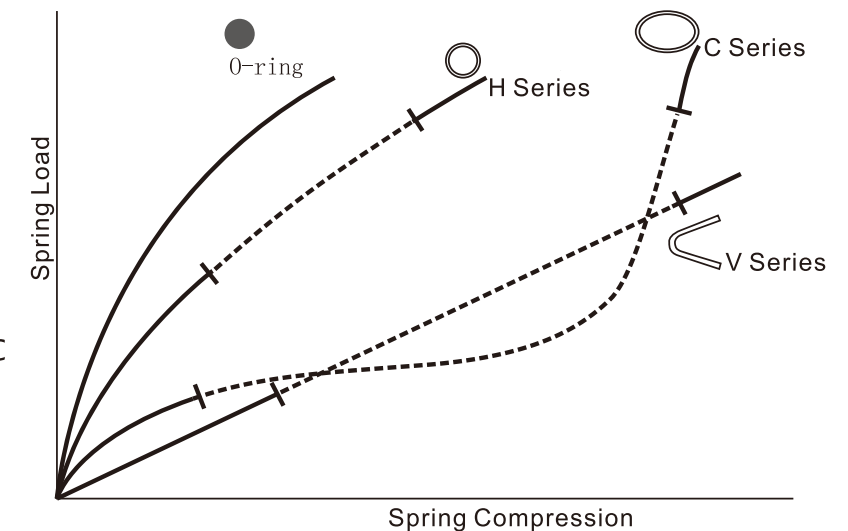


Fig.1 GreatSeal® without system pressure

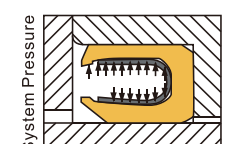
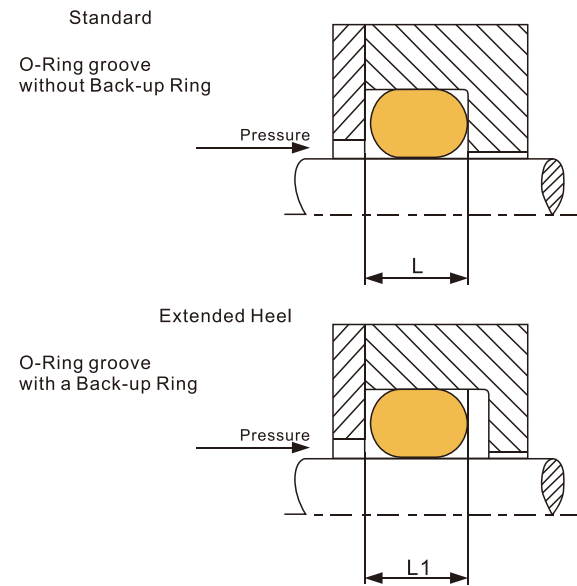


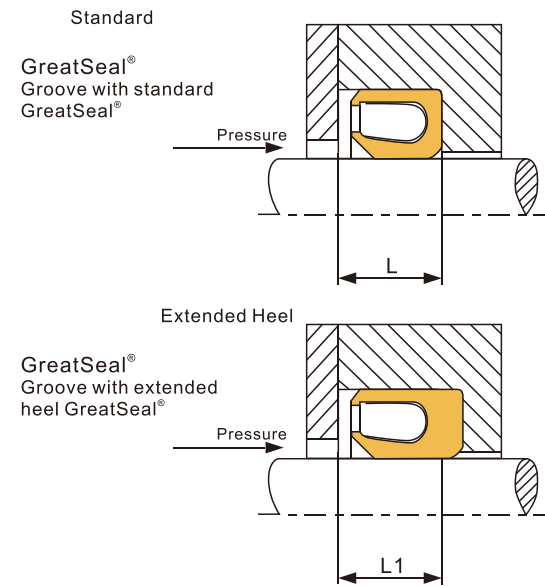
Fig.2 GreatSeal® with system pressure

GreatSeal® can be used replace of O ring

All GreatSeal® types except the Roto GreatSeal® can be supplied with an extended heel as an alternative to existing O-Ring groove versions, (with or without back-up ring)



This version is recommended also for high-pressure applications or when the extrusion gap is larger than prescribed.



General Design Instructions

Lead-in Chamfer for Rod Seals

To avoid damage to the rod seal during installation, lead-in chamfers and rounded edges must be designed into the rod (Figure 1). If this is not possible, an installation tool will be required.

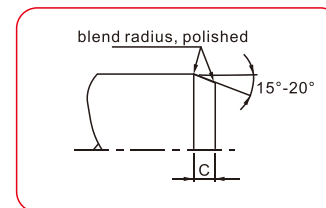


Figure 1 Lead-in chamfer for rod seals

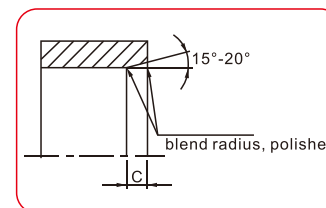


Figure 2 Lead-in chamfer for piston seals

The minimum length of the lead-in chamfer (C) depends on the series of the seal as shown in the following table.

Lead-in Chamfer on Rods

Length C minimum(mm)	GreatSeal® Series No.
4.0	RV_0
5.0	RV_1
5.0	RV_2
7.5	RV_3
12.0	RV_4
12.0	RV_5

The minimum length of the lead-in chamfer (C) depends on the series of the seal as shown in the following table.

Lead-in Chamfer on Pistons

Length C minimum(mm)	GreatSeal® Series No.
4.0	PV_0
5.0	PV_1
5.0	PV_2
7.5	PV_3
12.0	PV_4
12.0	PV_5

Surface Roughness

µm Recommended Maximum Surface Roughness µm			
Media	Rotary Surface	Reciprocating Surface	Static Groove Surface
Cryogenic and low molecular gases: Hydrogen, Helium, Freon, Oxygen, Nitrogen	Rmax=1.0 µm Rz=0.63 µm Ra=0.1 µm	Rmax=2.5 µm Rz=1.6 µm Ra=0.2 µm	Rmax=3.5 µm Rz=2.2 µm Ra=0.3 µm
Low viscosity fluids: Water, Alcohols, Hydrazine, Gaseous, nitrogen, Natural gas, Skydrol, air	Rmax=2.5 µm Rz=1.6 µm Ra=0.2 µm	Rmax=3.5 µm Rz=2.2 µm Ra=0.3 µm	Rmax=5.0 µm Rz=3.5 µm Ra=0.6 µm
High viscosity fluids: Hydraulic oils, Crude oil, Gear oil, Sealants, Glue, Milkproducts	Rmax=2.5 µm Rz=1.6 µm Ra=0.2 µm	Rmax=4.0 µm Rz=2.5 µm Ra=0.4 µm	Rmax=6.5 µm Rz=5.0 µm Ra=0.8 µm

Dynamic Hardware Sealing Surface Finish Hardness

As a general rule, the lower the sealing surface finish, the better the overall seal performance that can be expected, lower finish value reduces wear and increases seal life. A 40 Rockwell C hardness or greater is recommended for slow to moderate reciprocating motion.

The ideal hardness is 60 to 70 Rockwell C. Hardness in this range is recommended for moderate to high speed linear or rotary motion. Hard anodized surface finish must be polished after anodizing.

Half-Open Groove Design for Snap Fitting

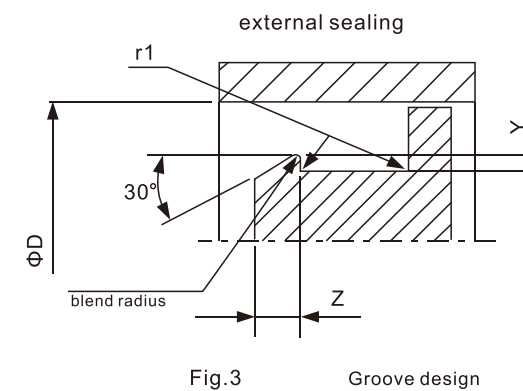


Fig.3 Dimensions for Groove Design(Snap Fitting - External Sealing)

External sealing Walle Series No.			Step Height	Chamfer length	Radius
V	C	H	Ymin.mm	Zmin.mm	r1max.mm
PV_0	PC_0	PH_0	0.4	2.5	0.4
PV_1	PC_1	PH_1	0.6	3.5	0.4
PV_2	PC_2	PH_2	0.7	3.5	0.6
PV_3	PC_3	PH_3	0.8	4.5	0.8
PV_4	PC_4	PH_4	0.9	7.5	0.8
PV_5	PC_5	PH_5	1.5	7.5	0.8

①Y max=0.035xD

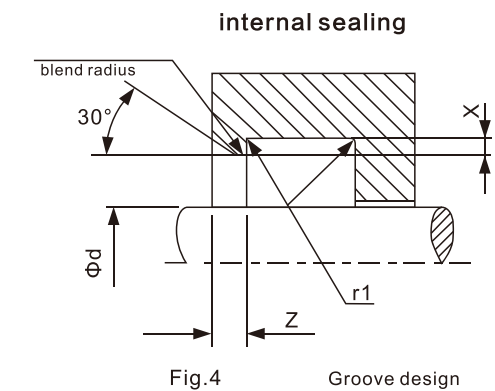


Fig.4 Dimensions for Groove Design(Snap Fitting - Internal Sealing)

Internal sealing Walle Series No.			Step Height	Chamfer length	Radius
V	C	H	Ymin.mm	Zmin.mm	r1max.mm
RV_0	RC_0	RH_0	0.4	2.5	0.4
RV_1	RC_1	RH_1	0.6	3.5	0.4
RV_2	RC_2	RH_2	0.7	3.5	0.6
RV_3	RC_3	RH_3	0.8	4.5	0.8
RV_4	RC_4	RH_4	0.9	7.5	0.8
RV_5	RC_5	RH_5	1.5	7.5	0.8

①X max=0.02xD

Note: It is not always possible to reach recommended "Step height". In case of doubt, please contact on Walle Sealing Solutions.

Installation in Closed Grooves

For simple installation of the GreatSeal®, we recommend that the grooves be opening or that a half-split groove be designed into the housing. Installation in closed grooves is possible, depending on the rod and bore diameter, as shown in the following tables.

Note: Roto GreatSeal® seals only can be installed in split grooves.

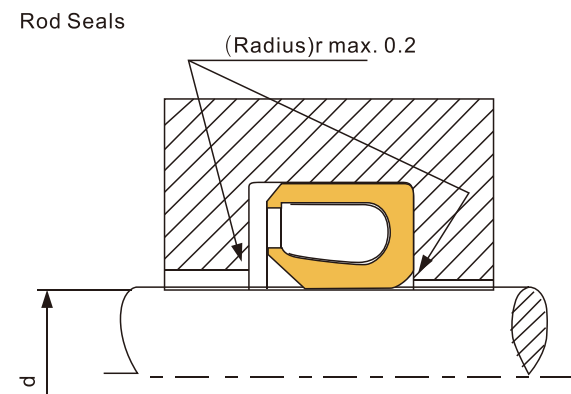


Fig.5 Installation in closed grooves

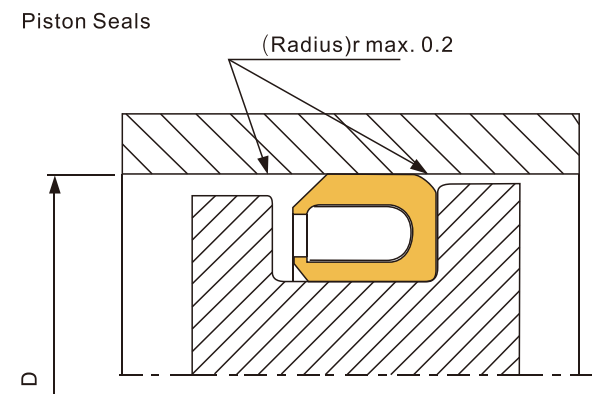


Fig.6 Installation in closed grooves

Installation of GreatSeal® V

Series No.	dmin.mm
RV_0	30.0
RV_1	70.0
RV_2	110.0
RV_3	300.0
RV_4	500.0

Installation of GreatSeal® V

Series No.	dmin.mm
PV_0	35.0
PV_1	50.0
PV_2	70.0
PV_3	105.0
PV_4	140.0

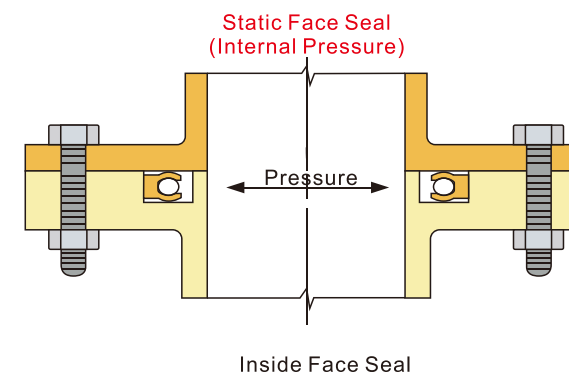
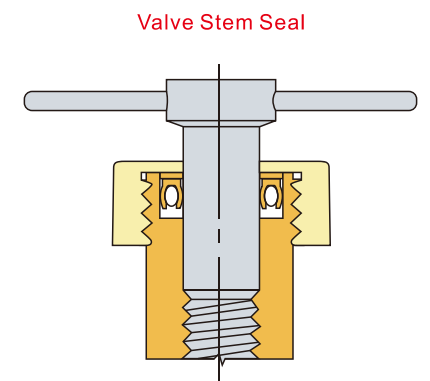
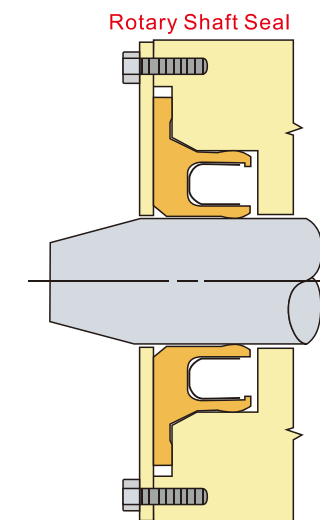
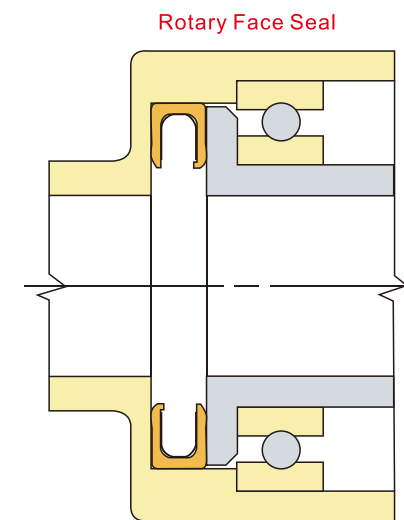
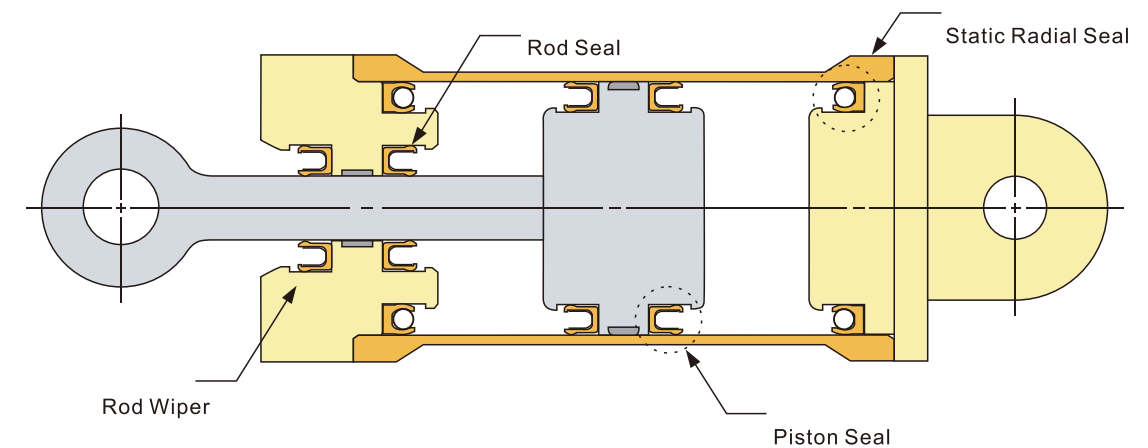
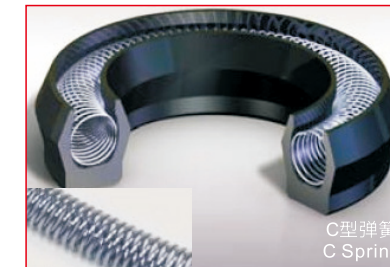
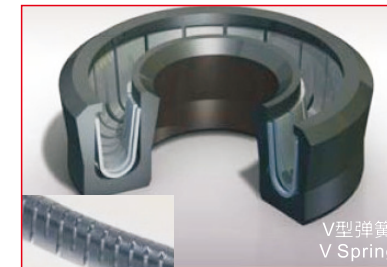
Installation of GreatSeal® C and GreatSeal® H in closed grooves

Series No.	dmin.mm
RC_0 & RH_0	25.0
RC_1 & RH_1	65.0
RC_2 & RH_2	110.0
RC_3 & RH_3	230.0
RC_4 & RH_4	400.0
RC_5 & RH_5	700.0

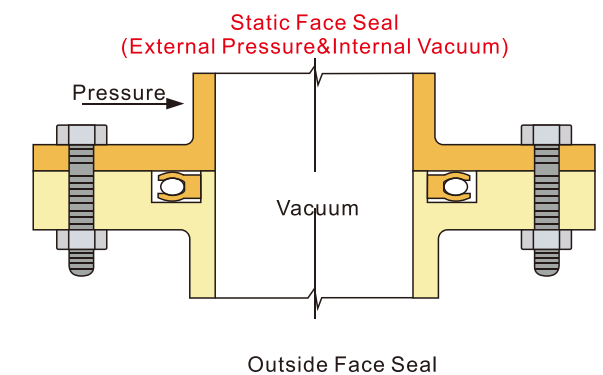
Installation of GreatSeal® C and GreatSeal® H in closed grooves

Series No.	dmin.mm
RC_0 & PH_0	20.0
RC_1 & PH_1	30.0
RC_2 & PH_2	45.0
RC_3 & PH_3	60.0
RC_4 & PH_4	95.0
RC_5 & PH_5	300.0

Typical Installations



Inside Face Seal



Outside Face Seal

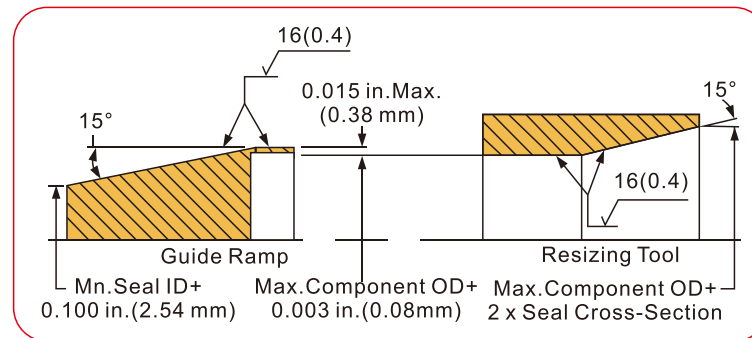
Gland Installation



Closed Gland

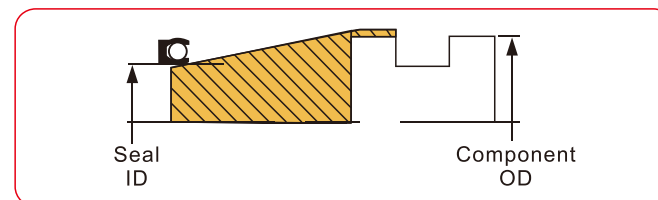
(Piston Seal Installation)

The guide ramp and resizing tool can be assisted in installing the Seal into a fully closed gland.



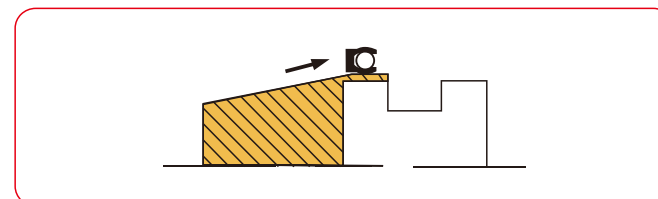
斜面引导工具与校正工具
Stretching Guide Ramp and Resizing Tool

STEP 1: Firstly, preheating the seal to as much as 150 °C (300 °F) in either oil, oven or water, it will be softer seal and aiding in guide ramp and installing the seal.



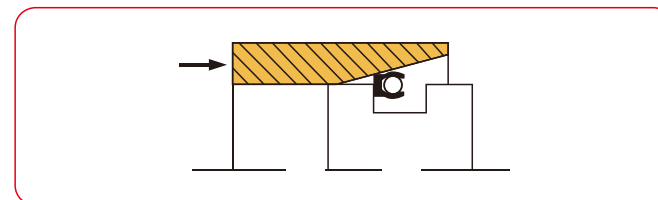
Place on Guide Ramp

STEP 2: Push the seal over the guide ramp and into the groove.



Push Seal

STEP 3: Slide the resizing tool over the seal to compress the seal to its original diameter.



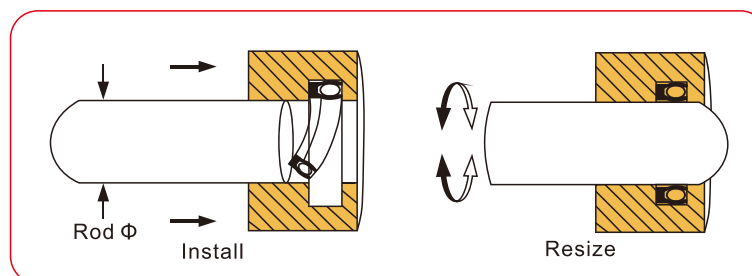
Compress Seal

Please be careful to prevent burns to your hands

Rod Seal Installation

STEP 1: Push the seal into the groove with one end with an obtuse angle.

STEP 2: Correct the seal with the rounded end of the tool.



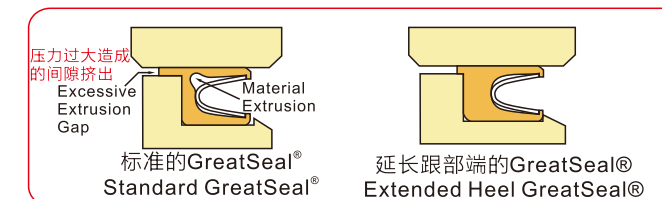
Rod Seal Installation in Solid Gland

Triangular Back-Up Ring(fig.4)

In some cases where a high temperature precedes a high pressure it is recommended to use a triangular backup.

Extended Heel and Back-Up Ring

Back-Up Rings are used when sealing fluids or gases at high temperature and high pressure combinations. Careful attention is also required at high pressure and high speed reciprocation conditions. we strongly advice to contact our technical support for further assistance. So it need to extended the seals' heel or add Back-Up Ring. Refer to fig.1、2



图形1(fig.1)

Double Triangular Back-Up Ringclosing the extrusion gap and preventing extrusion of the seal.(fig.5)

For extreme high pressure and temperature combinations it is recommended to use a set of two triangular back up rings. It is very important to assemble the 90° corner of the backup ring towards the extrusion gap. This type of backup ring is often used when the radial groove dimension changes as a result of the system pressure.

Rectangular Back-Up Ring(fig.3)

In most applications with lower pressure and temperatures below 250° C, a rectangular backup will secure the seal for extrusion. Such backup rings are machined to fit exactly in the radial groove width. The material should be a compound with a higher extrusion resistance then the seal's material.

L-shaped Back-Up Ring(fig.6)

The L-shaped backup ring is used for preventing extrusion at extreme high pressure and high temperature combinations. It is capable of securing PTFE seals up to + 300°C and extreme pressures, such as 20 MPa, with very large extrusions gaps.

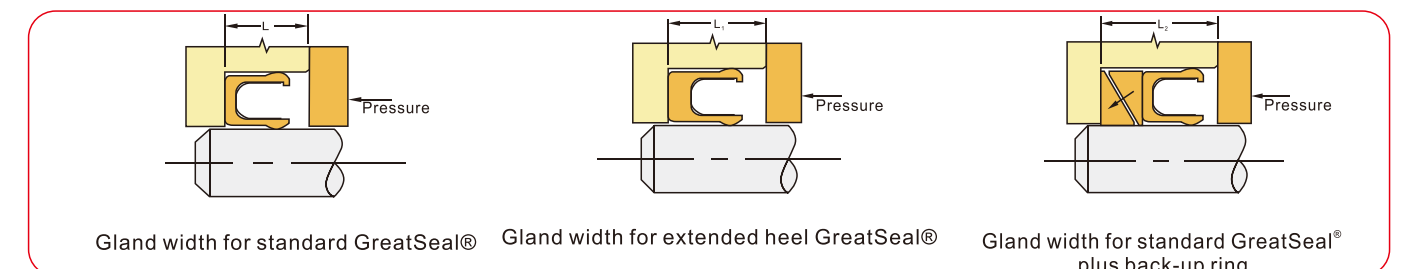


fig.2

Extrusion is a function off:

- the size of the extrusion gap
- the temperature
- the system pressure
- surface speed(reciprocating movements)



fig.3

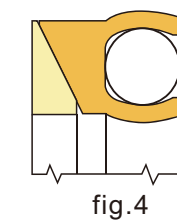


fig.4

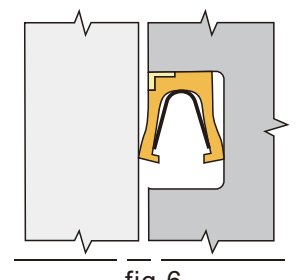


fig.6

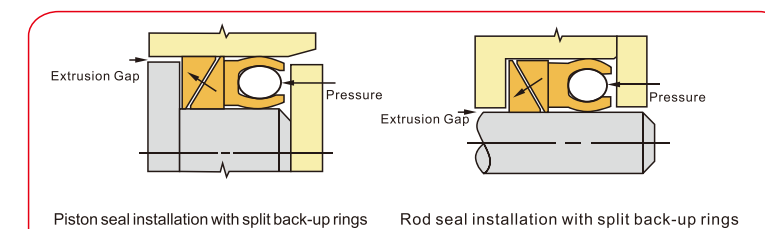
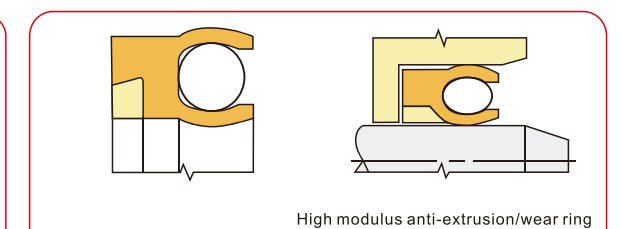


fig.5



High modulus anti-extrusion/wear ring

Other Types

General Standard GreatSeal®

Radial	Standard Lip	Skived I.D.Lip	Skived O.D.Lip
Standard Heel L Width			
Seal Design	V10	V11	V12
Extended Heel L1 Width			
Seal Design	V20	V21	V22
Flanged Heel H1 Width			Other Form
Seal Design	V30	V31	

Technical Data

Operating pressure

Maximum dynamic load:
45MPa(450bar,6527psi)

Maximum static load:
60MPa(600bar,8702psi)

Speed:

Reciprocating up to:15m/s(49ft/sec)

Rotating up to:1m/s(3ft/sec)

Operating temperature
-70°C(-94°F) ~ +260°C(+500°F)

Special PTFE materials as well alternative spring materials
are available for applications outside this temperature range.

Media compatibility

(All fluids, chemicals and gases. Fluids of medium to high
viscosity or containing hard particles.)

Note:At high temperatures operating pressures and speeds should be lower.

Radial	Standard Lip	Skived I.D.Lip	Skived O.D.Lip
Standard Heel L Width			
Seal Design	C10	C11	C12
Extended Heel L1 Width			
Seal Design	C20	C21	C22
Flanged Heel H1 Width			Other Form
Seal Design	C30	C31	

Technical Data

Operating pressure

Maximum dynamic load:
20MPa(200bar,2900psi)

Maximum static load:
60MPa(600bar,8702psi)

Speed:

Reciprocating up to:15m/s(49ft/sec)

Rotating up to:1m/s(3ft/sec)

Operating temperature
-70°C(-94°F) ~ +230°C(+446°F)

Media compatibility

(Virtually all fluids, chemicals and gases.)

Note: At high temperatures operating pressures and speeds
should be lower.

Radial	Standard Lip	Skived I.D.Lip	Skived O.D.Lip
Standard Heel L Width			
Seal Design	H10	H11	H12
Extended Heel L1 Width			
Seal Design	H20	H21	H22
Flanged Heel H1 Width			Other Form
Seal Design	H30	H31	

Technical Data

Operating pressure

Maximum dynamic load:
20MPa(200bar,2900psi)

Maximum static load:
80MPa(800bar,11603psi)

Speed:

Reciprocating up to:15m/s(49ft/sec)

Rotating up to:1m/s(3ft/sec)

Operating temperature
-120°C(-248°F) ~ +260°C(+500°F)

Media compatibility

(Virtually all fluids, chemicals and gases.)

Note: Please Contact on Walle Sealing Solutions for applications
outside these parameters.



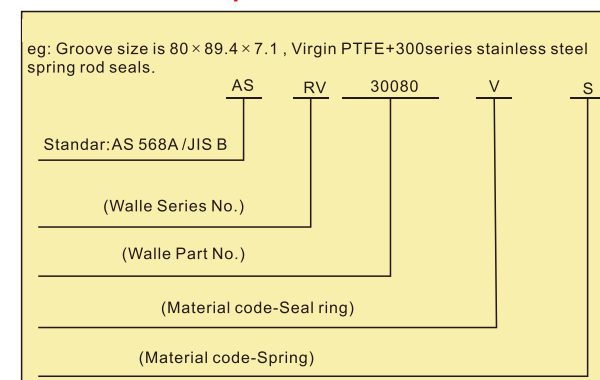
Spring Materials Selection Guide

Media	Spring materials	Spring order lode
For General use e.g.Oil, Grease, Air, Water, steam, Solvents, Food, drugs, Gas	(301 304 316) 300Series Stainless steel	S
For use in corrosive media e.g.Acids, Caustics, Seawater	Hastelloy C-276	H
For petrochemical use e.g.Crude oil,Sour gas	Elgiloy	E
For use in high temperature and Corrosion resistance occasion, such as aerospace, oil, gas, chemical, nuclear industry, etc.	Inconel	I

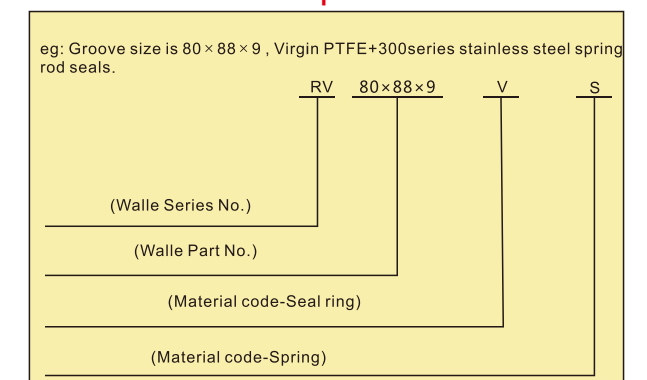
Materials Selection Guide-Seal ring

Material code	Colour	Temperature Range	Material Description
V	White	+260°~-253°	Virgin PTFE: Excellent for light fo moderate dynamic and static service. Limited wear and heat resistance. Low gas permeability. Good cryogenic properties. Moderate to hard vacuum service. FDA approved.
B	Tan	+260°~-200°	Bronze filled PTFE: Standard material for hydraulics, high compressive strength, good sliding and wear properties, good extrusion resistance.
G	Gray	+260°~-200°	Lubricated Glass Filled PTFE: Tough, long wearing, heat resistant. Recommended for high pressure hydraulic service. Caution: Can be abrasive running against soft metals at high surface speeds.
C	Black	+260°~-200°	Polymer: Filled PTFE Excellent wear material for higher temperatures, pressures and speeds. Excellent in water and water base solutions. Superior in dry or poor lubricated applications. Can be abrasive running against soft metals.
P	Tan	+260°~-200°	Polymer Filled PTFE: Superior heat and wear resistance. Non-abrasive. Recommended for moderate to high speed dynamic service running against soft metals.
U	White	+80°~-200°	Formulated UHMW: Extremely good wear and abrasion resistance, but limited heat and chemical resistance. Meets FDA requirements.
H	Gold	+80°~-200°	Formulated UHMW: Extremely tough, long wearing but limited heat and chemical resistance. Particularly suitable for abrasive media. Recommended for long wear life under severe conditions.
K	Tan	+316°~-73°	Virgin Polyaryletherketone: A high modulus material with excellent high temperature resistance. Recommended for back-up rings and for special applications.

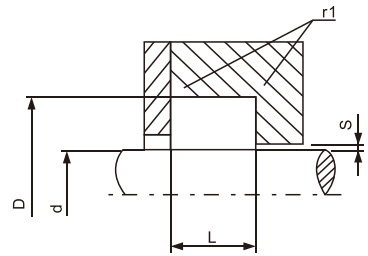
Standard Option



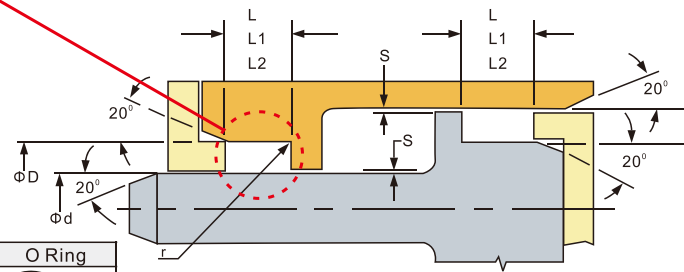
Non Standard Option



Split groove



Rod Seal Gland

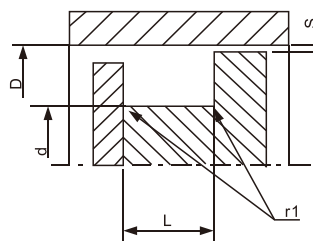


Type	V Spring	C Spring	H Spring	O Ring
Profile form				
Walle Series No.	RV	RC	RH	RO

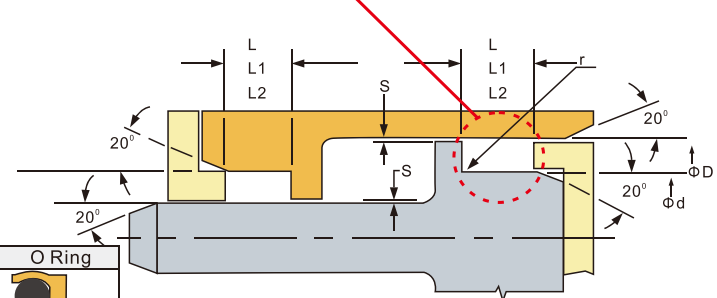
Installation Dimensions

Walle Series No. for types			Rod Diameter d H9mm		Groove Diameter	Groove Width	Radius	Radial Clearance S max. *mm			
V Spring	C Spring	H Spring	Standard Range	Extended Range	D H9 mm	L + 0.2 mm	r1 max. mm	<2MPa (20bar)	<10MPa (100bar)	<20MPa (200bar)	<40MPa (400bar)
RV-0	RC-0	RH-0	3.0-9.9	3.0-40.0	d + 2.9	2.4	0.4	0.20	0.10	0.08	0.05
RV-1	RC-1	RH-1	10.0-19.9	6.0-200.0	d + 4.5	3.6	0.4	0.25	0.15	0.10	0.07
RV-2	RC-2	RH-2	20.0-39.9	10.0-400.0	d + 6.2	4.8	0.6	0.35	0.20	0.15	0.08
RV-3	RC-3	RH-3	40.0-119.9	20.0-700.0	d + 9.4	7.1	0.8	0.50	0.25	0.20	0.10
RV-4	RC-4	RH-4	120.0-630.0	35.0-1600.0	d + 12.2	9.5	0.8	0.60	0.30	0.25	0.12
RV-5	RC-5	RH-5	1000.0-2500.9	80.0-2500.0	d + 19.0	15.0	0.8	0.90	0.50	0.40	0.20

Split groove



Piston Seal Gland

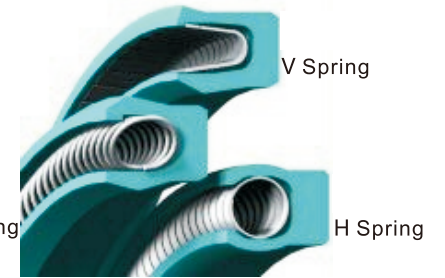
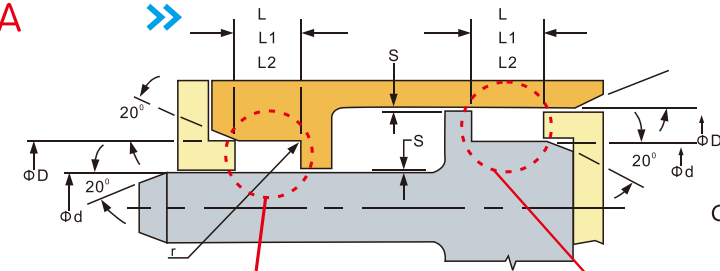


Type	V Spring	C Spring	H Spring	O Ring
Profile form				
Walle Series No.	PV	PC	PH	PO

Installation Dimensions

Walle Series No. for types			Bore Diameter D H9mm		Groove Diameter	Groove Width	Radius	Radial Clearance S max. *mm			
V Spring	C Spring	H Spring	Standard Range	Extended Range	d H9 mm	L + 0.2 mm	r1 max. mm	<2MPa (20bar)	<10MPa (100bar)	<20MPa (200bar)	<40MPa (400bar)
PV-0	PC-0	PH-0	6.0-13.9	6.0-40.0	D-2.9	2.4	0.4	0.20	0.10	0.08	0.05
PV-1	PC-1	PH-1	14.0-24.9	10.0-200.0	D-4.5	3.6	0.4	0.25	0.15	0.10	0.07
PV-2	PC-2	PH-2	25.0-45.9	16.0-400.0	D-6.2	4.8	0.6	0.35	0.20	0.15	0.08
PV-3	PC-3	PH-3	46.0-124.9	28.0-700.0	D-9.4	7.1	0.8	0.50	0.25	0.20	0.10
PV-4	PC-4	PH-4	125.0-630.0	45.0-1600.0	D-12.2	9.5	0.8	0.60	0.30	0.25	0.12
PV-5	PC-4	PH-5	1000.0-2500.0	1000.0-2500.0	D-19.0	15.0	0.8	0.90	0.50	0.40	0.20

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Type	Spring	C Spring	H Spring	O Ring
截面形状 Profile form				
华乐系列号 Walle Series No.	RV	RC	RH	RO

Type	Spring	C Spring	H Spring	O Ring
Profile form				
Walle Series No.	PV	PC	PH	PO

Piston rod/shaft seals groove size

Rod Diameter d h9 mm	Groove Diameter D H9 mm	Groove Width L+0.2 mm	Walle Part No.
3.0	5.9		000030
4.0	6.9		000040
5.0	7.9		000050
6.0	8.9		000060
8.0	10.9		000080
10.0	14.5		100100
12.0	16.5		100120
14.0	18.5		100140
15.0	19.5		100150
16.0	20.5		100160
18.0	22.5		100180
20.0	26.2		200200
22.0	28.2		200220
25.0	31.2		200250
28.0	34.2		200280
30.0	36.2		200300
32.0	38.2		200320
35.0	41.2		200350
36.0	42.2		200360
40.0	49.4		300400
42.0	51.4		300420
45.0	54.4		300450
48.0	57.4		300480
50.0	59.4		300500
52.0	61.4		300520
55.0	64.4		300550
56.0	65.4		300560
60.0	69.4		300600
63.0	72.4		300630
65.0	74.4		300650
70.0	79.4		300700
75.0	84.4		300750
80.0	89.4		300800
85.0	94.4		300850
90.0	99.4		300900
95.0	104.4		300950
100.0	109.4		301000
105.0	114.4		301050
110.0	119.4		301100
115.0	124.4		301150
120.0	132.2		401200
125.0	137.2		401250
130.0	142.2		401300
135.0	147.2		401350
140.0	152.2		401400
150.0	162.2		401500
160.0	172.2		401600
170.0	182.2		401700
180.0	192.2		401800
190.0	202.2		401900
200.0	212.2		402000
210.0	222.2		402100
220.0	232.2		402200
230.0	242.2		402300
240.0	252.2		402400
250.0	262.2		402500
280.0	292.2		402800
300.0	312.2		403000
320.0	332.2		403200
350.0	362.2		403500
360.0	372.2		403600
400.0	412.2		404000

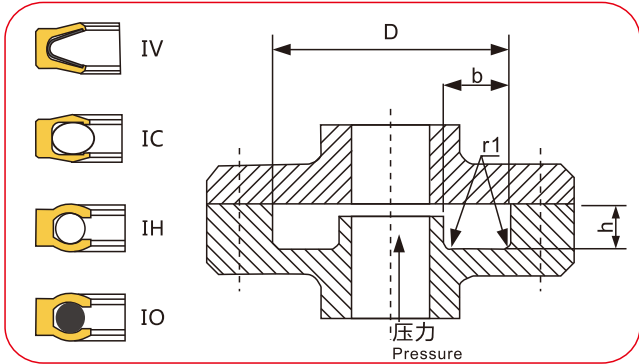
Piston/bore seal ring groove size

Bore Diameter D H9 mm	Groove Diameter d h9 mm	Groove Width L+0.2 mm	Walle Part No.
6.0	3.1		000060
8.0	5.1		000080
10.0	7.1		000100
12.0	9.1		000120
14.0	9.5		100140
15.0	10.5		100150
16.0	11.5		100160
18.0	13.5		100180
20.0	15.5		100200
22.0	17.5		100220
25.0	18.8		200250
28.0	21.8		200280
30.0	23.8		200300
32.0	25.8		200320
35.0	28.8		200350
40.0	33.8		200400
42.0	35.8		200420
45.0	38.8		200450
48.0	38.6		300480
50.0	40.6		300500
52.0	42.6		300520
55.0	45.6		300550
56.0	46.6		300560
60.0	50.6		300600
63.0	53.6		300630
65.0	55.6		300650
70.0	60.6		300700
75.0	65.6		300750
80.0	70.6		300800
85.0	75.6		300850
90.0	80.6		300900
95.0	85.6		300950
100.0	90.6		301000
110.0	100.6		301100
115.0	105.6		301150
120.0	110.6		301200
125.0	112.8		401250
130.0	117.8		401300
135.0	122.8		401350
140.0	127.8		401400
150.0	137.8		401500
160.0	147.8		401600
170.0	157.8		401700
180.0	167.8		401800
190.0	177.8		401900
200.0	187.8		402000
210.0	197.8		402100
220.0	207.8		402200
230.0	217.8		402300
240.0	227.8		402400
250.0	237.8		402500
280.0	267.8		402800
300.0	287.8		403000
320.0	307.8		403200
350.0	337.8		403500
400.0	387.8		404000
420.0	407.8		404200
450.0	437.8		404500
480.0	467.8		404800
500.0	487.8		405000

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(Inside Face Seal-For Interl pressure)



Installation Dimensions

Walle Series No. for types			Groove Outside Diameter D H11 mm		Groove Width b mm	Groove Depth h		Radius r1mm
V Spring	C Spring	HS pring	Recommended Range	Extended Range	min	h mm	mm	max.
IV-0	IC-0	IH-0	10-13.9	10-40	2.4	1.45	+0.03	0.4
IV-1	IC-1	IH-1	14-24.9	13-200	3.6	2.25	+0.05	0.4
IV-2	IC-2	IH-2	25-45.9	18-400	4.8	3.10	+0.08	0.6
IV-3	IC-3	IH-3	46-124.9	28-700 ^{1]}	7.1	4.70	+0.10	0.8
IV-4	IC-4	IH-4	125-999.9 ^{**]}	45-100 ^{**]}	9.5	6.10	+0.15	0.8
IV-5	IC-5	IH-5	1000-2500 ^{***]}	110-2500 ^{***]}	15.0	9.50	+0.20	0.8

above 600 mm b min. = 8.0 mm For diameters above 600 mm b min. = 11.0 mm For diameters above 1000 mm b min. = 18.0 mm ¹⁾Available on request

Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
D H11 mm	b mm	h mm	
10.0	2.4	1.45	000100
12.0	2.4	1.45	000120
14.0	3.6	2.25	100140
15.0	3.6	2.25	100150
16.0	3.6	2.25	100160
18.0	3.6	2.25	100180
20.0	3.6	2.25	100200
22.0	3.6	2.25	100220
25.0	4.8	3.10	200250
28.0	4.8	3.10	200280
30.0	4.8	3.10	200300
32.0	4.8	3.10	200320
35.0	4.8	3.10	200350
36.0	4.8	3.10	200360
40.0	4.8	3.10	200400
42.0	4.8	3.10	200420
45.0	4.8	3.10	200450
48.0	7.1	4.70	300480
50.0	7.1	4.70	300500
52.0	7.1	4.70	300520
55.0	7.1	4.70	300550
56.0	7.1	4.70	300560
60.0	7.1	4.70	300600
63.0	7.1	4.70	300630
65.0	7.1	4.70	300650
70.0	7.1	4.70	300700
75.0	7.1	4.70	300750
80.0	7.1	4.70	300800
85.0	7.1	4.70	300850
90.0	7.1	4.70	300900
95.0	7.1	4.70	300950

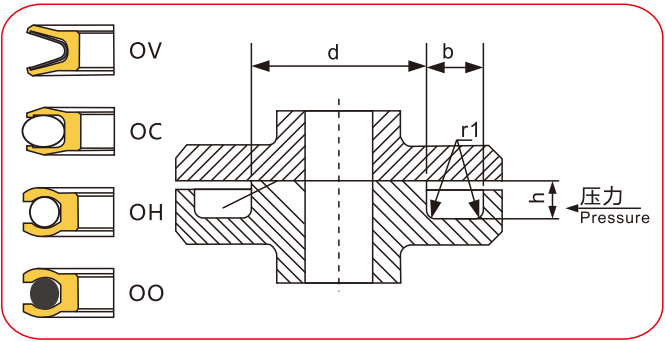
Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
D H11 mm	b mm	h mm	
100.0	7.1	4.70	301000
105.0	7.1	4.70	301050
110.0	7.1	4.70	301100
115.0	7.1	4.70	301150
120.0	7.1	4.70	301200
122.0	7.1	4.70	301220
125.0	9.5	6.10	401250
130.0	9.5	6.10	401300
135.0	9.5	6.10	401350
140.0	9.5	6.10	401400
150.0	9.5	6.10	401500
160.0	9.5	6.10	401600
170.0	9.5	6.10	401700
180.0	9.5	6.10	401800
190.0	9.5	6.10	401900
200.0	9.5	6.10	402000
210.0	9.5	6.10	402100
220.0	9.5	6.10	402200
230.0	9.5	6.10	402300
240.0	9.5	6.10	402400
250.0	9.5	6.10	402500
280.0	9.5	6.10	402800
300.0	9.5	6.10	403000
320.0	9.5	6.10	403200
350.0	9.5	6.10	403500
360.0	9.5	6.10	403600
400.0	9.5	6.10	404000
420.0	9.5	6.10	404200
450.0	9.5	6.10	404500
480.0	9.5	6.10	404800
500.0	9.5	6.10	405000

All intermediate sizes up to 500 mm diameter can be supplied.Sizes > 500 mm diameter up to 2500 mm diameter on request. ¹⁾Tolerances for groove depth, see Table.

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(Outside Face Seal-For External pressure/Vacuum)



Installation Dimensions

华乐系列号针对型号 Walle Series No. for types			沟槽内侧直径 Groove inside Diameter d H11 mm		沟槽宽度b Groove Width b mm	沟槽深度 h Groove Depth h		倒圆 Radius r1mm
V型 V Spring	C型 C Spring	H型 HS pring	推荐的范围 Recommended Range	扩展的范围 Extended Range	min	h mm	公差 mm	max.
OV-0	OC-0	OH-0	3-9.9	3-40	2.4	1.45	+0.03	0.4
OV-1	OC-1	OH-1	10-19.9	8-200	3.6	2.25	+0.05	0.4
OV-2	OC-2	OH-2	20-39.9	12-400	4.8	3.10	+0.08	0.6
OV-3	OC-3	OH-3	40-119.9	20-700 ^{1]}	7.1	4.70	+0.10	0.8
OV-4	OC-4	OH-4	120-999.9 ^{**]}	35-100 ^{**]}	9.5	6.10	+0.15	0.8
OV-5	OC-5	OH-5	1000-2500 ^{***]}	80-2500 ^{***]}	15.0	9.50	+0.20	0.8

For diameters above 600 mm b min. = 8.0 mm request For diameters above 600 mm b min. = 11.0 mm For diameters above 1000 mm b min. = 18.0 mm ¹⁾ Available on

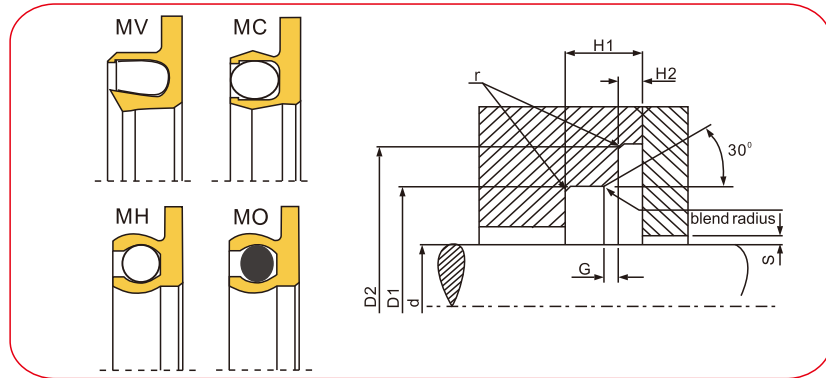
Walle Part numbers for External Pressure / Vacuum

Groove Inside Diameter	Groove Width	Groove Depth	Walle Part No.
d H11 mm	b mm	h mm	
4.0	2.4	1.4	000040
5.0	2.4	1.4	000050
6.0	2.4	1.4	000060
8.0	2.4	1.4	000080
10.0	3.6	2.2	100100
12.0	3.6	2.2	100120
14.0	3.6	2.2	100140
15.0	3.6	2.2	100150
16.0	3.6	2.2	100160
18.0	3.6	2.2	100180
20.0	4.8	3.1	200200
22.0	4.8	3.1	200220
25.0	4.8	3.1	200250
28.0	4.8	3.1	200280
30.0	4.8	3.1	200300
32.0	4.8	3.1	200320
35.0	4.8	3.1	200350
36.0	4.8	3.1	200360
40.0	7.1	4.7	300400
42.0	7.1	4.7	300420
45.0	7.1	4.7	300450
48.0	7.1	4.7	300480
50.0	7.1	4.7	300500
52.0	7.1	4.7	300520
55.0	7.1	4.7	300550
56.0	7.1	4.7	300560
60.0	7.1	4.7	300600
63.0	7.1	4.7	300630
65.0	7.1	4.7	300650
70.0	7.1	4.7	300700
75.0	7.1	4.7	300750
80.0	7.1	4.7	300800
85.0	7.1	4.7	300850

Groove Inside Diameter	Groove Width	Groove Depth	Walle Part No.
d H11 mm	b mm	h mm	
90.0	7.1	4.7	300900
95.0	7.1	4.7	300950
100.0	7.1	4.7	301000
105.0	7.1	4.7	301050
110.0	7.1	4.7	301100
115.0	7.1	4.7	301150
120.0	9.5	6.1	401200
125.0	9.5	6.1	401250
130.0	9.5	6.1	401300
135.0	9.5	6.1	401350
140.0	9.5	6.1	401400
150.0	9.5	6.1	401500
160.0	9.5	6.1	401600
170.0	9.5	6.1	401700
180.0	9.5	6.1	401800
190.0	9.5	6.1	401900
200.0	9.5	6.1	402000
210.0	9.5	6.1	402100
220.0	9.5	6.1	402200
230.0	9.5	6.1	402300
240.0	9.5	6.1	402400
250.0	9.5	6.1	402500
280.0	9.5	6.1	402800
300.0	9.5	6.1	403000
320.0	9.5	6.1	403200
350.0	9.5	6.1	403500
360.0	9.5	6.1	403600
400.0	9.5	6.1	404000
420.0	9.5	6.1	404200
450.0	9.5	6.1	404500
480.0	9.5	6.1	404800
500.0	9.5	6.1	405000

All intermediate sizes up to 500 mm diameter can be supplied.Sizes > 500 mm diameter up to 2500 mm diameter on request. ¹⁾Tolerances for groove depth, see Table.

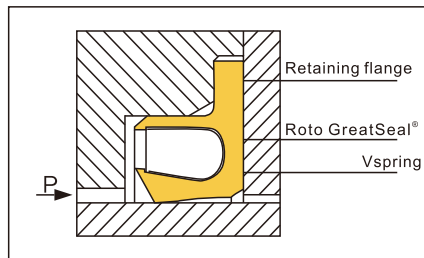
Roto GreatSeal®



Installation Dimensions

Walle Series No.for types			Rod Diameter df8/h9 mm		Groove Diameter		Groove Width		Introduced Chamfer	Radius	Radial Clearance Smax. mm		
V Spring	C Spring	H Spring	Standard Range	Extended Range	D1 H9 mm	D2 H10 mm	H1 mm	H2 mm	G mm	rmax. mm	<2MPa (20bar)	<10MPa (100bar)	<20MPa (200bar)
MV-1	MC-1	MH-1	5.0-19.9	20.0-200.0	d+5.0	d+9.0	3.6	0.85 _{+0/-0.1}	0.8	0.3	0.25	0.15	0.10
MV-2	MC-2	MH-2	20.0-39.9	10.0-400.0	d+7.0	d+12.5	4.8	1.35 _{+0/-0.15}	1.1	0.4	0.35	0.20	0.15
MV-3	MC-3	MH-3	40.0-399.9	20.0-700.0	d+10.5	d+17.5	7.1	1.80 _{+0/-0.20}	1.4	0.5	0.50	0.25	0.20
MV-4	MC-4	MH-4	400.0-999.9	35.0-999.9	d+14.0	d+22.0	9.5	2.80 _{+0/-0.20}	1.6	0.5	0.60	0.30	0.25

Available on request 2) For diameters larger than the standard range contact Walle



Technical Data

Operating pressure

Maximum dynamic load:
15MPa(150bar,2175psi)

Maximum static load:
25MPa(250bar,3626psi)

Speed:

Reciprocating up to:10m/s(33ft/sec)

Rotating up to:2m/s(6.5ft/sec)

Operating temperature

-100°C(-148°F) ~ +260°C(+500°F)

Media compatibility

(Virtually all fluids, chemicals and gases.)

Note:At high temperatures operating pressures and speeds are lower.

Installation Roto GreatSeal®

GreatSeal® should only be installed in split grooves.

Carry out installation following the steps below for a concentric and strain—free fit:

- ① Place seal in the open groove
- ② Fit the cover and secure loosely
- ③ Install shaft
- ④ Tighten cover onto block

Shaft Bearing and Radial Clearance

Seals should not be used jointly as a seal and bearing as the sealing function will be reduced. It is recommended that the seals are guided with a roller or a slide bearing. Acceptable eccentricity is detailed in table 1.

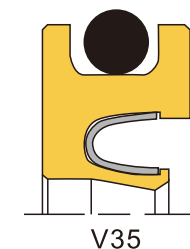
Table 1 Permissible Eccentricity for Roto GreatSeal®

Walle Series No.	Max. allowable deviation mm
MV-1	0.05
MV-2	0.10
MV-3	0.15
MV-4	0.20

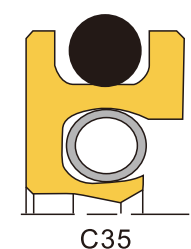
Roto GreatSeal® standard option

Rod Diameter	Groove Diameter	Groove Width	Walle Part No.
d f&h9 mm	D1 H9 mm	H1 min. mm	
5.0	10.0	3.6	100050
6.0	11.0	3.6	100060
8.0	13.0	3.6	100080
10.0	15.0	3.6	100100
12.0	17.0	3.6	100120
14.0	19.0	3.6	100140
15.0	20.0	3.6	100150
16.0	21.0	3.6	100160
18.0	23.0	3.6	100180
20.0	27.0	4.8	200200
22.0	29.0	4.8	200220
25.0	32.0	4.8	200250
28.0	35.0	4.8	200280
30.0	37.0	4.8	200300
32.0	39.0	4.8	200320
35.0	42.0	4.8	200350
36.0	43.0	4.8	200360
40.0	50.5	7.1	300400
42.0	52.5	7.1	300420
45.0	55.5	7.1	300450
48.0	58.5	7.1	300480
50.0	60.5	7.1	300500
52.0	62.5	7.1	300520
55.0	65.5	7.1	300550
56.0	66.5	7.1	300560
60.0	70.5	7.1	300600
63.0	73.5	7.1	300630
65.0	75.5	7.1	300650
70.0	80.5	7.1	300700
75.0	85.5	7.1	300750
80.0	90.5	7.1	300800
85.0	95.5	7.1	300850
90.0	100.5	7.1	300900

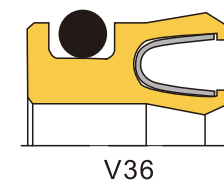
Rod Diameter	Groove Diameter	Groove Width	Walle Part No.
d f&h9 mm	D1 H9 mm	H1 min. mm	
95.0	105.5	7.1	300950
100.0	110.5	7.1	301000
105.0	115.5	7.1	301050
110.0	120.5	7.1	301100
115.0	125.5	7.1	301150
120.0	130.5	7.1	301200
125.0	135.5	7.1	301250
130.0	140.5	7.1	301300
135.0	145.5	7.1	301350
140.0	150.5	7.1	301400
150.0	160.5	7.1	301500
160.0	170.5	7.1	301600
170.0	180.5	7.1	301700
180.0	190.5	7.1	301800
190.0	200.5	7.1	301900
200.0	210.5	7.1	302000
210.0	220.5	7.1	302100
220.0	230.5	7.1	302200
230.0	240.5	7.1	302300
240.0	250.5	7.1	302400
250.0	260.5	7.1	302500
280.0	290.5	7.1	302800
300.0	310.5	7.1	303000
320.0	330.5	7.1	303200
350.0	360.5	7.1	303500
360.0	370.5	7.1	303600
400.0	414.0	9.5	404000
420.0	434.0	9.5	404200
450.0	464.0	9.5	404500
480.0	494.0	9.5	404800
500.0	514.0	9.5	405000
600.0	614.0	9.5	406000
700.0	714.0	9.5	407000



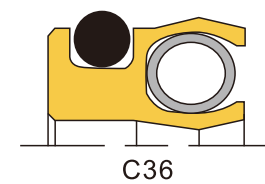
V35



C35



V36



C36

Mating Surface Materials

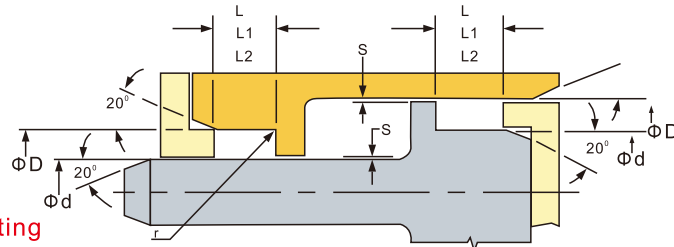
Sealing of applications with rotating movements require very good mating surfaces. A minimum hardness 55 HRC is recommended to a hardening depth of at least 0.3 mm. Particular attention must be paid to coated surfaces and good heat dissipation through the coating is required.

JIS B



V Spring GreatSeal®

Reciprocating



C Spring GreatSeal®



H Spring GreatSeal®

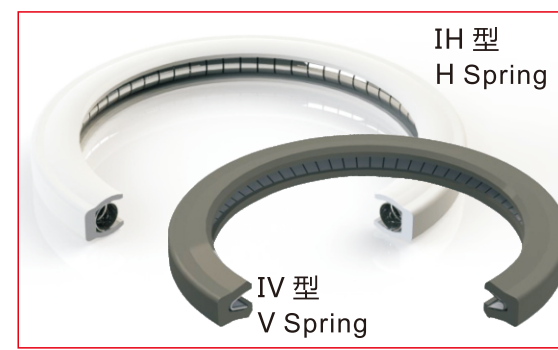
Type	V Spring	C Spring	H Spring	O Ring
Profile form				
Walle Series No.	RV	RC	RH	RO

Type	V Spring	C Spring	H Spring	O Ring
Profile form				
Walle Series No.	PV	PC	PH	PO

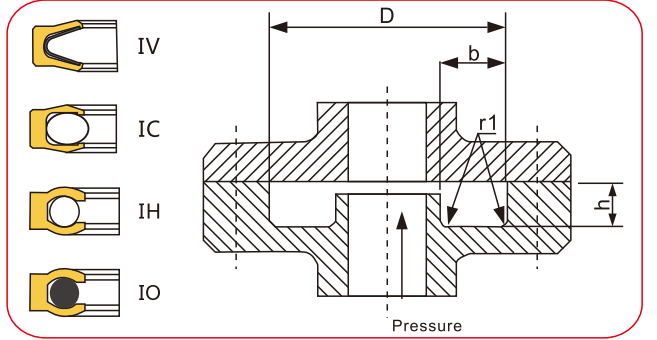
d h9 mm	D H9 mm	L+0.2 mm	Walle Part No.
3.00	6.00	(2.5 3.9 5.4)	000030
4.00	7.00		000040
5.00	8.00		000050
6.00	9.00		000060
7.00	10.00		000070
8.00	11.00		000080
9.00	12.00		000090
10.00	13.00	(3.2 4.4 6.0)	000100
10.00	14.00		100100A
11.00	15.00		100110
11.20	15.20		100112
12.00	16.00		100120
12.50	16.50		100125
14.00	18.00		100140
15.00	19.00		100150
16.00	20.00		100160
18.00	22.00		100180
20.00	24.00		100200
21.00	25.00	(4.7 6.0 7.8)	100210
22.00	26.00		100220
22.00	28.00		200220A
22.40	28.40		200224
24.00	30.00		200240
25.00	31.00		200250
25.50	31.50		200255
26.00	32.00		200260
28.00	34.00		200280
29.00	35.00		200290
29.50	35.50	(7.5 9.0 11.5)	200295
30.00	36.00		200300
31.00	37.00		200310
31.50	37.50		200315
32.00	38.00		200320
34.00	40.00		200340
35.00	41.00		200350
35.50	41.50		200355
36.00	42.00		200360
38.00	44.00		200380
39.00	45.00		200390
40.00	46.00	(11.0 13.0 17.0)	200400
41.00	47.00		200410
42.00	48.00		200420
44.00	50.00		200440
45.00	51.00		200450
46.00	52.00		200460
48.00	54.00		200480
49.00	55.00		200490
50.00	56.00		200500
48.00	58.00		300480A
50.00	60.00	(7.5 9.0 11.5)	300500A
52.00	62.00		300520
53.00	63.00		300530
55.00	65.00		300550
56.00	66.00		300560
58.00	68.00		300580
60.00	70.00		300600
62.00	72.00		300620
63.00	73.00		300630
65.00	75.00		300650
67.00	77.00		300670
70.00	80.00		300700

d h9 mm	D H9 mm	L+0.2 mm	Walle Part No.
71.00	81.00	(7.5 9.0 11.5)	300710
75.00	85.00		300750
80.00	90.00		300800
85.00	95.00		300850
90.00	100.00		300900
95.00	105.00		300950
100.00	110.00		3001000
102.00	112.00		3001020
105.00	115.00		3001050
110.00	120.00		3001100
112.00	122.00		3001120
115.00	125.00	(11.0 13.0 17.0)	3001150
120.00	130.00		3001200
125.00	135.00		3001250
130.00	140.00		3001300
132.00	142.00		3001320
135.00	145.00		3001350
140.00	150.00		3001400
145.00	155.00		3001450
150.00	160.00		3001500
150.00	165.00	(11.0 13.0 17.0)	4001500A
155.00	170.00		4001550
160.00	175.00		4001600
165.00	180.00		4001650
170.00	185.00		4001700
175.00	190.00		4001750
180.00	195.00		4001800
185.00	200.00		4001850
190.00	205.00		4001900
195.00	210.00		4001950
200.00	215.00		4002000
205.00	220.00		4002050
209.00	224.00		4002090
210.00	225.00		4002100
215.00	230.00		4002150
220.00	235.00	(11.0 13.0 17.0)	4002200
225.00	240.00		4002250
230.00	245.00		4002300
235.00	250.00		4002350
240.00	255.00		4002400
245.00	260.00		4002450
250.00	265.00		4002500
255.00	270.00		4002550
260.00	275.00		4002600
265.00	280.00		4002650
270.00	285.00		4002700
275.00	290.00		4002750
280.00	295.00		4002800
285.00	300.00		4002850
290.00	305.00	(11.0 13.0 17.0)	4002900
295.00	310.00		4002950
300.00	315.00		4003000
315.00	330.00		4003150
320.00	335.00		4003200
335.00	350.00		4003350
340.00	355.00		4003400
355.00	370.00		4003550
360.00	375.00		4003600
375.00	390.00		4003750
385.00	400.00		4003850
400.00	415.00		4004000

JIS B



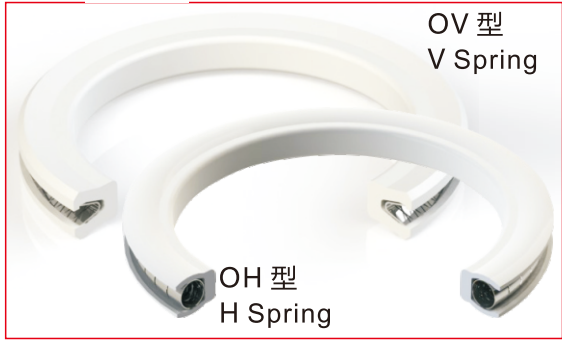
(Inside Face Seal-For Internal pressure)



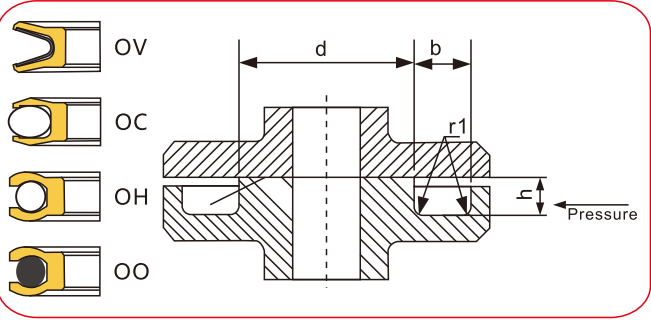
Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
D H11(mm)	b(mm)	h(mm)	
9.00	2.5	1.4	000090
10.00	2.5	1.4	000100
11.00	2.5	1.4	000110
12.00	2.5	1.4	000120
13.00	2.5	1.4	000130
14.00	3.2	1.8	100140
15.00	3.2	1.8	100150
15.20	3.2	1.8	100152
16.00	3.2	1.8	100160
16.50	3.2	1.8	100165
18.00	3.2	1.8	100180
19.00	3.2	1.8	100190
20.00	3.2	1.8	100200
22.00	3.2	1.8	100220
24.00	3.2	1.8	100240
25.00	3.2	1.8	100250
26.00	3.2	1.8	100260
28.00	4.7	2.7	200280
29.50	4.7	2.7	200295
30.00	4.7	2.7	200300
31.00	4.7	2.7	200310
31.50	4.7	2.7	200315
32.00	4.7	2.7	200320
34.00	4.7	2.7	200340
35.00	4.7	2.7	200350
35.50	4.7	2.7	200355
36.00	4.7	2.7	200360
37.00	4.7	2.7	200370
37.50	4.7	2.7	200375
39.00	4.7	2.7	200390
40.00	4.7	2.7	200400
41.00	4.7	2.7	200410
41.50	4.7	2.7	200415
42.00	4.7	2.7	200420
44.00	4.7	2.7	200440
45.00	4.7	2.7	200450
46.00	4.7	2.7	200460
47.00	4.7	2.7	200470
48.00	4.7	2.7	200480
50.00	4.7	2.7	200500
51.00	4.7	2.7	200510
52.00	4.7	2.7	200520
54.00	4.7	2.7	200540
55.00	4.7	2.7	200550
56.00	4.7	2.7	200560
58.00	7.5	4.6	300580
60.00	7.5	4.6	300600
62.00	7.5	4.6	300620
63.00	7.5	4.6	300630
65.00	7.5	4.6	300650
66.00	7.5	4.6	300660
68.00	7.5	4.6	300680
70.00	7.5	4.6	300700
72.00	7.5	4.6	300720
73.00	7.5	4.6	300730
75.00	7.5	4.6	300750
77.00	7.5	4.6	300770
80.00	7.5	4.6	300800
81.00	7.5	4.6	300810
85.00	7.5	4.6	300850

Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
D H11(mm)	b(mm)	h(mm)	
90.00	7.5	4.6	300900
95.00	7.5	4.6	300950
100.00	7.5	4.6	301000
105.00	7.5	4.6	301050
110.00	7.5	4.6	301100
112.00	7.5	4.6	301120
115.00	7.5	4.6	301150
120.00	7.5	4.6	301200
122.00	7.5	4.6	301220
125.00	7.5	4.6	301250
130.00	7.5	4.6	301300
135.00	7.5	4.6	301350
140.00	7.5	4.6	301400
142.00	7.5	4.6	301420
145.00	7.5	4.6	301450
150.00	7.5	4.6	301500
155.00	7.5	4.6	301550
160.00	7.5	4.6	301600
165.00	11.0	6.9	401650
170.00	11.0	6.9	401700
175.00	11.0	6.9	401750
180.00	11.0	6.9	401800
185.00	11.0	6.9	401850
190.00	11.0	6.9	401900
195.00	11.0	6.9	401950
200.00	11.0	6.9	402000
205.00	11.0	6.9	402050
210.00	11.0	6.9	402100
215.00	11.0	6.9	402150
220.00	11.0	6.9	402200
224.00	11.0	6.9	402240
225.00	11.0	6.9	402250
230.00	11.0	6.9	402300
235.00	11.0	6.9	402350
240.00	11.0	6.9	402400
245.00	11.0	6.9	402450
250.00	11.0	6.9	402500
255.00	11.0	6.9	402550
260.00	11.0	6.9	402600
265.00	11.0	6.9	402650
270.00	11.0	6.9	402700
275.00	11.0	6.9	402750
280.00	11.0	6.9	402800
285.00	11.0	6.9	402850
290.00	11.0	6.9	402900
295.00	11.0	6.9	402950
300.00	11.0	6.9	403000
305.00	11.0	6.9	403050
310.00	11.0	6.9	403100
315.00	11.0	6.9	403150
330.00	11.0	6.9	403300
335.00	11.0	6.9	403350
350.00	11.0	6.9	403500
355.00	11.0	6.9	403550
370.00	11.0	6.9	403700
375.00	11.0	6.9	403750
390.00	11.0	6.9	403900
400.00	11.0	6.9	404000
415.00	11.0	6.9	404150

JIS B



(Outside Face Seal-For External pressure/Vacuum)



Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
d H11(mm)	b(mm)	h(mm)	
3.00	2.5	1.4	000030
4.00	2.5	1.4	000040
5.00	2.5	1.4	000050
6.00	2.5	1.4	000060
7.00	2.5	1.4	000070
8.00	2.5	1.4	000080
9.00	2.5	1.4	000090
10.00	2.5	1.4	000100
10.00	3.2	1.8	100100A
11.00	3.2	1.8	100110
11.20	3.2	1.8	100112
12.00	3.2	1.8	100120
12.50	3.2	1.8	100125
14.00	3.2	1.8	100140
15.00	3.2	1.8	100150
16.00	3.2	1.8	100160
18.00	3.2	1.8	100180
20.00	3.2	1.8	100200
21.00	3.2	1.8	100210
22.00	3.2	1.8	100220
22.00	4.7	2.7	200220A
22.40	4.7	2.7	200224
24.00	4.7	2.7	200240
25.00	4.7	2.7	200250
25.50	4.7	2.7	200255
26.00	4.7	2.7	200260
28.00	4.7	2.7	200280
29.00	4.7	2.7	200290
29.50	4.7	2.7	200295
30.00	4.7	2.7	200300
31.00	4.7	2.7	200310
31.50	4.7	2.7	200315
32.00	4.7	2.7	200320
34.00	4.7	2.7	200340
35.00	4.7	2.7	200350
35.50	4.7	2.7	200355
36.00	4.7	2.7	200360
38.00	4.7	2.7	200380
39.00	4.7	2.7	200390
40.00	4.7	2.7	200400
41.00	4.7	2.7	200410
42.00	4.7	2.7	200420
44.00	4.7	2.7	200440
45.00	4.7	2.7	200450
46.00	4.7	2.7	200460
48.00	4.7	2.7	200480
49.00	4.7	2.7	200490
50.00	4.7	2.7	200500
48.00	7.5	4.6	300480A
50.00	7.5	4.6	300500A
52.00	7.5	4.6	300520
53.00	7.5	4.6	300530
55.00	7.5	4.6	300550
56.00	7.5	4.6	300560
58.00	7.5	4.6	300580
60.00	7.5	4.6	300600
62.00	7.5	4.6	300620
63.00	7.5	4.6	300630
65.00	7.5	4.6	300650
67.00	7.5	4.6	300670
70.00	7.5	4.6	300700

Groove Outside Diameter	Groove Width	Groove Depth	Walle Part No.
d H11(mm)	b(mm)	h(mm)	
71.00	7.5	4.6	300710
75.00	7.5	4.6	300750
80.00	7.5	4.6	300800
85.00	7.5	4.6	300850
90.00	7.5	4.6	300900
95.00	7.5	4.6	300950
100.00	7.5	4.6	3001000
102.00	7.5	4.6	3001020
105.00	7.5	4.6	3001050
110.00	7.5	4.6	3001100
112.00	7.5	4.6	3001120
115.00	7.5	4.6	3001150
120.00	7.5	4.6	3001200
125.00	7.5	4.6	3001250
130.00	7.5	4.6	3001300
132.00	7.5	4.6	3001320
135.00	7.5	4.6	3001350
140.00	7.5	4.6	3001400
145.00	7.5	4.6	3001450
150.00	7.5	4.6	3001500
160.00	11.0	6.9	4001500A
155.00	11.0	6.9	4001550
160.00	11.0	6.9	4001600
165.00	11.0	6.9	4001650
170.00	11.0	6.9	4001700
175.00	11.0	6.9	4001750
180.00	11.0	6.9	4001800
185.00	11.0	6.9	4001850
190.00	11.0	6.9	4001900
195.00	11.0	6.9	4001950
200.00	11.0	6.9	4002000
205.00	11.0	6.9	4002050
209.00	11.0	6.9	4002090
210.00	11.0	6.9	4002100
215.00	11.0	6.9	4002150
220.00	11.0	6.9	4002200
225.00	11.0	6.9	4002250
230.00	11.0	6.9	4002300
235.00	11.0	6.9	4002350
240.00	11.0	6.9	4002400
245.00	11.0	6.9	4002450
250.00	11.0	6.9	4002500
255.00	11.0	6.9	4002550
260.00	11.0	6.9	4002600
265.00	11.0	6.9	4002650
270.00	11.0	6.9	4002700
275.00	11.0	6.9	4002750
280.00	11.0	6.9	4002800
285.00	11.0	6.9	4002850
290.00	11.0	6.9	4002900
295.00	11.0	6.9	4002950
300.00	11.0	6.9	4003000
315.00	11.0	6.9	4003150
320.00	11.0	6.9	4003200
335.00	11.0	6.9	4003350
340.00	11.0	6.9	4003400
355.00	11.0	6.9	4003550
360.00	11.0	6.9	4003600
375.00	11.0	6.9	4003750
385.00	11.0	6.9	4003850
400.00	11.0	6.9	4004000

Great Lip® seals solve difficult applications which are not used by conventional elastomer seals. It exceed the performance of elastomer lip-seals in the following areas.



- Greater chemical resistance
- Lower friction
- Capable of surface speeds to 7000 ft/min.
- Works to temperature extremes (-65°F to 450°F)
- Has extended seal life in dry or abrasive media
- Handles pressure in excess of 500 PSID

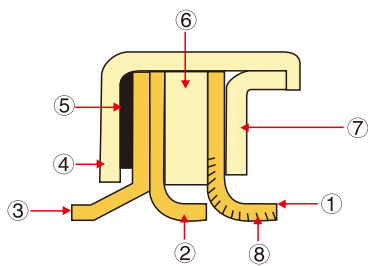


FDA GreatCase®

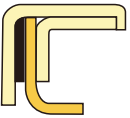
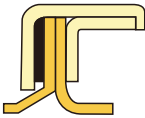
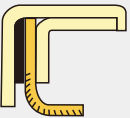
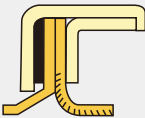
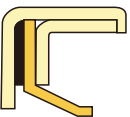
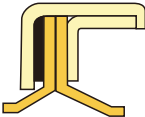
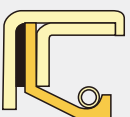
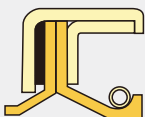
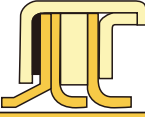
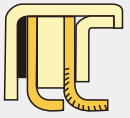
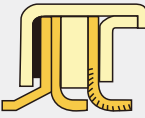
Successful Applications

- Hydraulic motors and pumps
- Chemical pumps
- Rotary compressors
- Rotary unions
- Vacuum pumps
- Blowers
- Drilling and tapping spindles
- High-speed gearboxes
- Crankshafts of engines and compressors
- Robotics
- Pharmaceutical and food processing equipment
- Mixers
- Chemical processing equipment
- Actuators
- Alternators and generators
- Radar and thermal optical devices
- Electric Motor Shafts
- Encoders

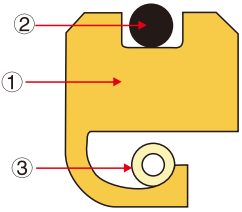
GreatCase® Lip Seal >>



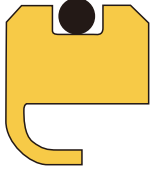
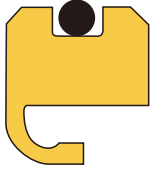
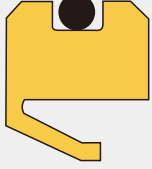
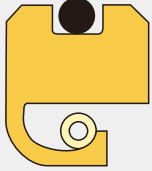
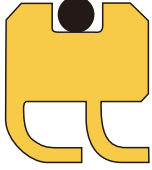
- 1. Primary element
- 2. Secondary element
- 3. Wiper seal
- 4. Outer case
- 5. Gasket(Fluorocarbon)
- 6. Washer
- 7. Inner case
- 8. Helical lines

Seal Type	Seal Type	Application Details
Series L1	Series L2	Series L1 and L2 are economical GreatLip seal designs employed in a wide range of applications. They are used in lubricated and non-lubricated environments. They can be used at shaft speeds to 5000 ft./min. in lubricated media and pressures to 100 PSID. Maximum PV 75,000 lubricated, 37,500 non-lubricated. Typical applications are: gear boxes and environmental seals.
		
Series T1	Series T2	Series T1 and T2 incorporate a threaded sealing lip which pumps the media away from the seal. These designs should only be used in lubricating media. These designs offer long life and positive sealing at shaft speeds to 6000 ft./min. They should not be used for pressures greater than 5 PSID. It only used in single rotary shaft , rotate by clockwise or anti clockwise , please confirm the rotary shaft direction before place order.
		
Series F1	Series F2	Series F1 and F2 offer low torque and long life. They can be used at shaft speeds to 6000 ft/min., but are not recommended for pressures greater than 25 PSID. Due to their light lip loading, these designs should not be used where a leak-tight seal is required. They are an excellent environmental seal. Maximum PV 75,000 lubricated, 37,500 non-lubricated. Typical applications are: dust/dirt excluders, spindle and conveyer seals.
		
Series S1	Series S2	Series S1 and S2 incorporate spring loading which improves sealing where shaft runout or bore/shaft misalignment exist. These designs offer positive sealing during long term storage. They can be used at shaft speeds to 2000 ft./min. and pressures to 100 PSID. Maximum PV 75,000 lubricated, 37,500 non-lubricated. Typical applications are : mixers, gear boxes and augers.
		
Series H2	Series H3	Series H2 and H3 are designed for pressures up to 500 PSID lubricating media, speeds up to 3500 ft./min. Maximum PV 300,000 lubricated, 50,500 non-lubricated. Typical applications are: hydraulic motors, pumps, hydrostatic transmissions and other high pressure hydraulic equipment.
		
Series W2	Series W3	Series W2 and W3 incorporate a threaded primary sealing lip with a standard secondary sealing lip. These series are designed for sealing lubricating media at high speeds 4,500ft./min and pressures up to 250 PSID. Maximum PV 200,000 lubricated. It only used in single rotary shaft , rotate by clockwise or anti clockwise , please confirm the rotary shaft direction before place order. Typical applications are: air compressors, refrigeration compressors and vacuum pumps.
		

GreatLip® Seal >>



- 1. Seal material
- 2. O-Ring(Fluorocarbon)
- 3. Extension spring(Stainless steel)

Seal Type For NORMAL Temperatures	Application Details
Series P1	 Series P1 is economical GreatLip® designs employed in a wide range of applications. They are used in lubricated and non-lubricated environments. They can be used at shaft speeds to 5000ft./min. in lubricated media and pressures to 75 PSID. Maximum PV 75,000 lubricated, 37,500 non-lubricated. Typical applications are: gear boxes and environmental seals.
Series P2	
	Series P2 is modifications of Series P1 which offer longer life and improved sealing of gasses and abrasive media due to their higher lip load. They also offer additional runout capability, They can operati at speeds, presure and PV as noted in Series P1, Recommended shaft hardness of 55HRC or greater when operating at the higher PV limits. Typical applications are: gear boxes, submersible pumps/ motors, and mixers.
Series P3	 Series P3 offer low torque and long life. They can be used at shaft speeds up to 6000ft/min. They are not recommended for pressures greater than 25 PSID. Due to light lip loading, this design should not be used where a leak tight seal is required. They are excellent environmental seals. Maximum PV 75,000 lubricated, 37,500 non-lubricated, 37,500 non-lubricated. Typical applications are: dust/dirt excluders, spindle and conveyer seals.
Series P4	
	Series P4 incorporate spring loading which improves sealing where shaft runout or bore/shaft misalignment exist. These designs offer positive sealing during long term storage. They can be used at shaft speeds to 2000 ft./min. and pressures to 75 PSID. Maximum PV 75,000 lubricated, 37,500 non-lubricated. Typical applications are: mixers, gear boxes and augers.
Series P5	 Series P5 is designed for pressure up to 200 PSID in lubricating media , speed up to 3,500 ft./min. in lubricating media. Maximum PV 200,000 lubricated, 50,500 non-lubricated. Typical applications are: hydraulic motors, pumps, hydrostatic transmissions and other high pressure hydranlic equipment.

GreatLip® provides similar performance to the GreatCase® seal but it is more economical in smaller quantities. Because the seal has a soft surface on the OD, the seal will not damage the housing and can easily be installes and removed. Due to the seal's soft sealing on the OD. GreatLip® designed for extreme temperatures utilize a metallic support ring to minimize temperature's effect on the seal.

Groove Size

Shaft Diameter	Bore Diameter	Seal Width	Walle Part No.
d h9 mm	D H9 mm	L+0.2 mm	
8	22	7	8-22-7
8	24	7	8-24-7
8	26	7	8-26-7
9	22	7	9-22-7
9	24	7	9-24-7
9	26	7	9-26-7
10	22	7	10-22-7
10	24	7	10-24-7
10	26	7	10-26-7
11	22	7	11-22-7
11	26	7	11-26-7
12	24	7	12-24-7
12	28	7	12-28-7
12	30	7	12-30-7
14	28	7	14-28-7
14	30	7	14-30-7
14	35	7	14-35-7
15	26	7	15-26-7
15	30	7	15-30-7
15	32	7	15-32-7
15	35	7	15-35-7
16	28	7	16-28-7
16	30	7	16-30-7
16	32	7	16-32-7
16	35	7	16-35-7
17	28	7	17-28-7
17	30	7	17-30-7
17	32	7	17-32-7
17	35	7	17-35-7
17	40	7	17-40-7
18	30	7	18-30-7
18	32	7	18-32-7
18	35	7	18-35-7
20	40	7	20-40-7
20	32	7	20-32-7
20	35	7	20-35-7
20	40	7	20-40-7
20	47	7	20-47-7
22	35	7	22-35-7
22	40	7	22-40-7
22	47	7	22-47-7
24	35	7	24-35-7
24	37	7	24-37-7
24	40	7	24-40-7
24	47	7	24-47-7
25	40	7	25-40-7
25	42	7	25-42-7
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26	37	7	26-37-7
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26	47	7	26-47-7
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36	47	7	36-47-7
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36	52	7	36-52-7
38	62	8	38-62-8
38	52	7	38-52-7
38	55	8	38-55-8
38	62	8	38-62-8
40	52	7	40-52-7
40	55	8	40-55-8
40	60	8	40-60-8
40	62	8	40-62-8
40	72	8	40-72-8
42	55	8	42-55-8
42	60	8	42-60-8
42	62	8	42-62-8
42	72	8	42-72-8

Shaft Diameter	Bore Diameter	Seal Width	Walle Part No.
d h9 mm	D H9 mm	L+0.2 mm	
45	60	8	45-60-8
45	62	8	45-62-8
45	65	8	45-65-8
45	72	8	45-72-8
48	62	8	48-62-8
48	65	8	48-65-8
48	72	8	48-72-8
50	65	8	50-65-8
50	68	8	50-68-8
50	72	8	50-72-8
50	80	8	50-80-8
52	68	8	52-68-8
52	72	8	52-72-8
55	70	8	55-70-8
55	72	8	55-72-8
55	80	8	55-80-8
55	85	10	55-85-10
56	70	8	56-70-8
56	72	8	56-72-8
56	80	8	56-80-8
56	85	10	56-85-10
58	72	8	58-72-8
58	80	8	58-80-8
60	75	8	60-75-8
60	80	8	60-80-8
60	85	10	60-85-10
60	90	10	60-90-10
62	80	8	62-80-8
62	85	10	62-85-10
62	90	10	62-90-10
63	85	10	63-85-10
63	90	10	63-90-10
65	85	10	65-85-10
65	90	10	65-90-10
65	100	10	65-100-10
68	90	10	68-90-10
68	100	10	68-100-10
70	90	10	70-90-10
70	100	10	70-100-10
72	95	10	72-95-10
72	100	10	72-100-10
75	95	10	75-95-10
75	100	10	75-100-10
78	100	10	78-100-10
80	100	10	80-100-10
80	100	12	80-100-12
85	110	12	85-110-12
85	120	12	85-120-12
90	110	12	90-110-12
90	120	12	90-120-12
95	120	12	95-120-12
95	125	12	95-125-12
100	120	12	100-120-12
100	125	12	100-125-12
100	130	12	100-130-12
105	130	12	105-130-12
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115	140	12	115-140-12
115	150	12	115-150-12
120	150	12	120-150-12
120	160	12	120-160-12
125	150	12	125-150-12
125	160	12	125-160-12
130	160	12	130-160-12
130	170	15	130-170-15
138	170	15	138-170-15
140	170	15	140-170-15
145	175	15	145-175-15
150	180	15	150-180-15
160	190	15	160-190-15
170	200	15	170-200-15
180	210	15	180-210-15
190	220	15	190-220-15
200	230	15	200-230-15

Housing and Shaft Recommendations

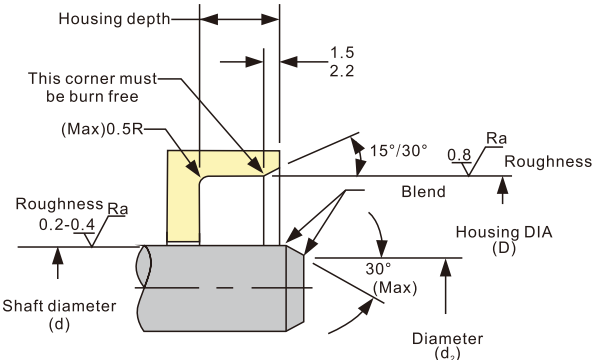


Shaft Material & Hardness

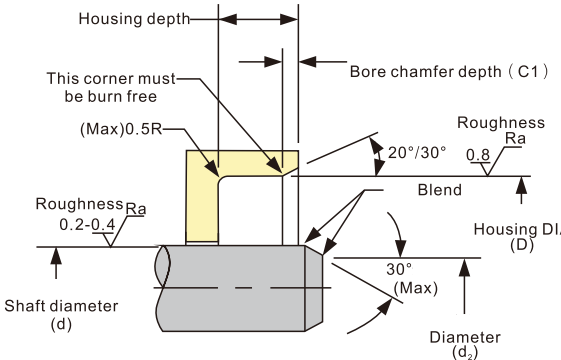
- Castiron are hardenable steel is recommended.
- Shaft hardness of 40 to 58 HRC is recommended for low to moderate hydraulic oil pressure (0-200 PSID). A higher hardness range of 58 to 65 HRC for high pressure hydraulic oil, abrasive or non-lubricating medias, or high speed applications 3000 ft./min. and above.

Bore Material

- Cast iron, steel, aluminum and other are commonly used metallic and nonmetallic materials are acceptable. Plastics are only acceptable for GreatLIP® seals.



GreatCase® Shaft seal



GreatLip® Shaft seal

Shaft Lead-In Chamfer

Diameter d	Diameter d-d₂
Up to 10	1,5 min.
11 to 20	2,0 min.
21 to 30	2,5 min.
31 to 40	3,0 min.
41 to 50	3,5 min.
51 to 70	4,0 min.
71 to 100	4,5 min.
101 to 130	5,0 min.
131 to 180	6,0 min.
181 to 210	6,5 min.

Bore Tolerance : H8

Shaft Tolerance : h11

Bore Lead-In Chamfer(GreatLip® only)

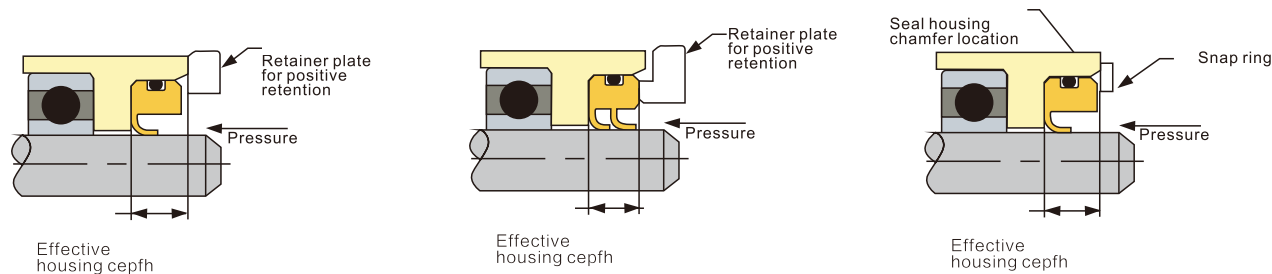
(Housing Diameter Sizes)	(Bore Chamfer) C₁
Up 100	1,5/2,0
100 to 200	2,1/2,5

Hardware variations

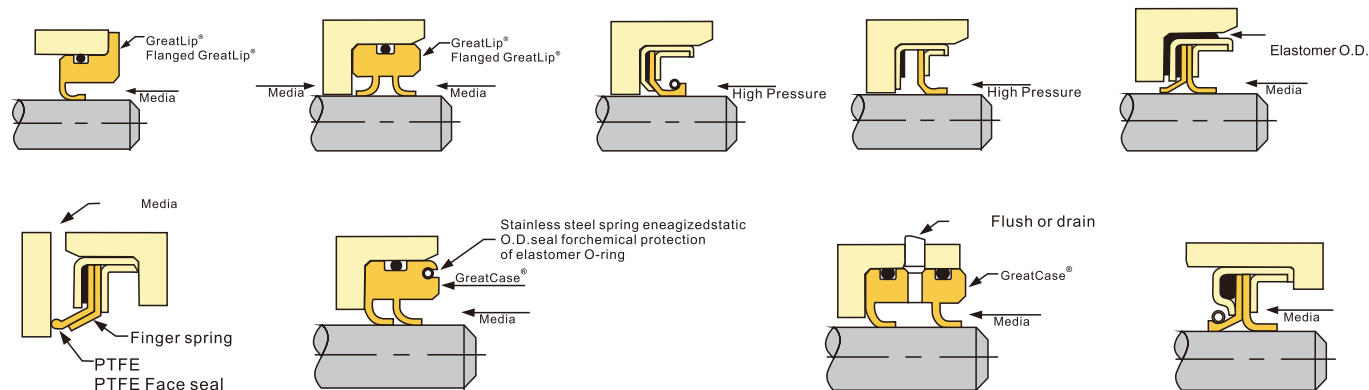


Sealing Lip Extension

GreatLip® seal incorporate two sealing lips, or a wiper seal, which will have seal lip extensions as shown. This must be considered when designing a seal gland.



Non-Standard Seal Configurations

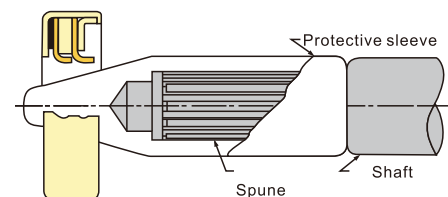


Seal Installation

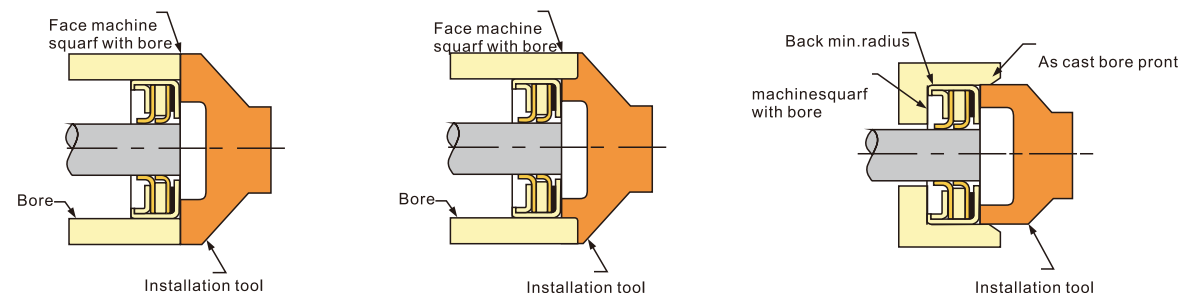
Care must be taken not to damage the sealing lip during the installation of the shaft through the seal. It is much easier to install the seal if the shaft enters the seal from the atmosphere side. If this is not possible, or if the seal must be installed on a shaft which has a keyway or splines, please contact the factory. We can help with the design and manufacture of simple tooling to assure that the seal should be pressed into the bore evenly. A tool, as shown below, simplifies this operation.

Installation Tooling

Care is essential in the installation of GreatCase® & GreatLip® seals onto the shaft. If chamfer (smaller than I.D. of seal lip element) is not enough big, and/or if lip must pass over spline or keyway, a tapered installation sleeve (shown at right) is necessary. Sleeve design information is available on request.



Press Fit Tools



O-Rings



Molded Rubber Parts



S Seals*FS Spring Seals
T Seals*L Seals



Rotary shaft seals



Oil seals



Combined seals



PTFE Seals



Polyurethane seals