



255™ Cartridge Dual Seal

Installation Instructions

SEAL INSTALLATION

Preparation

Determine if the pump is in good condition.

A. Check the shaft or sleeve.

1. Remove all burrs and sharp corners, especially in areas where the O-Ring has to slide. Cover threads and keyway slots with a thin tape to prevent cutting the O-Ring. The distance from the face of the stuffing box to the center of the O-Ring groove is approximately 1.12" (28,5 mm).
2. The shaft finish should be no rougher than 32 microinches (0,8 microns) AA. It should feel smooth if you run your fingernail along the shaft in the axial direction.
3. **Make sure the shaft or sleeve diameter is within tolerance (no more than +/- .002" [0,05 mm] from nominal).**
Example: 1.750" shaft should not be larger than 1.752" or smaller than 1.748".
4. Use a dial indicator to measure the shaft runout in the area where the seal is to be installed. **Readings should not exceed .001" TIR per inch (0,001 mm TIR per millimeter) of shaft diameter.**
5. Place the dial indicator on the end of the shaft and alternately push and pull the shaft in the axial direction to measure end play. If the bearings are in a good condition, end play should not exceed .005" (0,13 mm) TIR.

6. Protect the sleeve O-Ring by lubricating the shaft with a clean silicone based lubricant. A sufficient quantity is provided with the seal.

B. Check the stuffing box face.

1. The stuffing box face must be smooth enough for a gasket to seal; maximum 125 microinches (3,2 microns) AA.
2. Split case pumps will sometimes cause a step (misalignment) to occur on the stuffing box face. This step must be machined flat.
3. Make sure the stuffing box is clean and clear along its entire length.
4. If possible, attach the base of a dial indicator to shaft and rotate shaft and indicator slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box relative to the shaft should not exceed .005" TIR per inch (0,005 mm TIR per millimeter) of shaft diameter. Though the 255 can accommodate up to 0.025" (0,64 mm) of misalignment, minimizing the misalignment will maximize seal life.

Installation

1. Check the chemical listing to determine if the Fluorocarbon O-Rings installed in this seal are compatible with the fluid being sealed. If it is necessary to change the O-Ring material, disassemble the seal as shown in the instructions and replace it with suitable O-Rings. A spare set of Ethylene Propylene O-Rings is supplied with the seal.

2. The 1/4 dog point set screws go into smaller holes in the sleeve. Do not disengage the 1/4 dog point screws from the sleeve when positioning the seal. The three (six for sizes above 2.50" and 60 mm) cup point set screws go through the larger holes in the sleeve. Make sure all six screws (nine screws for sizes above 2.50" and 60 mm) are engaged into the sleeve but do not protrude into the ID bore. Additionally, when repositioning or removing the seal make sure the three centering clips and socket head cap screws are engaged.
3. The centering clips have been preset at the factory. If for any reason you loosen or remove the centering clip cap screws, re-tighten as follows prior to installing seal on your equipment: Tighten the cap screw finger tight, then using the Allen wrench, tighten the capscrew an additional 1/8 of a turn. This will approximate the 30 lbs-in (3,4 Nm) of torque set at the factory. Make sure that the lip on the end of the centering clips is inside the groove in the gland.
4. **CAUTION: If the 255 seal is operating at a stuffing box pressure of over 300 psig (20 Bar) or if the shaft is case hardened, replace the three (six for sizes above 2.50" and 60 mm) 316 stainless steel set screws that go through the larger holes on the sleeve with the hardened steel set screws supplied with the seal.**
5. Slide the seal onto the shaft, making sure the 1/4 dog point set screws are engaged through the seal sleeve.

SEAL INSTALLATION

6. Reassemble the pump and make necessary shaft alignments and impeller adjustments. The impeller can be reset at any time, as long as the centering clips are in place and the seal set screws are loosened while the shaft is being moved.
7. Orient the barrier fluid connections to the location required. The ports are plugged prior to shipping. Removal of the plugs will require 25 lbs-ft. (34 Nm) of torque.
8. **Piping connections should not be made prior to tightening the gland bolts.**
9. Tighten the gland nuts evenly. **Important: the gland nuts must be tightened before tightening set screws onto the shaft.**
10. Evenly tighten all six set screws (three cup point set screws and three 1/4 dog point set screws) with the hex key provided. After they have been tightened with the hex key, tighten them again with a torque wrench to 50-60 lbs-in. (5,7- 6,8 Nm). Note: For sizes above 2.50" and 60 mm there is a total of nine set screws (six cup point set screws and three 1/4 dog point set screws).
11. Remove centering clips and socket head cap screws, retain for later use.
12. Check the spring gap, between the rotary and lock ring, to check if it is an even 1/16" (approximately) all around. An equal 1/16" (1,6 mm) spring gap is indicative of squareness of the stuffing box to the shaft.
13. **IMPORTANT:** It is important to make sure that the gland is properly centered over the sleeve. To do this, turn the shaft by hand to make sure the seal turns freely. If you hear metal to metal contact within the seal, it was improperly centered. Replace the centering clips finger tight, loosen gland bolts, tighten clips, re-tighten gland bolts, and then remove clips. If metal to metal contact still exists check the centering of the stuffing box.
14. Piping connections should not be made until the gland nuts are tightened.
15. **BARRIER FLUID CONNECTIONS:**
The barrier fluid port connections are:
 - 1/4" NPT for 1.00" through -1.50" and 25 mm through 38 mm.
 - 3/8" NPT for 1.625" through - 2.50" and 40 mm through 60 mm.
 - 1/2" NPT for 2.625" through - 3.750" and 65 mm through 120 mm.This seal is equipped with a pumping device to circulate the barrier fluid.
The Piping Connections are Dependent on Shaft Rotation.
When looking at the lock ring end of the seal: CONVECTION (when ports are positioned at 12:00).

A. **CLOCKWISE shaft rotation**

- The cool fluid enters through the right port.
- The hot fluid exits the seal through the left port and goes to the top of the convection tank.

B. **COUNTER-CLOCKWISE shaft rotation**

- The cool fluid from the bottom of the convection tank enters through the left port.
- The hot fluid exits the seal through the right port and goes to the top of the convection tank.
- Add fluid, typically 50/50 ethylene glycol and water or Chesterton® 610 Synthetic Lubricating Oil, to the convection tank.

FORCED CIRCULATION

(when ports are positioned at 12:00)

A. **CLOCKWISE shaft rotation**

- The cool fluid enters through the right port.
- The hot fluid exits the seal through the left port.

B. **COUNTER-CLOCKWISE shaft rotation**

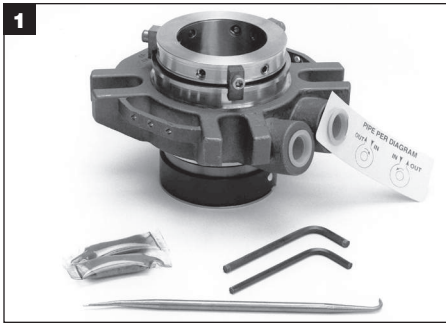
- The cool fluid enters through the left port.
- The hot fluid exits the seal through the right port.

For a double sealing arrangement, the barrier fluid is typically pressurized at approximately 15-20 psig (1-1,5 Bar) above the stuffing box pressure. For a tandem sealing arrangement, the barrier fluid is typically pressurized between 15 psig (1 Bar) and half of the stuffing box pressure. Take all necessary precautions and follow normal safety procedures before starting equipment.

CAUTIONS

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of their plant for successful use of mechanical seals. If in doubt, get assistance from someone in the plant who is familiar with the seals or delay the installation until a seal representative is available. All necessary auxiliary arrangements for successful operation (heating, cooling, flushing) as well as safety devices must be employed. These decisions are to be made by the user. The chemical listing is intended as a general reference for this seal only. The decision to use this seal or any other Chesterton seal in a particular service is the customer's responsibility.

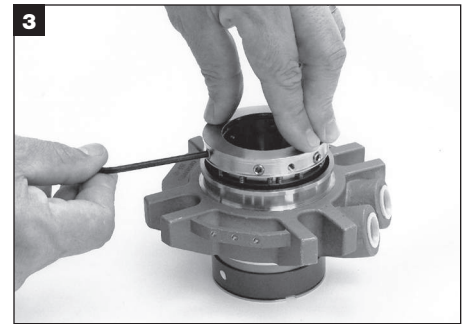
DISASSEMBLY (1-10)



1 You will need the hex keys provided with the seal, and an O-Ring extractor or paper clip to disassemble the seal.



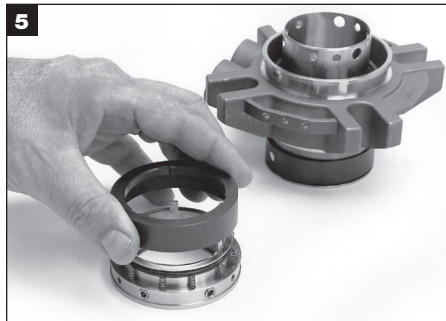
2 Place the seal, lock ring side up, on a flat surface. Remove the centering clips.



3 While pressing down on the lock ring, back off all the set screws so they disengage from the sleeve.



4 Carefully lift the lock ring and rotary assembly out holding the rotary seal ring as well as the lock ring. This will keep the rotary seal ring from falling off. Place the lock ring assembly with the rotary seal ring side up.



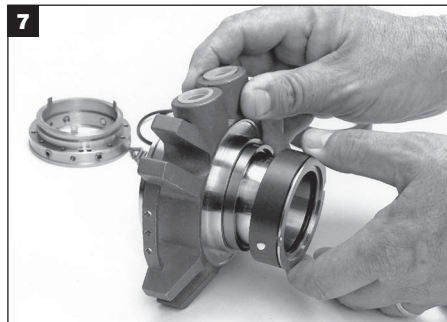
5 Separate the rotary seal ring and the lock ring.

Refer to the chemical listing to determine the chemical compatibility of the elastomers with the fluid being sealed. The 255 is supplied with Fluorocarbon O-Rings installed. If necessary, replace the Fluorocarbon with the Ethylene Propylene provided. If Fluorocarbon and Ethylene Propylene are not compatible, you may obtain Buna-N, Neoprene, Chesterton 76, FFKM elastomers from your Chesterton distributor.

DISASSEMBLY (1-10)



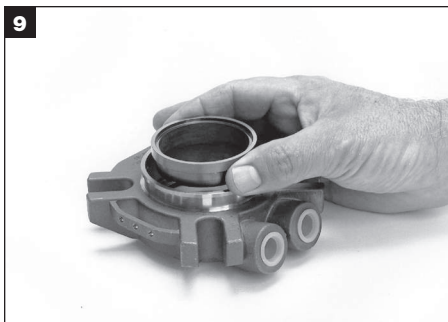
6 Remove the springs and the O-Rings from the lock ring.



7 Rest the gland on its edge and slide the sleeve and inboard rotary assembly out.



8 Remove the rotary seal ring and the two O-Rings from the sleeve.

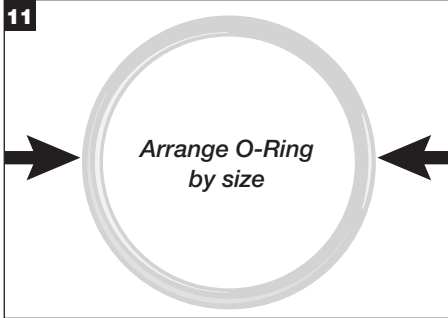


9 Remove the two stationary seal rings out of the gland and remove the O-Rings.



10 Remove the flow channel out of the gland and remove the drive lug. The flow channel can only be removed in one direction.

ASSEMBLY (11-21)



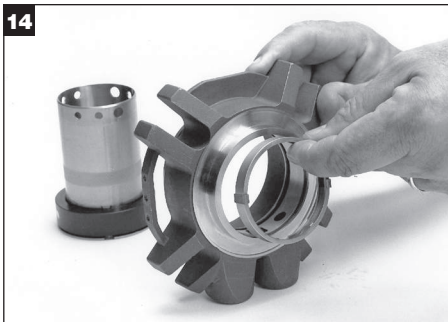
The O-Ring placement by increasing size is:
 Smallest size O-Ring (1) Sleeve ID
 Next larger size O-Ring (1) Lock Ring ID
 Next larger size O-Rings (2) Rotary Seal Rings
 Largest size O-Rings (2) Gland



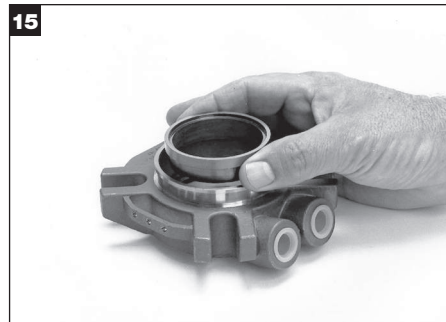
Lubricate the sleeve ID O-Ring with the silicone grease provided and install it in the sleeve ID O-Ring groove. Lubricate the sleeve rotary O-Ring and install it in the sleeve OD O-Ring groove. Slide the rotary seal ring onto the sleeve, lining up the sleeve drive tabs with rotary seal ring slots, until it bottoms out.



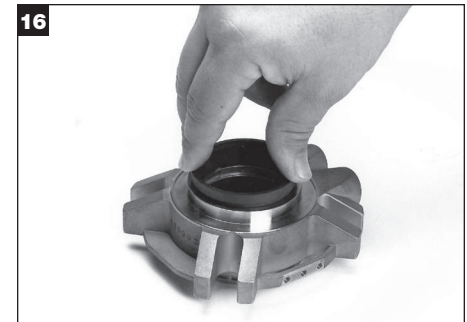
If the two drive clips are not already attached, install the two drive clips in the slots in the flow channel. Note: There are four drive clips for sizes above 2.50" and 60 mm.



Lubricate one gland O-Ring with the silicone grease provided and install it in one of the gland O-Ring grooves. Place rectangular side of drive lug into the gland horizontally. The square shaped side of the drive lug should be facing up. Place the gland on its edge and slide the channel into the gland past the other O-Ring groove, lining up the drive lug with the slot in the flow channel. Lubricate the other gland O-Ring with the silicone grease provided and install it in the other gland O-Ring groove.



Place the gland with the outboard side facing up (gasket side down). Slide one of the stationary seal rings into the outboard end of the gland, pushing gently past the O-Ring, until it engages with the drive clips on the flow channel. Make sure the drive clips are lined up with the stationary seal ring slots.



Turn the gland assembly over. Push the other stationary into the inboard end of the gland, pushing gently past the O-Ring, until it engages with the drive clips on the flow channel. Make sure the drive clips are lined up with the stationary slots. This assembly should be able to move (axially) easily.

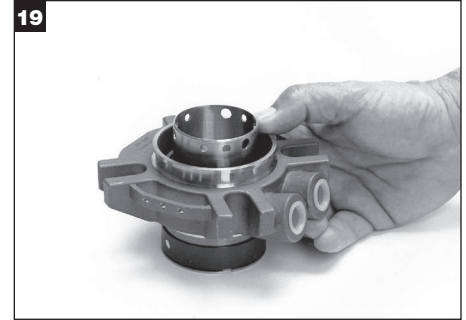
ASSEMBLY (11-21)



Lubricate the lock ring O-Rings and place them in the lock ring O-Ring grooves. Make sure the proper screws are in the lock ring. There should be three cup point set screws and three hybrid dog/cup point set screws placed alternately in the bigger holes on the lock ring. (For sizes above 2.50" and 60 mm there are six cup point set screws). Place a spring in each hole in the lock ring. Apply a small amount of silicone grease to the bottom of each spring. This will help the springs stay in the holes.



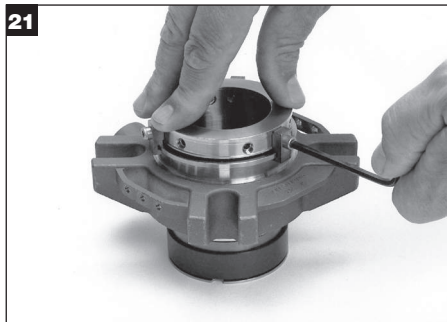
Slide the outboard rotary seal ring over the lock ring until it is over the O-Ring, aligning the drive tabs with the rotary slots. Press on the rotary seal ring to compress the springs to make sure that the rotary seal ring can move freely. Wipe the stationary and rotary seal ring faces clean with a lint free cloth.



Place the sleeve assembly with the lock ring side facing up. Lift the gland assembly and slide it onto the sleeve, making sure that the outboard side of the gland faces up towards the lock ring end of the sleeve.

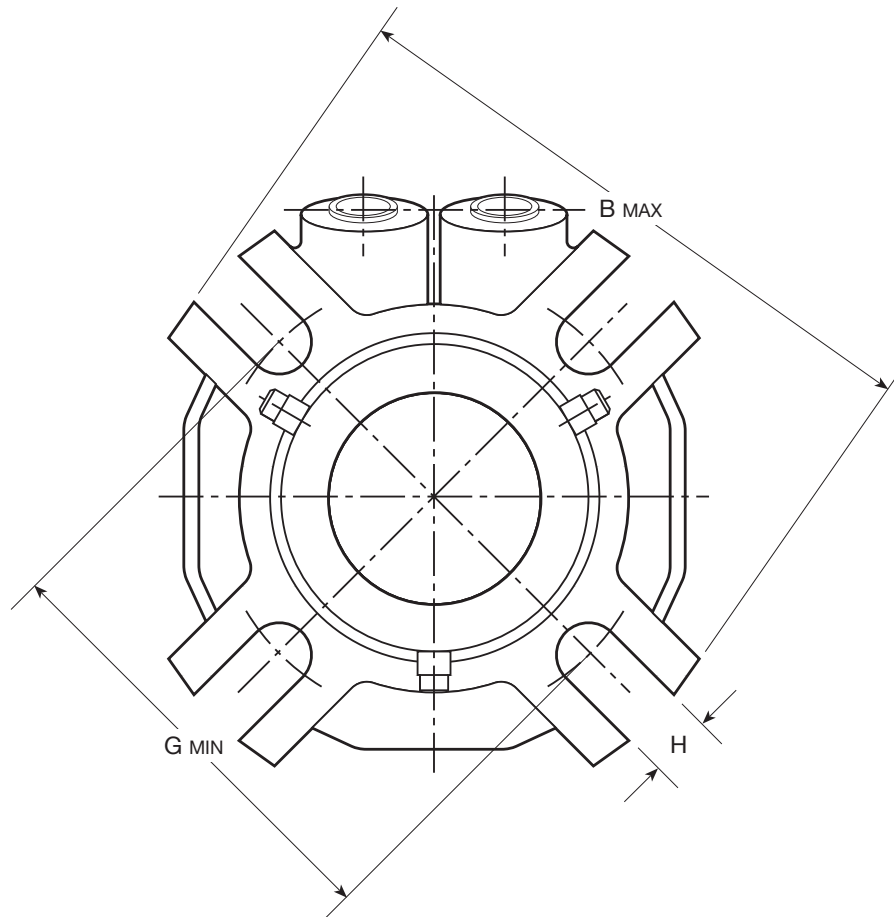
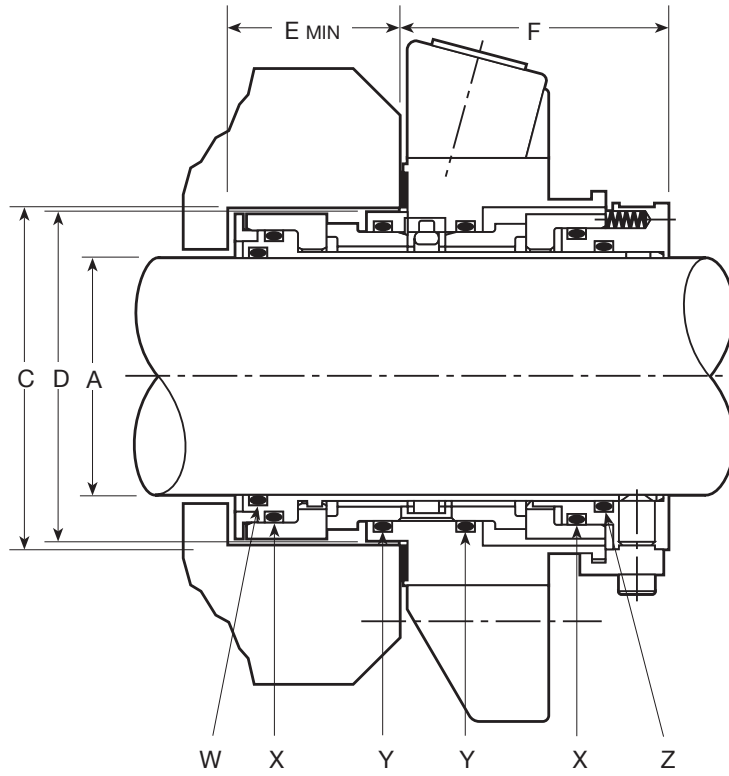


Carefully pick up the lock ring and rotary assembly holding the rotary seal ring as well as the lock ring. This will keep the rotary from falling off. Make sure the drive tabs are still aligned with the rotary seal ring slots. Turn the lock ring assembly over and slide it over the sleeve, aligning the 1/4 point set screws with the smaller holes and the cup point set screws with the larger holes. Hold the rotary seal ring with your fingers while gently pushing down on the lock ring till the rotary makes contact with the stationary seal ring.



Press down on the lock ring and tighten the 1/4 dog point set screws and the cup point set screws. Check to ensure that the sleeve is not deformed while tightening the set screws. Make sure the screws do not protrude into the sleeve ID bore. Install and re-tighten the centering clips as follows: Tighten the cap screw finger tight, then using the Allen wrench, tighten the capscrew an additional 1/8 of a turn. Make sure that the lip on the end of the gland is inside the groove in the gland. **The assembly is now complete.**

DIMENSIONAL DATA (DRAWINGS) – SMALL



255 DIMENSIONAL DATA (INCH) – SMALL

DASH NO.	A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	W	X	Y	Z
								3/8"	1/2"	5/8"					
8	1.000	4.12	1.75	1.81	1.73	1.36	2.16	2.81*	2.94*		0.57	120	124	126	121
9	1.125	4.12	1.88	1.94	1.85	1.36	2.16	2.95*	3.08*		0.57	122	126	128	124
10	1.250	4.12	2.00	2.06	1.98	1.36	2.16	3.08*	3.21*		0.57	124	128	130	126
11	1.375	4.37	2.13	2.31	2.10	1.36	2.16	3.21*	3.34*		0.57	126	130	132	128
12	1.500	4.50	2.25	2.44	2.23	1.36	2.16	3.33*	3.46*		0.57	128	132	134	130
13	1.625	5.00	2.38	2.56	2.35	1.36	2.16	3.45*	3.58*		0.56	130	134	136	132
14	1.750	5.50	2.50	2.81	2.48	1.36	2.16	3.66	3.79*		0.56	132	136	138	134
15	1.875	5.50	2.63	2.94	2.60	1.36	2.16	3.78	3.91*		0.56	134	138	140	136
16	2.000	5.50	2.75	3.19	2.73	1.36	2.16	4.03	4.16		0.56	136	140	142	138
17	2.125	6.01	2.88	3.44	2.85	1.36	2.16	4.29	4.42	4.54	0.68	138	142	144	140
18	2.250	6.01	3.00	3.56	2.98	1.36	2.16	4.41	4.54	4.66	0.68	140	144	146	142
19	2.375	6.01	3.13	3.59	3.10	1.36	2.16	4.44	4.57	4.69*	0.68	142	146	148	144
20	2.500	6.51	3.25	3.81	3.23	1.36	2.16	4.66	4.79	4.91	0.68	144	148	150	146

255 DIMENSIONAL DATA (METRIC) – SMALL

A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	W	X	Y	Z
							8 mm	10 mm	12 mm					
25	105	44	46	43	35	55	70*	72*	74*	14	120	124	126	121
28	105	47	49	46	35	55	73*	75*	77*	14	121	126	128	123
30	105	49	51	48	35	55	76*	78*	80*	14	123	127	129	125
32	105	51	52	50	35	55	77*	79*	81*	14	124	128	131	126
33	114	54	58	53	35	55	78*	80*	82*	14	125	129	131	127
35	111	54	59	53	35	55	80*	82*	84*	14	126	130	132	128
38	114	57	62	57	35	55	83*	85*	87*	14	128	132	134	130
40	127	59	61	58	35	55	86	88*	90*	14	129	134	136	131
43	127	64	69	63	35	55	89	91*	93*	14	131	135	137	133
45	140	64	66	63	35	55	93	95*	97*	14	132	137	139	134
48	140	69	74	68	35	55	94	96*	98*	14	134	139	141	136
50	140	69	71	68	35	55	98	100	102*	14	136	140	142	137
55	153	74	76	73	35	55		103	105	17	139	143	145	140
60	153	79	85	79	35	55		113	115	17	142	146	148	144

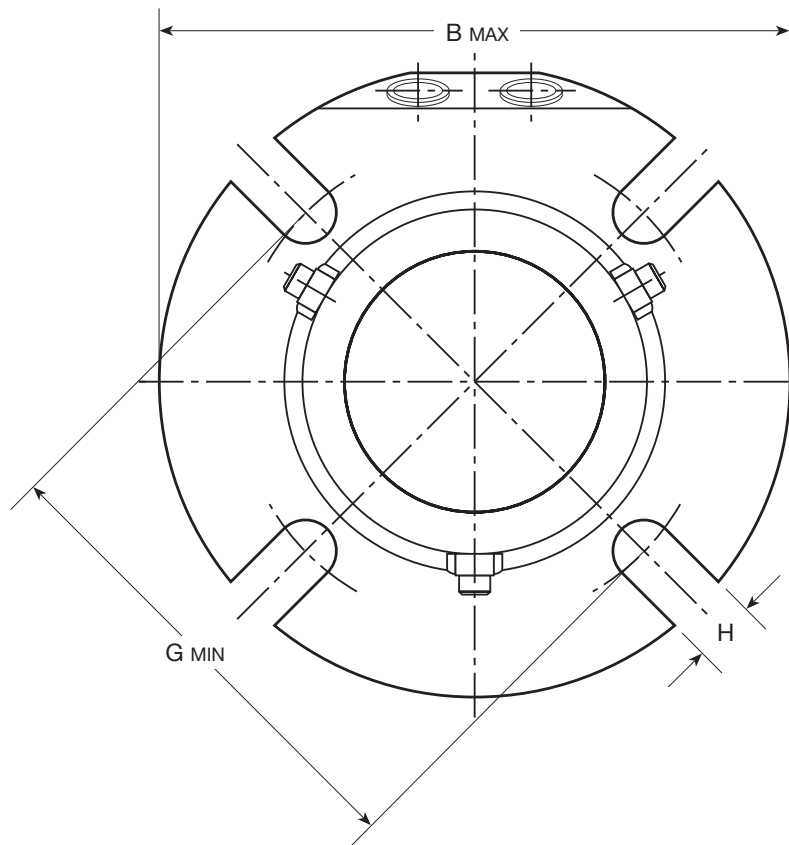
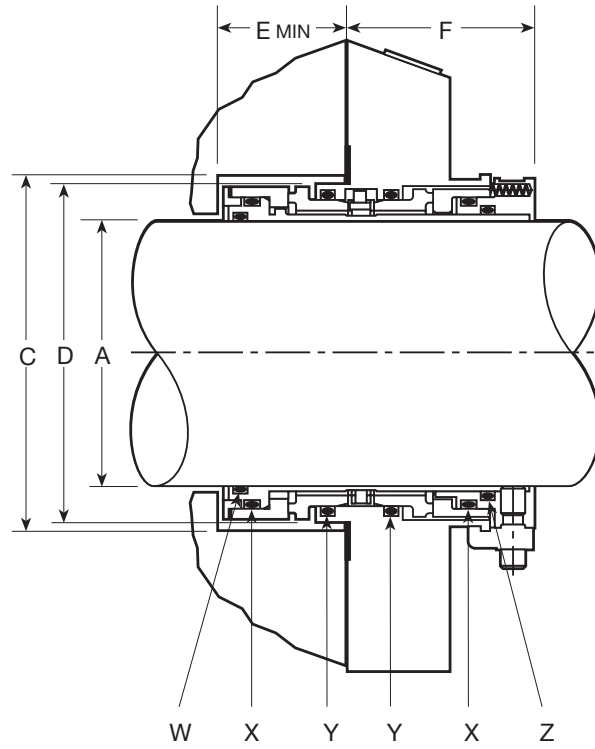
* Two bolts only

NOTE: Dimensional data is based on Standard Hex (not Heavy Hex)

KEY (drawings & charts)

- A – Shaft Size
- B – Maximum Gland Diameter
- C – Stuffing Box Inside Diameter
- D – Seal Diameter in Stuffing Box
- E – Minimum Stuffing Box Depth
- F – Outboard Seal Length
- G – Minimum Bolt Circle by Bolt Size
- H – Slot Width
- W – Shaft O-Ring
- X – Rotary Seal O-Ring (2)
- Y – Stationary Seal O-Ring (2)
- Z – Sleeve O-Ring

DIMENSIONAL DATA (DRAWINGS) – LARGE



255 DIMENSIONAL DATA (INCH) – LARGE

DASH NO.	A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	W	X	Y	Z
								1/2"	5/8"	3/4"					
21	2.625	6.45	3.63	3.69	3.60	1.64	2.52	5.02*	5.15*		0.68	231	234	236	233
22	2.750	7.71	3.75	4.19	3.72	1.64	2.52	5.42	5.55		0.68	232	235	237	234
23	2.875	7.83	3.88	4.32	3.85	1.64	2.52	5.50	5.63		0.68	233	236	238	235
24	3.000	7.94	4.00	4.44	3.97	1.64	2.52	5.65	5.78		0.68	234	237	239	236
25	3.125	7.99	4.13	4.57	4.10	1.64	2.52	5.80	5.93		0.68	235	238	240	237
26	3.250	8.19	4.25	4.69	4.22	1.64	2.52	5.93	6.06		0.68	236	239	241	238
27	3.375	8.31	4.38	4.82	4.35	1.64	2.52	6.00	6.13	6.26	0.81	237	240	242	239
28	3.500	8.44	4.50	4.94	4.47	1.64	2.52	6.16	6.29	6.42	0.81	238	241	243	240
29	3.625	8.49	4.63	5.07	4.60	1.64	2.52	6.29	6.42	6.55	0.81	239	242	244	241
30	3.750	8.72	4.75	5.19	4.72	1.64	2.52	6.36	6.49	6.62	0.81	240	243	245	242
31	3.875	8.84	4.88	5.32	4.85	1.64	2.52	6.50	6.63	6.76	0.81	241	244	246	243
32	4.000	8.96	5.00	5.44	4.97	1.64	2.52	6.64	6.77	6.90	0.81	242	245	247	244
33	4.125	8.99	5.13	5.57	5.10	1.64	2.52	6.76	6.89	7.02	0.81	243	246	248	245
34	4.250	8.99	5.25	5.69	5.22	1.64	2.52	6.89	7.02	7.15	0.81	244	247	249	246
35	4.375	9.34	5.38	5.82	5.35	1.64	2.52	7.01	7.14	7.27	0.81	245	248	250	247
36	4.500	9.49	5.50	5.94	5.47	1.64	2.52	7.16	7.29	7.42	0.81	246	249	251	248
37	4.625	9.49	5.63	6.07	5.60	1.64	2.52	7.26	7.39	7.52	0.81	247	250	252	249
38	4.750	10.49	5.75	6.19	5.72	1.64	2.52	7.38	7.51	7.64	0.81	248	251	253	250

255 DIMENSIONAL DATA (METRIC) – LARGE

A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	W	X	Y	Z
							12 mm	16 mm	20 mm					
65	164	92	93	91	42	64	127*	131*		17	231	234	236	232
70	196	95	105	95	42	64	137	141		17	232	235	237	234
75	202	102	112	101	42	64	143	147		17	234	237	239	235
80	203	105	115	104	42	64	147	151		17	235	238	240	237
85	211	111	121	110	42	64	152	156	160*	21	237	240	242	238
90	214	114	124	114	42	64	156	160	164	21	238	241	243	240
95	221	121	131	120	42	64	161	165	169	21	240	243	245	241
100	228	127	137	126	42	64	168	172	176	21	242	245	247	243
110	237	137	147	136	42	64	177	181	185	21	245	248	250	246
120	266	146	156	145	42	64	187	191	195	21	248	251	253	249

* Two bolts only

NOTE: Dimensional data is based on Standard Hex (not Heavy Hex)

KEY (drawings & charts)

A – Shaft Size
 B – Maximum Gland Diameter
 C – Stuffing Box Inside Diameter
 D – Seal Diameter in Stuffing Box
 E – Minimum Stuffing Box Depth
 F – Outboard Seal Length
 G – Minimum Bolt Circle by Bolt Size
 H – Slot Width
 W – Shaft O-Ring
 X – Rotary Seal O-Ring (2)
 Y – Stationary Seal O-Ring (2)
 Z – Sleeve O-Ring

255 DIMENSIONAL DATA (OVERSIZE)

DASH NO.	A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	W	X	Y	Z
								3/8"	1/2"	5/8"					
-9	1.125	4.49	2.63	2.94	2.62	1.48	1.98	3.77			0.44	122	126	128	124
11	1.375	5.40	2.82	2.99	2.80	1.48	1.98	4.02			0.44	126	130	132	128
14	1.750	6.64	3.51	3.74	3.48	1.30	2.16	5.21	5.34	5.46	0.75	132	136	138	134
15	1.875	5.99	3.57	3.80	3.54	1.30	2.16		4.94		0.63	134	138	140	136
17	2.125	6.99	3.89	4.24	3.87	1.30	2.16			5.89	0.75	138	142	144	140
20	2.500	7.77	4.51	4.74	4.49	1.30	2.16			6.70	0.75	144	148	150	146

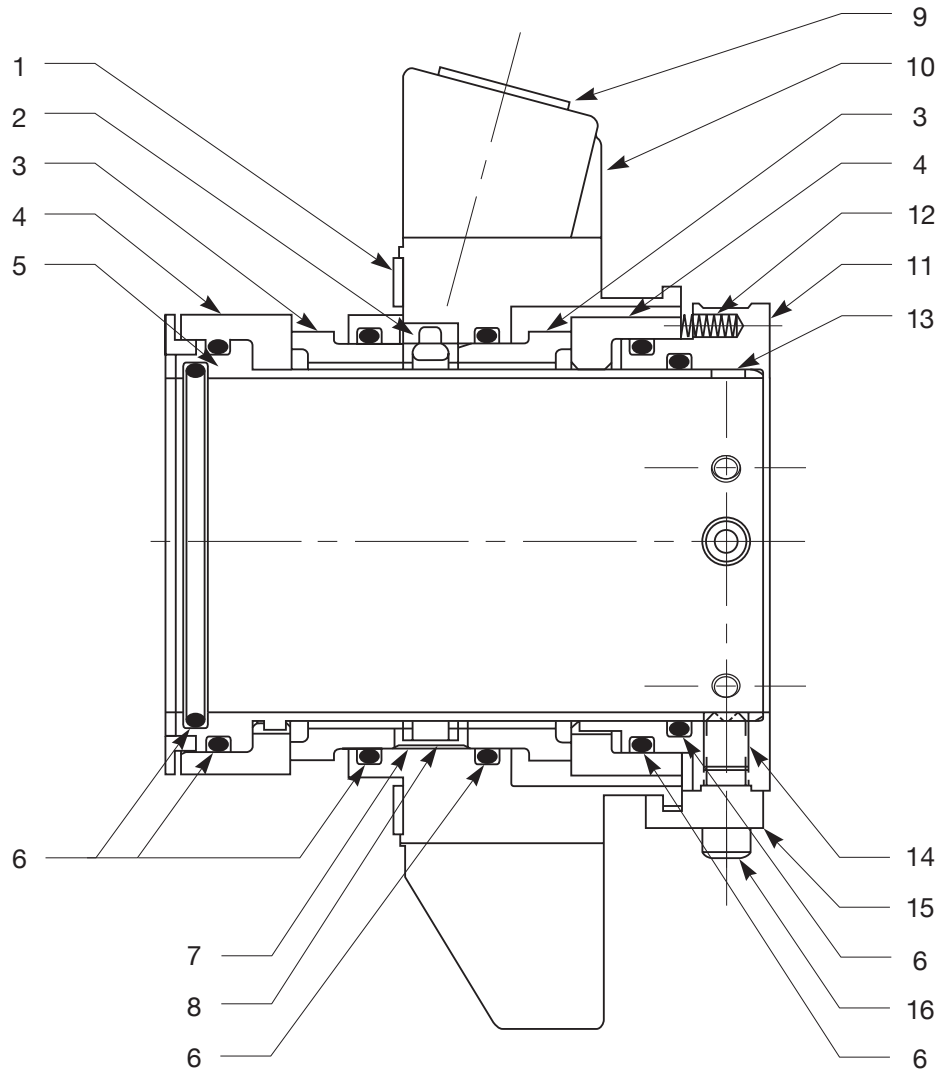
255 DIMENSIONAL DATA (ADAPTER VERSION)

DASH NO.	A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	G MIN			H	V	W	X	Y	Z
								3/8"	1/2"	5/8"						
8	1.000	4.12	1.75	1.81	1.73	1.18	2.35	2.81*	2.94*		0.57	133	120	124	126	121
9	1.125	4.12	1.88	1.94	1.85	1.18	2.35	2.95*	3.08*		0.57	135	122	126	128	124
10	1.250	4.12	2.00	2.06	1.98	1.18	2.35	3.08*	3.21*		0.57	137	124	128	130	126
11	1.375	4.37	2.13	2.31	2.10	1.18	2.35	3.21*	3.34*		0.57	139	126	130	132	128
12	1.500	4.50	2.25	2.44	2.23	1.18	2.35	3.33*	3.46*		0.57	141	128	132	134	130
13	1.625	5.00	2.38	2.56	2.35	1.18	2.35	3.45*	3.58*		0.56	143	130	134	136	132
14	1.750	5.50	2.50	2.81	2.48	1.18	2.35	3.66	3.79*		0.56	145	132	136	138	134
15	1.875	5.50	2.63	2.94	2.60	1.18	2.35	3.78	3.91*		0.56	147	134	138	140	136
16	2.000	5.50	2.75	3.19	2.73	1.18	2.35	4.03	4.16		0.56	149	136	140	142	138
17	2.125	6.01	2.88	3.44	2.85	1.18	2.35	4.29	4.42	4.55	0.68	150	138	142	144	140
18	2.250	6.01	3.00	3.56	2.98	1.18	2.35	4.41	4.54	4.67	0.68	151	140	144	146	142
19	2.375	6.01	3.13	3.59	3.10	1.18	2.35	4.44	4.57	4.70*	0.68	151	142	146	148	144
20	2.500	6.51	3.25	3.81	3.23	1.18	2.35	4.66	4.79	4.92	0.68	152	144	148	150	146

*Two bolts only

NOTE: Dimensional data is based on Standard Hex (not Heavy Hex)

PARTS IDENTIFICATION



KEY	
1 – Gasket	9 – Cap Plug
2 – Drive Lug	10 – Gland (Cast gland shown)
3 – Stationary Seal Ring	11 – Lock Ring
4 – Rotary Seal Ring	12 – Spring
5 – Sleeve	13 – 1/4 Dog Pt Set Screw
6 – O-Rings	14 – Cup Point Set Screw
7 – Drive Clip	15 – Centering Clip
8 – Flow Channel	16 – Socket Head Screw

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