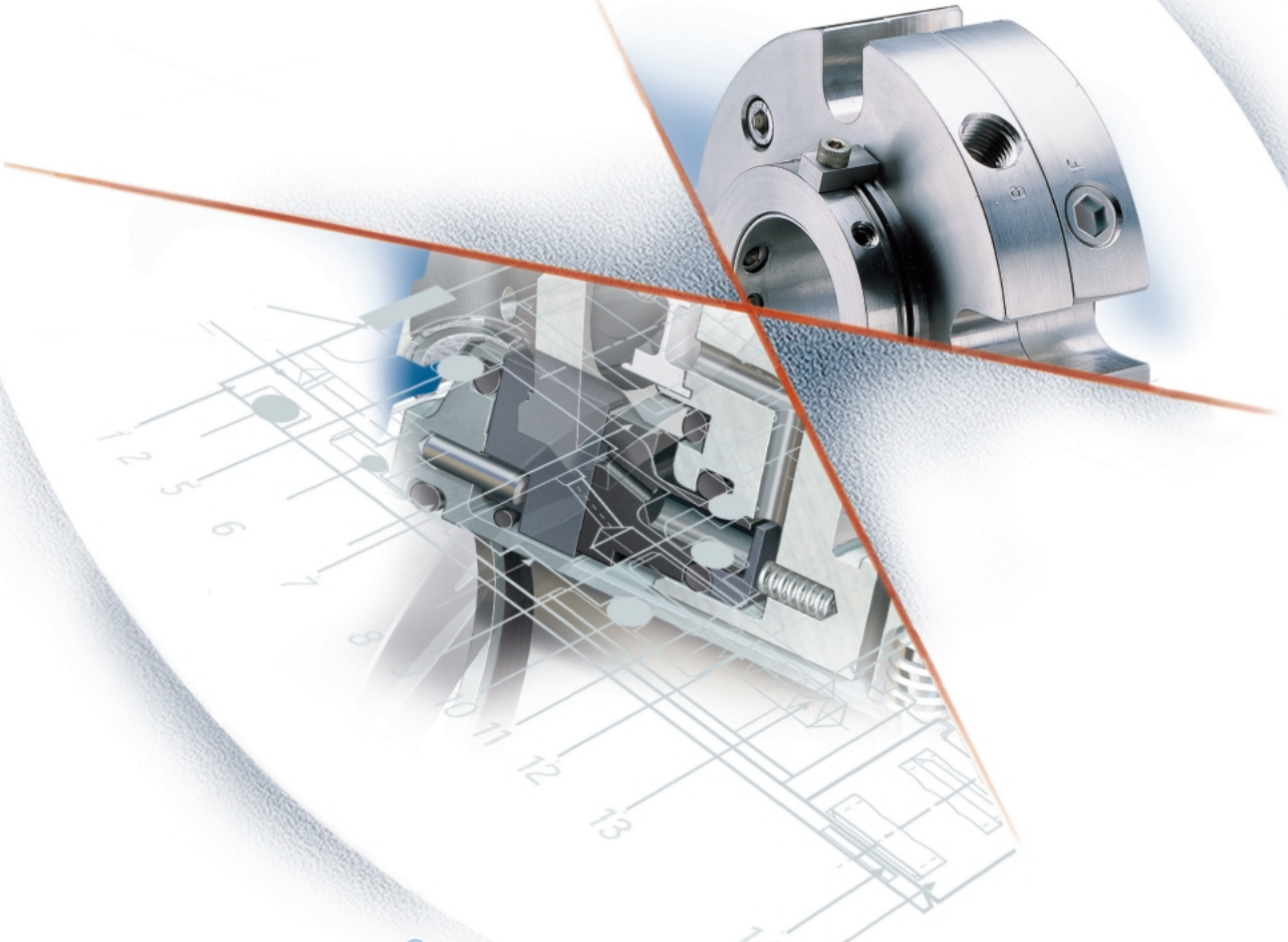
CHESTERTON®

ISO 9001
CERTIFIED

4400 TwinHybrid™ Gas Seal

- Fits most cross-section stuffing boxes
- Revolutionary In-Gland Control System
- No external pressure regulators needed
- Exclusive TwinHybrid™ design
- Responds to system upsets and pressure reversals
- Non-contacting, zero fugitive emission sealing
- Provides dual seal functionality with single seal simplicity
- Multiple patents granted



Introducing the plug & play gas seal for process pumps

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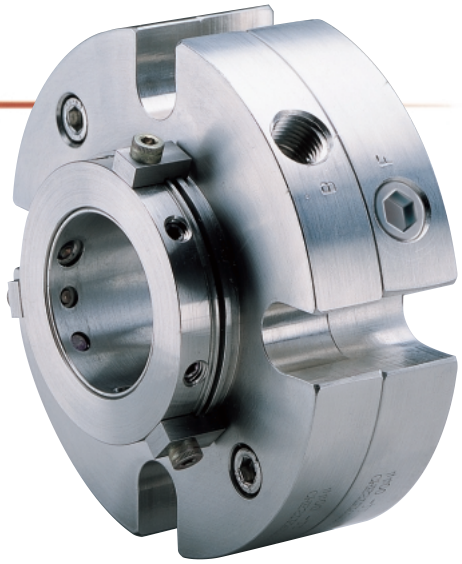
4400 TwinHybrid™ Gas Seal



The functionality of a dual seal with the simplicity of a single seal

The CHESTERTON® 4400 TwinHybrid™ Gas Seal takes gas seal technology out of the realm of the esoteric and into the practical world of process pumps. No pump modifications are needed. Easy to use and easy to maintain. No external gas regulators required. The 4400 provides all the benefits of gas seals, like zero emissions, long life and low power usage without the complexity or difficulties.

Fits standard process pumps

The 4400 Gas Seal has been designed from the ground up to work in existing process pumps. No stuffing box modifications are required. Requires less axial space than most cartridge single seals.

Uses common installation practices

No special operations training is needed to install and operate the 4400. Installs as easily as a cartridge single seal. Just pipe a dry, filtered gas supply to the gland and the seal is ready to run. Truly plug & play.

No expensive control panels are needed

Save thousands of dollars in gas regulation support equipment. The 4400 features an In-Gland Control System, an ingenious new barrier gas pressure regulating system. No external gas pressure regulators required. Monitoring needs are met with optional, low cost packages.

Secure sealing under pressure upset conditions

The 4400 In-Gland Control System automatically tracks process pressure and maintains optimum pressure differential between barrier gas and process pressures. This provides secure sealing even under upset conditions such as pressure surges or drops.

Reliable even under loss of barrier gas condition

The 4400 is uniquely tolerant of gas source interruptions. If barrier gas is interrupted, it makes a controlled transition to liquid lubricated, contact sealing. Normal gas lubricated operation is re-established when barrier gas supply is restored. No need for shutdown or costly rebuilding.

Seals on the O.D. of the faces

Product is sealed on the O.D. of the faces. Damaging, heavier particles are centrifuged away rather than forced into the seal interface. In addition to enhancing seal life, this also enables the 4400 to incorporate a port to reach the pumped product cavity, to be used in services where flushing or recirculation may be beneficial.

Exclusive TwinHybrid™ design

TwinHybrid™ design provides dual seal functionality with single seal simplicity. There are two seal interfaces within a single set of seal rings. This simple, robust and compact design provides greater intrinsic reliability than traditional gas seal designs. TwinHybrid design also enables the 4400 to utilize combined hydrostatic and hydrodynamic actions.

Hydrodynamic plus hydrostatic actions

Hydrodynamic action is desirable in gas seals because the gas film between the faces is self-regulating at normal operating speeds. The 4400 uses hydrostatic action as well, providing quick face separation at start-up and cushioned landings at shut down, for increased reliability and longer life. This hydrostatic force is created by direct injection of the barrier gas into the confined annular space at the TwinHybrid faces.

O-ring hang-up problems are defeated

A combination of features make the 4400 less susceptible to O-ring hang-up than common gas seals, for greater reliability. The seal is optimized for unimpeded, floating face movement within normal limits.

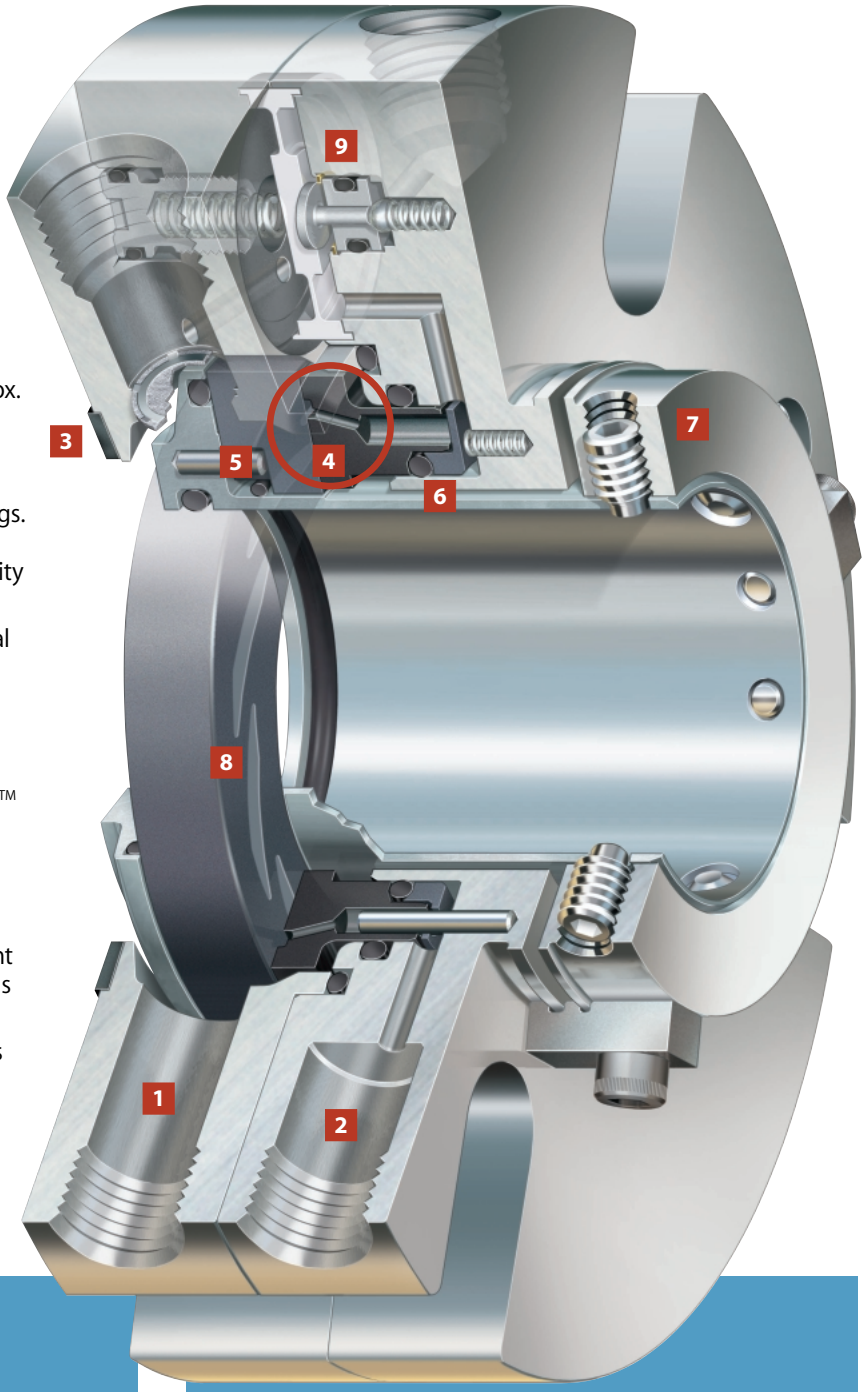
Field rebuildable

The 4400 cartridge design, with minimal parts and robust construction, can be rebuilt in the field if necessary.

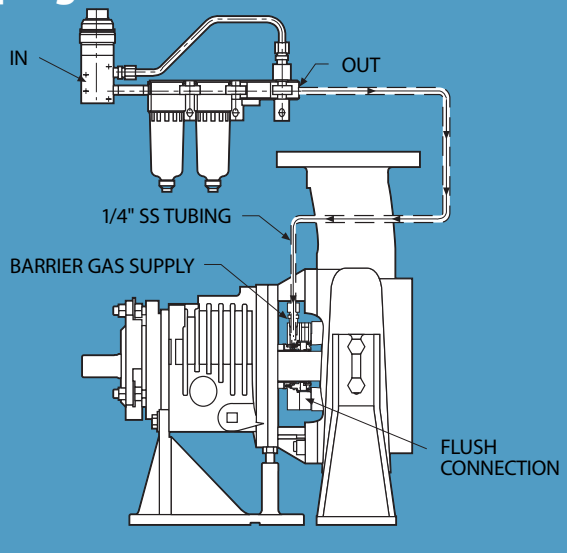
When you see CHESTERTON, you see the future of sealing.

Construction Details

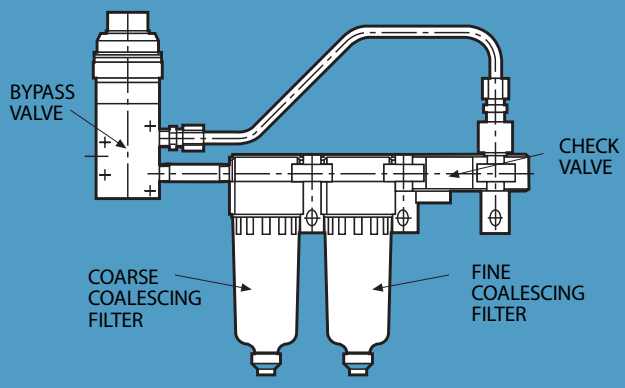
1. Convenient environmental control port allows maximum flexibility of application. Connect flush or recirculation lines when needed.
2. Gauge port allows monitoring of barrier gas pressure at the faces. Track differential pressure between barrier gas pressure and process pressure simply by attaching a pressure gauge to the seal gland.
3. No part of the seal protrudes into the stuffing box. This allows the seal to fit seal chambers of any size, even 5/16" (8 mm) cross-section and less.
4. Compact TwinHybrid™ face design effects two independent seal interfaces on only two seal rings. Hydrodynamic and hydrostatic face separation technologies are combined for increased reliability and longer life.
5. Rotary cushion o-ring provides proper rotary seal ring centering and support.
6. The combination of a special spring loading mechanism and micro-polished o-ring travel surface virtually eliminates o-ring hang-up.
7. Patented CHESTERTON Self-Centering Lock Ring™ assures stationary seal ring perpendicularity to the axis of shaft rotation, preventing rotary seal ring oscillation. This provides simple, reliable stationary seal operation.
8. Enclosed lift-off groove technology helps prevent contamination which can inhibit efficiency of this critical surface feature.
9. Exclusive In-Gland Control System tracks process pressure fluctuations with barrier gas pressure adjustments to assure proper gas pressure differential under system upset conditions.



Gas Barrier Piping Plan

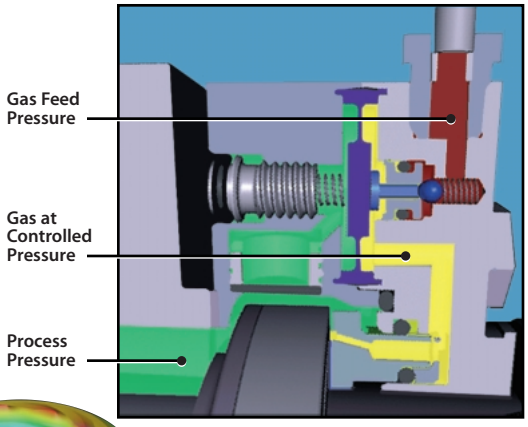


Optional, Low Cost Filtering Package



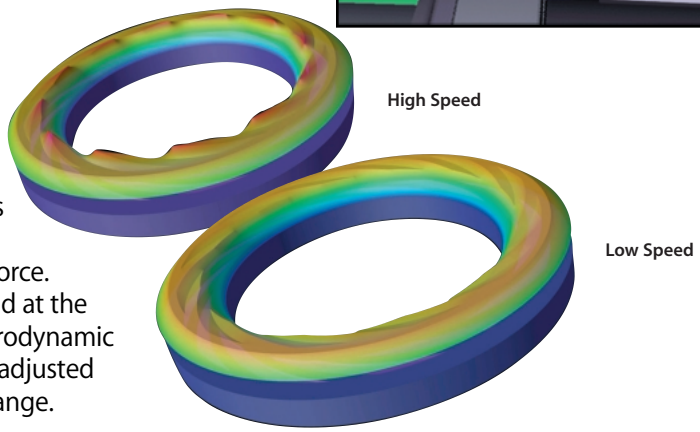
Revolutionary In-Gland Control System (IGCS)

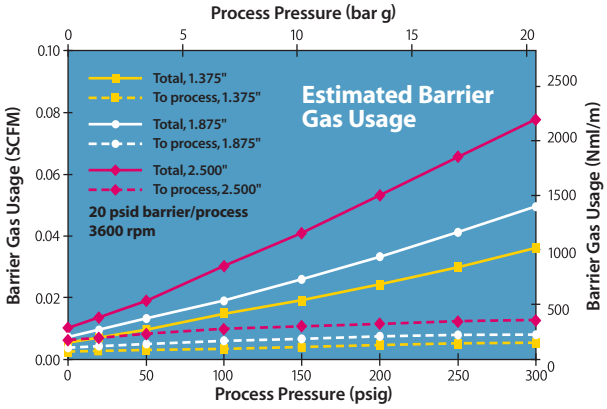
The CHESTERTON® In-Gland Control System performs the essential function of regulating barrier gas pressure. This is accomplished within the seal itself and requires no external pressure regulators. It dynamically regulates barrier gas pressure by tracking process pressure. This is superior for process sealing since the process pressure itself will rarely be constant. The IGCS reliably delivers gas at a preset differential above process pressure. Best of all, it is a simple mechanism. This translates to both low cost and high reliability.

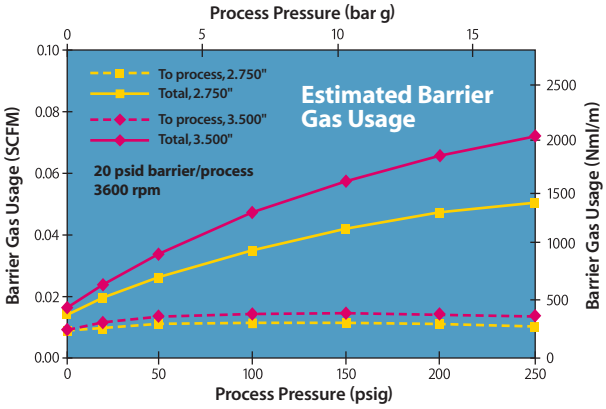


Adjustable lift-off speed

The computer-generated images at right shows gas pressure distribution across the rotary face element of the TwinHybrid™ design. Highest pressure at operating speeds is at the trailing edge of the lift-off profiles, showing the self-regulating hydrodynamic force. At low speed, highest gas pressures are found at the annular groove area. This enhances the hydrodynamic actions. The hydrostatic effect can be easily adjusted to expand the non-contacting operational range.





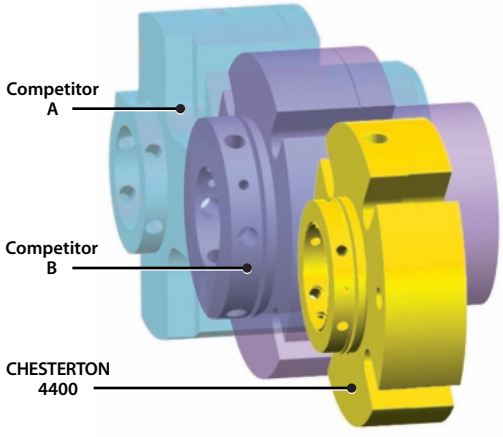


Low gas consumption

The 4400 provides zero fugitive emissions sealing with minimal barrier gas consumption. Due to the efficiencies of the TwinHybrid design and the exclusive In-Gland Control System, only a fraction of the overall gas consumed is introduced to process. The remainder of the gas introduced to the seal is transferred to atmosphere after performing the critical function of face separation.

Space saving envelope

The physical envelopes for the most commonly used gas seals in comparison to the extremely compact design of the CHESTERTON 4400 are shown at right. Besides the obvious fitting and installation benefits, this also makes gas sealing technology available to a wider range of applications since the economic hurdle of pump modification has been removed. The compact design is also an indication of the simplicity of the TwinHybrid design with its intrinsically high reliability.



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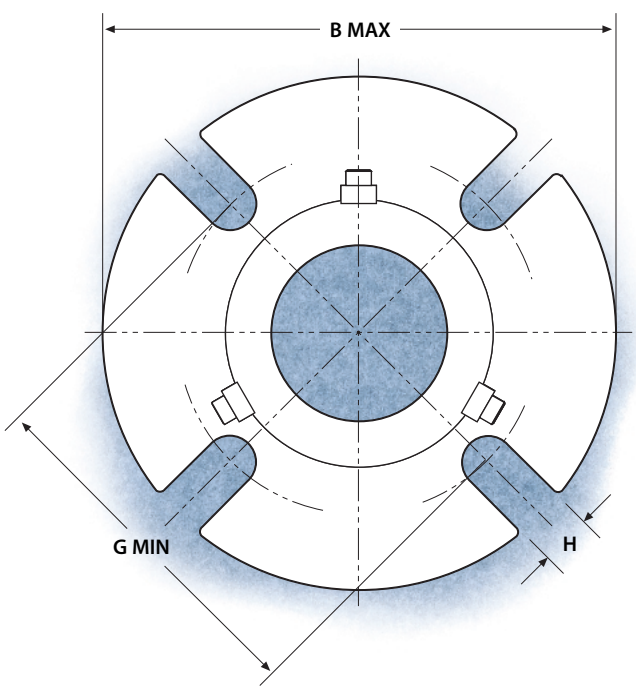
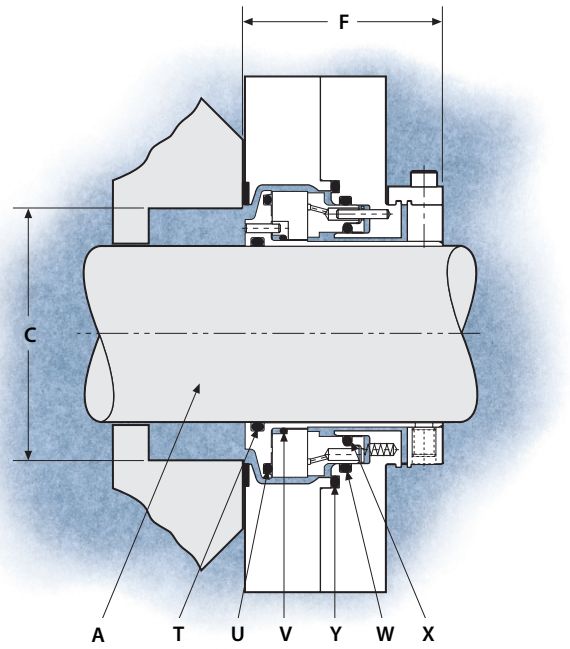
4400 – Dimensional Data (Inch)

SHAFT SIZE	GLAND OD	STUFFING BOX BORE	OB LENGTH	BOLT CIRCLE BY BOLT SIZE				SLOT WIDTH	SHAFT	ROTARY	CUSHION	STAT. OD	STAT. ID	GLAND ADPT
A	B	C	F	G MIN				H	T	U	V	W	X	Y
	MAX	MAX	MAX	3/8"	1/2"	5/8"	3/4"							
1.000	4.000	2.03	2.125	2.86				.44	-120	-134	-024	-134	-124	-139
1.125	4.000	2.06	2.125	2.99				.44	-122	-136	-026	-136	-126	-141
1.250	4.000	2.29	2.125	3.11				.44	-124	-138	-028	-138	-128	-143
1.375	4.360	2.45	2.125	3.24	3.36			.57	-126	-140	-029	-140	-130	-145
1.500	4.485	2.65	2.125	3.36	3.49			.57	-128	-142	-030	-142	-132	-147
1.625	4.985	2.71	2.125	3.49	3.61			.57	-130	-144	-031	-144	-134	-149
1.750	4.485	2.83	2.125	3.61	3.74			.57	-132	-146	-032	-146	-136	-150
1.875	5.485	2.96	2.125	3.74	3.86			.57	-134	-148	-033	-148	-138	-151
2.000	5.485	3.21	2.125	3.97	4.10			.57	-136	-150	-034	-150	-140	-152
2.125	5.985	3.46	2.125	4.22	4.34	4.47		.69	-138	-151	-035	-151	-142	-152
2.250	5.985	3.58	2.125	4.35	4.48	4.60		.69	-140	-151	-036	-152	-144	-153
2.375	5.985	3.61	2.125	4.41	4.53	4.66		.69	-142	-152	-037	-152	-146	-153
2.500	6.485	3.83	2.125	4.59	4.72	4.84		.69	-144	-152	-038	-153	-148	-154
2.625	6.445	4.06	2.227	4.85	4.98	5.10		.69	-146	-153	-040	-154	-151	-155
1.375 OS	5.385	3.27	2.125	3.98	4.11			.44	-126	-140	-029	-140	-130	-150
1.750 OS	6.635	3.90	2.125	5.36	5.48	5.61		.57	-132	-146	-032	-146	-136	-153
1.875 OS	5.985	3.96	2.125	4.86	4.98	5.11		.57	-134	-148	-033	-148	-138	-153
2.125 OS	6.985	4.40	2.125	5.74	5.86	5.99		.69	-138	-151	-035	-151	-142	-154
2.500 OS	7.76	5.40	2.125	6.49	6.61	6.74		.69	-144	-152	-038	-153	-148	-157
2.625 OS	6.98	4.92	2.227	5.73	5.86	5.98		.69	-146	-153	-040	-154	-151	-157
2.750	7.71	4.46	2.500		5.37	5.50		.69	-232	-242	-151	-242	-235	-246
2.875	7.83	4.59	2.500		5.47	5.60		.69	-233	-243	-151	-243	-236	-247
3.000	7.94	4.71	2.500		5.60	5.73		.69	-234	-244	-152	-244	-237	-248
3.125	7.99	4.84	2.500		5.75	5.87		.69	-235	-245	-152	-245	-238	-249
3.250	8.19	4.96	2.500		5.87	6.01		.69	-236	-246	-153	-246	-239	-250
3.375	8.31	5.09	2.500		5.97	6.10	6.22	.81	-237	-247	-153	-247	-240	-251
3.500	8.44	5.21	2.500		6.14	6.25	6.38	.81	-238	-248	-154	-248	-241	-252
3.625	8.49	5.34	2.500		6.27	6.38	6.52	.81	-239	-249	-154	-249	-242	-253

4400 – Dimensional Data (Metric)

SHAFT SIZE	GLAND OD	STUFFING BOX BORE	OB LENGTH	BOLT CIRCLE BY BOLT SIZE				SLOT WIDTH	SHAFT	ROTARY	CUSHION	STAT. OD	STAT. ID	GLAND ADPT
A	B	C	F	G MIN				H	T	U	V	W	X	Y
	MAX	MAX	MAX	10 mm	12 mm	16 mm	20 mm							
25	102	52	54	73				11	-120	-134	-024	-134	-124	-139
28	102	52	54	76				11	-122	-136	-026	-136	-126	-141
30	102	58	54	80				11	-123	-138	-028	-138	-128	-143
32	111	62	54	83	85			14	-124	-140	-029	-140	-130	-145
35	111	62	54	83	85			14	-126	-140	-029	-140	-130	-145
38	114	67	54	86	88			14	-128	-142	-030	-142	-132	-147
40	127	69	54	89	91			14	-129	-144	-031	-144	-134	-149
43	139	72	54	92	94			14	-131	-146	-032	-146	-136	-150
45	139	75	54	95	97			14	-133	-148	-033	-148	-138	-151
48	139	82	54	101	103			14	-134	-150	-034	-150	-140	-152
50	139	82	54	101	103			14	-136	-150	-034	-150	-140	-152
55	152	91	54	111	113	117		18	-139	-151	-036	-152	-144	-153
60	152	92	54	112	114	118		18	-142	-152	-037	-152	-146	-153
65	164	103	57	123	125	129		18	-145	-153	-040	-154	-151	-155
70	196	113	64		135	139		18	-232	-242	-151	-242	-235	-246
75	202	119	64		141	145		18	-234	-243	-152	-243	-236	-247
80	208	125	64		149	152		18	-236	-244	-153	-244	-237	-248
85	211	129	64		151	155	159	21	-237	-245	-153	-245	-238	-249
90	216	135	64		158	162	166	21	-239	-246	-154	-246	-239	-250





STANDARD MATERIALS†

Faces:
- Carbon Stationary Seal Ring
- Sintered Silicon Carbide Rotary Seal Ring

Elastomers:
- Fluorocarbon, EPR, Chemraz*, Kalrez**, AFLAS***

Metal Parts:
- 316SS body
- Alloy C-276 springs and drive pins
- Hardened set screws standard

*Greene, Tweed & Co. Registered Trademark.
**DuPont Registered Trademark.
***Asahi Glass Co. Registered Trademark.

OPERATING LIMITS††

Speed Limits:
- 5000 fpm (25 m/s) Maximum
- 250 fpm (1.3 m/s) Minimum

Temperature Limits:
- 500°F (260°C) Max (elastomers)

Pressure Limits:
- Vacuum to 300 psig (20 bar g) 1.000" (25 mm) through 2.625" (65 mm)
- Vacuum to 250 psig (17 bar g) 2.750" (70 mm) through 3.625" (90 mm)

†Other materials available through CHESTERTON Application Engineering.
††Consult CHESTERTON Application Engineering for applications beyond these limits.

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