CGT™ RINGS

CAPPED GT RING SEALING SYSTEM

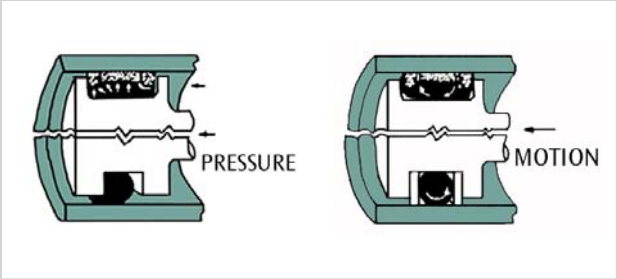
The Greene, Tweed Capped G-T™ Ring is a double-acting, high-pressure piston seal that combines the space-saving and non-extrusion features of more conventional compression-type seals with the low-friction, long-life characteristics of O-ring energized TFE cap-type seals.

A positive seal that offers a high degree of sealability in both high and low pressure environments, the CGT™ Ring is designed to handle temperature extremes, a wide variety of fluid media and larger than normal clearances—yet requires a short axial length gland, and assembles and installs easily in the shop or in the field. Further, the CGT Ring is especially suited for long-stroke applications due to its low sliding friction and unique geometry which prevents roll and spiral.

ELASTOMERIC SEAL PROBLEMS

In designing, with many elastomeric compression-type seals, engineers have to deal with inherently higher friction as well as roll, spiral, nibble and extrusion failure problems which severely limit the performance envelope (Figures 1 and 2). The CGT Ring solves these problems, its geometry providing the high degree of stability necessary to overcome roll and spiral (especially useful in long-stroke applications) and its radially-energized backup rings preventing the "T" shaped elastomeric sealing element or TFE cap from wedging into the diametral clearance or pinching off under motion or pressure (Figure 2).

And, because the CGT Ring's TFE cap is radially loaded in direct proportion to applied pressure levels, frictional losses and wear are reduced to an absolute minimum—while full sealability and prolonged seal life are maintained (Figure 7).



Figures 1 and 2

Installed O-ring energized sealing element (no system pressure).

Figure 3

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PISTON DRIFT, PREMATURE FAILURE

Unlike conventional cap-type seals, the CGT Ring virtually eliminates piston drift. Piston drift is caused by low pressure leakage past the cap. Because conventional caps (Figure 3) are not adequately energized at low pressures, leakage can occur—ultimately resulting in piston drift. The CGT Ring's cap is adequately loaded both in the static mode through high energizer squeeze, and in the dynamic mode through the proportional axial-to-radial conversion of system pressure levels. Thus, a fully positive seal is maintained throughout the pressure range. And, the CGT Ring's substantial, uniform cap permits a high degree of evenly distributed radial load, virtually eliminating the possibility of excessive wear and premature failure found in conventional cap-type seals (Figures 4 and 5).

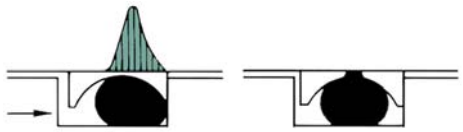
OPTIMUM ELEMENT DESIGN

Unlike conventional compression-type seals and O-ring energized TFE cap seals, each of the CGT Ring's elements can be designed to perform a specific task by optimizing desired properties, dramatically reducing materials compromises that would normally be made. The "T"-shaped elastomeric energizer must transform axial pressure to radial loading, and thus is compounded for low compression set and high modulus. The low friction sealing element (cap) is designed for sealability and optimal wear resistance, resulting in long operational life—in comparison with conventional caps the design of which must be compromised so that the combination of extrusion resistance, wear resistance and sealability are adequately provided for. Finally, the CGT Ring's anti-extrusion rings have been designed based on the use of Greene, Tweed's high shear strength NWR (wear-resistant nylon) material to provide stability and superior extrusion protection.

Figures 7 and 8 illustrate the CGT Ring's evenly distributed radial loading. An improvement over conventional cap seals, this uniform distribution prevents localized cap wear (Figures 4 and 5) and results in substantially increased service life.

CLEARANCE LIMITS

Wider clearances can be used when designing with the CGT Ring. This allows for the use of wear rings which eliminate the possibility of piston and bore damage due to metal-to-metal contact. Please consult Non-Metallic Wear Rings and Bearing Materials Bulletin for design information on Greene, Tweed's #911 wear rings.



Sealing force distribution with system pressure applied.

O-ring energizer creates high peak force concentration.

Peak force concentration causes localized wear, resulting in eventual fracture of "cap."

Figures 4 and 5

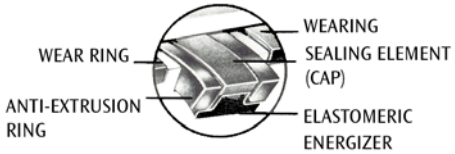
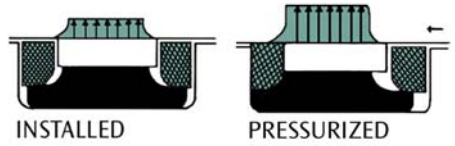


Figure 6



Figures 7 and 8

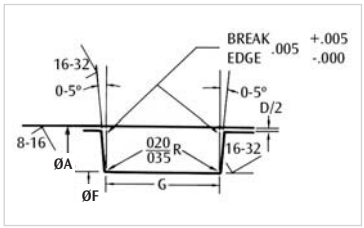
TABLE 1 CGT RING DIMENSIONAL INFORMATION INCHES

GT Dash Number	Nominal Seal CX	Bore Diameter (ØA)	Tolerance	Gland Diameter (ØF)	Tolerance	Gland Length (G) +0.010 -0.000	Piston Bore Clearance (D) Without Wear Ring max.	Piston Bore Clearance (D) With Wear Ring min./max
312		1.000		.627				
313		1.063		.690				
314		1.125		.752				
315		1.188		.815				
316		1.250		.877				
317		1.313		.940				
318		1.375		1.002				
319		1.438		1.065				
320		1.500		1.127			0.006	
321		1.563		1.190		0.424		0.024/0.030
322	3/16 in.	1.625		1.252				
323	(0.210)	1.688		1.315				
324		1.750		1.377				
325		1.875		1.502				
326		2.000		1.627				
327		2.125		1.752				
328		2.250		1.877				
329		2.375		2.002	+0.000			
330		2.500	+0.002	2.127	-0.002			
331		2.625	-0.000	2.252				
332		2.750		2.377				
333		2.875		2.502				
409		3.000		2.522				
410		3.125		2.647				
411		3.250		2.772			0.007	
412		3.375		2.897				
413		3.500		3.022				
414		3.625		3.147				
415		3.750		3.272		0.579		0.024/0.038
416	1/4 in.	3.875		3.397				
417	(0.275)	4.000		3.522				
418		4.125		3.647				
419		4.250		3.772				
420		4.375		3.897				
421		4.500		4.022				
422		4.625		4.147				
423		4.750		4.272			0.008	
424		4.875		4.397				
678		5.001		4.274				
679		5.126		4.399				
680	3/8 in.	5.251	+0.003	4.524	+0.000	0.750	0.009	.024/.045
681	(0.405)	5.376	-0.000	4.649	-0.003			
682		5.501		4.774				
683		5.626		4.899				
684		5.751		5.024				

NOTE: Testing was done 30 Days @ 70ºF in 19 Chemicals.

GLAND DETAIL

When designing with the CGT™ Ring, please refer to this drawing and gland dimensions listed in Table 1.



SPACE REDUCTION

The CGT Ring is ideal for use on components where axial space is at a premium. When replacing single or multiple lip seals, a substantial reduction in piston length can be achieved (even with the addition of wear rings). And, this reduction does not come at the expense of clearance limits or performance. Please refer to Table 1 for dimensional information.

TABLE 1 CGT RING DIMENSIONAL INFORMATION INCHES (CONTINUED)

GT Dash Number	Nominal Seal CX	Bore Diameter (ØA)	Tolerance	Gland Diameter (ØF)	Tolerance	Gland Length (G) +0.010 -0.000	Piston Bore Clearance (D) Without Wear Ring max.	Piston Bore Clearance (D) With Wear Ring min./max
685		5.876		5.149			0.009	
686		6.001		5.274				
687		6.126		5.399	+0.000			
688		6.251	+0.003	5.524	-0.003			
689	6.376	6.376	-0.000	5.649				
690		6.501		5.774				
691		6.751		6.024				
692		7.001		6.274				
693		7.251		6.524		0.750		
694		7.501		6.774				0.61/1.14
695	3/8 in.	7.751		7.024				
696	(0.405)	8.001		7.274				
697		8.251		7.524				
698		8.501		7.774				
699		8.751		8.024				
700		9.001		8.274				
702		9.501		8.775				
704		10.001		9.275				
706		10.501		9.775				
708		11.001		10.275				
710		11.501		10.775			0.010	
712		12.001		11.275	+0.000			
714		12.501	+0.004	11.775	-0.004			
716		13.001	-0.000	12.275				
718		13.501		12.775				
720		14.001		13.275				
722		14.501		13.775				
724		15.001		14.275				
726		15.501		14.775				
728		16.001		15.275				

**Zeros shown in these positions indicate standard size or materials. Any other number indicates non-standard, and is only assigned by GT Engineering.*

SYSTEM CONTAMINATION

Where grit may become trapped between seal and dynamic surface in conventional systems, the CGT™ Ring's anti-extrusion rings serve as bore wipers, pre-cleaning the seal path and significantly reducing contamination-caused wear.

SURFACE FINISHES

Recommended TFE caps – 4 to 16 RMS; elastomeric (hydraulic fluids) – 8 to 16 RMS; elastomeric gasses) – 8 to 12 RMS; static – 32 RMS max.

PART NUMBERING SYSTEM

The CGT Ring part number is designed to express the composition and size of the seal. Each sealing element material, energizer compound and anti-extrusion ring material is designated using numbers found in Table 1. Numbers for non-standard sizes will be assigned by Greene, Tweed Engineering.

Part Numbering Examples—Piston-Type ACGT

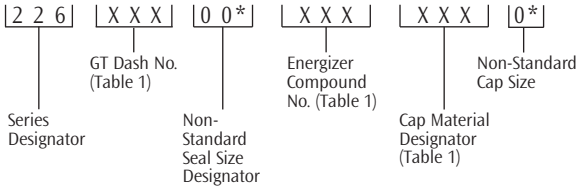


TABLE 1 CGT RING DIMENSIONAL INFORMATION METRIC

GT Dash Number	Nominal Seal CX	Bore Diameter (ØA)	Tolerance	Gland Diameter (ØF)	Tolerance	Gland Length (G) +0.254 -0.000	Piston Bore Clearance (D) Without Wear Ring max.	Piston Bore Clearance (D) With Wear Ring min./max
312		25.40		15.93				
313		27.00		17.53				
314		28.57		19.11				
315		30.17		20.70				
316		31.75		22.28				
317		33.35		23.88				
318		34.92		25.45				
319		36.52		27.05				
320		38.10		28.63			0.15	
321		39.70		30.23		10.79		.061/.762
322		41.27		31.80				
323		42.87		33.40				
324	4.76 mm	44.45		34.98				
325		47.62		38.15				
326		50.80		41.33				
327		53.97		44.50				
328		57.15		47.68				
329		60.32		50.85	+0.000			
330		63.50	+0.051	54.03	-0.051			
331		66.67	-0.000	57.20				
332		69.85		60.38				
333		73.02		63.55				
409		76.20		64.06				
410		79.37		67.23				
411		82.55		70.41			0.18	
412		85.72		73.58				
413		88.90		76.76				
414		92.07		79.93				
415		95.25		3.272		14.71		0.061/0.96
416	6.35 mm	98.42		86.28				
417		101.60		89.46				
418		104.77		92.63				
419		107.95		95.81				
420		111.12		98.98				
421		114.30		102.16				
422		117.47		105.33				
423		120.65		108.51			0.20	
424		123.82		111.68				
678		127.02		108.56				
679		130.20		111.73				
680	9.525	133.37	+0.003	114.91	+0.000	0.750	0.23	0.024/0.045
681		136.55	-0.076	118.08	-0.076			
682		139.72		121.26				
683		142.90		124.43				
684		146.07		127.61				

NOTE: Testing was done 30 Days @ 21ºC in 19 Chemicals

PART NUMBERING SYSTEM

The CGT Ring part number is designed to express the composition and size of the seal. Each sealing element material, energizer compound and anti-extrusion ring material is designated using numbers found in Table 1. Numbers for non-standard sizes will be assigned by Greene, Tweed Engineering.

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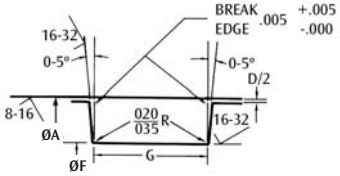
TABLE 1 CGT RING DIMENSIONAL INFORMATION METRIC (CONTINUED)

GT Dash Number	Nominal Seal CX	Bore Diameter (ØA)	Tolerance	Gland Diameter (ØF)	Tolerance	Gland Length (G) +0.254 -0.000	Piston Bore Clearance (D) Without Wear Ring max.	Piston Bore Clearance (D) With Wear Ring min./max
685		149.25		130.78			.23	
686		152.42		133.96				
687		155.60		137.13	+0.000			
688		158.77		140.31	-0.076			
689		160.68	+0.076	143.48				
690		165.12	-0.000	146.66				
691		171.47		153.01				
692		177.82		159.36				
693		184.17		165.71				
694		190.52		172.06				0.61/1.14
695	9.525 mm	196.87		178.41				
696		203.22		184.76				
697		209.57		191.11				
698		215.92		197.46				
699		222.27		203.81				
700		228.62		210.16				
702		241.32		222.88				
704		254.02		235.58				
706		266.72		248.28				
708		279.42		260.98				
710		292.12		273.68			0.254	
712		304.82		286.38	+0.000			
714		317.52	+0.102	299.08	-0.010			
716		330.22	-0.000	311.78				
718		342.92		324.48				
720		355.62		337.18				
722		368.32		349.88				
724		381.02		362.58				
726		393.72		375.28				
728		406.42		387.98				

**Zeros shown in these positions indicate standard size or materials. Any other number indicates non-standard, and is only assigned by GT Engineering.*

GLAND DETAIL



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