ACT® RING

ADVANCED CONCEPT T-RING SEALS

Using FEA (Finite Element Analysis) and expertise in seal design, Greene, Tweed has taken the concept behind our renowned AGT® seal, optimized the design of the elastomer and anti-extrusion rings, and developed an Advanced Concept T-ring (ACT).

The ACT® ring is designed with converging sides in order to promote lubrication for reduced friction and wear, with an apex for force concentration under low-pressure conditions to optimize sealing. The design also enhances oil film passage upon the retract stroke for lubrication of the apex of the elastomer. Our in-house tests demonstrate service life increases by as much as 30 percent over some alternative seal designs.

ACT Piston Ring

ACT Rod Ring

ACT Ring with Wedge Adapter

FEATURES & BENEFITS

- Improved stability in gland, resulting in reduced stress in the elastomer for enhanced sealing performance
- Specially tapered elastomer side wall design reduces friction and promotes efficient seal lubrication ultimately leading to longer seal life
- Hydromechanically activated, anti-extrusion rings for enhanced extrusion protection at all sealing pressures
- The wide static footprint of the “T” geometry cross-section eliminates spiral failure
- Retrofits existing MIL-G-5514/AS4716 and AS4832 glands
- Metric series available for metric-sized designs

APPLICATIONS

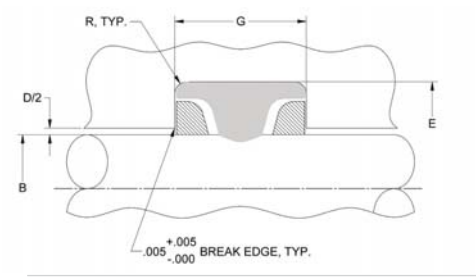
- Accumulators and reservoirs
- Actuators (e.g., door actuators)
- Flight controls (e.g., spoilers, rudders, aileron, etc.)
- Landing gear actuator subsystems (e.g., end caps and static seals, etc.)
- Landing gear spare dynamic seals
- Landing gear dynamic seals

ACT® CONFIGURATIONS

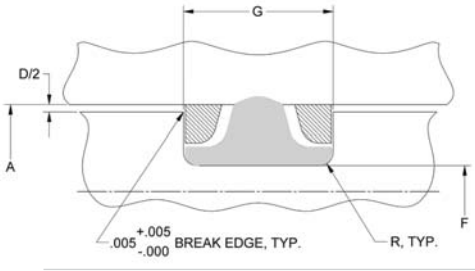
For pressures up to 4,000 psi (276 bar), we recommend standard diametrical clearances per MIL-G-5514/AS4716, providing proper gland lengths and materials are selected.

Gland Dimensions

Rod

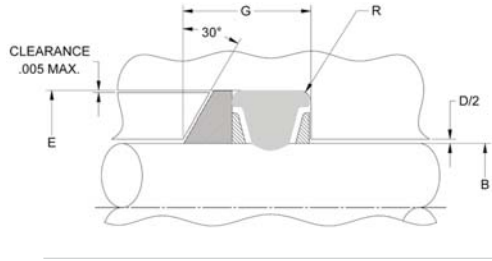


Piston



Note: Refer to the dimensional tables for more information.

ACT with Wedge Adapter



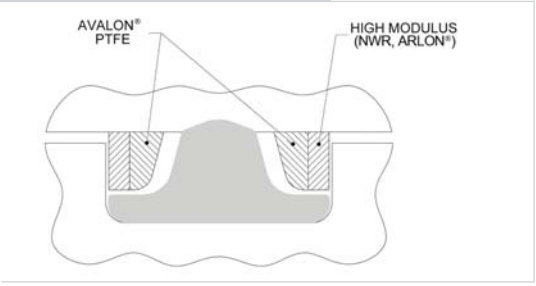
Note: Custom configurations are available to suit BACS11AA. Contact GT engineering for more information.

ACT RING OPTIONS

"Staged" and "Split-Lock" Anti-Extrusion Ring Set

It is possible within wide-base gland arrangements to stage two different anti-extrusion ring materials on either side of the elastomeric sealing stem in order to accommodate high acceleration and pressure rates. The "softer" in-board PTFE material will protect the elastomer from abrasion and nibbling while the higher modulus out-board anti-extrusion ring performs the required anti-extrusion function.

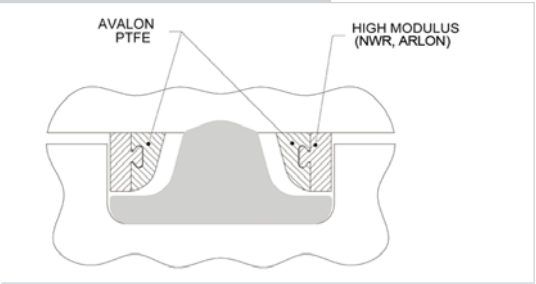
Staged ACT Ring



Staged rings can also be provided with our patented "split-lock" design. Each independent scarf-cut ring is interlocked along the radial face to simulate a one-piece continuous or endless anti-extrusion ring. This allows for ease of assembly. The ring halves are dovetailed together, allowing the ring set to expand—"open"—for easier assembly than typical piston-type glands. This produces a stable ring within the gland that will not dislodge and become sheared during a blind assembly or with rotational motion typical of threaded end caps. Locked rings are ideal for field repair of landing gear shock struts.

Note: For rod-type assemblies the gland must be open ended, permitting the locked ring sets to be placed down in the gland.

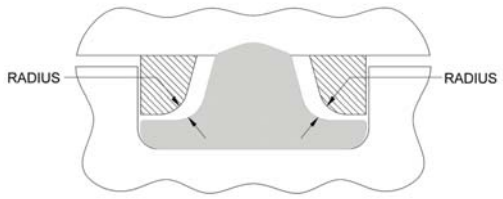
Split-Lock ACT Ring



Radiused "T" Design

ACT® ring assemblies are designed with a transition radius between the sealing stem and the extending flanges of the elastomer. The mating corner radius in the anti-extrusion completes this unique feature, thus reducing the tensile stresses within this region and prolonging the life of the seal.

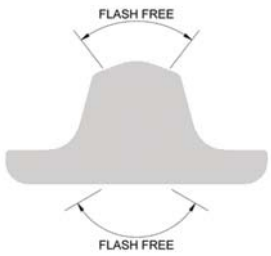
Radiused "T" Design Cross-section



"Flash Free" Option

Typical O-ring and generic "T" rings are molded with a parting line around the critical ID and OD sealing surfaces. This inherent interruption on the contact surface can lead to bypass seepage when sealing low molecular weight gases and liquids in low-pressure accumulator/reservoir applications. To combat this Greene, Tweed offers a flash free ACT ring.

"Flash Free" Option



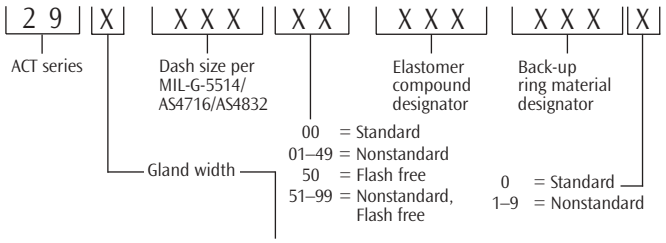
**Note: The ID of the flash free option cannot be less than 0.422 in.*

Metric Designs

The ACT metric ring features the same design characteristics and expected performance as the standard ACT ring, but it was developed for glands designed to metric standards. The dimension tables for the ACT metric ring piston and rod glands are found in a table on pages 6 – 9.

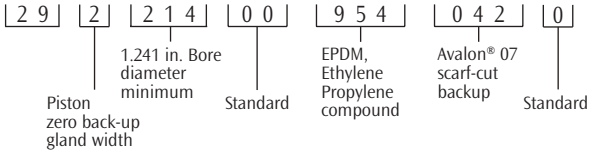
ACT® PART NUMBERING SYSTEM

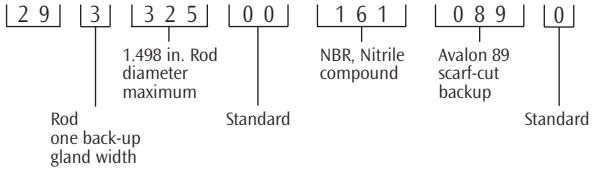
The part numbering system requires the use of the material designator tables found on the next page. For nonstandard designs contact GT engineering.



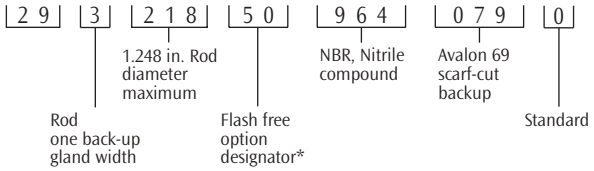
ROD	PISTON	GLAND WIDTH
1	2	Zero back-up gland width
3	4	One back-up gland width
5	6	Two back-up gland width

General Part Numbering Examples





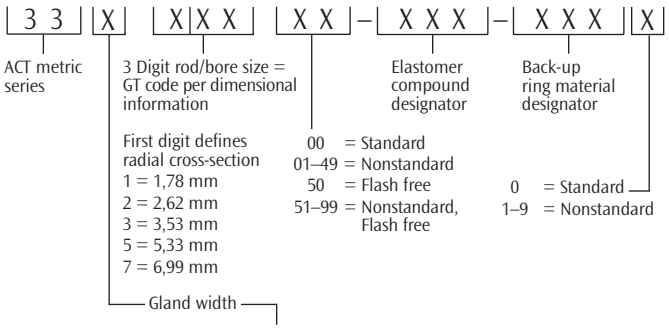
Flash Free Part Numbering Examples



**Note: The ID of the flash free option cannot be less than 0.422 in.*

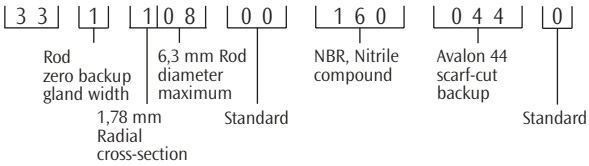
ACT PART NUMBERING SYSTEM (METRIC SEALS)

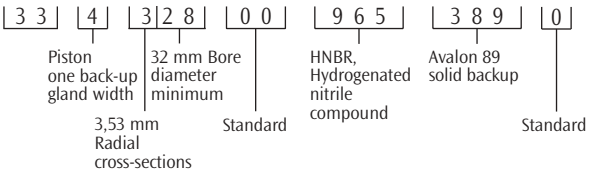
The part numbering system requires the use of the material designator tables found on the next page. For nonstandard designs contact GT engineering.



ROD	PISTON	GLAND WIDTH
1	2	Zero back-up gland width
3	4	One back-up gland width
5	6	Two back-up gland width

Part Numbering Examples





Contact your local Greene, Tweed representative for specific recommendations to suit higher performance requirements.

Material Designator Tables

CODE	ELASTOMER COMPOUND
160	NBR, Nitrile
161	NBR, Nitrile
409	FVMQ, Fluorosilicone
410	FVMQ, Fluorosilicone
731	FKM, Fluorocarbon
772	FKM, Fluorocarbon
952	EPM, Ethylene Propylene
954	EPDM, Ethylene Propylene
964	NBR, Nitrile
965	HNBR, Hydrogenated Nitrile
987	NBR, Nitrile

BACK-UP MATERIAL		
SPLIT CODE (SCARF-CUT)	SOLID CODE	MATERIAL
001	301	Avalon® 01
042	043	Avalon 07
016	019	Avalon 09
044	344	Avalon 44
057	357	Avalon 57
079	379	Avalon 69
089	389	Avalon 89
006	018	NWR
045	046	Arlon® 1000
038	039	Arlon 1330
035	036	Arlon 1555
STAGED CODE		MATERIAL
070		Avalon 09/Arlon 1330
504		Avalon 01/NWR
SPLIT-LOCK CODE		MATERIAL
551		Avalon 56/Arlon 1305

See GT Surface Finish guidelines.

ROD DIMENSIONAL INFORMATION (METRIC)

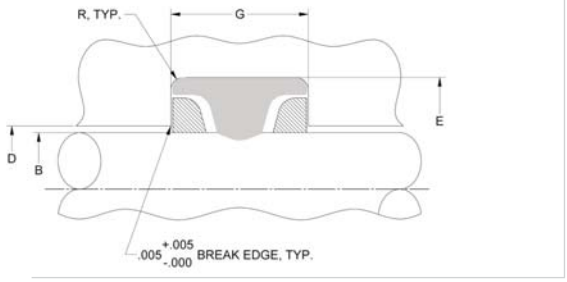
GREENE, TWEED CODE	B		E		D		G (WIDTH) (+0.25/–0)			R (RADII)
	ROD OD (MM)	TOLERANCE f8 (MICRONS)	GLAND OD (MM)	TOLERANCE H8 (MICRONS)	ROD CLEARANCE DIA. (MM)	TOLERANCE H8 (MICRONS)	NARROW ZERO (MM)	INTER ONE (MM)	WIDE TWO (MM)	(MM)
105	4	-10 / -28	6.97	+22 / -0	4	+18 / -0	2.39*	3.78	5.26	0.13 / 0.38
106	5		7.97		5					
107	6		8.97		6					
108	6.3	-13 / -35	9.27		6.3	+22 / -0				
109	7		9.97		7					
110	8		10.97	+27 / -0	8					
111	9		11.97		9					
212	10		14.50		10		3.58	4.65	6.22	0.13 / 0.38
213	11	-16 / -43	15.50		11	+27 / -0				
214	12		16.50		12					
215	13		17.50		13					
216	14		18.50	+33 / -0	14					
217	15		19.50		15					
218	16		20.50		16					
219	18		22.50		18					
320	20	-20 / -53	26.07		20	+33 / -0	4.78	5.97	7.72	0.25 / 0.64
321	21		27.07		21					
322	22		28.07		22					
323	23		29.07		23					
324	25		31.06	+39 / -0	25					
325	27		33.06		27					
326	28		34.06		28					
327	30		36.06		30					
328	32	-25 / -64	38.05		32	+39 / -0				
329	33		39.05		33					
330	35		41.05		35					
331	36		42.05		36					
332	38		44.05		38					
533	40		49.17		40					
534	42		51.17	+46 / -0	42		7.14	8.48	10.77	0.51 / 0.89
535	45		54.17		45					
536	48		57.17		48					
537	50		59.17		50					
538	55	-30 / -76	64.16		55	+46 / -0				
539	56		65.16		56					
540	60		69.16		60					
541	63		72.16		63					
542	65		74.16		65					
543	70		79.16		70					
544	75		84.16	+54 / -0	75					
545	80		89.16		80					
546	85	-36 / -90	94.15		85	+54 / -0				
547	90		99.15		90					
548	95		104.15		95					
549	100		109.15		100					
550	105		114.15		105					
551	110		119.15		110					
752	115		127.12	+63 / -0	115		9.53	12.07	14.71	0.51 / 0.89
753	120		132.12		120					

**Note: Not recommended with +0.25/-0 tolerance. GT recommended tolerance is +0.13/-0.*

Rod dimensional information continued

GREENE, TWEED CODE	B		E		D		G (WIDTH) (+0.25/–0)			R (RADII)
	ROD OD (MM)	TOLERANCE f8 (MICRONS)	GLAND OD (MM)	TOLERANCE H8 (MICRONS)	ROD CLEARANCE DIA. (MM)	TOLERANCE H8 (MICRONS)	NARROW ZERO (MM)	INTER ONE (MM)	WIDE TWO (MM)	(MM)
754	125	-43 / -106	137.12	+63 / -0	125	+63 / -0	9.53	12.07	14.71	0.51 / 0.89
755	130		142.12		130					
756	135		147.12		135					
757	140		152.12		140					
758	145		157.12		145					
759	150		162.12		150					
760	155		167.12		155					
761	160		172.12		160					
762	165		177.12		165					
763	170		182.11	+72 / -0	170	+72 / -0				
764	175		187.11		175					
765	180		192.11		180					
766	185	-50 / -122	197.10		185					
767	190		202.10		190					
768	195		207.10		195					
769	200		212.10		200					
770	205		217.10		205					
771	210		222.10		210					
772	215		227.10		215					
773	220		232.10		220					
774	225		237.10		225					
775	230		242.10		230					
776	235		247.10		235					
777	240		252.09	+81 / -0	240	+81 / -0				
778	245		257.09		245					
779	250		262.09		250					
780	255	-56 / -137	267.09		255					
781	260		272.09		260					
782	265		277.09		265					
783	270		282.09		270					
784	280		292.09		280					
785	290		302.09		290					
786	300		312.09		300					
787	320	-62 / -151	332.07	+89 / -0	320	+89 / -0				
788	340		352.07		340					
789	360		372.07		360					
790	380		392.07		380					
791	400		412.06	+97 / -0	400	+97 / -0				
792	425	-68 / -165	437.05		425					
793	450		462.05		450					
794	475		487.05		475					

For Reference: Rod



PISTON DIMENSIONAL INFORMATION (METRIC)

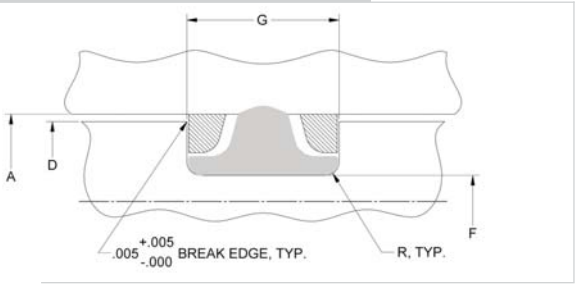
GREENE, TWEED CODE	A		F		D		G (WIDTH) (+0.25/–0)			R (RADII)
	BORE ID (MM)	TOLERANCE F8 (MICRONS)	GLAND ID (MM)	TOLERANCE h8 (MICRONS)	PISTON OD (MM)	TOLERANCE (MICRONS)	NARROW ZERO (MM)	INTER ONE (MM)	WIDE TWO (MM)	(MM)
108	6.3	+22 / -0	3.40	+0 / -18	6.3	-25 / -61 (e9)	2.39*	3.78	5.26	0.13 / 0.38
109	7		4.10		7					
110	8		5.10		8					
111	9		6.10	+0 / -22	9					
112	10		7.10		10					
113	11	+27 / -0	8.10		11	-32 / -75 (e9)				
114	12		9.10		12					
214	12		7.60		12		3.58	4.65	6.22	
215	13		8.60		13					
216	14		9.60		14					
217	15		10.60		15					
218	16		11.61	+0 / -27	16					
219	18		13.61		18					
220	20	+33 / -0	15.61		20	-40 / -92 (e9)				
221	21		16.61		21					
222	22		17.61		22					
223	23		18.61	+0 / -33	23					
322	22		15.99		22	-20 / -72 (f9)	4.78	5.97	7.72	0.25 / 0.64
323	23		16.99		23					
324	25		18.99		25					
325	27		20.99		27					
326	28		21.99		28					
327	30		23.99		30					
328	32	+39 / -0	26.00		32	-25 / -87 (f9)				
329	33		27.00		33					
330	35		29.00		35					
331	36		30.00		36					
332	38		32.00	+0 / -39	38					
333	40		34.00		40					
334	42		36.00		42					
335	45		39.00		45					
535	45		35.78		45					
536	48		38.78		48					
537	50		40.78		50					
538	55	+46 / -0	45.78		55	-30 / -104 (f9)	7.14	8.48	10.77	0.51 / 0.89
539	56		46.78		56					
540	60		50.79	+0 / -46	60					
541	63		53.79		63					
542	65		55.79		65					
543	70		60.79		70					
544	75		65.79		75					
545	80		70.79		80					
546	85	+54 / -0	75.79		85	-36 / -123 (f9)				
547	90		80.79	+0 / -54	90					
548	95		85.79		95					
549	100		90.79		100					
550	105		95.79		105					
551	110		100.79		110					
552	115		105.79		115					
553	120		110.79		120					
554	125	+63 / -0	115.80		125	-43 / -106 (f8)				
555	130		120.80	+0 / -63	130					
556	135		125.80		135					

**Note: Not recommended. If used with +0.13/-0 gland width tolerance recommended.*

Piston dimensional information continued

GREENE, TWEED CODE	A		F		D		G (WIDTH) (+0.25/–0)			R (RADII)
	BORE ID (MM)	TOLERANCE H8 (MICRONS)	GLAND ID (MM)	TOLERANCE h8 (MICRONS)	PISTON OD (MM)	TOLERANCE (MICRONS)	NARROW ZERO (MM)	INTER ONE (MM)	WIDE TWO (MM)	(MM)
756	135	+63 -0	122.65	+0 -63	135	-43 -106 (f8)	9.53	12.07	14.71	0.51 0.89
757	140		127.65		140					
759	150		137.65		150					
761	160		147.65		160					
763	170		157.65		170					
765	180		167.65		180					
767	190	+72 -0	177.65	+0 -72	190	-50 -122 (f8)				
769	200		187.66		200					
771	210		197.66		210					
773	220		207.66		220					
774	225		212.66		225					
775	230		217.66		230					
776	235		222.66		235					
779	250		237.66		250					
782	265	+81 -0	252.67	+0 -81	265	-56 -137 (f8)				
784	280		267.67		280					
786	300		287.67		300					
787	320	+89 -0	307.67	+0 -89	320	-62 -151 (f8)				
788	340		327.68		340					
789	360		347.68		360					
790	380		367.68		380					
791	400		387.68		400					

For Reference: Piston



04/07-GT DS-US-AS-010

Contact Us

Greene, Tweed & Co.
Aerospace
Kulpsville, PA, USA

Tel: +1.215.256.9521
Tel: +1.800.220.4733
Fax: +1.215.513.9411