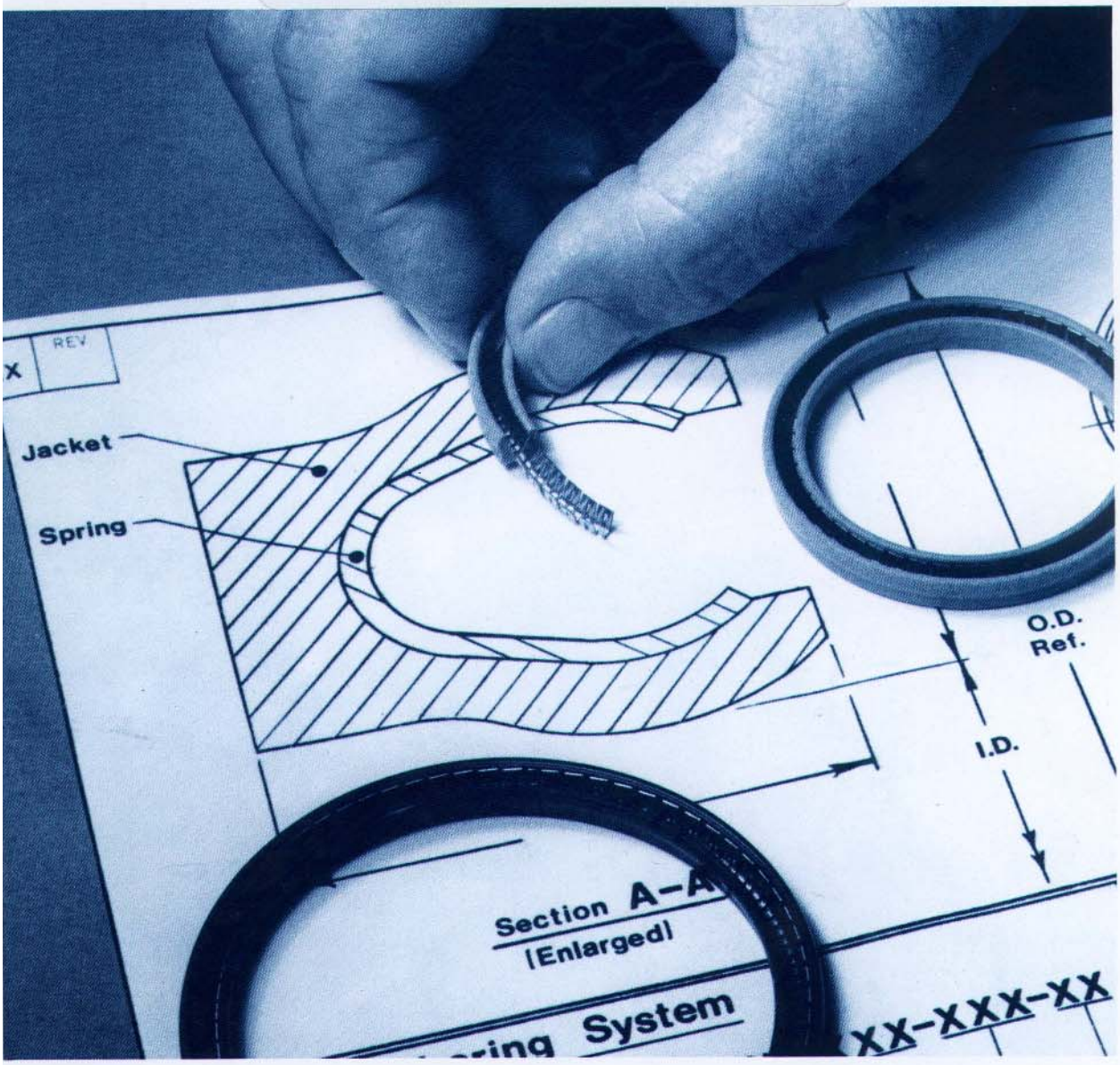
Tetrafluor

Metallic Spring Energized Teflon* Seals

CoorsTek
Amazing Solutions



- Spring shape conforms to inner surface of jacket to provide positive spring retention
- Jacket and spring design prevents permanent deformation assuring longer seal life and minimal leakage
- Superior installability
- For static, rotary and reciprocating installations
- Ultra-low breakout and running friction in dynamic applications
- Temperatures—From Cryogenic to 600°F
- Pressures—Vacuum to 25,000 psi
- Diameters—¼" to 12 ft

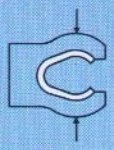
U.S. Patent No. 4,508,356
Other patents pending

*DuPont's Registered Trademark

The functionally correct spring actuated seal design…Here's why:

- **Spring shape conforms intimately to the inner jacket surface.**

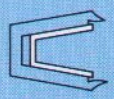
- **Line contact at the sealing surfaces provides high unit loading for positive sealing.**



- **Optimum radius cantilever design of the spring and jacket creates a highly stable seal system.**

- **Unique geometry assures positive spring retention.**

The spring seal has been developed to overcome the disadvantages of ordinary spring energizers  **used in some spring actuated fluoropolymer seals. These include shearing of the retention lip …installation difficulties…and permanent spring set.**



Sheared Retention Lip

Table of Contents

Introduction

The development of Coors Tetrafluor's metal spring loaded lip seals is the result of a technical metamorphosis that occurred during recent years.

Elastomeric sealing elements, including o-rings, were accepted as suitable for most dynamic sealing applications. With the advent of highly sensitive electro-hydraulic and electro-pneumatic control systems, complicated by severe military related environmental constraints, elastomeric elements provided serious friction and permanent set problems for dynamic applications.

Fluoropolymer (Teflon*) sealing elements are still used where the elastomeric element performs an energizing function. However, in the most severe situations, fluoroplastics are subject to cold flow. In addition, their elastomeric energizing elements are subject to swelling, permanent set, and attack by some corrosive media. So, fluoroplastics by themselves, or, when energized by elastomeric elements only, cannot withstand temperature extremes for the above-stated reasons.

Tetrafluor's spring-loaded seals have been developed specifically to overcome the problems associated with fluoroplastics and elastomerics. *They are designed for static, rotary and reciprocating applications in temperatures from cryogenic to 600°F, and pressures from vacuum to 25,000 psi, to survive the most corrosive environments.*

The innovative design combines a "C" shaped spring with a fluoropolymer-based seal jacket to achieve one of the most efficient and versatile sealing methods. The high strength stainless steel energizer provides strength and flexibility to control seal loading, even with temperature extremes, while the fluoroplastic jacket provides the well known Teflon* virtues of low friction, corrosion resistance, sealability and wear resistance.

The optimum radius cantilever design of the jacket and spring creates a highly stable seal system. Further, the superior jacket design allows for optimum stress distribution and the elimination of jacket failure due to shear of the spring retention lip characteristic of competitive products.

By eliminating the spring retention lip, the spring can move without restraint relative to the jacket creating unique flexibility. *This permits easy installation in situations where competitor designs would encounter severe problems.*

There are many applications that are ideal for metal spring-loaded lip seals including the following:

- Thermal extremes make the requirement for a stable seal element unobtainable using other designs or material.
- Control of friction loads is essential and unobtainable using other designs or material.
- High wear is unavoidable and cannot be compensated for by other designs.
- Manufacturing tolerances or the presence of side loads make the requirement for a flexible seal lip mandatory.
- Corrosive medium compromises elastomeric sealing or energizing elements.

Coors Tetrafluor's spring energized seals have gained a high level of industry acceptance for their unlimited potential to solve sealing system problems. This handbook presents design information primarily for standard gland applications and retrofit into your existing glands.

For special situations contact the factory, or your local distributor, for engineering assistance.

*DuPont's Registered Trademark

Spring Seal Materials

Typical Jacket Materials

Material Code	Name	Description
001	Virgin Teflon (unfilled)	The most corrosion resistant material for general applications at moderate speeds, pressures and temperatures. Exhibits low gas permeability characteristics.
059	Tetralon ACS	Modified bronze-filled PTFE. Good for dynamic applications with high PV factor. Resists friction heating.
230	Tetralene B-1000	UHMW Polyethylene with friction-reducing fillers. Very tough and long wearing at temperatures below 200°F. Excellent for sealing abrasive media. Good cryogenic resistance.
300	Tetralon 720	Polymeric filled PTFE. Excellent thermal stability. Impressive wear ratio of 1000:1 over unfilled PTFE. Suitable for sealing against soft mating surfaces.
430	Tetralon	Proprietary modified unfilled virgin PTFE. Excellent heat and wear resistance. Wear resistance property at least 10 to 100 times greater than virgin PTFE.
440	Tetralon TFC-031	Tetralon with glass fiber. Very good resistance to extrusion and cold flow. Good for cryogenic applications. Can be abrasive against soft metals.
450	Tetralon TFC-033	Similar to Tetralon TFC-031, but higher glass fiber content. Increased resistance to high temperatures or cryogenic conditions. Not recommended for use against soft metals.
490	TFC-082	Glass-moly filler. Recommended for high pressure and high temperature applications. Excellent creep resistance.
570	TFC-021	Graphite-filled PTFE. Excellent friction and wear characteristics. Recommended for use in water or water-based fluids.
600	TFC-108	Carbon-graphite filled PTFE. Excellent wear and extrusion resistance. Suitable for applications requiring low friction. Minimizes "stiction."
902	Tetralon 900 Series	Ultra wear resistant, non-abrasive filled PTFE material. Suitable for non-lubricated applications. Minimal wear debris.

For extreme operating conditons, check the factory for material recommendations.

Typical Spring Materials

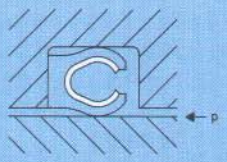
Material Code	Name	Description
A	301 Stainless Steel	Good corrosion resistance for general applications.
B	Inconel 718	For extreme temperatures. Good resilience and tensile properties.
C	Elgiloy	The most resilient spring. Excellent chemical compatibility and corrosion resistance. Meets N.A.C.E. MR-01-75.
	Others Include:	
D	Hastelloy C-276	High nickel content for maximum corrosion resistance. Meets N.A.C.E. MR-01-75
E	304 Stainless Steel	Meets N.A.C.E. MR-01-75. Good for general applications requiring corrosion resistance and non-magnetic characteristics.
F	17-7 PH Stainless Steel	Good for cryogenic applications. Used in many military-aerospace requirements.
G	316 Stainless Steel	A good corrosion resistant alloy for applications requiring higher chemical compatibility.
H	302 Stainless Steel	Typical non-magnetic 300 series stainless steel.

Seal Selection Guide

Select the seal type and TF series from the table below.

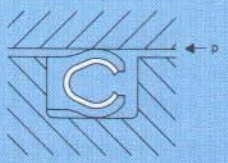
Seal Types

Reciprocating (Linear Motion) Rod Seal
Military Standard MIL-G-5514
TF 888R Page 8



Commercial-Industrial Standard
TF 1188R (Static only) Page 9
TF 1288R Page 10

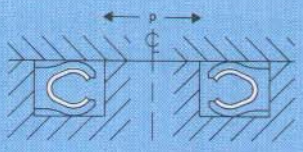
Reciprocating (Linear Motion) Piston Seal
Military Standard MIL-G-5514
TF 888P Page 11



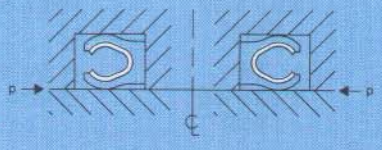
Commercial-Industrial Standard
TF 1188P (Static only) Page 12
TF 1288P Page 13

Reciprocating (Linear Motion) Rod Scraper
TF 1388 Page 14

Static Face Seal I.D., Internal
TF 888F Page 15

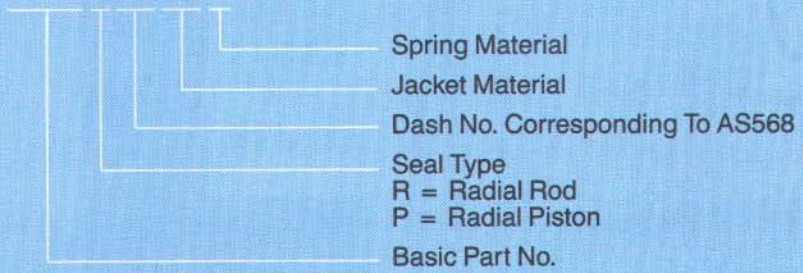


Static Face Seal O.D., External
TF 888E Page 16

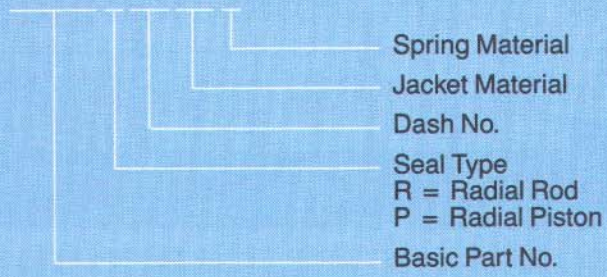


Ordering Information

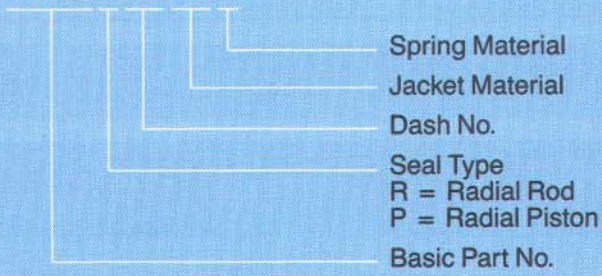
Aerospace Static and Dynamic Applications
Gland Design Per MIL-G-5514F
TF888 R 215-001 A



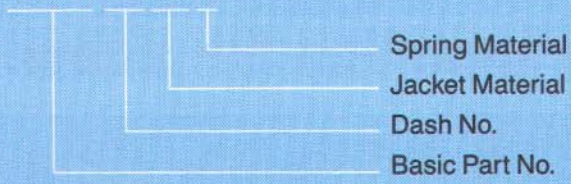
Industrial Dynamic Applications
TF1288 R 215-001 A



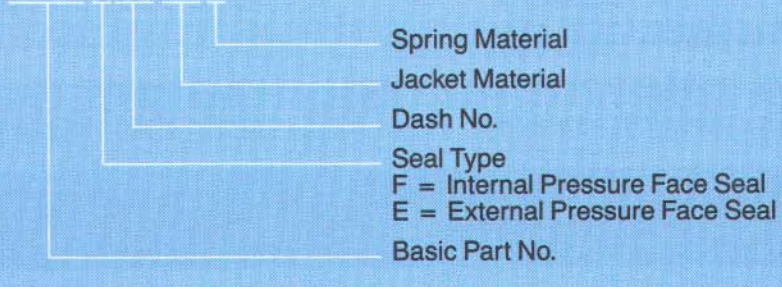
Industrial Static Applications
TF1188 R 215-001 A



Scraper Rod Applications
TF1388-215-001 A



Face Seals
TF888 F 215-001 A



Dash No.	A Dia. +.001 −.000	B Dia. +.000 −.001
012	.485	.373
	+.002 −.000	+.000 −.002
013	.547	.435
014	.610	.498
015	.672	.560
016	.735	.623
017	.797	.685
018	.860	.748
019	.922	.810
020	.985	.873
021	1.047	.935
022	1.110	.998
023	1.172	1.060
024	1.235	1.123
025	1.297	1.185
026	1.360	1.248
027	1.422	1.310
028	1.485	1.373
110	.551	.373
111	.613	.435
112	.676	.498
113	.738	.560
114	.801	.623
115	.863	.685
116	.926	.748
117	.988	.810
118	1.051	.873
119	1.113	.935
120	1.176	.998
121	1.238	1.060
122	1.301	1.123
123	1.363	1.185
124	1.426	1.248
125	1.488	1.310
126	1.551	1.373
127	1.613	1.435
128	1.676	1.498
129	1.738	1.560
130	1.801	1.623
131	1.863	1.685
132	1.926	1.748
133	1.988	1.810
134	2.051	1.873
135	2.114	1.936
136	2.176	1.998
137	2.239	2.061
138	2.301	2.123
139	2.364	2.186
140	2.426	2.248
141	2.489	2.311
142	2.551	2.373
143	2.614	2.436
144	2.676	2.498

Dash No.	A Dia. +.002 −.000	B Dia. +.000 −.002
145	2.739	2.561
146	2.801	2.623
147	2.864	2.686
148	2.926	2.748
149	2.989	2.811
210	.991	.748
211	1.053	.810
212	1.116	.873
213	1.178	.935
214	1.241	.998
215	1.303	1.060
216	1.366	1.123
217	1.428	1.185
218	1.491	1.248
219	1.553	1.310
220	1.616	1.373
221	1.678	1.435
222	1.741	1.498
223	1.866	1.623
224	1.991	1.748
225	2.116	1.873
226	2.241	1.998
227	2.366	2.123
228	2.491	2.248
229	2.616	2.373
230	2.741	2.498
231	2.866	2.623
232	2.991	2.748
233	3.116	2.873
234	3.240	2.997
235	3.365	3.122
236	3.490	3.247
237	3.615	3.372
238	3.740	3.497
239	3.865	3.622
240	3.990	3.747
241	4.115	3.872
242	4.240	3.997
243	4.365	4.122
244	4.490	4.247
245	4.615	4.372
246	4.740	4.497
247	4.865	4.622
325	1.870	1.498
326	1.995	1.623
327	2.120	1.748
328	2.245	1.873
329	2.370	1.998
330	2.495	2.123
331	2.620	2.248
332	2.745	2.373
333	2.870	2.498
334	2.995	2.623
335	3.120	2.748

Dash No.	A Dia. +.002 −.000	B Dia. +.000 −.002
336	3.245	2.873
337	3.369	2.997
338	3.494	3.122
339	3.619	3.247
340	3.744	3.372
341	3.869	3.497
342	3.994	3.622
343	4.119	3.747
344	4.244	3.872
345	4.369	3.997
346	4.494	4.122
347	4.619	4.247
348	4.744	4.372
349	4.869	4.497
	+.003 −.000	+.000 −.003
425	4.974	4.497
426	5.099	4.622
427	5.224	4.747
428	5.349	4.872
429	5.474	4.997
430	5.599	5.122
431	5.724	5.247
432	5.849	5.372
433	5.974	5.497
434	6.099	5.622
435	6.224	5.747
436	6.349	5.872
437	6.474	5.997
438	6.724	6.247
439	6.974	6.497
440	7.224	6.747
441	7.474	6.997
442	7.724	7.247
443	7.974	7.497
444	8.224	7.747
445	8.474	7.997
446	8.974	8.497
	+.004 −.000	+.000 −.003
447	9.474	8.997
448	9.974	9.497
449	10.474	9.997
450	10.974	10.497
451	11.474	10.997
452	11.974	11.497
453	12.474	11.997
454	12.974	12.497
455	13.474	12.997
456	13.974	13.497
457	14.474	13.997
458	14.974	14.497
459	15.474	14.997
460	15.974	15.497

Dash No.	G Groove Width +.010 −.000	R Groove Radius	E Diametral Clearance Max.
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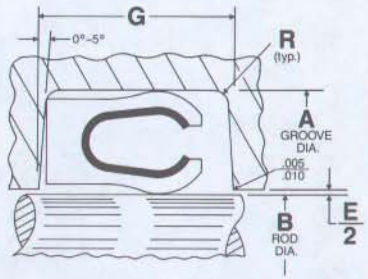
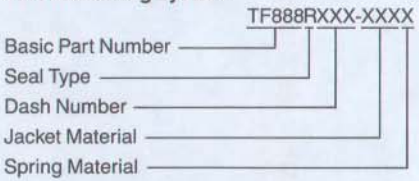
013-028	.094	.005-.015	.005
110-126	.141	.005-.015	.005
127-132	.141	.005-.015	.006
133-149	.141	.005-.015	.007
210-222	.188	.010-.025	.005
223-224	.188	.010-.025	.006
225-245	.188	.010-.025	.007
246-247	.188	.010-.025	.008
325-327	.281	.020-.035	.006
328-349	.281	.020-.035	.007
425-438	.375	.020-.035	.009
439-460	.375	.020-.035	.010



Notes:

1. Rod and groove dimensions in accordance with MIL-G-5514 Rev. F for no backup ring groove width.
2. Seal dash nos. correspond to dash nos. of AS568 uniform numbering system of O-Rings.
3. See Alternate Gland Configuration and Retrofit Information.

Part Numbering System



Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon,® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17–7PH SST
G	316 SST
H	302 SST

Tetrafluor

ROD SEAL INSTALLATION FOR MIL-G-5514 (F REVISION) NO BACK-UP GLAND

CODE IDENT. 07128

TF888R

Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.002	Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.002	Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.002	Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.004	Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.004
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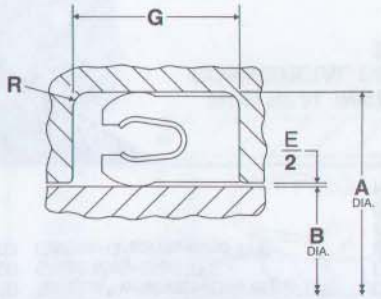
011	.412	.312	134	2.037	1.875	226	2.222	2.000	317	1.277	.937	384	15.340	15.000
012	.475	.375	135	2.099	1.937	227	2.347	2.125	318	1.340	1.000	385	16.340	16.000
013	.537	.437	136	2.162	2.000	228	2.472	2.250	319	1.402	1.062	386	17.340	17.000
014	.600	.500	137	2.224	2.062	229	2.597	2.375	320	1.465	1.125	387	18.340	18.000
015	.662	.562	138	2.287	2.125	230	2.722	2.500	321	1.527	1.187	388	19.340	19.000
016	.725	.625	139	2.349	2.187	231	2.847	2.625	322	1.590	1.250	389	20.340	20.000
017	.787	.687	140	2.412	2.250	232	2.972	2.750	323	1.652	1.312	390	21.340	21.000
018	.850	.750	141	2.474	2.312	233	3.097	2.875	324	1.715	1.375	391	22.340	22.000
019	.912	.812	142	2.537	2.375	234	3.222	3.000	325	1.840	1.500	392	23.340	23.000
020	.975	.875	143	2.599	2.437	235	3.347	3.125	326	1.965	1.625	393	24.340	24.000
021	1.037	.937	144	2.662	2.500	236	3.472	3.250	327	2.090	1.750	394	25.340	25.000
022	1.100	1.000	145	2.724	2.562	237	3.597	3.375	328	2.215	1.875	395	26.340	26.000
023	1.162	1.062	146	2.787	2.625	238	3.722	3.500	329	2.340	2.000	425	4.952	4.500
024	1.225	1.125	147	2.849	2.687	239	3.847	3.625	330	2.465	2.125	426	5.077	4.625
025	1.287	1.187	148	2.912	2.750	240	3.972	3.750	331	2.590	2.250	427	5.202	4.750
026	1.350	1.250	149	2.974	2.812	241	4.097	3.875	332	2.715	2.375	428	5.327	4.875
027	1.412	1.312	150	3.037	2.875	242	4.222	4.000	333	2.840	2.500	429	5.452	5.000
028	1.475	1.375	151	3.162	3.000	243	4.347	4.125	334	2.965	2.625	430	5.577	5.125
029	1.600	1.500	152	3.412	3.250	244	4.472	4.250	335	3.090	2.750	431	5.702	5.250
030	1.725	1.625	153	3.662	3.500	245	4.597	4.375	336	3.215	2.875	432	5.827	5.375
031	1.850	1.750	154	3.912	3.750	246	4.722	4.500	337	3.340	3.000	433	5.952	5.500
032	1.975	1.875	155	4.162	4.000	247	4.847	4.625	338	3.465	3.125	434	6.077	5.625
033	2.100	2.000	156	4.412	4.250	248	4.972	4.750	339	3.590	3.250	435	6.202	5.750
034	2.225	2.125	157	4.662	4.500	249	5.097	4.875	340	3.715	3.375	436	6.327	5.875
035	2.350	2.250	158	4.912	4.750	250	5.222	5.000	341	3.840	3.500	437	6.452	6.000
036	2.475	2.375	159	5.162	5.000	251	5.347	5.125	342	3.965	3.625	438	6.702	6.250
037	2.600	2.500	160	5.412	5.250	252	5.472	5.250	343	4.090	3.750	439	6.952	6.500
038	2.725	2.625	161	5.662	5.500	253	5.597	5.375	344	4.215	3.875	440	7.202	6.750
039	2.850	2.750	162	5.912	5.750	254	5.722	5.500	345	4.340	4.000	441	7.452	7.000
040	2.975	2.875	163	6.162	6.000	255	5.847	5.625	346	4.465	4.125	442	7.702	7.250
041	3.100	3.000	164	6.412	6.250	256	5.972	5.750	347	4.590	4.250	443	7.952	7.500
042	3.350	3.250	165	6.662	6.500	257	6.097	5.875	348	4.717	4.375	444	8.202	7.750
043	3.600	3.500	166	6.912	6.750	258	6.222	6.000	349	4.840	4.500	445	8.452	8.000
044	3.850	3.750	167	7.162	7.000	259	6.472	6.250	350	4.965	4.625	446	8.952	8.500
045	4.100	4.000	168	7.412	7.250	260	6.722	6.500	351	5.090	4.750	447	9.452	9.000
046	4.350	4.250	169	7.662	7.500	261	6.972	6.750	352	5.215	4.875	448	9.952	9.500
047	4.600	4.500	170	7.912	7.750	262	7.222	7.000	353	5.340	5.000	449	10.452	10.000
048	4.850	4.750	171	8.162	8.000	263	7.472	7.250	354	5.465	5.125	450	10.952	10.500
049	5.100	5.000	172	8.412	8.250	264	7.722	7.500	355	5.590	5.250	451	11.452	11.000
050	5.350	5.250	173	8.662	8.500	265	7.972	7.750	356	5.715	5.375	452	11.952	11.500
107	.381	.219	174	8.912	8.750	266	8.222	8.000	357	5.840	5.500	453	12.452	12.000
108	.412	.250	175	9.162	9.000	267	8.472	8.250	358	5.965	5.625	454	12.952	12.500
109	.474	.312	176	9.412	9.250	268	8.722	8.500	359	6.090	5.750	455	13.452	13.000
110	.537	.375	177	9.662	9.500	269	8.972	8.750	360	6.215	5.875	456	13.952	13.500
111	.599	.437	178	9.912	9.750	270	9.222	9.000	361	6.340	6.000	457	14.452	14.000
112	.662	.500	204	.597	.375	271	9.472	9.250	362	6.590	6.250	458	14.952	14.500
113	.724	.562	205	.659	.437	272	9.722	9.500	363	6.840	6.500	459	15.452	15.000
114	.787	.625	206	.722	.500	273	9.972	9.750	364	7.090	6.750	460	15.952	15.500
115	.849	.687	207	.784	.562	274	10.222	10.000	365	7.340	7.000	461	16.452	16.000
116	.912	.750	208	.847	.625	275	10.722	10.500	366	7.590	7.250	462	16.952	16.500
117	.974	.812	209	.909	.887	276	11.222	11.000	367	7.840	7.500	463	17.452	17.000
118	1.037	.875	210	.972	.750	277	11.722	11.500	368	8.090	7.750	464	17.952	17.500
119	1.099	.937	211	1.034	.812	278	12.222	12.000	369	8.340	8.000	465	18.452	18.000
120	1.162	1.000	212	1.097	.875	279	13.222	13.000	370	8.590	8.250	466	18.952	18.500
121	1.224	1.062	213	1.159	.937	280	14.222	14.000	371	8.840	8.500	467	19.452	19.000
122	1.287	1.125	214	1.222	1.000	281	15.222	15.000	372	9.090	8.750	468	19.952	19.500
123	1.349	1.187	215	1.284	1.062	282	16.222	16.000	373	9.340	9.000	469	20.452	20.000
124	1.412	1.250	216	1.347	1.125	283	17.222	17.000	374	9.590	9.250	470	21.452	21.000
125	1.474	1.312	217	1.409	1.187	284	18.222	18.000	375	9.840	9.500	471	22.452	22.000
126	1.537	1.375	218	1.472	1.250		+.002 -.000	+.000 -.004	376	10.090	9.750	472	23.452	23.000
127	1.599	1.437	219	1.534	1.312				377	10.340	10.000	473	24.452	24.000
128	1.662	1.500	220	1.597	1.375	311	.902	.562	378	10.840	10.500	474	25.452	25.000
129	1.724	1.562	221	1.659	1.437	312	.965	.625	379	11.340	11.000	475	26.452	26.000
130	1.787	1.625	222	1.722	1.500	313	1.027	.687	380	11.840	11.500			
131	1.849	1.687	223	1.847	1.625	314	1.090	.750	381	12.340	12.000			
132	1.912	1.750	224	1.972	1.750	315	1.152	.812	382	13.340	13.000			



Dash No.	G Groove Width +.005-.000	R Groove Radius	E Diametral Clearance Max.
010-050	.093	.005-.015	.005
107-178	.140	.005-.015	.005
204-284	.187	.010-.025	.006
311-395	.281	.020-.035	.006
425-475	.375	.020-.035	.007

Part Numbering System

TF1188RXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	Description
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

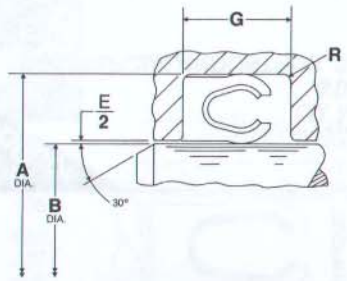
Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17-7PH SST
G	316 SST
H	302 SST

Tetrafluor

SEAL INSTALLATION
I.D. MOUNTED,
STATIC ONLY
COMMERCIAL-INDUSTRIAL STANDARD

CODE IDENT	
07128	**TF1188R**

Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. +.002 −.001	B Dia. +.001 −.002	Dash No.	A Dia. +.002 −.001	B Dia. +.001 −.002
006	.250	.125	122	1.312	1.125	225	2.125	1.875	326	2.000	1.625	405	2.500	2.000
007	.281	.156	123	1.375	1.187	226	2.250	2.000	327	2.125	1.750	406	2.625	2.125
008	.312	.187	124	1.437	1.250	227	2.375	2.125	328	2.250	1.875	407	2.750	2.250
009	.343	.218	125	1.500	1.312	228	2.500	2.250	329	2.375	2.000	408	2.875	2.375
010	.375	.250	126	1.562	1.375	229	2.625	2.375	330	2.500	2.125	409	3.000	2.500
011	.437	.312	127	1.625	1.437	230	2.750	2.500	331	2.625	2.250	410	3.125	2.625
012	.500	.375	128	1.687	1.500	231	2.875	2.625	332	2.750	2.375	411	3.250	2.750
013	.562	.437	129	1.750	1.562	232	3.000	2.750	333	2.875	2.500	412	3.375	2.875
014	.625	.500	130	1.812	1.625	233	3.125	2.875	334	3.000	2.625	413	3.500	3.000
015	.687	.562	131	1.875	1.687	234	3.250	3.000	335	3.125	2.750	414	3.625	3.125
016	.750	.625	132	1.937	1.750	235	3.375	3.125	336	3.250	2.875	415	3.750	3.250
017	.812	.687	133	2.000	1.812	236	3.500	3.250	337	3.375	3.000	416	3.875	3.375
018	.875	.750	134	2.062	1.875	237	3.625	3.375	338	3.500	3.125	417	4.000	3.500
019	.937	.812	135	2.125	1.937	238	3.750	3.500	339	3.625	3.250	418	4.125	3.625
020	1.000	.875	136	2.187	2.000	239	3.875	3.625	340	3.750	3.375	419	4.250	3.750
021	1.062	.937	137	2.250	2.062	240	4.000	3.750	341	3.875	3.500	420	4.375	3.875
022	1.125	1.000	138	2.312	2.125	241	4.125	3.875	342	4.000	3.625	421	4.500	4.000
023	1.187	1.062	139	2.375	2.187	242	4.250	4.000	343	4.125	3.750	422	4.625	4.125
024	1.250	1.125	140	2.437	2.250	243	4.375	4.125	344	4.250	3.875	423	4.750	4.250
025	1.312	1.187	141	2.500	2.312	244	4.500	4.250	345	4.375	4.000	424	4.875	4.375
026	1.375	1.250	142	2.562	2.375	245	4.625	4.375	346	4.500	4.125	425	5.000	4.500
027	1.437	1.312	143	2.625	2.437	246	4.750	4.500	347	4.625	4.250	426	5.125	4.625
028	1.500	1.375	144	2.687	2.500	247	4.875	4.625	348	4.750	4.375	427	5.250	4.750
029	1.625	1.500	145	2.750	2.562	248	5.000	4.750	349	4.875	4.500	428	5.375	4.875
030	1.750	1.625	146	2.812	2.625	249	5.125	4.875	350	5.000	4.625	429	5.500	5.000
031	1.875	1.750	147	2.875	2.687	250	5.250	5.000	351	5.125	4.750	430	5.625	5.125
032	2.000	1.875	148	2.937	2.750	251	5.375	5.125	352	5.250	4.875	431	5.750	5.250
033	2.125	2.000	149	3.000	2.812	252	5.500	5.250	353	5.375	5.000	432	5.875	5.375
034	2.250	2.125	150	3.062	2.875	253	5.625	5.375	354	5.500	5.125	433	6.000	5.500
035	2.375	2.250	151	3.187	3.000	254	5.750	5.500	355	5.625	5.250	434	6.125	5.625
036	2.500	2.375	152	2.437	3.250	255	5.875	5.625	356	5.750	5.375	435	6.250	5.750
037	2.625	2.500	153	3.687	3.500	256	6.000	5.750	357	5.875	5.500		+.003 −.001	+.001 −.003
038	2.750	2.625	154	3.937	3.750	257	6.125	5.875	358	6.000	5.625			
039	2.875	2.750	155	4.187	4.000	258	6.250	6.000	359	6.125	5.750	436	6.375	5.875
040	3.000	2.875	156	4.437	4.250	259	6.500	6.250	360	6.250	5.875	437	6.500	6.000
041	3.125	3.000	157	4.687	4.500	260	6.750	6.500	361	6.375	6.000	438	6.750	6.250
042	3.375	3.250	158	4.937	4.750	261	7.000	6.750	362	6.625	6.250	439	7.000	6.500
043	3.625	3.500	159	5.187	5.000	262	7.250	7.000	363	6.875	6.500	440	7.250	6.750
044	3.875	3.750	160	5.437	5.250	263	7.500	7.250	364	7.125	6.750	441	7.500	7.000
045	4.125	4.000	161	5.687	5.500	264	7.750	7.500	365	7.375	7.000	442	7.750	7.250
046	4.375	4.250	208	.875	.625	265	8.000	7.750	366	7.625	7.250	443	8.000	7.500
106	.375	.187	209	.937	.687	266	8.250	8.000	367	7.875	7.500	444	8.250	7.750
107	.406	.219	210	1.000	.750	267	8.500	8.250	368	8.125	7.750	445	8.500	8.000
108	.437	.250	211	1.062	.812	268	8.750	8.500	369	8.375	8.000	446	9.000	8.500
109	.500	.312	212	1.125	.875	269	9.000	8.750	370	8.625	8.250	447	9.500	9.000
110	.562	.375	213	1.187	.937	270	9.250	9.000	371	8.875	8.500	448	10.000	9.500
111	.625	.437	214	1.250	1.000	316	1.250	.875	372	9.125	8.750	449	10.500	10.000
112	.687	.500	215	1.312	1.062	317	1.312	.937	373	9.375	9.000	450	11.000	10.500
113	.750	.562	216	1.375	1.125	318	1.375	1.000	374	9.625	9.250	451	11.500	11.000
114	.812	.625	217	1.437	1.187	319	1.437	1.062	375	9.875	9.500	452	12.000	11.500
115	.875	.687	218	1.500	1.250	320	1.500	1.125	376	10.125	9.750	453	12.500	12.000
116	.937	.750	219	1.562	1.312	321	1.562	1.187	377	10.375	10.000	454	13.000	12.500
117	1.000	.812	220	1.625	1.375	322	1.625	1.250	378	10.875	10.500	455	13.500	13.000
118	1.062	.875	221	1.687	1.437	323	1.687	1.312	401	2.000	1.500	456	14.000	13.500
119	1.125	.937	222	1.750	1.500	324	1.750	1.375	402	2.125	1.625	457	14.500	14.000
120	1.187	1.000	223	1.875	1.625	325	1.875	1.500	403	2.250	1.750	458	15.000	14.500
121	1.250	1.062	224	2.000	1.750				404	2.375	1.875	459	15.500	15.000
												460	16.000	15.500



Dash No.	G Groove Width +.010 −.000	R Groove Radius	E Diametral Clearance Max.
006-012	.094	.005-.015	.004
013-046	.094	.005-.015	.005
106-129	.141	.005-.015	.005
130-161	.141	.005-.015	.006
208-270	.188	.010-.025	.006
316-324	.281	.020-.035	.006
325-378	.281	.020-.035	.007
401-460	.375	.020-.035	.010

Part Numbering System

TF1288RXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17-7PH SST
G	316 SST
H	302 SST

Tetrafluor

ROD SEAL INSTALLATION COMMERCIAL-INDUSTRIAL STANDARD

CODE IDENT 07128

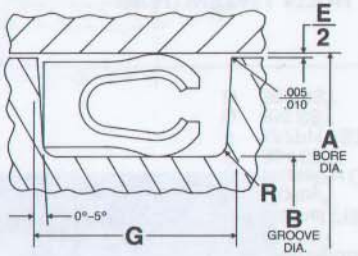
TF1288R

Dash No.	A Dia.	B Dia.
	+.001 −.000	+.000 −.001
012	.485	.373
	+.002 −.000	+.000 −.002
013	.550	.438
014	.613	.501
015	.675	.563
016	.738	.627
017	.800	.688
018	.863	.751
019	.925	.813
020	.991	.879
021	1.053	.941
022	1.116	1.004
023	1.178	1.066
024	1.241	1.129
025	1.303	1.191
026	1.366	1.254
027	1.428	1.316
028	1.491	1.379
110	.550	.372
111	.613	.435
112	.675	.497
113	.738	.560
114	.800	.622
115	.863	.685
116	.925	.747
117	.991	.813
118	1.053	.875
119	1.116	.938
120	1.178	1.000
121	1.241	1.063
122	1.303	1.125
123	1.366	1.188
124	1.428	1.250
125	1.491	1.313
126	1.553	1.375
127	1.616	1.438
128	1.678	1.500
129	1.741	1.563
130	1.805	1.627
131	1.867	1.689
132	1.930	1.752
133	1.992	1.814
134	2.055	1.877
135	2.118	1.940
136	2.180	2.002
137	2.243	2.065
138	2.305	2.127
139	2.368	2.190
140	2.430	2.252
141	2.493	2.315
142	2.555	2.377
143	2.618	2.440
144	2.680	2.502

Dash No.	A Dia.	B Dia.
	+.002 −.000	+.000 −.002
145	2.743	2.565
146	2.805	2.627
147	2.868	2.690
148	2.930	2.752
149	2.993	2.815
210	.991	.748
211	1.053	.810
212	1.116	.873
213	1.178	.935
214	1.241	.998
215	1.303	1.060
216	1.366	1.123
217	1.428	1.185
218	1.491	1.248
219	1.553	1.310
220	1.616	1.373
221	1.678	1.435
222	1.741	1.498
223	1.867	1.624
224	1.992	1.749
225	2.118	1.875
226	2.243	2.000
227	2.368	2.125
228	2.493	2.250
229	2.618	2.375
230	2.743	2.500
231	2.868	2.625
232	2.993	2.750
233	3.118	2.875
234	3.243	3.000
235	3.368	3.125
236	3.493	3.250
237	3.618	3.375
238	3.743	3.500
239	3.868	3.625
240	3.993	3.750
241	4.118	3.875
242	4.243	4.000
243	4.368	4.125
244	4.493	4.250
245	4.618	4.375
246	4.743	4.500
247	4.868	4.625
325	1.867	1.495
326	1.992	1.620
327	2.118	1.746
328	2.243	1.871
329	2.368	1.996
330	2.493	2.121
331	2.618	2.246
332	2.743	2.371
333	2.868	2.496
334	2.993	2.621
335	3.118	2.746

Dash No.	A Dia.	B Dia.
	+.002 −.000	+.000 −.002
336	3.243	2.871
337	3.368	2.996
338	3.493	3.121
339	3.618	3.246
340	3.743	3.371
341	3.868	3.496
342	3.993	3.621
343	4.118	3.746
344	4.243	3.871
345	4.368	3.996
346	4.493	4.121
347	4.618	4.246
348	4.743	4.371
349	4.868	4.496
	+.003 −.000	+.000 −.003
425	4.974	4.497
426	5.099	4.622
427	5.224	4.747
428	5.349	4.872
429	5.474	4.997
430	5.599	5.122
431	5.724	5.247
432	5.849	5.372
433	5.974	5.497
434	6.099	5.622
435	6.224	5.747
436	6.349	5.872
437	6.474	5.997
438	6.724	6.247
439	6.974	6.497
440	7.224	6.747
441	7.474	6.997
442	7.724	7.247
443	7.974	7.497
444	8.224	7.747
445	8.474	7.997
446	8.974	8.497
	+.004 −.000	+.000 −.003
447	9.474	8.997
448	9.974	9.497
449	10.474	9.997
450	10.974	10.497
451	11.474	10.997
452	11.974	11.497
453	12.474	11.997
454	12.974	12.497
455	13.474	12.997
456	13.974	13.497
457	14.474	13.997
458	14.974	14.497
459	15.474	14.997
460	15.974	15.497

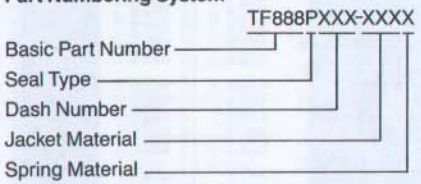
Dash No.	G Groove Width +.010 −.000	R Groove Radius	E Diametral Clearance Max.
012	.094	.005-.015	.004
013-028	.094	.005-.015	.005
110-126	.141	.005-.015	.005
127-132	.141	.005-.015	.006
133-149	.141	.005-.015	.007
210-222	.188	.010-.025	.005
223-224	.188	.010-.025	.006
225-245	.188	.010-.025	.007
246-247	.188	.010-.025	.008
325-327	.281	.020-.035	.006
328-349	.281	.020-.035	.007
425-438	.375	.020-.035	.009
439-460	.375	.020-.035	.010



Notes:

1. Rod and groove dimensions in accordance with MIL-G-5514 Rev. F for no backup ring groove width.
2. Seal dash nos. correspond to dash nos. of AS568 uniform numbering system for O-Rings.
3. See alternate gland configuration and retrofit information.

Part Numbering System



Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon,® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17–7PH SST
G	316 SST
H	302 SST

Tetrafluor

PISTON SEAL INSTALLATION FOR MIL-G-5514 (F REVISION) NO BACK-UP GLAND

CODE IDENT	
07128	**TF888P**

Dash No.	A Dia. +.002 -.000	B Dia. +.000 -.002
010	.375	.275
011	.437	.337
012	.500	.400
013	.562	.462
014	.625	.525
015	.687	.587
016	.750	.650
017	.812	.712
018	.875	.775
019	.937	.837
020	1.000	.900
021	1.062	.962
022	1.125	1.025
023	1.187	1.087
024	1.250	1.150
025	1.312	1.212
026	1.375	1.275
027	1.437	1.337
028	1.500	1.400
029	1.625	1.525
030	1.750	1.650
031	1.875	1.775
032	2.000	1.900
033	2.125	2.025
034	2.250	2.150
035	2.375	2.275
036	2.500	2.400
037	2.625	2.525
038	2.750	2.650
039	2.875	2.775
040	3.000	2.900
041	3.125	3.025
042	3.375	3.275
043	3.625	3.525
044	3.879	3.775
045	4.129	4.025
046	4.379	4.275
047	4.629	4.525
048	4.879	4.775
049	5.129	5.025
050	5.379	5.275
107	.412	.243
108	.443	.275
109	.505	.338
110	.568	.400
111	.630	.463
112	.693	.525
113	.755	.588
114	.818	.650
115	.880	.713
116	.943	.775
117	1.005	.838
118	1.068	.900
119	1.130	.963
120	1.193	1.025
121	1.255	1.088
122	1.318	1.150
123	1.380	1.213
124	1.443	1.275
125	1.505	1.338
126	1.568	1.400
127	1.630	1.463
128	1.693	1.525
129	1.755	1.588
130	1.818	1.650
131	1.880	1.713
132	1.943	1.775
133	2.005	1.838
134	2.068	1.900
135	2.131	1.963
136	2.193	2.025
137	2.256	2.088
138	2.312	2.150
139	2.375	2.213
140	2.437	2.275
141	2.500	2.338
142	2.562	2.400
143	2.625	2.463
144	2.687	2.525
145	2.750	2.588
146	2.812	2.650
147	2.875	2.713
148	2.937	2.775
149	3.000	2.838
150	3.062	2.900
151	3.187	3.025
152	3.437	3.275
153	3.687	3.525
154	3.937	3.775
155	4.187	4.025
156	4.437	4.275
157	4.687	4.525
158	4.937	4.775
159	5.187	5.025
160	5.437	5.275
161	5.687	5.525
162	5.937	5.775
163	6.187	6.025
164	6.437	6.275
165	6.687	6.525
166	6.937	6.775
167	7.187	7.025
168	7.437	7.275
169	7.687	7.525
170	7.937	7.775
171	8.187	8.025
172	8.437	8.275
173	8.687	8.525
174	8.937	8.775
175	9.187	9.025
176	9.437	9.275
177	9.687	9.525
178	9.937	9.775
204	.625	.403
205	.687	.465
206	.750	.528
207	.812	.590
208	.875	.653
209	.937	.715
210	1.000	.778
211	1.062	.840
212	1.125	.903
213	1.187	.965
214	1.250	1.028
215	1.312	1.090
216	1.375	1.153
217	1.437	1.215
218	1.500	1.278
219	1.562	1.340
220	1.625	1.403
221	1.687	1.465
222	1.750	1.528
223	1.875	1.653
224	2.000	1.778
225	2.125	1.903
226	2.250	2.028
227	2.375	2.153
228	2.500	2.278
229	2.625	2.403
230	2.750	2.528
231	2.875	2.653
232	3.000	2.778
233	3.125	2.903
234	3.250	3.028
235	3.375	3.153
236	3.500	3.278
237	3.625	3.403
238	3.750	3.528
239	3.875	3.653
240	4.000	3.778
241	4.125	3.903
242	4.250	4.028
243	4.375	4.153
244	4.500	4.278
245	4.625	4.403
246	4.750	4.528
247	4.875	4.653
248	5.000	4.778
249	5.125	4.903
250	5.250	5.028
251	5.375	5.153
252	5.500	5.278
253	5.625	5.403
254	5.750	5.528
255	5.875	5.653
256	6.000	5.778
257	6.125	5.903
258	6.250	6.028
259	6.500	6.278
260	6.750	6.528
261	7.000	6.778
262	7.250	7.028
263	7.500	7.278
264	7.750	7.528
265	8.000	7.778
266	6.250	8.028
267	8.500	8.278
268	8.750	8.528
269	9.000	8.778
270	9.250	9.028
271	9.500	9.278
272	9.750	9.528
273	10.000	9.778
274	10.250	10.028
275	10.750	10.528
276	11.250	11.028
277	11.750	11.528
278	12.250	12.028
279	13.250	13.028
280	14.250	14.028
281	15.250	15.028
282	16.250	16.028
283	17.250	17.028
284	18.250	18.028
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311	.937	.597
312	1.000	.660
313	1.062	.722
314	1.125	.785
315	1.187	.847
316	1.250	.910
317	1.312	.972
318	1.375	1.035
319	1.437	1.097
320	1.500	1.160
321	1.562	1.222
322	1.625	1.285
323	1.687	1.347
324	1.750	1.410
325	1.875	1.535
326	2.000	1.660
327	2.125	1.785
328	2.250	1.910
329	2.375	2.035
330	2.500	2.160
331	2.625	2.285
332	2.750	2.410
333	2.875	2.535
334	3.000	2.660
335	3.125	2.785
336	3.250	2.910
337	3.375	3.035
338	3.500	3.160
339	3.625	3.285
340	3.750	3.410
341	3.875	3.535
342	4.000	3.660
343	4.125	3.785
344	4.250	3.910
345	4.375	4.035
346	4.500	4.160
347	4.625	4.285
348	4.750	4.410
349	4.875	4.535
350	5.000	4.660
351	5.125	4.785
352	5.250	4.910
353	5.375	5.035
354	5.500	5.160
355	5.625	5.285
356	5.750	5.410
357	5.875	5.535
358	6.000	5.660
359	6.125	5.785
360	6.250	5.910
361	6.375	6.035
362	6.625	6.285
363	6.875	6.535
364	7.125	6.785
365	7.375	7.035
366	7.625	7.285
367	7.875	7.535
368	8.125	7.785
369	8.375	8.035
370	8.625	8.285
371	8.875	8.535
372	9.125	8.785
373	9.375	9.035
374	9.625	9.285
375	9.875	9.535
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379	11.375	11.035
380	11.875	11.535
381	12.375	12.035
382	13.375	13.035
383	14.375	14.035
384	15.375	15.035
385	16.375	16.035
386	17.375	17.035
387	18.375	18.035
388	19.375	19.035
389	20.375	20.035
390	21.375	21.035
391	22.375	22.035
392	23.375	23.035
393	24.375	24.035
394	25.375	25.035
395	26.375	26.035
425	5.000	4.548
426	5.125	4.673
427	5.250	4.798
428	5.375	4.923
429	5.500	5.048
430	5.625	5.173
431	5.750	5.298
432	5.875	5.423
433	6.000	5.548
434	6.125	5.673
435	6.250	5.798
436	6.375	5.923
437	6.500	6.048
438	6.750	6.298
439	7.000	6.548
440	7.250	6.798
441	7.500	7.048
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444	8.250	7.798
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463	17.500	17.048
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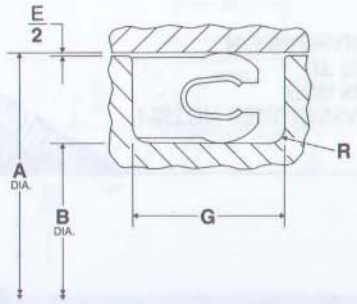
465	18.500	18.048
466	19.000	18.548
467	19.500	19.048
468	20.000	19.548
469	20.500	20.048
470	21.500	21.048
471	22.500	22.048
472	23.500	23.048
473	24.500	24.048
474	25.500	25.048
475	26.500	26.048



Dash No.	G Groove Width +.005-.000	R Groove Radius	E Diametral Clearance Max.
010-050	.093	.005-.015	.005
107-178	.140	.005-.015	.005
204-284	.187	.010-.025	.006
311-395	.281	.020-.035	.006
425-475	.375	.020-.035	.007

Part Numbering System

TF1188PXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

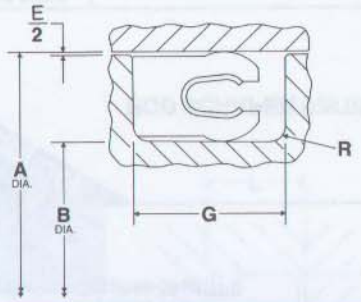
Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17-7PH SST
G	316 SST
H	302 SST

Tetrafluor

SEAL INSTALLATION
O.D. MOUNTED, STATIC ONLY
COMMERCIAL-INDUSTRIAL STANDARD

CODE IDENT	
07128	**TF1188P**

Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. ±.001	B Dia. ±.001	Dash No.	A Dia. +.002 −.001	B Dia. +.001 −.002	Dash No.	A Dia. +.002 −.001	B Dia. +.001 −.002
006	.250	.125	122	1.312	1.125	225	2.125	1.875	326	2.000	1.625	405	2.500	2.000
007	.281	.156	123	1.375	1.187	226	2.250	2.000	327	2.125	1.750	406	2.625	2.125
008	.312	.187	124	1.437	1.250	227	2.375	2.125	328	2.250	1.875	407	2.750	2.250
009	.343	.218	125	1.500	1.312	228	2.500	2.250	329	2.375	2.000	408	2.875	2.375
010	.375	.250	126	1.562	1.375	229	2.625	2.375	330	2.500	2.125	409	3.000	2.500
011	.437	.312	127	1.625	1.437	230	2.750	2.500	331	2.625	2.250	410	3.125	2.625
012	.500	.375	128	1.687	1.500	231	2.875	2.625	332	2.750	2.375	411	3.250	2.750
013	.562	.437	129	1.750	1.562	232	3.000	2.750	333	2.875	2.500	412	3.375	2.875
014	.625	.500	130	1.812	1.625	233	3.125	2.875	334	3.000	2.625	413	3.500	3.000
015	.687	.562	131	1.875	1.687	234	3.250	3.000	335	3.125	2.750	414	3.625	3.125
016	.750	.625	132	1.937	1.750	235	3.375	3.125	336	3.250	2.875	415	3.750	3.250
017	.812	.687	133	2.000	1.812	236	3.500	3.250	337	3.375	3.000	416	3.875	3.375
018	.875	.750	134	2.062	1.875	237	3.625	3.375	338	3.500	3.125	417	4.000	3.500
019	.937	.812	135	2.125	1.937	238	3.750	3.500	339	3.625	3.250	418	4.125	3.625
020	1.000	.875	136	2.187	2.000	239	3.875	3.625	340	3.750	3.375	419	4.250	3.750
021	1.062	.937	137	2.250	2.062	240	4.000	3.750	341	3.875	3.500	420	4.375	3.875
022	1.125	1.000	138	2.312	2.125	241	4.125	3.875	342	4.000	3.625	421	4.500	4.000
023	1.187	1.062	139	2.375	2.187	242	4.250	4.000	343	4.125	3.750	422	4.625	4.125
024	1.250	1.125	140	2.437	2.250	243	4.375	4.125	344	4.250	3.875	423	4.750	4.250
025	1.312	1.187	141	2.500	2.312	244	4.500	4.250	345	4.375	4.000	424	4.875	4.375
026	1.375	1.250	142	2.562	2.375	245	4.625	4.375	346	4.500	4.125	425	5.000	4.500
027	1.437	1.312	143	2.625	2.437	246	4.750	4.500	347	4.625	4.250	426	5.125	4.625
028	1.500	1.375	144	2.687	2.500	247	4.875	4.625	348	4.750	4.375	427	5.250	4.750
029	1.625	1.500	145	2.750	2.562	248	5.000	4.750	349	4.875	4.500	428	5.375	4.875
030	1.750	1.625	146	2.812	2.625	249	5.125	4.875	350	5.000	4.625	429	5.500	5.000
031	1.875	1.750	147	2.875	2.687	250	5.250	5.000	351	5.125	4.750	430	5.625	5.125
032	2.000	1.875	148	2.937	2.750	251	5.375	5.125	352	5.250	4.875	431	5.750	5.250
033	2.125	2.000	149	3.000	2.812	252	5.500	5.250	353	5.375	5.000	432	5.875	5.375
034	2.250	2.125	150	3.062	2.875	253	5.625	5.375	354	5.500	5.125	433	6.000	5.500
035	2.375	2.250	151	3.187	3.000	254	5.750	5.500	355	5.625	5.250	434	6.125	5.625
036	2.500	2.375	152	2.437	3.250	255	5.875	5.625	356	5.750	5.375	435	6.250	5.750
037	2.625	2.500	153	3.687	3.500	256	6.000	5.750	357	5.875	5.500		+.003 −.001	+.001 −.003
038	2.750	2.625	154	3.937	3.750	257	6.125	5.875	358	6.000	5.625			
039	2.875	2.750	155	4.187	4.000	258	6.250	6.000	359	6.125	5.750	436	6.375	5.875
040	3.000	2.875	156	4.437	4.250	259	6.500	6.250	360	6.250	5.875	437	6.500	6.000
041	3.125	3.000	157	4.687	4.500	260	6.750	6.500	361	6.375	6.000	438	6.750	6.250
042	3.375	3.250	158	4.937	4.750	261	7.000	6.750	362	6.625	6.250	439	7.000	6.500
043	3.625	3.500	159	5.187	5.000	262	7.250	7.000	363	6.875	6.500	440	7.250	6.750
044	3.875	3.750	160	5.437	5.250	263	7.500	7.250	364	7.125	6.750	441	7.500	7.000
045	4.125	4.000	161	5.687	5.500	264	7.750	7.500	365	7.375	7.000	442	7.750	7.250
046	4.375	4.250	208	.875	.625	265	8.000	7.750	366	7.625	7.250	443	8.000	7.500
106	.375	.187	209	.937	.687	266	8.250	8.000	367	7.875	7.500	444	8.250	7.750
107	.406	.219	210	1.000	.750	267	8.500	8.250	368	8.125	7.750	445	8.500	8.000
108	.437	.250	211	1.062	.812	268	8.750	8.500	369	8.375	8.000	446	9.000	8.500
109	.500	.312	212	1.125	.875	269	9.000	8.750	370	8.625	8.250	447	9.500	9.000
110	.562	.375	213	1.187	.937	270	9.250	9.000	371	8.875	8.500	448	10.000	9.500
111	.625	.437	214	1.250	1.000	316	1.250	.875	372	9.125	8.750	449	10.500	10.000
112	.687	.500	215	1.312	1.062	317	1.312	.937	373	9.375	9.000	450	11.000	10.500
113	.750	.562	216	1.375	1.125	318	1.375	1.000	374	9.625	9.250	451	11.500	11.000
114	.812	.625	217	1.437	1.187	319	1.437	1.062	375	9.875	9.500	452	12.000	11.500
115	.875	.687	218	1.500	1.250	320	1.500	1.125	376	10.125	9.750	453	12.500	12.000
116	.937	.750	219	1.562	1.312	321	1.562	1.187	377	10.375	10.000	454	13.000	12.500
117	1.000	.812	220	1.625	1.375	322	1.625	1.250	378	10.875	10.500	455	13.500	13.000
118	1.062	.875	221	1.687	1.437	323	1.687	1.312	401	2.000	1.500	456	14.000	13.500
119	1.125	.937	222	1.750	1.500	324	1.750	1.375	402	2.125	1.625	457	14.500	14.000
120	1.187	1.000	223	1.875	1.625	325	1.875	1.500	403	2.250	1.750	458	15.000	14.500
121	1.250	1.062	224	2.000	1.750				404	2.375	1.875	459	15.500	15.000
												460	16.000	15.500



Dash No.	G Groove Width +.010 −.000	R Groove Radius	E Diametral Clearance Max.
006-012	.094	.005-.015	.004
013-046	.094	.005-.015	.005
106-129	.141	.005-.015	.005
130-161	.141	.005-.015	.006
208-270	.188	.010-.025	.006
316-324	.281	.020-.035	.006
325-378	.281	.020-.035	.007
401-460	.375	.020-.035	.010

Part Numbering System

TF1288PXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17-7PH SST
G	316 SST
H	302 SST

Tetrafluor

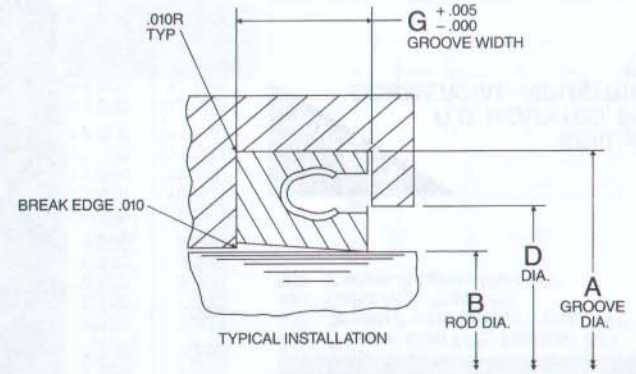
SEAL INSTALLATION
O.D. MOUNTED, DYNAMIC ONLY
COMMERCIAL-INDUSTRIAL STANDARD
PISTON SEALS

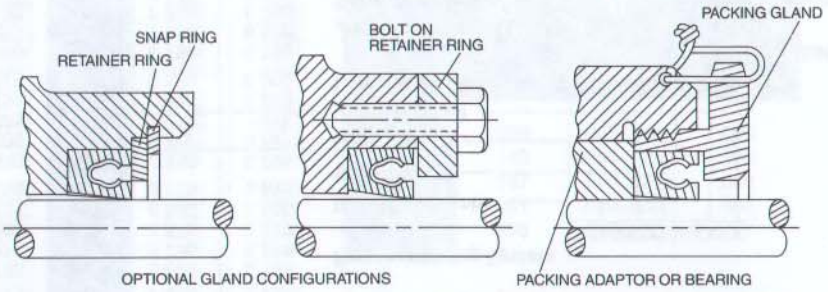
CODE IDENT 07128

TF1288P

Dash No.	A Groove	B Rod	D
	+.002 −.000	+.000 −.001	+.010 −.000
1/4	.436	.248	.354
5/16	.498	.310	.416
3/8	.561	.373	.479
7/16	.623	.435	.541
		+.000 −.002	
1	.766	.498	.635
2	.828	.560	.697
3	.891	.623	.760
4	.953	.685	.822
5	1.016	.748	.885
6	1.078	.810	.947
7	1.141	.873	1.010
8	1.203	.935	1.072
9	1.266	.998	1.135
10	1.328	1.060	1.197
11	1.391	1.123	1.260
12	1.453	1.185	1.322
13	1.516	1.248	1.385
14	1.578	1.310	1.447
15	1.641	1.373	1.510
16	1.703	1.435	1.572
17	1.766	1.498	1.635
18	1.891	1.623	1.760
19	2.016	1.748	1.885
20	2.141	1.873	2.010
21	2.266	1.998	2.135
22	2.391	2.123	2.260
23	2.516	2.248	2.385
24	2.641	2.373	2.510
25	2.766	2.498	2.635
26	2.971	2.623	2.780
27	3.096	2.748	2.905
28	3.221	2.873	3.030
29	3.345	2.997	3.154
30	3.470	3.122	3.279
31	3.595	3.247	3.404
32	3.720	3.372	3.529
33	3.845	3.497	3.654
34	3.970	3.622	3.779
35	4.095	3.747	3.904
36	4.220	3.872	4.029
37	4.345	3.997	4.154
38	4.470	4.122	4.279
39	4.595	4.247	4.404
40	4.720	4.372	4.529
	+.003 −.000	+.000 −.003	
41	4.845	4.497	4.654
42	4.970	4.622	4.779
43	5.095	4.747	4.904
44	5.220	4.872	5.029
45	5.345	4.997	5.154
46	5.470	5.122	5.279

Dash No.	A Groove	B Rod	D
	+.003 −.000	+.000 −.003	+.010 −.000
47	5.595	5.247	5.404
48	5.720	5.372	5.529
49	5.845	5.497	5.654
50	5.970	5.622	5.779
51	6.095	5.747	5.904
52	6.220	5.872	6.029
53	6.345	5.997	6.154
54	6.595	6.247	6.404
55	6.845	6.497	6.654
56	7.095	6.747	6.904
57	7.345	6.997	7.154
58	7.595	7.247	7.404
59	7.845	7.497	7.654
60	8.095	7.747	7.904
	+.005 −.000	+.000 −.003	+.010 −.000
61	8.345	7.997	8.154
62	8.845	8.497	8.654
63	9.345	8.997	9.154
64	9.845	9.497	9.654
65	10.345	9.997	10.154
66	10.845	10.497	10.654
67	11.345	10.997	11.154
68	11.845	11.497	11.654
69	12.345	11.997	12.154
70	12.845	12.497	12.654
71	13.345	12.997	13.154
	+.002 −.000	+.000 −.002	
501	.686	.498	.604
502	.748	.560	.666
503	.811	.623	.729
504	.873	.685	.791
505	.936	.748	.854
506	.998	.810	.916
507	1.061	.873	.979
508	1.123	.935	1.041
509	1.186	.998	1.104
510	1.248	1.060	1.166
511	1.311	1.123	1.229
512	1.373	1.185	1.291
513	1.436	1.248	1.354
514	1.498	1.310	1.416
515	1.561	1.373	1.479
516	1.623	1.435	1.541
517	1.686	1.498	1.604
518	1.811	1.623	1.729
519	1.936	1.748	1.854
520	2.061	1.873	1.979
521	2.186	1.998	2.104
522	2.311	2.123	2.229
523	2.436	2.248	2.354
524	2.561	2.373	2.479
525	2.686	2.498	2.604





Part Numbering System

TF 1388 — XXX — XXX X

- Basic Part Number
- Dash Number
- Jacket Material
- Spring Material

Dash No.	G Width
1/4 THRU 7/16	.144
1 THRU 25	.195
26 THRU 71	.240
501 THRU 525	.144

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17-7PH SST
G	316 SST
H	302 SST

Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Tetrafluor

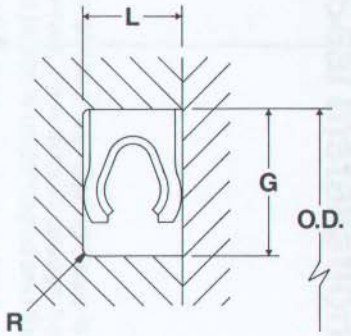
ROD SCRAPER INSTALLATION

CODE IDENT 07128

TF1388

Dash No.	O.D. ±.005	Dash No.	O.D. ±.005	Dash No.	O.D. ±.005	Dash No.	O.D. ±.005
008	.317	130	1.817	230	2.755	345	4.380
009	.348	131	1.880	231	2.880	346	4.505
010	.380	132	1.942	232	3.005	347	4.630
011	.442	133	2.005	233	3.130	348	4.755
012	.505	134	2.067	234	3.255	349	4.880
013	.567	135	2.130	235	3.380	425	5.005
014	.630	136	2.192	236	3.505	426	5.130
015	.692	137	2.255	237	3.630	427	5.255
016	.755	138	2.317	238	3.755	428	5.380
017	.817	139	2.380	239	3.880	429	5.505
018	.880	140	2.442	240	4.005	430	5.630
019	.942	141	2.505	241	4.130	431	5.755
020	1.005	142	2.567	242	4.255	432	5.880
021	1.067	143	2.630	243	4.380	433	6.005
022	1.130	144	2.692	244	4.505	434	6.130
023	1.192	145	2.755	245	4.630	435	6.255
024	1.255	146	2.817	246	4.755	436	6.380
025	1.317	147	2.880	247	4.880	437	6.505
026	1.380	148	2.942			438	6.755
027	1.442	149	3.005			439	7.005
028	1.505						
110	.567	210	1.005	325	1.880	440	7.255
111	.630	211	1.067	326	2.005	441	7.505
112	.692	212	1.130	327	2.130	442	7.755
113	.755	213	1.192	328	2.255	443	8.005
114	.817	214	1.255	329	2.380	444	8.255
115	.880	215	1.317	330	2.505	445	8.505
116	.942	216	1.380	331	2.630	446	9.005
117	1.005	217	1.442	332	2.755	447	9.505
118	1.067	218	1.505	333	2.880	448	10.005
119	1.130	219	1.567	334	3.005	449	10.505
120	1.192	220	1.630	335	3.130	450	11.005
121	1.255	221	1.692	336	3.255	451	11.505
122	1.317	222	1.755	337	3.380	452	12.005
123	1.380	223	1.880	338	3.505	453	12.505
124	1.442	224	2.005	339	3.630	454	13.005
125	1.505	225	2.130	340	3.755	455	13.505
126	1.567	226	2.255	341	3.880	456	14.005
127	1.630	227	2.380	342	4.005	457	14.505
128	1.692	228	2.505	343	4.130	458	15.005
129	1.755	229	2.630	344	4.255	459	15.505
						460	16.005

Dash No.	Gland Dimensions		
	L	G	R
008-028	.056/.058	.094/.104	.005/.015
110-149	.089/.091	.141/.151	
210-247	.121/.123	.188/.198	.010/.025
325-349	.186/.188	.281/.291	.020/.030
425-460	.238/.241	.375/.385	



Part Numbering System

TF888FXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon,® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17–7PH SST
G	316 SST
H	302 SST

Tetrafluor

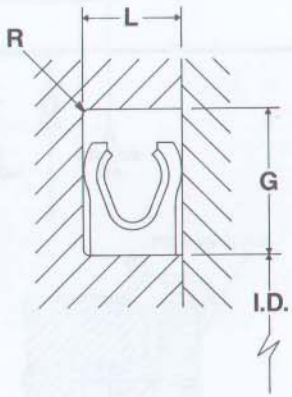
FACE SEAL,
INTERNAL PRESSURE

CODE IDENT
07128

TF 888F

Dash No.	I.D. ±.005	Dash No.	I.D. ±.005	Dash No.	I.D. ±.005	Dash No.	I.D. ±.005
008	.182	130	1.620	230	2.495	345	3.995
009	.213	131	1.682	231	2.620	346	4.120
010	.245	132	1.745	232	2.745	347	4.245
011	.307	133	1.807	233	2.870	348	4.370
012	.370	134	1.870	234	2.995	349	4.495
013	.432	135	1.932	235	3.120	425	4.495
014	.495	136	1.995	236	3.245	426	4.620
015	.557	137	2.057	237	3.370	427	4.745
016	.620	138	2.120	238	3.495	428	4.870
017	.682	139	2.182	239	3.620	429	4.995
018	.745	140	2.245	240	3.745	430	5.120
019	.807	141	2.307	241	3.870	431	5.245
020	.870	142	2.370	242	3.995	432	5.370
021	.932	143	2.432	243	4.120	433	5.495
022	.995	144	2.495	244	4.245	434	5.620
023	1.057	145	2.557	245	4.370	435	5.745
024	1.120	146	2.620	246	4.495	436	5.870
025	1.182	147	2.682	247	4.620	437	5.995
026	1.245	148	2.745			438	6.245
027	1.307	149	2.807			439	6.495
028	1.370						
110	.370	210	.745	325	1.495	440	6.745
111	.432	211	.805	326	1.620	441	6.995
112	.495	212	.870	327	1.745	442	7.245
113	.557	213	.932	328	1.870	443	7.495
114	.620	214	.995	329	1.995	444	
115	.682	215	1.057	330	2.120	445	7.995
116	.745	216	1.120	331	2.245	446	8.495
117	.807	217	1.182	332	2.370	447	8.995
118	.870	218	1.245	333	2.495	448	9.495
119	.932	219	1.307	334	2.620	449	9.995
120	.995	220	1.370	335	2.745	450	10.495
121	1.057	221	1.432	336	2.870	451	10.995
122	1.120	222	1.495	337	2.995	452	11.495
123	1.182	223	1.620	338	3.120	453	11.995
124	1.245	224	1.745	339	3.245	454	12.495
125	1.307	225	1.870	340	3.370	455	12.995
126	1.370	226	1.995	341	3.495	456	13.495
127	1.432	227	2.120	342	3.620	457	13.995
128	1.495	228	2.245	343	3.745	458	14.495
129	1.557	229	2.370	344	3.870	459	14.995
						460	15.495

Dash No.	Gland Dimensions		
	L	G	R
008-028	.056/.058	.094/.104	.005/.015
110-149	.089/.091	.141/.151	
210-247	.121/.123	.188/.198	.010/.025
325-349	.186/.188	.281/.291	.020/.030
425-460	.238/.241	.375/.385	



Part Numbering System

TF888EXXX-XXXX

- Basic Part Number
- Seal Type
- Dash Number
- Jacket Material
- Spring Material

Jacket Material Code

Code	Description
001	Virgin TFE
300	Polymer-filled TFE, Tetralon® 720
430	Tetralon,® wear-resistant virgin TFE
490	Glass-Moly-filled TFE
600	Carbon-Graphite-filled TFE

Spring Material Code

Code	Description
A	301 SST
B	Inconel 718
C	Elgiloy®
D	Hastelloy C
E	304 SST
F	17–7PH SST
G	316 SST
H	302 SST

Tetrafluor

FACE SEAL, EXTERNAL PRESSURE

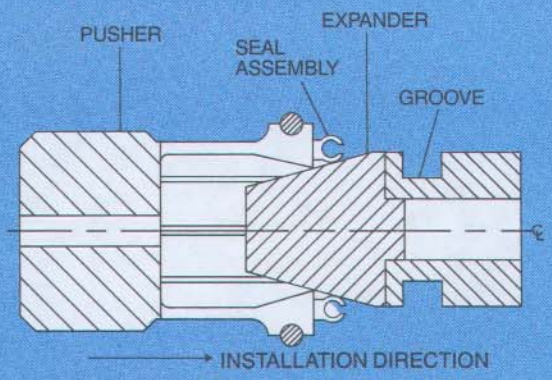
CODE IDENT
07128

TF 888E

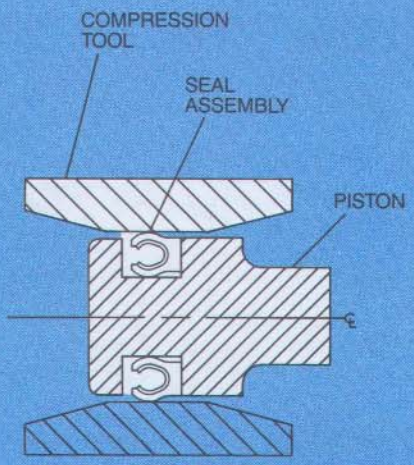
Spring Seal Installation

The installation of Tetrafluor Spring Seals is easy by the patented design features. However, care should always be taken during installation to assure that the jacket is undamaged and the seal is properly seated.

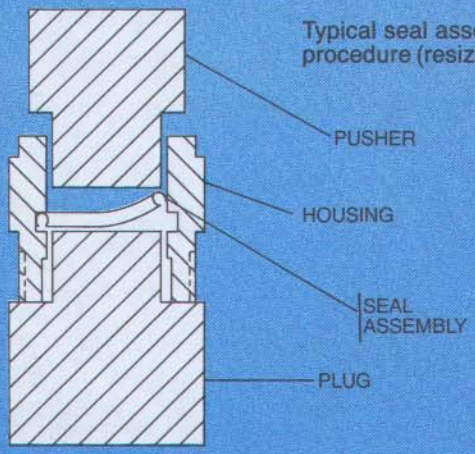
The illustration below shows some of the procedures for general installation techniques. Tetrafluor will supply tools or tool drawings on request to accommodate customer's hardware. Consult the factory regarding the method of installation and required tools best suited to your application.



Seal expansion over a ramp and into a one piece piston groove.



Typical seal assembly compression procedure (resizing) into groove.



Bore mounted rod seal installation using plug and pusher.

Alternate Design And Retrofit Information

Alternate Design

Tetrafluor spring energized seals are designed to be installed readily in standard O-ring grooves.

However, alternate seal gland housing configurations may be used safely for easy seal installation.

Figures 1 and 2 illustrate typical modified rod and piston seal gland housings.

Figure 3 illustrates a gland housing for a bi-directional piston seal.

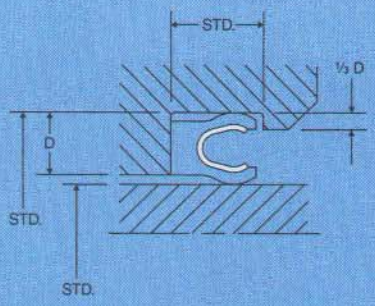


Figure 1

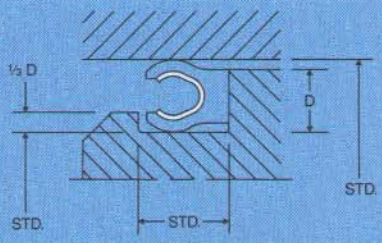
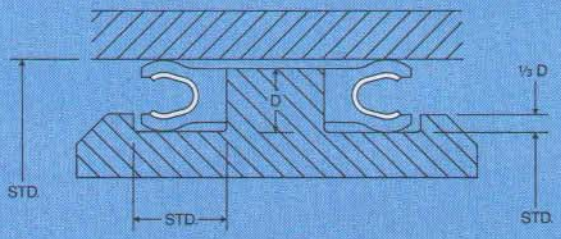


Figure 2



Bi-Directional Piston Seal

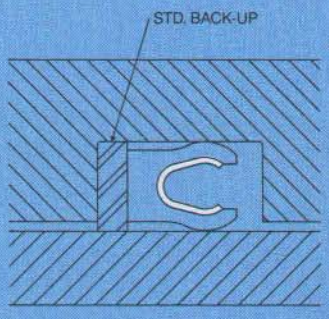
Figure 3

Alternate Retrofit

Tetrafluor spring energized seals can be used for retrofitting into existing seal glands.

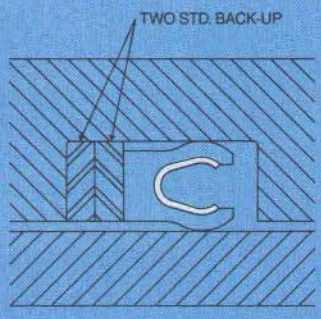
Standard spring energized seals are designed for installation into a no-backup gland.

For existing equipment that is configured for one or two backup ring groove widths, refer to Figures 4 and 5.



One Backup Ring Groove

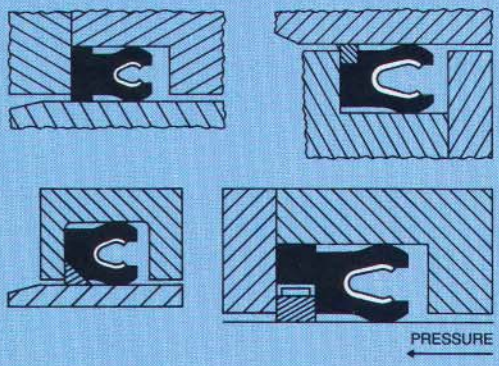
Figure 4



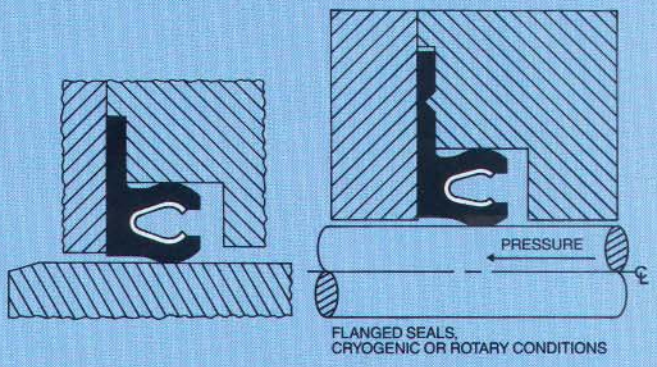
Two Backup Ring Groove

Figure 5

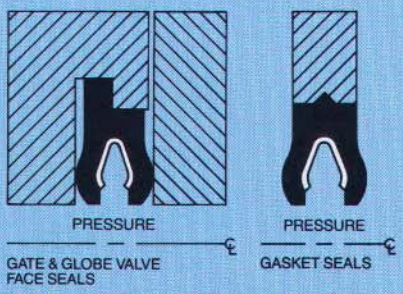
Special Applications



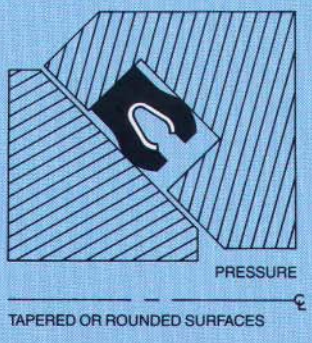
Anti-Extrusion Ring—In high pressure/high temperature dynamic applications, ring materials such as Tetra-Temp® PEEK resist deformation and extrusion. In some cases, the anti-extrusion ring is retained as an integral part in the heel of the seal for handling and installation. In wider glands, extrusion can be eliminated with one or two back-up rings.



Flanged Seal—For rotary applications, the hardware members lock the flanged heel in place to prevent seal rotation...For cryogenic applications, the flanged heel prevents shrinkage of the seal material from the O.D. mating surface.



Gasket Seals, Gate and Globe Valve Face Seals, Other Special Purpose Seals—To meet critical specifications or performance requirements, Tetrafluor can design and manufacture seals for virtually any need.



Symmetrical Cross Section Seals—To accommodate angular glands in conical or spherical hardware, angular planes can be machined. It is recommended that a Tetrafluor engineer should be consulted early in the design for application assistance.

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