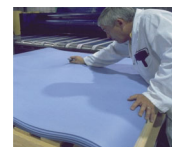
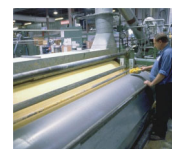
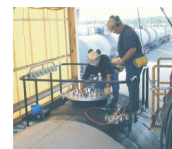




gasket

resources  
*incorporated*



# Technical Handbook

# GASKET RESOURCES INC.

## DURLON® GASKETING TECHNICAL HANDBOOK

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Updated August 15,2018

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**DURLON®** Products are manufactured  
In an ISO 9001:2015 certified facility



 **SAI GLOBAL**

**ISO 9001**

## GRI Genuine Viton™ is available in standard black Viton™ or Identa-Seal™ Viton™ B (Blue) or GF-S (Gold)



- FKM is an ASTM designation for the fluoroelastomer category.
  - FKM may indicate a fluoroelastomer but not the material grade or application.
- When an FKM is specified, at best you will get an “A” type Viton™ material only.
  - Other Viton™ grades including B and GF-S, better suited to your needs are available.
- Not all FKM materials are equivalent.
  - **Does your fluoroelastomer costs less? Is it a compromised imposter?**
  - Compromised composition results in increased risk of seal failure.
- How can you be sure you are getting the right grade of *fluoroelastomer* your application requires?
- **GRI Viton™ and Identa-Seal™** are licensed under the Genuine Viton™ program
  - If your application requires Viton™; make sure that you are getting 100% Viton™ *fluoroelastomer!*
  - Newer Viton™ grades from DuPont Performance Elastomers include those with APA (Advanced Polymer Architecture) technology.
  - GRI Identa-Seal B and GF-S are the only colored Viton™ materials in the DuPont SU2A.

Viton™ Family	Identa-Seal™ Name/Color	Principal Applications	Polymer Composition	Weight% Fluorine
<b>A</b>	<b>GRI-A / Black &amp; UV fluorescence</b>	General purpose sealing: Automotive, Aerospace fuels & lubricants	Dipolymers of VF2/HFP, bisphenol cure.	66%
<b>B</b>	<b>GRI-B / Identa-Seal Blue</b>	Chemical Process plant, Railroad Tank Cars & Tank Trucks, Power Utility Seals & Gaskets	Terpolymers of VF2/HFP/TFE, bisphenol cure.	~68%
<b>F</b>	<b>GRI-GF-S / Identa-Seal Gold</b> GRI uses the newest, most advanced Viton™ GF-S, which utilizes DuPont Performance Elastomers' Advanced Polymer Architecture (APA) polymerization and curing technology, which is a combination of specific design and control of molecular weight distribution, polymer chain branching, and new cure site monomers.	GRI-GF-S has slightly higher fluorine content over A, B, F or GF, which gives improved fluid resistance. GRI-GF-S has shown improved compression set and fluid resistance to the older technology GF polymer. Other properties, including low-temperature performance are equivalent.	Terpolymers of VF2/HFP/TFE peroxide cure, PLUS Advanced Polymer Architecture (APA) technology AND new proprietary cure site monomers (CSM).	70%

### Comparison Testing - Standard Black Viton™ vs. Colored GRI Identa-Seal™

Compound No./Style (Color)	15-01 B-Black	15-02 GRI-B-Blue	15-03 GF-S Black	15-04 GRI-GF-S Gold
<b>TEMPERATURE PROPERTIES</b>				
Low Temperature, T <sub>g</sub> , °C (°F)	-14 (7)	-14 (7)	-5 (23)	-6 (21)
Maximum Temperature °C (°F)	204 (400)	204 (400)	204 (400)	204 (400)

Identa-Seal™ is a trademark of Gasket Resources Inc.  
Gasket Resources Inc. is a Chemours licensee.

Viton™ is a registered trademark of The Chemours Company

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## Comparison Testing - Continued

Compound No./Style (Color)	15-01 B-Black	15-02 GRI-B-Blue	15-03 GF-S Black	15-04 GRI-GF-S Gold
<b><u>Benzene - 1000 hrs/23°C</u></b>				
Duro point change	-7	-7	0	0
Volume Swell, %	9.0	9.0	0	0
<b><u>Ethylene Glycol - 168 hrs/23°C</u></b>				
Duro point change	0	0	-1	2
Volume Swell, %	2	5	1	3
<b><u>Glycerin - 336 hrs/150°C</u></b>				
Duro point change	-1	0	1	-1
Volume Swell, %	1	1	1	2
<b><u>Hexane - 168 hrs/23°C</u></b>				
Duro point change	1	-2	0	3
Volume Swell, %	1	0	1	1
<b><u>Hexane - 1000 hrs/23°C</u></b>				
Duro point change	-2	-3	0	0
Volume Swell, %	2	2	0	0
<b><u>Methanol - 1000 hrs/23°C</u></b>				
Duro point change	-17	-15	-9	-5
Volume Swell, %	18	18	5	5
<b><u>Methylene Chloride - 168 hrs/23°C</u></b>				
Duro point change	-12	-10	-9	-4
Volume Swell, %	17	19	14	15
<b><u>Methylene Chloride - 1000 hrs/23°C</u></b>				
Duro point change	NR	NR	-13	-13
Volume Swell, %	NR	NR	15	14
<b><u>Nitric Acid - 1008 hrs/50°C/70%</u></b>				
Duro point change	NR	NR	-5	-3
Volume Swell, %	NR	NR	8	10
<b><u>Nitric Acid - 1000 hrs/23°C</u></b>				
Duro point change	NR	NR	-5	-7
Volume Swell, %	NR	NR	13	11
<b><u>Steam/80 PSIG - 672 hours</u></b>				
Duro point change	2	7	3	-1
Volume Swell, %	-1	-3	1	0
<b><u>Sulfuric Acid - 336 hours/70°C/96%</u></b>				
Duro point change	-3	-3	-2	-1
Volume Swell, %	8	8	2	4
<b><u>Sulfuric Acid - 672 hours/70°C/96%</u></b>				
Duro point change	-5	-5	-1	-3
Volume Swell, %	12	13	3	6
<b><u>RME Biodiesel - 336 hours/70°C</u></b>				
Duro point change	-2	-4	-5	-4
Volume Swell, %	2	3	2	2
<b><u>RME Biodiesel - 672 hours/70°C</u></b>				
Duro point change	-3	-3	-6	-5
Volume Swell, %	1	1	1	1

Additional information on compound testing and chemical resistance is available at  
[www.gasketresources.com](http://www.gasketresources.com)

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## Molded Rubber Gaskets

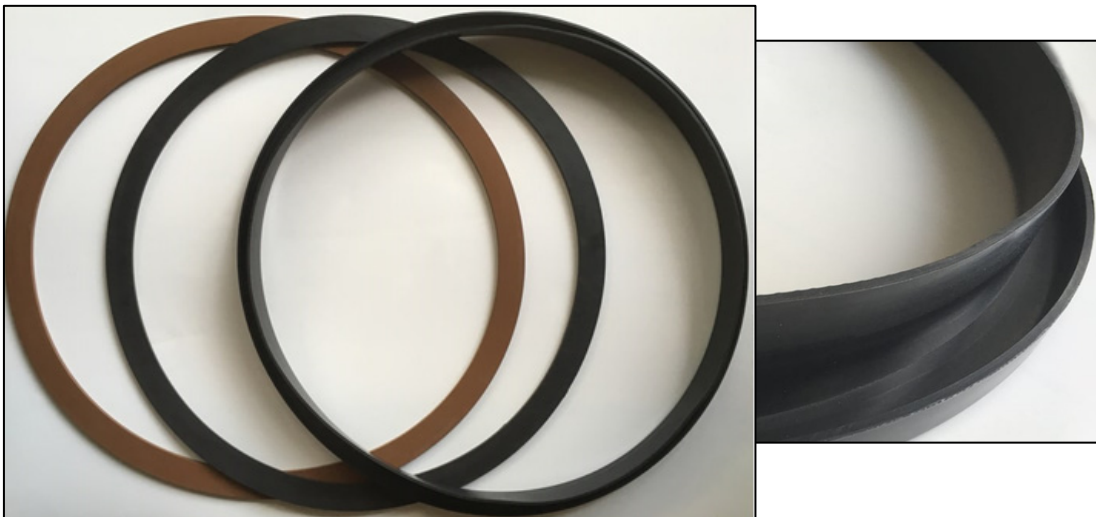
Our customized rubber gaskets, parts, and washers are manufactured using advanced fluoroelastomer (FKM, Viton) and a wide variety of elastomers and other synthetic (including EPDM/PTFE) rubber product technologies. Our extensive knowledge of compression molding techniques as well as our state-of-the-art research and development facility allow us to provide innovative and extensive sealing solutions that are practical and adhere to international safety protocols and standards. We pride ourselves on the production of durable and high-performance custom rubber molding parts for the most challenging applications.

Our Low Torque (LT) series of molded gaskets are engineered for low torque applications on metallic and non-metallic flanges with either flat or raised faces. At low torque, our triple rib design minimizes deformation on each rib extending the service life of the gasket and creating a long lasting seal. All Low Torque LT gaskets have complete traceability, identification and manufactured date for your reference.

Our industrial rubber gaskets, parts and washers are customized to effectively perform in air, water, acids, oils, steam, and various chemicals.

### HINGED & BOLTED MANWAY & NOZZLE RAILCAR GASKETS & MORE

We produce high performance molded rubber gaskets for hinged & bolted manways on railroad tank cars in both flat AAR styles, nozzle gaskets, and acid car gaskets. We also produce molded gaskets for non-metallic FRP flanges. Our fluoroelastomer (FKM, Viton) and other elastomers are guaranteed to provide exceptional sealing properties for a wide range of applications in high temperature and chemical environments. Our technicians will work with your company to customize materials that meet all specifications in the colors and durometers necessary. All GRI products undergo rigorous testing processes including leakage detection through every level of production.



## LATHE CUT GASKETS

Our Lathe Cut Gaskets and Seals are produced using fluoroelastomer (FKM, Viton), and a variety of other elastomers. We use molded cylinders and rolls in various durometers to produce custom rubber washers, rubber seals and rubber bushings up to 20-inches in outside diameter (OD). Our machinery allows for either straight or beveled cut end-products to meet your specifications. Our precision production process is environmentally friendly, reducing waste droppings and creating a savings for the customer.

All molded and lathe cut materials are manufactured in an ISO 9001:2015 certified facility and are subjected to rigid testing and quality controls.

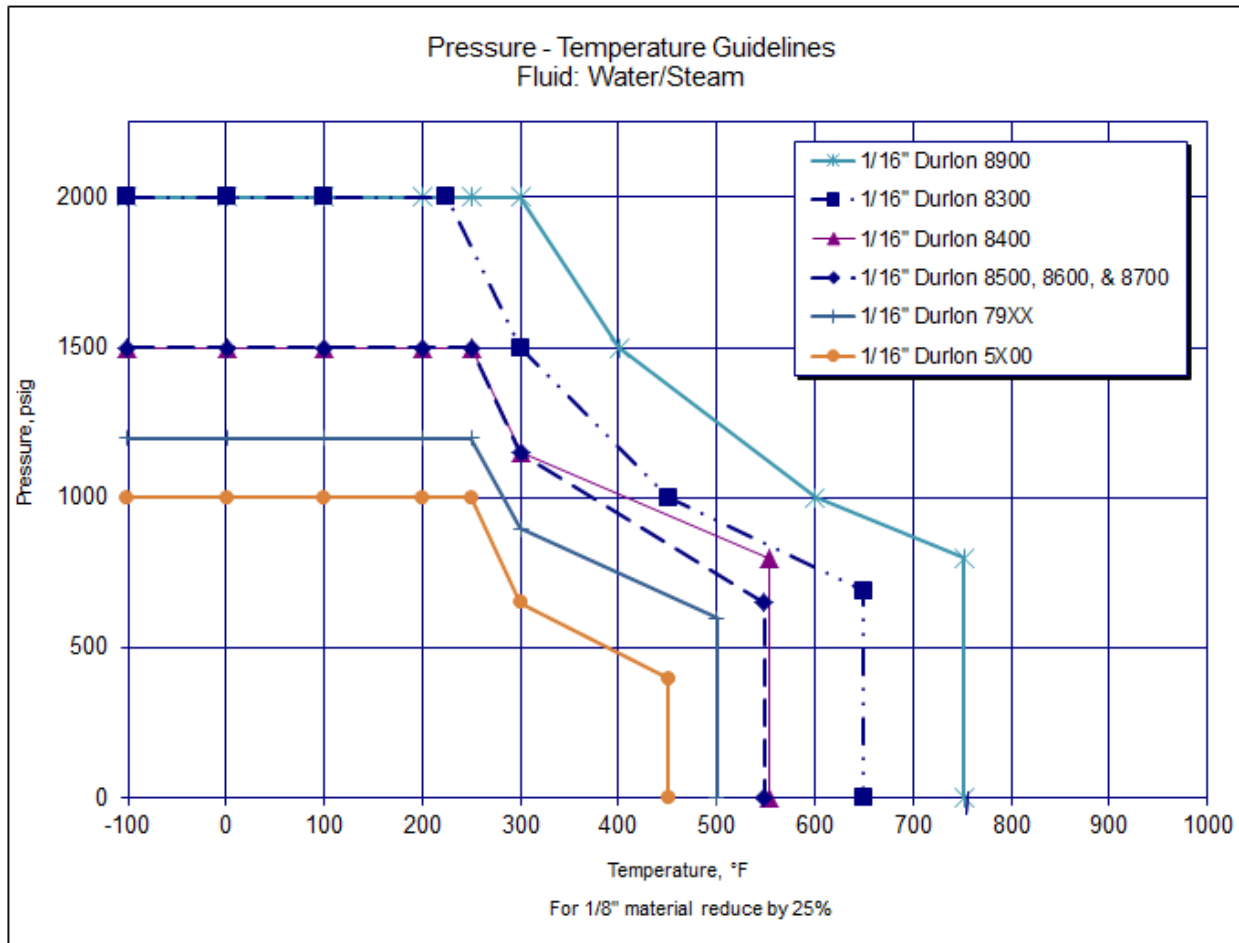
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Style	Composition	Description
5000	Inorganic/NBR Compressed Gasketing	DURLON® 5000 is a commercial grade compressed sheet gasket material for moderate service conditions. It is suitable for steam, oil, water, mild alkalis and acids, hydrocarbons and solvents.
5300	Inorganic/NBR ABS Product Design Assessment	DURLON® 5300 has the ABS Product Design Assessment (PDA) Certificate 14-HS1146798-PDA for intended service in Marine and Offshore Applications - Sealing Gasket for Steam, Oil, Water, Mild Alkalis and Acids, Hydrocarbons and Solvents.
7910	Aramid/NBR NSF 61 Certified	An economy grade general service compressed sheet with NBR rubber binder for mild service in piping and equipment and OEM applications in POTABLE WATER, steam, hydrocarbons and refrigerants.
7900/7925/ 7950	Aramid/NBR Compressed Gasketing	An economy grade general service compressed sheet with NBR rubber binder for mild service in piping and equipment and OEM applications in steam, hydrocarbons and refrigerants. An economical alternative when service ranges and applications are not severe.
7760 DuraSwell	Aramid/SBR Controlled Swell Material	An economy grade general service compressed sheet with SBR rubber binder for mild service in piping and equipment and OEM applications in steam, hydrocarbons and refrigerants. An economical alternative when service ranges and applications are not severe.
8300	Carbon Fibers with NBR Binders High Temperature	A premium grade compressed sheet, DURLON 8300 is excellent in steam and hydrocarbon services in the refining, petrochemical and power generation industries. Other applications include oil, water, mild alkalis, mild acids, and solvents. DURLON 8300 contains high strength carbon fibers bonded with nitrile (NBR) synthetic rubber.
8400	Phenolic Fibers with NBR Binder	With an extremely wide pH application range, DURLON 8400 can be used in process piping and equipment in chemical, pulp and paper, and other general industrial applications.
8500	Aramid-Inorganic Fibers with NBR Binder Passed 6FB 6 <sup>th</sup> Ed Fire Test, FDA Compliant	Our workhorse material, DURLON 8500 is excellent in steam, natural gas, soybean processing and with new generation refrigerants. A high quality general service gasket material for use in a wide range of services in pulp and paper, food, beverage, pharmaceutical, chemical, refinery, gas pipeline and general industry. FDA, FIRE TESTED: DURLON 8500 passed API 6FB fire test.
8600	Aramid-Inorganic Fibers with SBR Binder	A high quality gasket material containing high strength aramid and inorganic fibers bonded with SBR rubber. An excellent choice for steam or services where a white gasket material is required.
8700	Aramid-Inorganic Fibers with Neoprene Binder	A high performance compressed gasket material for use in processes that require a neoprene (CR) bonded sheet. Excellent for steam, oils and refrigeration services.
8900	Aramid-Inorganic Fibers with NBR Binder High Temperature / Superheated Steam  Passed 6FB 6 <sup>th</sup> Ed Fire Test	DURLON® 8900 is a premium grade gasket material for service conditions to 925°F (496°C) and continuous operating temperatures of -100°F to 752°F (-73°C to 400°C), or 2000 psi (13.8 MPa). It contains high strength fibers and graphite fillers. Rubber levels were optimized without compromising on physical properties at high temperature. FIRE TESTED: DURLON® 8900 passed the ANSI/API 607, 6th Edition Fire Test with zero leakage.

**Anti-Stick Properties:** Much effort has gone into improving the anti-stick release agents of all compressed DURLON® products. All DURLON® compressed gasket materials have passed the MIL-G-24696B Navy Adhesion Test (366°F/48 hrs).

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PxT Chart - DURLON® Compressed Fiber Gasket Materials



Note: Sheet type gaskets are not recommended for applications above Class 300 due to higher pressures.

## Cross-Reference

In General GRI/DURLON® Gasketing Can Be Used In The Same Conditions and Services As The Following: <sup>1</sup>

GRI/DURLON	Garlock	Flexitallic	Thermoseal	Teadit	Leader
Durlon 5000/5300	2550, 2900, 2950	SF-2400, 2401		NA1001	NA 59
Durlon 7900/7925/ 7950	2550, 2900, Blue-Gard® 3000	SF1600, AF 2100, AF-2400	Klinger®sil C-4201, C-4324, C-4401, 4300	NA1001	NA 60
Durlon 7910	3760-U			NA1082SAN	
Durlon 7760	3760			NA1088	
Durlon 8300	HTC-9800, HTC-9850, G- 9900, ST-706	SF 5000, 5001	Klinger®sil C-4500	NA1100	NA 1078
Durlon 8400	Blue-Gard® 3700, IFG 5500	–	Klinger®sil C-7400	–	986-A
Durlon 8500	Blue-Gard® 3000, IFG® 5500	SF 3300, SF 3500	Klinger®sil C-4401, C-4430, & C-4433	NA1081	NA 60
Durlon 8600	Blue-Gard® 3200, 3400	SF 2420	Klinger®sil C-6400	NA1080, NA1035	960, 961
Durlon 8700	Blue-Gard® 3300	SF 2440	Klinger®sil C-5400	NA1076	976
Durlon 8900	ST-706			NA1122	

<sup>1</sup> Refer to the manufacturer for PxT, chemical resistance and other compatibility information. Be sure application is within the service limits of each DURLON material.

Garlock, ST-706, HTC, Blue-Gard, IFG, are registered trademarks of Garlock, Inc.; Flexitallic is a registered trademark for gaskets of the Flexitallic Group; Klinger and Klingsil are registered trademarks of Klinger AG, Zug, Switzerland; Teadit is a registered trademark of Teadit NA.

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## Typical Physical Properties

DURLON® Style	5000		5300		7910		79XX		7760	
Color: (Branded)	5000 – Light Green		5300 – Rust		7910 – White		7900 – Off White 7925 – Green 7950 – Blue		7760 – Off White	
Fluid Services:	Steam, Oil, Water, Mild Alkalis and Acids, Solvents, Hydrocarbons		Steam, Fuel, Water, Marine/Offshore ABS PDA Cert.: 14-HS1146798-PDA		Potable water, Saturated Steam, Dilute Acids & Alkalis		Steam, Water, Oils, Fuels, Dilute Acids & Alkalis, Hydrocarbons		Steam, Water, Inert Gases, Oils, Fuels, Dilute Acids & Alkalis	
Fiber System:	Inorganic		Inorganic		Aramid/Inorganic		Aramid		Synthetic	
Binder:	Nitrile (NBR)		Nitrile (NBR)		Nitrile (NBR)		Nitrile (NBR)		Prop. SBR Blend	
Density, g/cc (lbs/cu. ft):	1.7 (106)		1.7 (106)		1.7 (106)		1.7 (106)		1.65 (103)	
Temperature, Range:	-100 to 550°F (-73 to 288°C)		-100 to 550°F (-73 to 288°C)		-100 to 700°F (-73 to 371°C)		-100 to 700°F (-73 to 371°C)		-100 to 650°F (-73 to 344°C)	
Continuous, max:	450°F(232°C)		450°F(232°C)		500°F (260°C)		500°F (260°C)		400°F (205°C)	
Pressure Max:	1000 psig (69 bar)		1000 psig (69 bar)		1200 psig (83 bar)		1200 psig (83 bar)		1000 psig (69 bar)	
ASTM F36, Compressibility	7-17%		7-17%		9-19%		7-17%		7-17%	
ASTM F36, Recovery	40%		40%		40%		40%		50%	
ASTM F38, Creep Relaxation	25%		25%		25%		20%		<30%	
ASTM F152, Tensile Strength across grain, psi (MPa)	1,500 (10.3)		1,500 (10.3)		1,600 (11.0)		1,600 (11.0)		2,100 (14.8)	
Fluid Resistance, pH Range (room temp) ASTM F146					3 to 11		3 to 11		3 to 11	
IRM 903 Oil 5h/300°F Thickness Increase	0 to 10%		5% Maximum		0 to 15%		0 to 15%		<75%	
Weight Increase	10%		15% Maximum		15%		15%		<50%	
ASTM Fuel B 5h/70°F Thickness Increase	0 to 10%		5% Maximum		0 to 10%		0 to 10%		15 to 30%	
Weight Increase	10% Max		15% Maximum		12% Max		12% Max		<30% Max	
Leachable Halides:	-		-		-		-		-	
Leachable Chlorides:	-		-		-		-		-	
Leakage: ASTM F2378	0.05 cc/min		0.1 cc/min		0.05 cc/min		0.05 cc/min		0.01 cc/min	
Volume Resistivity, ASTM D257, 1/16"	-		-		-		-		-	
Dielectric Breakdown, ASTM D149, 1/16"	-		-		-		11.0 kv/mm		-	
Fire Testing (Passed)	-		-		-		-		-	
Stress Relaxation, DIN 52913 @ 7252 psi (50 MPa)	-		-		-		-		-	
16 h @ 347°F (175°C)										
16 h @ 572°F (300°C)										
M&Y Values	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"
M Value	1.5	2.5	1.5	2.5	1.5	1.5	3	3.2	6.9	-
Y psi	1855	2619	1855	2619	2416	3576	3347	3385	2412	-
Gasket Factors:	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"	1/16"	1/8"
Gb psi	474	902	474	902	502	736	497	486	95	-
a	0.256	0.253	0.256	0.253	0.289	0.237	0.226	0.276	0.609	-
Gs psi	0.48	4	0.48	4	0.001	9.1	3	0.4	4	-
ASTM F147, Flexibility	10x		10x		10x		10x		4x	
ASTM F104 Line Call-Out	F712120-B4E12L051M5		F713110-B4E12L051M5		F712120-B3E22L151M5		F712120-B3E22L151M5		F722990-B5E09L100M9	

Note: ASTM and DIN properties based on 1/16" sheet thickness, except ASTM F38 which is based on 1/32" sheet thickness. This is a general guide only and should not be the sole means of accepting or rejecting this material. The data listed here falls within the normal range of product properties, but should not be used to establish specification limits nor used alone as the basis of design.

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8300	8400	8500	8600	8700	8900
Black	Gold	Green	Off-White	Blue	Black
Saturated Steam, Oils, Dilute Acids & Alkalis, Solvents Hydrocarbons	Steam, Oils, Fuels, Solvents, Caustics, Refrigerants, Dilute Acids & Alkalis	Saturated Steam, Oils, Refrigerants, Dilute Acids & Alkalis, Fuels, FDA COMPLIANT	Saturated Steam, Water, Dilute Acids & Alkalis, Inert Gases, Ammonia	Saturated Steam, Oils, Water, Dilute Acids & Alkalis, Refrigerants	Superheated Steam, Oil, Dilute Acids & Alkalis, Solvents, Hydrocarbons
Carbon	Phenolic	Aramid/Inorganic	Aramid/Inorganic	Aramid/Inorganic	Aramid/Inorganic
Nitrile (NBR)	Nitrile (NBR)	Nitrile (NBR)	SBR	CR	Nitrile (NBR)
1.6 (100)	1.7 (106)	1.6 (100)	1.7 (106)	1.7 (106)	1.6 (100)
-100 to 800°F (-73 to 427°C) 600°F (315°C)	-100 to 800°F (-73 to 427°C) 554°F (290°C)	-100 to 700°F (-73 to 371°C) 548°F (287°C)	-100 to 700°F (-73 to 371°C) 548°F (287°C)	-100 to 700°F (-73 to 371°C) 548°F (287°C)	-100 to 925°F (-73 to 496°C) 752°F (400°C)
1500 psig(103 bar)	1500 psig (103 bar)	1500 psig (103 bar)	1500 psig (103 bar)	1500 psig (103 bar)	2000 psig (138 bar)
8-16%	8-16%	8-16%	8-16%	8-16%	7-17%
50%	50%	50%	45%	45%	50%
18%	25%	20%	20%	20%	15% Max
1,800 (12.4)	1,800 (12.4)	2,000 (13.8)	1,800 (12.4)	1,800 (12.4)	2,000 (13.8)
3 to 11	2 to 13	3 to 11	3 to 11	3 to 11	3 to 11
0 to 10% 10%	0 to 15% 15%	0 to 15% 15%	15 to 30% 30%	0 to 15% 15%	3% Maximum 15% Maximum
0 to 10% 12% Max	0 to 10% 15% Max	0 to 10% 10% Max	5 to 20% 30% Max	0 to 15% 15% Max	4% Maximum 12% Maximum
500 ppm max.	1000 ppm max.	1000 ppm max.	-	-	-
200 ppm max.	400 ppm max.	100 ppm max.	-	-	-
0.05 cc/min	0.03 cc/min	0.03 cc/min	0.05 cc/min	0.05 cc/min	0.02 cc/min
5 x 10 <sup>9</sup> ohm-cm	3.1 x 10 <sup>13</sup> ohm-cm	4.2 x 10 <sup>13</sup> ohm-cm	4.2 x 10 <sup>13</sup> ohm-cm	4.2 x 10 <sup>13</sup> ohm-cm	4.01 x 10 <sup>0</sup> ohm-cm
0.04 kv/mm	14.6 kv/mm	11.7 kv/mm	11.7 kv/mm	11.7 kv/mm	N/A
-	API 607 4 <sup>th</sup> Ed	API 6FB (12/08 Ed)	-	-	API 607 6 <sup>TH</sup> Ed.
-	-	-	-	-	6500 psi (44.8 MPa) 6000 psi (41.4 MPa)
1/16" 1/8" 3.7 3.0 3515 4014	1/16" 1/8" 2.9 4.5 2410 3967	1/16" 1/8" 2.7 4.2 2359 2931	1/16" 1/8" 2.9 2450	1/16" 1/8" 3.1 5.0 3127 4000	1/16" 1/8" 4.8 7.3 4851 3730
1/16" 1/8" 512 413 0.427	1/16" 1/8" 380 391 0.311 0.321 0.01 0.014	1/16" 1/8" 650 400 0.33 0.35 200 20	1/16" 1/8" 343 866 0.325 0.273 0.3 37	1/16" 1/8" 546 758 0.455 0.34 12 0.01	1/16" 1/8" 915 567 0.428 0.556 0.02 0.26
10x	8x	10x	8x	8x	12x
F712120- B3E22L311M5	F712120- B4E22L911M5	F712120- B3E12L151M6	F712440- B3E24L152M5	F712330- B5E45L153M5	F712120- B2E21L101M6

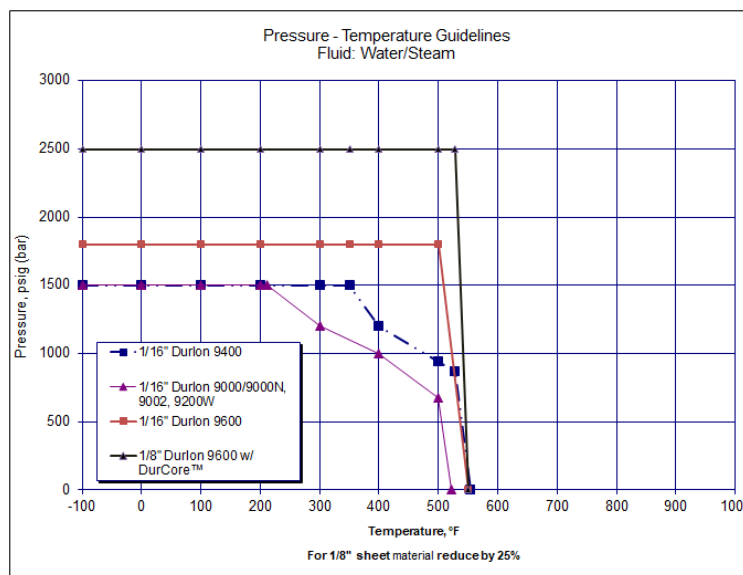
Note: ASTM and DIN properties based on 1/16" sheet thickness, except ASTM F38 which is based on 1/32" sheet thickness. This is a general guide only and should not be the sole means of accepting or rejecting this material. The data listed here falls within the normal range of product properties, but should not be used to establish specification limits nor used alone as the basis of design.

**Warning:** These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice. This edition cancels and obsoletes all previous editions.

Style	Composition	Description
9000/9000N	Pure PTFE resins with inorganic fillers	DURLON 9000/9000N is used extensively in chemical, pulp and paper, food and beverage and the railroad tankcar industries. It has been tested and approved for liquid chlorine, caustics, gaseous oxygen, and high purity applications in the pharmaceutical industry. The fillers are engineered shapes, homogeneously blended with pure PTFE resins that do not wick.
9002	Pure PTFE resins with inorganic fillers	Durlon® 9002 is an adaptation of the original glass filled formula to better meet extreme cryogenic system demands. Durlon® 9002 has passed both gaseous, [up to 500°F (260°C) and 754 psi (52 bar)] and liquid oxygen tests performed by BAM. Durlon® 9002 has also been tested for LOX Mechanical Impact Sensitivity. ABS Product Design Assessment and SOLAS 1974, Ch. II-1 (DNV-GL).
9200W	Pure PTFE resins with barium sulfate filler	Suitable for use in aggressive chemicals. Including caustics, hydrogen peroxide, sodium hypochlorite, nitric acid, liquors and digester in pulp and paper service. Applications In the chemical, pharmaceutical and plastics industries include butadiene, hydrofluoric acid, vinyl chloride, methyl methacrylates, and styrene.
9400	Pure PTFE resins with carbon filler	Carbon filled PTFE is approved as a material of construction for anhydrous hydrogen fluoride (AHF). DURLON 9400 also demonstrates good electrical conducting properties.
9600	Expanded PTFE	DURLON 9600 is an EXPANDED PTFE gasket material made with only pure PTFE resins. It is suitable for HF applications, use in steel flanges and flanges with irregular surfaces.
9600 with DurCore™	Expanded PTFE with DurCore™ Core Technology	DURLON 9600 is laminated to both sides of a superior SS316L DurCore™ core. The DurCore™ core technology goes beyond corrugated PTFE and is suitable for applications with cycling pressures, temperatures, and high vibration, while reducing the concern of blowouts.

- ◆ **Independent testing** has shown the fillers in the DURLON method to be more homogeneously blended than calendered, or layered filled PTFE gasket materials, giving DURLON filled PTFE's more consistent physical and mechanical properties without voids, separation and chemical compatibility problems found in the layered construction method.
- ◆ **Fabrication Services.** DURLON Filled PTFE is available in LATHE CUT, STEP GASKETS, REDUCED CONTACT AREA (RCA) and factory WELDED for diameters over 60".

### PxT Chart - DURLON® PTFE Gasket Materials



Note: Note: Sheet type gaskets are not recommended for applications above Class 300 due to higher pressures. 9600 Durcore is a semi-metallic gasket and can be used in higher pressure classes.

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## Typical Physical Properties

DURLON® Style	9000/9000N/9002	9200W	9400	9600	9600 DurCore™
Color:	9000 – Blue <sup>1,2,4,5</sup> 9000N- White <sup>1,2,4,5</sup> 9002 – Blue <sup>3,4,5</sup>	Granite White	Black	White	White
Fluid Services:	Steam, Oils, TiO <sub>2</sub> , ClO <sub>2</sub> , Liquid Chlorine, Acids, Caustics, H <sub>2</sub> O <sub>2</sub> , Liquid Oxygen, Oleum	Steam, Nitric Acid, TiO <sub>2</sub> , ClO <sub>2</sub> , H <sub>2</sub> O <sub>2</sub> , Liquors, Sulfur Dioxide, Brown Stock, Phosphoric Acid	Acids, Aqueous and Anhydrous Hydrogen Fluoride, Steam, Fuels, Oils, Alcohols	Aqueous and Anhydrous Hydrogen Fluoride, Steam, Oils, Caustics, Acids, Alcohols	Anhydrous Hydrogen Fluoride, Steam, Oils, Caustics, Acids, High pressure, Cycling Applications
Filler System:	Inorganic	Barium Sulfate	Carbon	—	—
Resin System:	Pure PTFE	Pure PTFE	Pure PTFE	Pure Expanded PTFE	Pure Expanded PTFE
Temperature, Range:	-350 to 520°F (-212 to 271°C)	-350 to 520°F (-212 to 271°C)	-350 to 550°F (-212 to 288°C)	-350 to 600°F (-212 to 316°C)	-350 to 600°F (-212 to 316°C)
Continuous, max:	500°F (260°C)	500°F (260°C)	500°F (260°C)	500°F (260°C)	500°F (260°C)
Pressure Max:	1500 psig (103 bar)	1500 psig (103 bar)	1500 psig (103 bar)	1800 psig (124 bar)	4600 psig (320 bar)
Density, g/cc (lbs/cu. ft):	2.2 (138)	2.5 (156)	2.1 (135)	0.8 (49.9)	N/A
ASTM F36, Compressibility	8-16%	8-16%	5-12%	40-60%	N/A
ASTM F36, Recovery	40%	35%	40%	12%	N/A
ASTM F38, Creep Relaxation	30%	30%	30%	30%	N/A
ASTM F152, Tensile Strength across grain, psi (MPa)	2,000 (13.8)	1920 (13.2)	2100 (14.5)	—	N/A
Fluid Resistance, pH Range (room temperature)	0 to 14	0 to 14	0 to 14	0 to 14	0 to 14
Leakage: ASTM F2378	0.01 cc/min	0.01 cc/min	0.01 cc/min	0.01 cc/min	0.01 cc/min
Leakage: TA-Luft (VDI 2440) 1 bar (14.5 psig) @ 180°C (392°F)	7.55 x 10 <sup>-6</sup> mbar-l/(m·s)	1.89 x 10 <sup>-5</sup> mbar-l/(m·s)	-	-	-
M&Y Values	1/16" 1/8"	1/16" 1/8"	1/16" 1/8"	1/16" 1/8"	1/8" 1/8"
M Value	2.2 4.6	1.5 4.2	6.8	1.5	833 (5.74)
Y psi (MPa)	1937 (13.4) 1639 (11.3)	952 (6.6) 827 (5.7)	2765 (19.1)	833 (5.74)	204 (1.41)
Gasket Factors	1/16" 1/8"	1/16" 1/8"	1/16" 1/8"	1/16" 1/8"	1/8" 1/8"
Gb psi (MPa)	639 (4.4) 495 (3.41)	153 (1.05) 96 (0.66)	1701 (11.7) 1412 (9.7)	1200 (8.3) 1400 (9.65)	204 (1.41)
a	0.22 0.262	0.36 0.437	0.173 0.164	0.2 0.2	0.316
Gs psi (MPa)	55 (0.38) 65 (1.45)	15 (0.1) 14 (0.1)	99 (0.68) 248 (1.7)	3.5 (.024) 1.5 (0.01)	0.0 (0)
ASTM F104 Line Call-Out:	F452111-A9B5E11K6M6	F452111-A9B5E11K6M5	F452111-A9B5E11K6M6	F428111-A9B5	F868: 9FMF2
Notes:	1. Pamphlet 95, The Chlorine Institute 2. Gaseous O <sub>2</sub> -BAM 3. Liquid O <sub>2</sub> -BAM 4. Conforms to FDA & USP Class VI 5. ABS PDA/ DNV-GL	1. O <sub>2</sub> Certified - BAM 2. Conforms to FDA 3. ABS PDA	—	1. Conforms to FDA & USP Class VI 2. ABS PDA	—

Note: ASTM and DIN properties based on 1/16" sheet thickness, except ASTM F38 which is based on 1/32" sheet thickness. This is a general guide only and should not be the sole means of accepting or rejecting this material. The data listed here falls within the normal range of product properties, but should not be used to establish specification limits nor used alone as the basis of design.

## Cross-Reference

In General, GRI/DURLON® Gasketing Can Be Used In The Same Conditions and Services As The Following: <sup>1</sup>

GRI/DURLON	Garlock	Flexitallic	TherMOseal	Teadit	Leader
Durlon 9000/9000N, 9002	Gylon 3500, 3504 <sup>2</sup> , 3510 <sup>3</sup>	Sigma 500, 511 <sup>2</sup> , 533 <sup>3</sup>	TopChem 2000, 2003, 2005, 2006 <sup>3</sup>	Tealon TF1590, Tealon TF1570	Clipperlon 2100, 2110
Durlon 9200W	Gylon 3510	Sigma 533	TopChem 2003	Tealon TF1580	Clipperlon 2120
Durlon 9400	Gylon 3530	<b>W.L. Gore</b>	<b>Intertech®</b>	n/a	n/a
Durlon 9600	Gylon 3540, 3545	Gore-Tex® GR	SQ-S	Qwimflex SH	Clipperlon 2130

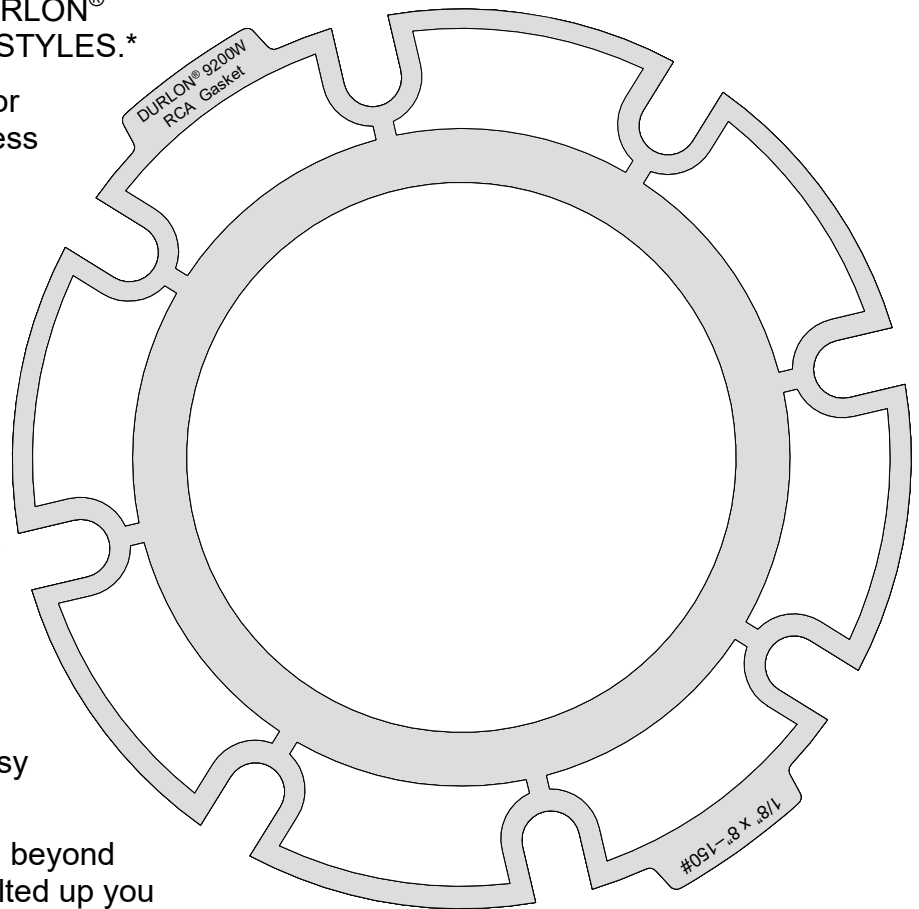
<sup>1</sup> Refer to the manufacturer for PXT, chemical resistance and other compatibility information. Be sure application is within the service limits of each material.

<sup>2</sup> Check torque for non-metallic flanges. <sup>3</sup> Exception, hydrofluoric acid.

Flexitallic and Sigma are registered trademarks for gaskets of Flexitallic Group; Intertech and SQ-S are registered trademarks of Intertech, Inc.; Garlock and Gylon are registered trademarks of Garlock, Inc.; Gore-Tex and GR are registered trademarks of W.L. Gore & Associates, Inc. TopChem is a registered trademark of Rich. Klingner Dichtungstechnik GmbH & Co. KG. Teadit and Qwimflex are registered trademarks of Teadit NA; Tealon is the trademark of Chemours CO FC LLC, licensed exclusively to Teadit; Clipperlon is a registered trademark of LGT Corporation

## The RCA™ (Reduced Contact Area) Full Face Gasket Sealing System

- **AVAILABILITY:** 1/16" & 1/8" DURLON® PTFE STYLES and 1/16" CNA STYLES.\*
- For FRP, PVC, GLASS LINED or STEEL flanges where a low stress gasket is required.
- **REDUCED CONTACT AREA = LOWER SEATING STRESS.**
- **LOWER SEALING STRESS** versus standard full face gaskets.
- **AVAILABLE SIZES:** 1 – 24" Class 150 Full Face RCA
- **SIGNIFICANT COST SAVINGS** cut from standard DURLON® sheet.
- **RCA FULL FACE REPLACES** standard Full Face gaskets.
- **ALIGNMENT GUIDES** – For easy positioning during installation
- **IDENTIFICATION TABS** extend beyond the flange OD so even when bolted up you know the size and the gasket material being used.



The DURLON® RCA™ full face gasket sealing system is a combination of DURLON® gasket materials and a REDUCED CONTACT AREA FULL FACE GASKET configuration for sealing applications requiring low gasket stresses.

The RCA sealing system combined with DURLON® PTFE STYLES can REPLACE STANDARD FULL FACE GASKETS in FRP, PVC, and in other nonmetallic and metallic pipe flanges where a low stress gasket is required. It is designed for use in piping and equipment in chemical, pulp and paper, food and beverage and other general industrial applications where resistance to highly aggressive chemicals is required.

The RCA™ configuration reduces total gasket contact area resulting in a lower seating stress at a given torque level, while preventing flange rotation. The RCA™ configuration can be cut from 1/16" or 1/8" DURLON® 9000, 9000N, 9200W or 9600, or 1/16" DURLON® CNA sheet resulting in a cost savings vs. other low stress gaskets.

\* Refer to the respective Durlon® material selection in this handbook for specific information on each product.

## Flexible Graphite Sheet

DURLON® Flexible Graphite is unaffected by heat over a wide range of temperatures. It exhibits low electrical resistivity and high thermal conductivity and is suitable for cryogenic temperatures. This product is suitable for applications in the automotive, refining and petrochemical plant processes.

Style	Composition	Description
<b>FGS95</b>	Homogeneous Flexible Graphite	Standard industrial grade sheet containing no binders or resins. Used in industrial applications such as oil refineries, power plants and chemical process plants.
<b>FGL316</b>	Laminated 0.002" Stainless 316 Foil Core/Flexible Graphite	Standard industrial grade sheet laminated with an adhesive bond on both sides of a .002" thick 316 stainless steel foil insert. Used where high performance and handleability is important.
<b>FGT316</b>	Laminated 0.004" Stainless 316 Tang Core/Flexible Graphite	Standard industrial grade sheet mechanically bonded on both sides of a .004" thick 316 stainless steel metal tang core. Used where stresses and pressures are high and improved handleability is important.
<b>FGM316</b>	Inhibited flexible graphite sheet laminated with multiple layers of 0.004" 316SS foil	Inhibited flexible graphite sheet adhesively bonded to multiple layers of .004" thick 316 stainless steel foil. Used where stresses and pressures are high and improved handleability is important. Fire safe.

## Typical Properties

Test Method	FGS95	FGL316	FGT316	FGM316
Temperature				
Min.	-450°F (-260°C)	-450°F (-260°C)	-450°F (-260°C)	-450°F (-260°C)
Max, In air	850°F (454°C)	850°F (454°C)	850°F (454°C)	1022°F (550°C)
Max, In Steam	1200°F (650°C)	1200°F (650°C)	1200°F (650°C)	1200°F (650°C)
Carbon Content, %	≥98	≥98	≥98	≥99
Graphite Grade	Standard	Standard	Standard	Super Inhibited
Pressure, Max: psi (bar)	3000 (207)	3000 (207)	3000 (207)	3625 (250)
Compressibility, % ASTM F36	35-40	35-40	35-40	30-40
Recovery, %	20	18	20	15-15
Creep Relaxation, % ASTM F38	5	5	5	5
Ignition Loss, % ASTM F495				
@ 850°F (454°C)	1	1	1	<1
@ 1200°F (650°C)	8	6	6	<3
Sealability, ASTM F2378	0.40	0.40	0.80	0.40
ASTM F104 & F868	F104:	F868:	F868:	F868:
Line Call Out	F517000B1M3	9FMF2	9FMF1	9FMF2

Note: ASTM and DIN properties based on 1/16" sheet thickness, except ASTM F38 which is based on 1/32" sheet thickness. This is a general guide only and should not be the sole means of accepting or rejecting this material. The data listed here falls within the normal range of product properties, but should not be used to establish specification limits nor used alone as the basis of design.

## Cross-Reference

In General, GRI/DURLON® Gasketing Can Be Used In The Same Conditions and Services As The Following: <sup>1</sup>

GRI/DURLON	Garlock	Flexitallic	Thermoseal	Graphoil	Teadit
FGS95	Graph-Lock 3123	Flexicarb LS	HL	GT™B	2660/1660
FGL316	Graph-Lock 3125SS	Flexicarb SR	SLS	GH™R	2661/1661
FGT316	Graph-Lock 3125TC	Flexicarb ST	PSM	GH™E	2663/1663
FGM316	Hochdruck® 3128				GR1700

<sup>1</sup> Refer to the manufacturer for PXT, chemical resistance and other compatibility information. Be sure application is within the service limits of each material.

Flexicarb, LS, SR and ST are registered trademarks of the Flexitallic Group  
 Garlock, and Graph-Lock are registered trademarks of Garlock, Inc.  
 Teadit is a registered trademark of Teadit

Thermoseal, Inc. A Klinger Licensee.  
 Graphoil®, GT™B, GH™R and GH™E are registered trademarks of Graftech, Inc.

**Warning:** These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice. This edition cancels and obsoletes all previous editions.

## Durlon® CFG - Corrugated Flexible Graphite

Style	Composition	Description
CFG	Flexible Graphite / Corrugated Stainless 316 Core	Designed for severe service conditions, the proprietary design of the corrugations gives <b>CFG</b> its superior sealing and recovery characteristics for tough conditions in the refining, chemical, petrochemical and pulp and paper industries. <b>CFG</b> is suitable for service in steam, oil, water, mild alkalis, hydrocarbons mild acids, and solvents.

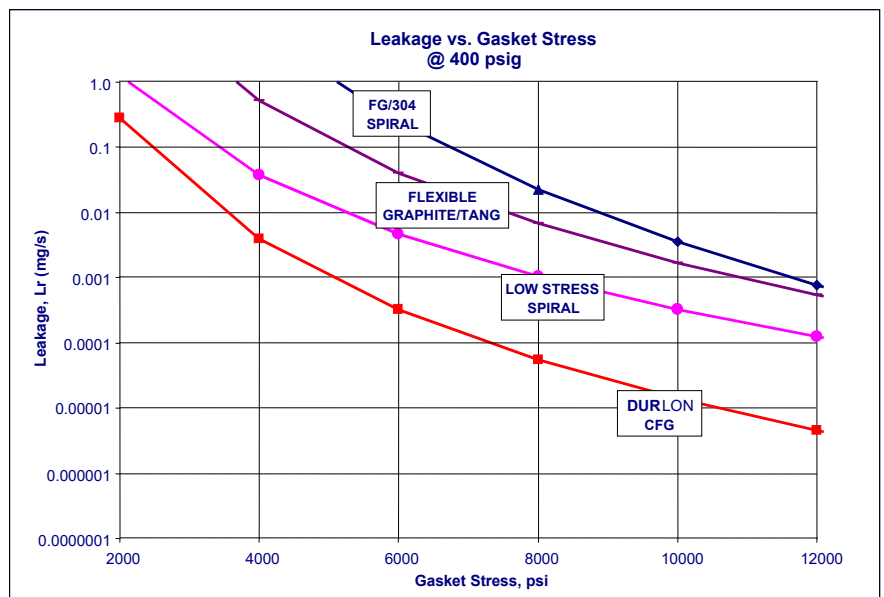
DURLON CFG will maintain a tight seal in a wide range of initial seating stresses making it the universal replacement for spiral wound, double jacketed and traditional flexible graphite in Class 150 & Class 300 applications.

### Sizes & Types:

- ◆ Standard ANSI Class 150 and 300 Ring and Full Face: 1/2" – 24"
- ◆ Non Standard MSS SP-44 & API 605: 26" – 96"
- ◆ Non Standard Ovals: Handhole and Manway Gaskets
- ◆ All Heat Exchanger Styles
- ◆ Different metals available to match flange metallurgy, temperature or chemical.

### Advantages:

- ◆ **Fire tested/fire resistant** – Passed the modified API 607 fire test
- ◆ **Recovery/Spring Back** characteristics for excellent sealing and thermal cycling.
- ◆ **Blow Out Resistant** – Metal core counteracts internal pressure spikes.
- ◆ **Superior Emissions Control** – DIN 3535 gas permeability/leakage <0.01 cc/min
- ◆ **Easy to handle, easy to install.**
- ◆ Seals tightly with lower bolt loads vs. spiral wounds.
  - ◆ **One thickness** – 3/32" for all applications



### Physical Properties:

Temperature, Min: -328°F (-200°C)  
 Max, In Air: 850°F (454°C)  
 In Steam: 1200°F (650°C)  
 Pressure, Max: 3,000 psi (207 bar)  
 pH Range: 0-14

Gasket Factors:  
 Gb 557 psi (3.8 MPa)  
 a 0.325  
 Gs 2.21 psi (0.02 MPa)

M&Y Values  
 M Factor: 2.6  
 Y psi (MPa) 3770 (26.0)

### Cross-Reference

In General, GRI/DURLON® Gasketing Can Be Used In The Same Conditions and Services As The Following: <sup>1</sup>

GRI/DURLON	Garlock	Clipper
CFG	Graphonic	ElastaGraph™

<sup>1</sup> Refer to the manufacturer for P×T, chemical resistance and other compatibility information. Be sure application is within the service limits of each DURLON material.

Durlon® Durtec®

Style	Composition	Description
DURTEC®	Flexible Graphite / Durcore™ Stainless 316 Core	Durcore™ is a specially engineered corrugated metal core that is bonded on both sides with soft covering layers, typically flexible graphite. The core is produced by patented technology that allows the finished gasket to have the best possible mechanical support function. Corrugations in the DURTEC® core are virtually uncrushable and will not flatten out unlike corrugated metal core gaskets. The precision construction guarantees that Durlon® DURTEC® gaskets will have excellent sealing characteristics under both low & high compressive loads.

Sizes & Types:

- ◆ Standard ASME, DIN, JIS, and BS EN sizes
- ◆ Non-Standard MSS SP-44, API 605, and other sizes up to 236" (6m) in diameter
- ◆ Ovals (normal or irregular), manways, track shapes, diamonds, squares/rectangles, with ribs, etc
- ◆ All Heat Exchanger Styles
- ◆ Standard core material is 316L stainless steel. Other core materials are available.
- ◆ Standard facing is inhibited flexible graphite, 1/8" thickness
- Other facing materials include Durlon® 9600 expanded PTFE (see DurCore™ with 9600), HT1000 (mica) or ceramic (see Durlon ETG – Extreme Temperature Gasket).

Advantages:

- ◆ **Fire tested/fire resistant** – Graphite faced Durtec passed the modified API 607 fire test  
Test results of API Standard 607 4th Edition with Exxon Modifications
  - Average bolt torque loss (with no adjustments):  
Upstream 45%; Downstream 33%
  - Fire & Cool Down: Combined Leak Rate (2 gaskets)  
0 mL/min at 30 psig avg.
  - Post Burn: Combined Leak Rate (2 gaskets)  
0 mL/min at 30 psig avg.
  - Exxon Requirements Post Burn: Combined Leak Rate (2 gaskets) with no flange bolt retorques at any test pressure
- ◆ **Superior DURCORE™ Core Technology**, engineered corrugation spacing and pitch results in an enhanced, higher performing gasket material.
- ◆ **Can be used in higher pressure classes:** Class 150 – Class 2500.
- ◆ **Blow Out Resistant** – Metal core counteracts internal pressure spikes.
- ◆ **Superior Emissions Control** –  
DIN 3535 gas permeability/leakage <0.01 cc/min
- ◆ **Seals tightly** at lower bolt loads. Can be used in place of spiral wounds and kammprofile gaskets.

Physical Properties:

Temperature, Min:	-328°F (-200°C)	Gasket Factors (w/FG):	
Temperature, Max:		Gb	187 psi (1.3 MPa)
Graphite/Air:	1022°F (550°C)	a	0.467
ETG w/HT1000/Air*:	1832°F (1000°C)	Gs	0.5 psi (0.0 MPa)
* Depends on core metallurgy		M&Y Values (w/FG)	
9600 (ePTFE)/Air:	520°F (271°C)	M Factor:	1.5
Pressure, Max:	4,600 psi (318 bar)	Y psi (MPa)	833 (26 MPa)
pH Range:	0-14		

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Durlon® Spiral Wound Gaskets (SWG) are made with an alternating combination of preformed engineered metal strip and a more compressible filler material, which creates an excellent seal when compressed. The engineered shape of the metal strip acts as a spring under load, resulting in a very resilient seal under varying conditions.

The strip metallurgy and filler material can be selected to seal a wide range of applications. All Durlon® SWG styles have been engineered to precise manufacturing tolerances that allow for lower stress (bolt load) sealing compared to conventional spiral wound gaskets.

Durlon® spiral wound gaskets are manufactured according to ASME B16.20 standards.

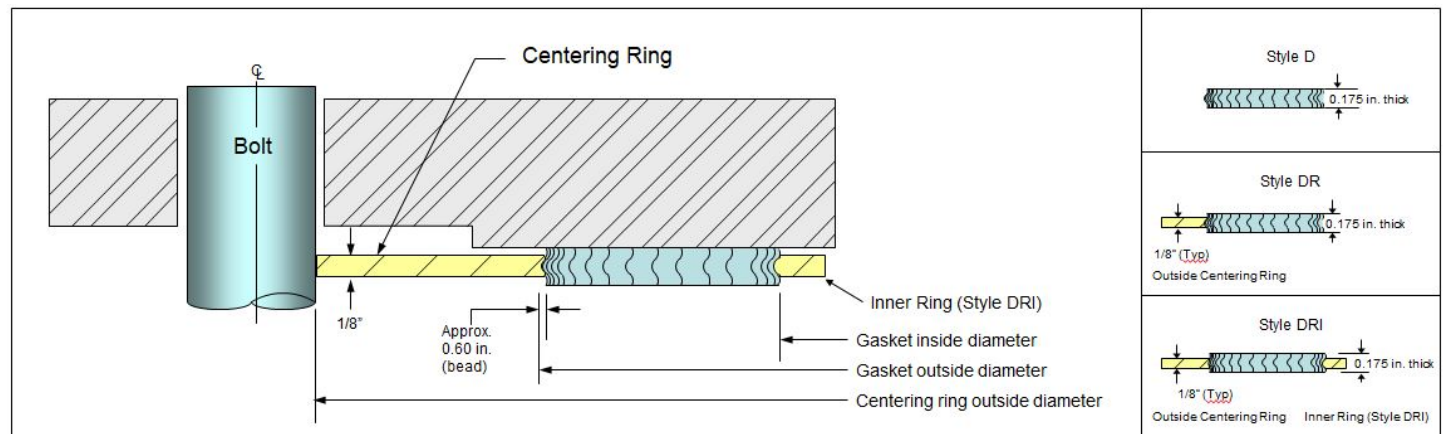
**DIMENSIONS FOR DURLON® STYLE DR & DRI SPIRAWOUND GASKETS TO BE USED WITH ASME B16.5 FLANGES**  
TO ASME B16.20

Nominal Pipe Size	Outside Diameter of Gasket		Inside Diameter of Gasket						Outside Diameter of Centering Ring						Inside Diameter of Inner-Ring				
	Class 150, 300, 600	Class 900, 1500, 2500	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500	Class 150, 300	Class 600	Class 900	Class 1500	Class 2500
1/2"	1.25	1.25	0.75	0.75	0.75	---	0.75	0.75	1.88	2.13	2.13	---	2.50	2.75	0.56	---	0.56	0.56	0.56
3/4"	1.56	1.56	1.00	1.00	1.00	---	1.00	1.00	2.25	2.63	2.63	---	2.75	3.00	0.81	---	0.81	0.81	0.81
1"	1.88	1.88	1.25	1.25	1.25	---	1.25	1.25	2.63	2.88	2.88	---	3.13	3.38	1.06	---	1.06	1.06	1.06
1-1/4"	2.38	2.38	1.88	1.88	1.88	---	1.56	1.56	3.00	3.25	3.25	---	3.50	4.13	1.50	---	1.50	1.31	1.31
1-1/2"	2.75	2.75	2.13	2.13	2.13	---	1.88	1.88	3.38	3.75	3.75	---	3.88	4.63	1.75	---	1.75	1.63	1.63
2"	3.38	3.38	2.75	2.75	2.75	---	2.31	2.31	4.13	4.38	4.38	---	5.63	5.75	2.19	---	2.19	2.06	2.06
2-1/2"	3.88	3.88	3.25	3.25	3.25	---	2.75	2.75	4.88	5.13	5.13	---	6.50	6.63	2.62	---	2.62	2.50	2.50
3"	4.75	4.75	4.00	4.00	4.00	3.75	3.63	3.63	5.38	5.88	5.88	6.63	6.88	7.75	3.19	3.19	3.10	3.10	3.10
4"	5.88	5.88	5.00	5.00	4.75	4.75	4.63	4.63	6.88	7.13	7.63	8.13	8.25	9.25	4.19	4.04	4.04	3.85	3.85
5"	7.00	7.00	6.13	6.13	5.81	5.81	5.63	5.63	7.75	8.50	9.50	9.75	10.00	11.00	5.19	5.05	5.05	4.90	4.90
6"	8.25	8.25	7.19	7.19	6.88	6.88	6.75	6.75	8.75	9.88	10.50	11.38	11.13	12.50	6.19	6.10	6.10	5.80	5.80
8"	10.38	10.13	9.19	9.19	8.88	8.75	8.50	8.50	11.00	12.13	12.63	14.13	13.88	15.25	8.50	8.10	7.75	7.75	7.75
10"	12.50	12.25	11.31	11.31	10.81	10.88	10.50	10.63	13.38	14.25	15.75	17.13	17.13	18.75	10.56	10.05	9.69	9.69	9.69
12"	14.75	14.50	13.38	13.38	12.88	12.75	12.75	12.50	16.13	16.63	18.00	19.63	20.50	21.63	12.50	12.10	11.50	11.50	11.50
14"	16.00	15.75	14.63	14.63	14.25	14.00	14.25	---	17.75	19.13	19.38	20.50	22.75	---	13.75	13.50	12.63	12.63	---
16"	18.25	18.00	16.63	16.63	16.25	16.25	16.00	---	20.25	21.25	22.25	22.63	25.25	---	15.75	15.35	14.75	14.50	---
18"	20.75	20.50	18.69	18.69	18.50	18.25	18.25	---	21.63	23.50	24.13	25.13	27.75	---	17.69	17.25	16.75	16.75	---
20"	22.75	22.50	20.69	20.69	20.50	20.50	20.25	---	23.88	25.75	26.88	27.50	29.75	---	19.69	19.25	19.00	18.75	---
24"	27.00	26.75	24.75	24.75	24.75	24.75	24.25	---	28.25	30.50	31.13	33.00	35.50	---	23.75	23.25	23.25	22.75	---

- Notes:**
- Inner rings (style DRI) are required for all PTFE filled gaskets and for NPS 24" Class 900 gaskets, NPS 12" - 24" Class 1500 gaskets, and NPS 4" - 12" Class 2500 gaskets (shaded area).
  - The dimensions for Class 300 and Class 600 gaskets in NPS 1/2" - 3" sizes are the same and are designated as dual Class 300/600 in these sizes.
  - There are no Class 400 flanges in NPS 1/2 through NPS 3 (use Class 600), Class 900 flanges in NPS 1/2 through NPS 2 1/2 (use Class 1500), or Class 2500 flanges in NPS 14 and larger.
  - Inner rings (style DRI) are the default selling condition for graphite filled gaskets, including mica-graphite filled. If inner rings are not required, no inner ring (style DR) must be specified for graphite or mica-graphite filled gaskets at time of order.
- Warning:** For specific application recommendations consult GRI Technical Services. These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice.

M&Y Factors	M	Y (psi)	Temperature				
	Durlon SWG Type D, DR and DRI Inhibited Graphite, Inhibited Graphite/Mica, PTFE		Filler Materials		Minimum	Maximum	Abbr.
	2.8	6500					
ROTT Factors	Gb (psi)	a	Gs (psi)	°F (C°)	°F (C°)		
Durlon SWG Type D, DR, DRI – Super Inhibited Graphite*	86	0.594	0.1	-350 (-212)	1000 (537)	FG	
Durlon SWG Type D, DR, DRI – Super Inhibited Graphite*/Mica	90	0.590	0.1	-350 (-212)	1400 (760)	MICA-GRA	
Durlon SWG Type D, DR, DRI – PTFE	173	0.405	1.0	-400 (-240)	500 (260)	PTFE	
Durlon SWG Type D, DR, DRI – Phyllosilicate	-	-	-	-67 (-55)	1832 (1000)	ETG	

\*Meets the requirements of Shell specification MESC SPE85/203. Meets PVRC SCR flexible graphite specification for FG600 material.



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Durlon® Kammprofile gaskets have a solid metal core with concentrically serrated grooves machined into the top and bottom faces. The metal core is typically stainless steel but it can be supplied in various metallurgies as per the customer's request. The serrated core is covered with soft sealing material and is dependent on the service conditions of the system. Super inhibited flexible graphite and expanded PTFE sealing layers are most common but other soft materials can be used as well. While providing the Durlon® Kammprofile gasket with excellent sealing properties, the soft sealing layers also fill in minor flange imperfections and protect the flange surfaces from damage.

## Application

Durlon® Kammprofile gaskets are the preferred choice for applications requiring improved performance at low seating stresses. The serrated peaks provide reduced contact area and when combined with the soft conformable sealing layers, the Durlon® Kammprofile gasket provides a virtual metal-to-metal connection. They feature excellent resistance to blowout and provide superior stability for ease of handling and installation.

The Durlon® Kammprofile gasket is an excellent choice for tough heat exchanger, vessel, and reactor applications in various flange configurations where traditional jacketed gaskets tend to be ineffective. They are particularly effective in applications where high temperatures, high pressures, and fluctuating conditions are encountered.

## Core Materials

- Standard core material is super inhibited 316 stainless steel with a nominal thickness of 0.125" (3mm).
- Other core materials and thicknesses are available to suit specific applications.
- Core material is generally selected in an identical material to the piping system in order to reduce corrosion problems.

## Facing Materials

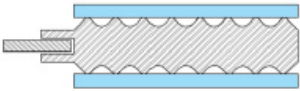
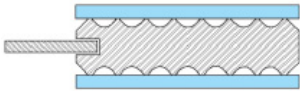
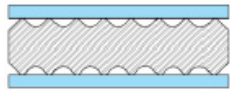

- Standard facing material is flexible graphite with a nominal thickness of 0.020" (0.5mm).
- Other facing materials and thicknesses are available to suit specific applications.

## Flange Surface Finish

- The ideal flange surface finish for use with Kammprofile gaskets is 125–250 RMS (3.2 – 6.3 µm Ra).

## Shapes

- Round, ovals (normal or irregular), manways, track shapes, diamonds, squares/rectangles, with ribs, etc.
- Correctly dimensioned drawings are required to make non-standard gaskets and gasket shapes.

<b>K40PEF &amp; K40CEF</b> Extended Core Floating Centering Ring	<b>K40PF &amp; K40CF</b> Floating Centering Ring	<b>K40P &amp; K40C</b> No Centering Ring	<b>K40PI &amp; K40CI</b> Integral Centering Ring
Similar to the floating centering ring, this style has an extended core whereby providing additional strength and stability to the overall floating design.	A loose fitting centering ring is recommended on applications where thermal or pressure cycling can affect the integrity of the serrated metal core. It allows for expansion and contraction of the core through these cycling conditions.	This basic configuration is most often used in tongue/groove and male/female flanges.	The centering ring is used to position the gasket between flat face and raised face type flanges.
			

## Physical Properties

Facing Material	Temperature °F (C°)	Pressure, Max, psi (bar)	pH Range	Gasket Factors
Super Inhibited Graphite* PTFE	(dependent on metallurgy) -328 (-200) 1000 (537) -400 (-240) 500 (260)	6,000 (414)	0-14	m 4.0 Y, psi 1,000

\* Meets the requirements of Shell specification MESC SPE85/203. Meets PVRC SCR flexible graphite specification for FG600 material

**Warning:** These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice. This edition cancels and obsoletes all previous editions.

## DURLON® ETG – Extreme Temperature Gaskets

Durlon® extreme temperature gaskets have been engineered to provide the preeminent solution to sealing gasketed joints exposed to high temperatures, typically greater than 1,200°F (650°C) and up to 1,832°F (1,000°C).\*\* At extreme temperatures, flange assembly torque retention is the key component to maintaining a tight seal. Durlon® ETG has combined an oxidation boundary material with the excellent stability and sealing characteristics of super inhibited\* flexible graphite in order to preserve seal integrity and to retain the initial assembly torque.

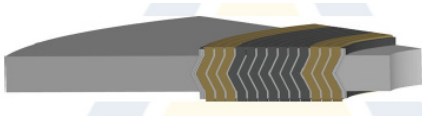
### DURLON® HT1000 – Sheet Gaskets

Durlon® HT1000™ consists of phlogopite mica paper impregnated with an inorganic binder at less than half the binder found in vermiculite-phyllsilicate filled products. This lower binder content allows for superior weight retention, less than 4% weight loss at 1,472°F (800°C), and results in ultimate extreme temperature sealing performance up to 1,832°F (1,000°C).\*\*

Sheets and Cut Gaskets – HT1000® is available in 3 sheet forms:

<p style="text-align: center;"><b>HT1000-S90</b></p> <p>Phlogopite mica paper impregnated with an inorganic binder and no carrier.</p>	<p style="text-align: center;"><b>HT1000-L316</b></p> <p>Phlogopite mica paper impregnated with an inorganic binder laminated with a 0.002" thick 316 stainless steel carrier.</p>	<p style="text-align: center;"><b>HT1000-L316</b></p> <p>Phlogopite mica paper impregnated with an inorganic binder laminated with a 0.004" thick 316 stainless steel perforated carrier.</p>
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### DRI-ETG Spiral Wound Gaskets



Durlon® takes our standard mica-graphite manufacturing technology two steps further by: (1) incorporating 3 full layers of HT1000® on the ID and OD of the sealing element and (2) using oxidation super inhibited\* flexible graphite layers as the central sealing component and finally uses the DRI style with an inner ring. This oxidation boundary created by the

HT1000® material allows for temperature stability up to 1,832°F (1,000°C).\*\*

As both mica and graphite offer outstanding natural chemical resistance, the Durlon® DRI- ETG is also capable of withstanding many aggressive chemicals and environments subject to elevated temperatures. The DRI- ETG can be manufactured in virtually any metal alloy combination required by the application.

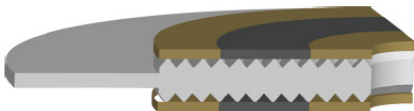
### Durtec ETG



The Durtec® gasket concept just got better. By using the ETG engineered design concept, the Durtec® gasket's facing layers get an extreme temperature upgrade providing both temperature resistance and enhanced sealability. On both faces of the unique DurCore® design lays a central oxidation super inhibited\* flexible graphite ring which is

surrounded on its ID and OD with a ring of HT1000® which acts as an oxidation barrier. The entire combination of materials and core design provides unsurpassed bolt torque retention, fire safety, sealability, and extreme temperature resistance to 1,832°F (1,000°C).\*\* There is no other single gasket on the market which exhibits the performance characteristics of the Durtec®-ETG.

### K40-ETG Kamprofile



Kamprofile gaskets are a common gasket used to improve sealability in tough thermal cycling applications such as heat exchangers and large vessel seal. Durlon® K40 Kamprofile Gaskets naturally provide a tight seal with enhanced load bearing and

distribution abilities but with the addition of the ETG engineering design concept similar to that used on the Durtec®-ETG, Durlon® K40-ETG kamprofile gaskets can now offer those abilities at extreme temperatures up to 1,832°F (1,000°C).\*\*

**The Durlon® ETG's engineered design principle is focused around providing oxidation protection zones around the central oxidation super inhibited\* flexible graphite sealing component.** Standard industrial grade flexible graphite typically begins to rapidly oxidize at around 850°F (454°C). By adding oxidation inhibitors to the graphite, the rate and amount of oxidation can be significantly reduced which can extend the seal life of the material, however, oxidation still occurs and at extreme temperatures it can be fatal to the integrity of the joint.

Durlon® ETG adds an inner and outer protection boundary in the form of a mica-phyllsilicate based sealing material called Durlon® HT1000®. Durlon® HT1000® consists of phlogopite mica paper impregnated with an inorganic binder at less than half the binder amount found in a typical vermiculite-phyllsilicate filled product. This lower binder content allows for superior weight retention and results in ultimate extreme temperature sealing performance. The Durlon® ETG design is the sealing industry's current best available technology for effectively sealing extreme temperature applications.

\* Meets the requirements of Shell specification MESC SPE85/203. Meets PVRC SCR flexible graphite specification for FG600 material.

\*\* Temperature rating is dependent upon the metallurgy used in construction.

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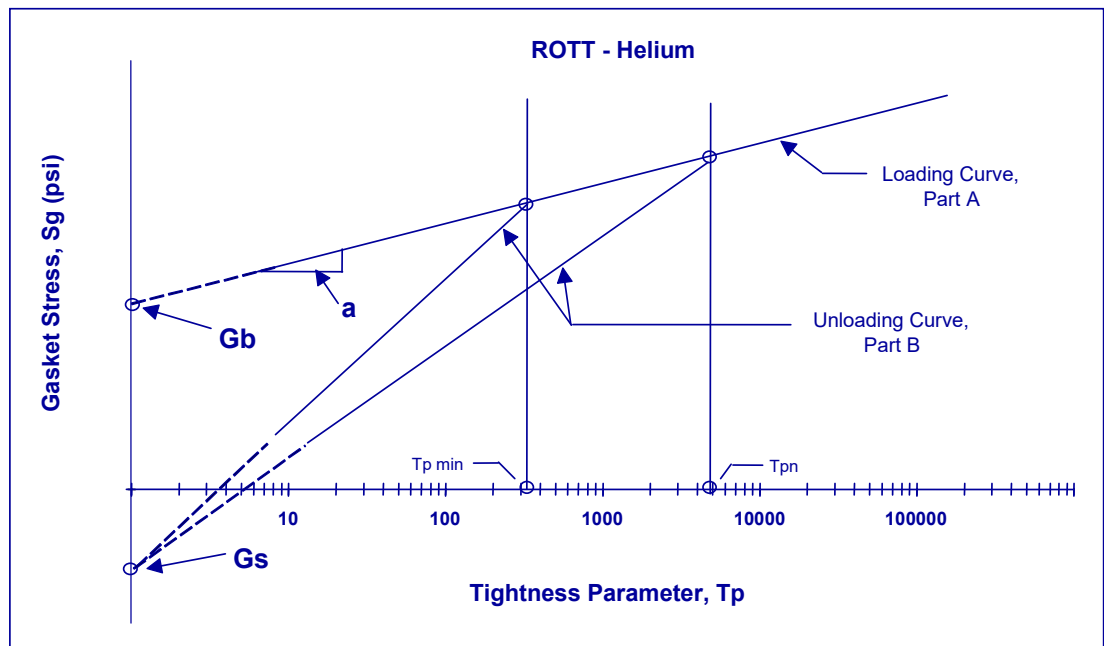
## Proposed ASME Gasket Factors: $G_b$ , $a$ and $G_s$

New gasket factors to replace the ASME Code  $m$  and  $y$  are currently being developed by the Pressure Vessel Research Council (PVRC) and ASME. The current  $m$  and  $y$  are difficult to replicate for non-asbestos gaskets and do not consider joint leakage. The new approach to bolted joint design makes the *tightness* of the joint a design parameter.

In a manner similar to the traditional ASME Code method, the design bolt load for a joint is calculated for operating and seating requirements from the new constants  $G_b$ ,  $a$  and  $G_s$  and the required tightness class associated with the minimum tightness.  $G_b$  and  $a$ , gives the gasket seating load and are

similar to  $y$  in the present Code.  $G_s$  is associated with the operating stress and is similar to the  $m$  value in the Code.

The proposed ASME constants  $G_b$ ,  $a$ , and  $G_s$  give a design bolt load obtained by interpretation of leakage test data as plots of gasket stress  $S_g$ , vs. a tightness parameter,  $T_p$ .  $T_p$  is the pressure (in atmospheres) normalized to the atmospheric pressure required to cause a helium leak rate of 1 mg/sec for a 150 mm OD gasket in a joint. Since this is about the same as the OD of an NPS 4 joint, the pressure to cause a leak of 1 mg/sec of helium for that joint is its tightness. A standard test procedure, the PVRC Room Temperature Tightness Test (ROTT) has been designed to produce the constants  $G_b$ ,  $a$  and  $G_s$ . Low values for  $G_b$ ,  $a$  and  $G_s$  are desirable while a higher value of  $T_p$  means a tighter joint.



## Pressure - Temperature Considerations

With gasketing, there is a relationship of pressure to temperature. Generally the higher the temperature the lower the allowable gasket working pressure. This is called the PT factor of the gasket (pressure times temperature). For example, if the pressure is 700 psi and the temperature is 500°F, we would need a material with a PT factor of 350,000. Some manufacturers feel this is the maximum level for safety.

Generally we find that all non-asbestos gasket materials are temperature sensitive requiring the pressure to drop more quickly as temperature rises to insure the seal is maintained. We have reviewed performance by in-house tests, controlled operating performance, and in the field. **There is no one PxT factor to use** as PxT can be a moving target.

Refer to the PxT charts in this handbook for the highest operating temperature given for the application. Find the highest pressure within the safety zone. Simple multiplication of the two will give you the PT factor. Keep in mind that today's sheet type gasket materials in general are intended for Class 300 applications and below.

It is always assumed the flange is correct and in good condition, the fluid is not aggressive and that the ideal thickness is 1/16". These limits will be increased for 1/32" but will decrease 25% or more for 1/8" thick material.

## M&amp;Y Values and Gasket Factors Gb, a, &amp; Gs

Product	Thickness	m	y	Gb	a	Gs
5X00 Series	1/16"	1.5	1855	474	0.256	48
5X00 Series	1/8"	2.5	2619	902	0.253	4
7000 Series	1/16"	3.0	3347	497	0.226	3
7000 Series	1/8"	3.2	3385	486	0.276	0.4
7910	1/16"	1.5	2416	502	0.289	0.001
7910	1/8"	1.5	3576	736	0.237	9.1
8300	1/16"	3.7	3515	512	0.355	13
8300	1/8"	3	4014	460	0.313	0.427
8400	1/16"	2.9	2410	380	0.311	0.01
8400	1/8"	4.5	3967	391	0.321	0.014
8500	1/32"			410	0.250	190
8500	1/16"	2.7	2359	650	0.330	200
8500	1/8"	4.2	2931	400	0.350	20
8600	1/16"	2.9	2540	343	0.325	0.3
8600	1/8"			866	0.273	37
8700	1/16"	3.1	3127	546	0.455	12
8700	1/8"	5.0	4000	758	0.34	0.01
8900	1/16"	4.8	4851	915	0.428	0.02
8900	1/8"	7.3	3730	567	0.556	0.26
9000	1/16"	2.2	1937	639	0.220	55
9000	1/8"	4.6	1639	495	0.262	65
9200W	1/16"	1.5	952	153	0.360	15
9200W	1/8"	4.2	827	96	0.437	14
9400	1/16"	6.8	2765	1701	0.173	99
9400	1/8"			1412	0.164	248
9600	1/16"			1200	0.2	3.5
9600	1/8"			1400	0.19	1.5
9600 w/ DurCore	1/8"	1.5	833	204	0.316	1.00E-07
FGS95	1/16"			970	0.038	1
FGS95	1/8"			970	0.038	1
FGL316	1/16"			816	0.380	1
FGL316	1/8"			816	0.38	1
FGT316	1/16"			1400	0.33	1
FGT316	1/8"			1400	0.33	1
FGM316	1/8"	2.5	4000			
CFG	3/32"			557	0.325	2.21
DURTEC (FG)	1/8"	1.5	833	187	0.467	0.5
DURTEC (ePTFE)	1/8"	1.5	833	204	0.316	1.00E-07
SWG/FG	0.175"	2.8	6500	86	0.594	0.1
SWG/Mica-FG	0.175"	2.8	6500	90	0.59	0.1
SWG/PTFE	0.175"	2.8	6500	173	0.405	1
KAMMPROFILE	1/8"	4	1000	368	0.4	0.28
ETG-HT1000™	1/16"					
ETG-SWG	0.175"	2.8	6500	90	0.59	0.1
ETG-DURTEC	1/8"	1.5	833	187	0.467	0.5
ETG-KAMMPROFILE	1/8"	4	1000	368	0.4	0.28

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## GASKET RESOURCES INC.

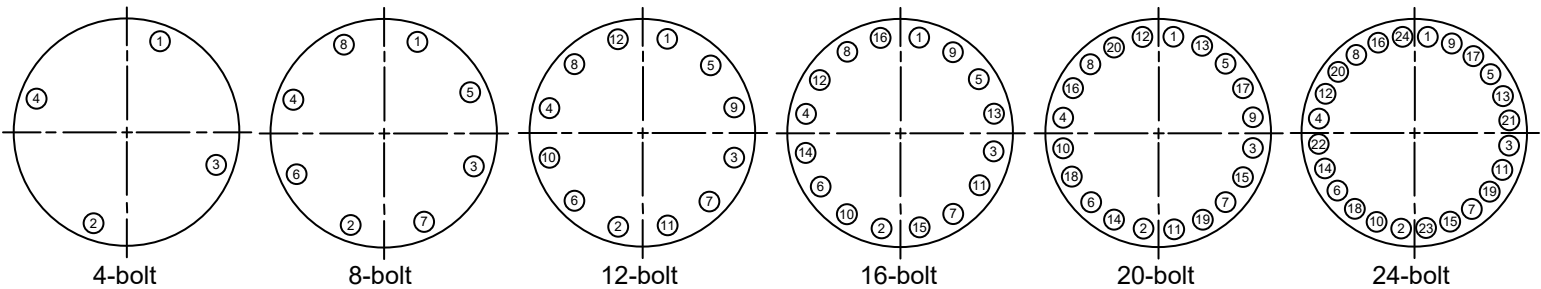
### DURLON® GASKETING - BOLT TIGHTENING WORK SHEET

Location/Identification: \_\_\_\_\_ Nominal Bolt Size: \_\_\_\_\_

Gasket Contact Surface Finish on Flange: \_\_\_\_\_; Lubricant Used: \_\_\_\_\_

**(Initial each step.)**

- \_\_\_ 1. Be sure system is at ambient temperature and depressurized. Follow local safety rules.
- \_\_\_ 2. Visually examine and clean flanges, bolts, nuts and washers. Replace components if necessary.
- \_\_\_ 3. **Lubricate bolts, nuts, and nut bearing surfaces.** Use of hardened steel washers are recommended.
- \_\_\_ 4. Install new gasket. **DO NOT REUSE OLD GASKET, OR USE MULTIPLE GASKETS.**
- \_\_\_ 5. Number bolts in cross-pattern sequence according to the appropriate sketch below.
- \_\_\_ 6. **IMPORTANT! HAND TIGHTEN NUTS, then using a hand wrench SNUG BOLTS 1/8 to 1/4 turn, following the appropriate cross pattern tightening sequence for the number of bolts below.**
- \_\_\_ 7. Starting at the #1 bolt, use the appropriate cross-pattern tightening sequence in the sketch below for Rounds 1, 2, and 3 (each sequence constitutes a "Round").



- **Final Torque:** \_\_\_\_\_ ft-lbs
- LUBRICATE, HAND TIGHTEN, PRE-TIGHTEN BOLTS**
- **Round 1** - Tighten to \_\_\_\_\_ ft-lbs - **1st torque** value in torque chart\* (30% of final torque)
- **Round 2** - Tighten to \_\_\_\_\_ ft-lbs – **2nd torque** value in torque chart (60% of final torque)
- **Round 3** - Tighten to \_\_\_\_\_ ft-lbs - **Final torque** value in torque chart (100% of final torque)

\*Refer to torque chart on next page

Check gap at 90° intervals around the flange between each of these rounds. Larger flanges may require checking the gap in smaller intervals. If the gap is not reasonably uniform, make the appropriate adjustments by selective bolt tightening before proceeding.

\_\_\_ **Rotational Round** - 100% of Final Torque (same as Round 3). Use ROTATIONAL, clockwise tightening sequence, starting with Bolt No. 1, for at least two complete rounds and continue until no further nut rotation occurs at 100% of the Final Torque value for any nut.

\_\_\_ **Retorque** - Short-term bolt preload loss can occur between four to twenty-four hours after initial tightening due to bolt relaxation and/or gasket creep. Repeating the Rotational Round recovers this loss. This is especially important for PTFE gaskets.

Joint Assembler: \_\_\_\_\_ Date: \_\_\_\_\_

**For torque questions, or tightening patterns for large diameter flanges, contact GRI Technical Services: (713) 856-9445, or tech@durlon.com**

**\*\* This page can be copied for use in the field \*\***

TORQUE VALUES FOR ANSI B16.21 CUT GASKETS

1/16" & 1/8" DURLON® Gasket Material - Torque: ft-lbs

Flange Size	B16.5 Class 150 RF/ Ring Gaskets					B16.5 Class 150 FF/ Full Face Gaskets				
	Torque / Round (ft-lbs)			Bolt Tighten Seq*		Torque / Round (ft-lbs)			Bolt Tighten Seq*	
	1st	2nd	Final	Dwg*/No.	Size	1st	2nd	Final	Dwg*/No.	Size
1/2"	10	20	30	4-bolt	1/2"	20	40	60	4-bolt	1/2"
3/4"	13	27	40	4-bolt	1/2"	20	40	60	4-bolt	1/2"
1"	15	30	50	4-bolt	1/2"	20	40	60	4-bolt	1/2"
1-1/4"	20	40	60	4-bolt	1/2"	20	40	60	4-bolt	1/2"
1-1/2"	20	40	60	4-bolt	1/2"	20	40	60	4-bolt	1/2"
2"	40	80	120	4-bolt	5/8"	40	80	120	4-bolt	5/8"
2-1/2"	40	80	120	4-bolt	5/8"	40	80	120	4-bolt	5/8"
3"	40	80	120	4-bolt	5/8"	40	80	120	4-bolt	5/8"
3-1/2"	40	80	120	8-bolt	5/8"	40	80	120	8-bolt	5/8"
4"	40	80	120	8-bolt	5/8"	40	80	120	8-bolt	5/8"
5"	60	120	200	8-bolt	3/4"	60	120	200	8-bolt	3/4"
6"	60	120	200	8-bolt	3/4"	60	120	200	8-bolt	3/4"
8"	60	120	200	8-bolt	3/4"	60	120	200	8-bolt	3/4"
10"	95	190	320	12-bolt	7/8"	95	190	320	12-bolt	7/8"
12"	95	190	320	12-bolt	7/8"	95	190	320	12-bolt	7/8"
14"	147	294	490	12-bolt	1"	147	294	490	12-bolt	1"
16"	147	294	490	16-bolt	1"	147	294	490	16-bolt	1"
18"	213	426	710	16-bolt	1-1/8"	213	426	710	16-bolt	1-1/8"
20"	213	426	710	20-bolt	1-1/8"	213	426	710	20-bolt	1-1/8"
24"	300	600	1,000	20-bolt	1-1/4"	300	600	1,000	20-bolt	1-1/4"

Flange Size	B16.5 Class 300 RF/ Ring Gaskets				
	Torque / Round (ft-lbs)			Bolt Tighten Seq*	
	1st	2nd	Final	Dwg*/No.	Size
1/2"	10	20	30	4-bolt	1/2"
3/4"	15	30	50	4-bolt	5/8"
1"	21	42	70	4-bolt	5/8"
1-1/4"	30	60	100	4-bolt	5/8"
1-1/2"	45	90	150	4-bolt	3/4"
2"	33	66	110	8-bolt	5/8"
2-1/2"	42	84	140	8-bolt	3/4"
3"	60	120	200	8-bolt	3/4"
3-1/2"	60	120	200	8-bolt	3/4"
4"	60	120	200	8-bolt	3/4"
5"	60	120	200	8-bolt	3/4"
6"	60	120	200	12-bolt	3/4"
8"	95	190	320	12-bolt	7/8"
10"	147	294	490	16-bolt	1"
12"	213	426	710	16-bolt	1-1/8"
14"	195	390	650	20-bolt	1-1/8"
16"	273	546	910	20-bolt	1-1/4"
18"	300	600	1,000	24-bolt	1-1/4"
20"	300	600	1,000	24-bolt	1-1/4"
24"	465	930	1,550	24-bolt	1-1/2"

THE EFFECT OF BOLT LUBRICATION

Bolt lubrication greatly affects the torque values used when installing gaskets. To achieve the same gasket compression, a much higher torque value is required for a dry bolt versus using a lubricant.

In a dry bolt up, or where an inefficient lubricant is used such as a light oil, the effort used in tightening is overcome by the frictional forces between the bolts and nuts and to a greater extent between the nuts and nut facings.

This can result in a lower gasket load and inadequate stress on the bolts, which can result in torque loss and eventual leakage in service.

Note: This is a general guide only and Gasket Resources Inc. does not accept responsibility for negligence or misuse of this information. Torque Values are in ft.-lbs. and assume new A193 Gr. B7 studs with 2H heavy hex nuts; with studs, nuts and the nut bearing surfaces lubricated with a never-seize type paste (k = 0.17) using the installation and bolt tightening practices outlined in this handbook. Lubricant should not be applied to the gasket or flange faces as a release agent. Hardened steel washers are also recommended to reduce friction. \* Refer to the appropriate bolt tightening sequence drawing under gasket installation in this handbook for the number of bolts listed.

\*\*Online Torque, including sizes up to 60" visit: <https://www.gasketresources.com/torque-value-display>

## DURLON® SPIRAL WOUND GASKETS – Torque: ft-lbs

Pipe Size (in)	Class 150		Class 300		Class 600		Class 900		Class 1500		Class 2500	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1/2	16	50	16	50	16	50	25	65	25	65	40	65
3/4	22	60	30	85	30	85	30	95	35	95	60	95
1	30	60	40	115	40	115	50	150	60	150	100	165
1 1/4	33	60	40	120	40	120	80	240	95	240	186	282
1 1/2	50	60	65	200	65	200	120	350	145	350	265	385
2	75	120	40	110	40	110	75	230	95	230	185	265
2 1/2	90	120	50	145	50	145	110	330	140	327	260	360
3	120	120	70	200	70	200	105	320	215	450	400	495
4	92	120	105	200	150	320	190	575	355	695	630	810
5	125	200	125	200	220	490	280	805	525	970	1160	1440
6	180	200	120	200	200	490	235	660	490	865	1730	2140
8	200	200	195	320	305	710	405	1000	800	1300	1685	1925
10	235	320	205	490	345	1000	422	915	1500	2260	2885	3315
12	320	320	310	710	365	1000	486	1100	1445	2200	4525	5870
14	410	490	270	710	410	1220	545	1165	1795	2325		
16	410	490	400	1000	515	1545	792	1540	2700	3880		
18	650	710	480	1000	755	2200	1410	2970	3860	5470		
20	570	710	525	1000	717	2085	1546	2800	4930	7700		
24	820	1000	725	1600	1291	3305	2610	4145	8032	11902		

Note: This is a general guide only and Gasket Resources Inc. does not accept responsibility for negligence or misuse of this information.

\* Torque Values are in ft.-lbs and assume new A193 Gr. B7 studs with 2H heavy hex nuts; with studs, nuts and the nut bearing surfaces lubricated with a never-seize type lubricant ( $k = 0.17$ ) using the installation and bolt tightening practices outlined in this handbook.

\* Minimum torque based on the higher of 10ksi compression or T2 based on ROTT factors Gb, a & Gs. Maximum torques based upon the lesser of 60ksi bolt stress or compression of 30ksi (Class 150-Class 900) or up to 40ksi for Class 1500 & 2500.

Extreme operating conditions such as high temperature may reduce bolt yield strength and caution should be used in these applications. For critical or extreme applications (high temperature/pressure) consult with GRI Technical Services.

\* Caution, if no inner ring is used, gasket may buckle on the ID.

This revision supersedes all previous versions

## DURLON® KAMMPROFILE GASKETS – Torque: ft-lbs

Pipe Size (in)	Class 150		Class 300		Class 600		Class 900		Class 1500		Class 2500	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1/2	15	40	15	40	15	40	20	60	25	60	40	60
3/4	20	55	20	70	20	70	25	75	35	75	55	75
1	20	60	30	85	30	85	35	105	50	110	85	115
1 1/4	40	60	50	120	50	120	65	190	90	190	170	225
1 1/2	50	60	70	200	70	200	100	290	135	290	245	320
2	90	120	45	120	45	120	60	175	90	175	170	205
2 1/2	105	120	60	180	60	180	80	235	130	235	235	260
3	120	120	95	200	95	200	110	320	215	425	400	465
4	120	120	140	200	165	320	210	630	370	695	655	805
5	180	200	180	200	240	490	300	865	530	915	1175	1365
6	200	200	150	200	205	490	240	675	490	810	1725	2005
8	200	200	245	320	310	710	440	1130	830	1255	1750	1855
10	300	320	260	490	315	950	460	1035	1515	2040	2985	3210
12	320	320	340	710	300	895	490	980	1450	1,955	4376	4,605
14	450	490	295	710	380	1,065	550	1,030	1875	2,385		
16	445	490	430	1,000	480	1,370	825	1,575	2715	3,495		
18	640	710	470	1,000	705	2,055	1415	2,725	3875	5,015		
20	560	710	515	1,000	1250	1,875	1595	2,850	4945	7,010		
24	730	1000	645	1,600	980	2,940	2635	4,170	7720	9,665		

Note: This is a general guide only and Gasket Resources Inc. does not accept responsibility for negligence or misuse of this information.

\* Torque Values are in ft.-lbs and assume new A193 Gr. B7 studs with 2H heavy hex nuts; with studs, nuts and the nut bearing surfaces lubricated with a never-seize type lubricant ( $k = 0.17$ ) using the installation and bolt tightening practices outlined in this handbook. Lubricant should not be applied to the gasket or flange faces as a release agent. Hardened steel washers are also recommended to reduce friction.

\* Refer to the appropriate bolt tightening sequence drawing under the gasket installation section in this handbook for the number of bolts listed.

Extreme operating conditions such as high temperature may reduce bolt yield strength and caution should be used in these applications. For critical or extreme applications (high temperature/pressure) consult with GRI Technical Services.

**Warning:** These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice. This edition cancels and obsoletes all previous editions.



## Sample Request Form

### Company Information

Company Name: \_\_\_\_\_ Company Contact: \_\_\_\_\_

Address: \_\_\_\_\_ Email: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

### Application Information

Industry: \_\_\_\_\_ Area/Location: \_\_\_\_\_

Fluid: \_\_\_\_\_ Gas \_\_\_\_\_ Liquid \_\_\_\_\_ pH: \_\_\_\_\_ Concentration: \_\_\_\_\_ %

Pressure: \_\_\_\_\_ Temperature Range: \_\_\_\_\_ Temperature: \_\_\_\_\_

If temperature or pressure cycles, please describe: \_\_\_\_\_

### Flange & Bolting Information

Flange Designation: ASME B16.5, Size: \_\_\_\_\_ Class: \_\_\_\_\_ RF: \_\_\_\_\_, FF: \_\_\_\_\_ Bolt Grade: \_\_\_\_\_

Special Flange Size/Type: \_\_\_\_\_ Fastener Lubricant: \_\_\_\_\_

### Sample Sizes

Durlon Material: \_\_\_\_\_ Thickness: \_\_\_\_\_

#### ASME B16.5 Flanges

Number: \_\_\_\_\_ Size: \_\_\_\_\_ Class: \_\_\_\_\_ RF: \_\_\_\_\_, FF: \_\_\_\_\_

Number: \_\_\_\_\_ Size: \_\_\_\_\_ Class: \_\_\_\_\_ RF: \_\_\_\_\_, FF: \_\_\_\_\_

Special Size: \_\_\_\_\_

### Test Information

Time schedule for testing: \_\_\_\_\_

Person responsible for reporting results to GRI: \_\_\_\_\_

Agree to share test results:  YES;  NO

Signature: \_\_\_\_\_

### Contact Info:

GRI Technical Services:  
PH: 713-856-9445; E-Mail: tech@durlon.com  
GRI Sales:  
PH: 610-363-5800; E-Mail: sales@durlon.com

**BOLTED JOINT ROOT CAUSE ANALYSIS FORM**

COMPANY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_ PHONE: \_\_\_\_\_  
 CONTACT: \_\_\_\_\_ E-MAIL: \_\_\_\_\_

GASKET MATERIAL: \_\_\_\_\_

COMPONENT THAT IS LEAKING: \_\_\_\_\_

DESCRIBE WHAT HAPPENED: \_\_\_\_\_

PRESSURE \_\_\_\_\_ IF PRESSURE CYCLES, PLEASE DESCRIBE: \_\_\_\_\_

TEMPERATURE \_\_\_\_\_ IF TEMPERATURE CYCLES, PLEASE DESCRIBE: \_\_\_\_\_

IS GAP AROUND THE FLANGE OD UNIFORM?  YES;  NO

INSTALLATION:  HAND WRENCH  TORQUE WRENCH  AIR IMPACT  OTHER

IF OTHER, PLEASE DESCRIBE: \_\_\_\_\_

ADDITIONAL INFORMATION: \_\_\_\_\_

PHOTOS:  YES;  NO

ADDITIONAL INFORMATION:

GASKET NO.	# Bolts	Bolt Dia	Bolt Grade	Flange Type (T/G, FF, RF)	Gasket Material/Cut Dimensions				Torque (ft-lbs)
					Material	Thk.	OD	ID	
1									
2									
3									

**NOTE:** Contact Gasket Resources before returning gaskets for evaluation. Gasket must be decontaminated and may require documentation.

Contact Info: GRI Technical Services

PH: 713-856-9445; E-Mail: tech@durlon.com

**Warning:** These materials should never be recommended when both temperature and pressure are at the maximum listed. Properties and applications shown are typical. No application should be undertaken by anyone without independent study and evaluation for suitability. Never use more than one gasket in one flange joint, and never reuse a gasket. Improper use or gasket selection could cause property damage and/or serious personal injury. Data reported in this brochure is a compilation of field testing, field service reports and/or in-house testing. While the utmost care has gone into publishing the information contained herein, we assume no responsibility for errors. Specifications and information contained in this brochure are subject to change without notice. This edition cancels and obsoletes all previous editions.

The following information is a general guide only for the selection of a suitable gasket material as there are unlimited combinations of fluid, pressure and temperature conditions

A - Acceptable  
 C - Caution - Depends on Conditions  
 NS - Not Suitable

FLUID	DURLON® COMPRESSED SHEET					DURLON® PTFE					DURLON® FG / Core		FLUID	DURLON® COMPRESSED SHEET					DURLON® PTFE					DURLON® FG / Core	
	8300 8900	8400	8500 79XX	8600	8700	9000	9200	9400	9600	None	ss316	8300 8900		8400	8500 79XX	8600	8700	9000	9200	9400	9600	None	ss316		
Acetic Acid, Glacial(100%)	C	C	C	C	C	A	A	A	A	A	A	Detergent Solutions	A	A	A	A	A	A	A	A	A	A	A		
Acetic Acid, 37%	A	A	A	A	A	A	A	A	A	A	A	Diacetone Alcohol	NS	NS	NS	NS	NS	A	A	A	A	A	A		
Acetic Anhydride	A	C	C	C	C	A	A	A	A	A	A	Dibenzyl Ether	NS	C	C	NS	NS	A	A	A	A	A	NS		
Acetone	C	C	C	C	C	A	A	A	A	A	A	Dibutylamine	C	C	C	NS	C	A	A	A	A	C	C		
Acetylene	A	A	A	C	A	A	A	A	A	A	A	Diesel Fuel	A	A	A	C	C	A	A	A	A	A	A		
Air	A	A	A	A	A	A	A	A	A	A	A	Dimethyl Acetamide	NS	C	NS	NS	NS	A	A	A	A	A	C	C	
Alum	A	A	A	A	A	A	A	A	A	A	A	Dimethylformamide	NS	C	NS	NS	NS	A	A	A	A	A	A		
Aluminum Acetate	A	A	A	A	A	A	A	A	A	C	C	Dioxane	NS	NS	NS	NS	NS	A	A	A	A	A	C		
Amines	NS	NS	NS	A	C	A	A	A	A	A	A	Dowtherm A, E	NS	C	C	NS	NS	A	A	A	A	A	A		
Ammonia, Gas <150°F	A	A	A	NS	A	A	A	A	A	A	C	Epichlorohydrin	NS	NS	NS	NS	NS	A	A	A	A	A	C		
Ammonia, Liquid<150°F	A	A	A	C	A	A	A	A	A	A	A	Ethane	A	A	A	C	C	A	A	A	A	A	A		
Ammonium Bisulfite	A	A	A	C	A	A	A	A	A	NS	NS	Ethyl Acetate	C	C	C	C	NS	A	A	A	A	A	A		
Ammonium Chloride	A	A	A	A	A	A	A	A	A	A	A	Ethyl Alcohol (Ethanol)	A	A	A	A	A	A	A	A	A	A	A		
Ammonium Hydroxide	A	A	A	A	A	A	A	A	A	A	A	Ethylbenzene	NS	NS	NS	NS	NS	A	A	A	A	A	A		
Amyl Chloride	NS	NS	NS	NS	NS	A	A	A	A	A	A	Ethylchloride	A	A	A	NS	NS	A	A	A	A	A	A		
Aniline, Aniline Oil	NS	NS	NS	NS	NS	A	A	A	A	A	A	Ethylene	A	A	A	NS	C	A	A	A	A	A	A		
Arsenic Acid	A	A	A	A	A	A	A	A	A	A	A	Ethylene Dichloride	NS	NS	NS	NS	NS	A	A	A	A	A	A		
Aviation Fuels	A	A	A	NS	C	A	A	A	A	A	A	Ethylene Glycol	A	A	A	A	A	A	A	A	A	A	A		
Barium Chloride	A	A	A	A	A	A	A	A	A	A	A	Ethyl Ether	C	C	C	NS	C	A	A	A	A	A	A		
Benzene (Benzol)	NS	NS	NS	NS	NS	A	A	A	A	A	A	Ethylene Oxide	NS	NS	NS	NS	NS	A	A	A	A	A	A		
Benzoic Acid	NS	NS	NS	NS	NS	A	A	A	A	A	A	Fatty Acids	A	A	A	NS	C	A	A	A	A	A	A		
Black Sulfate Liquor<350°F	NS	A	A	C	C	A	A	A	A	C	C	Ferric Chloride	A	A	A	A	A	A	A	A	A	A	NS		
Black Sulfate Liquor>350°F	NS	C	NS	NS	NS	A	A	A	A	NS	NS	Ferrous Chloride	A	A	A	A	A	A	A	A	A	A	NS		
Bleach Solutions	C	A	C	C	C	A	A	A	A	C	NS	Fluorine (Gas, Liquid)	NS	NS	NS	NS	NS	NS	NS	NS	NS	C	NS		
Boiler Feed Water	A	A	A	A	A	A	A	A	A	A	A	Formaldehyde	A	C	A	C	C	A	A	A	A	A	A		
Borax	A	A	A	A	A	A	A	A	A	A	A	Formic Acid	NS	NS	NS	C	A	A	A	A	A	A	A		
Brine	A	A	A	A	A	A	A	A	A	A	C	Freon	See Refrigerants												
Butadiene	NS	NS	NS	NS	A	A	A	A	A	A	A	Fuel Oil	A	A	A	NS	C	A	A	A	A	A	A		
Butane	A	A	A	NS	C	A	A	A	A	A	A	Gas - Natural	A	A	A	NS	A	A	A	A	A	A	A		
Butyl Acetate	NS	NS	NS	NS	NS	A	A	A	A	A	A	Gasoline	A	A	A	NS	NS	A	A	A	A	A	A		
Butyl Alcohol (Butanol)	A	A	A	A	A	A	A	A	A	A	A	Glucose	A	A	A	A	A	A	A	A	A	A	A		
Butyl Methacrylate	NS	NS	NS	NS	NS	A	A	A	A	C	NS	Glycerin (Glycerol)	A	A	A	A	A	A	A	A	A	A	A		
Butylene (Butene)	A	A	A	NS	C	A	A	A	A	A	A	Green Sulfate Liquor	C	A	C	NS	C	A	A	A	A	C	C		
Butyric Acid	A	A	A	C	C	A	A	A	A	A	A	Heptane	A	A	A	NS	C	A	A	A	A	A	A		
Calcium Carbonate	A	A	A	A	A	A	A	A	A	A	A	Hexane	A	A	A	NS	C	A	A	A	A	A	A		
Calcium Chloride	A	A	A	A	A	A	A	A	A	A	A	Hydraulic Oil (mineral)	A	A	A	C	C	A	A	A	A	A	A		
Calcium Hydroxide	A	A	A	A	A	A	A	A	A	A	A	Hydraulic Oil (phos. ester)	C	C	C	NS	NS	A	A	A	A	A	A		
Calcium Hypochlorite	C	A	C	C	C	A	A	A	A	A	A	Hydrazine	C	C	C	C	C	A	A	A	A	A	A		
Carbon Dioxide, wet	A	A	A	C	C	A	A	A	A	A	A	Hydrochloric Acid, 30%	NS	C	NS	NS	NS	A	A	A	A	A	NS		
Carbon Disulfide	NS	C	NS	NS	NS	A	A	A	A	A	A	Hydrochloric Acid, Conc	NS	C	NS	NS	NS	A	A	A	A	A	NS		
Carbon Tetrachloride	NS	C	C	NS	NS	A	A	A	A	A	A	Hydrofluoric Acid <150°F	NS	NS	NS	NS	NS	NS	A	A	A	A	NS		
Caustic Soda (NaOH)	NS	A	C	C	NS	A	A	A	A	A	A	Hydrofluoric Acid >150°F	NS	NS	NS	NS	NS	NS	A	A	A	A	NS		
Chlorine, liquid (dry) *	NS	NS	NS	NS	NS	A	A	A	A	A	C	Hydrogen	A	A	A	A	A	A	A	A	A	A	A		
Chlorine (wet) *	NS	C	NS	NS	NS	A	A	A	A	A	NS	Hydrogen Chloride, (dry)	A	NS	NS	NS	NS	A	A	A	A	A	NS		
Chlorine Dioxide	NS	NS	NS	NS	NS	A	A	NS	A	C	NS	Hydrogen Peroxide, 10%	C	C	C	C	C	A	A	A	A	C	C		
Chlorobenzene	NS	NS	NS	NS	NS	A	A	A	A	A	A	Hydrogen Sulfide (dry)	A	A	C	C	A	A	A	A	A	A	A		
Chromic Acid	NS	NS	NS	NS	NS	A	A	NS	A	A	A	Hydrogen Sulfide, (wet)	C	C	C	NS	C	A	A	A	A	A	A		
Citric Acid	A	A	A	A	A	A	A	A	A	A	A	Iodine	A	A	A	A	NS	A	A	A	A	NS	NS		
Coal Gas	A	A	A	C	C	A	A	A	A	A	A	Isooctane	A	A	A	NS	C	A	A	A	A	A	A		
Copper Sulfate	A	A	A	A	A	A	A	A	A	A	A	Isopropyl Alcohol	A	A	A	A	A	A	A	A	A	A	A		
Corn Oil	A	C	C	NS	C	A	A	A	A	A	A	Jet Fuel	A	A	A	NS	C	A	A	A	A	A	A		
Cotton Seed Oil	A	A	A	NS	C	A	A	A	A	A	A	Kerosene	A	A	A	NS	C	A	A	A	A	A	A		
Creosote (Coal Tar)	A	A	A	NS	NS	A	A	A	A	A	A	Lactic Acid	A	A	A	A	A	A	A	A	A	A	A		
Cresol	C	A	C	NS	NS	A	A	A	A	A	A	Linseed Oil	A	A	A	NS	C	A	A	A	A	A	A		
Crude Oil	A	A	A	NS	C	A	A	A	A	A	A	Lubricating Oil	A	A	A	NS	C	A	A	A	A	A	A		
Cumene	NS	NS	NS	NS	C	A	A	A	A	NS	NS	Magnesium Chloride	A	A	A	A	A	A	A	A	A	A	NS		
Cyclohexane	A	A	C	NS	C	A	A	A	A	A	A	Maleic Acid	A	A	A	C	NS	A	A	A	A	A	A		

\* Durlon 9000 is listed in Pamphlet 95 of the Chlorine Institute, as an acceptable gasket material for dry chlorine (liquid & gas) service. Gaskets for chlorine or oxygen service should be cleaned before installation.

# GRI/DURLON® - Chemical Resistance Chart

FLUID	DURLON® COMPRESSED SHEET					DURLON® PTFE				DURLON® FG / Core		FLUID	DURLON® COMPRESSED SHEET					DURLON® PTFE				DURLON® FG / Core	
	8300 8900	8400	5X00 8500 79XX	8600	8700	9000	9200	9400	9600	None	ss316		8300 8900	8400	5X00 8500 79XX	8600	8700	9000	9200	9400	9600	None	ss316
	Mercury	A	A	A	A	A	A	A	A	A	C		C	Refrigerant 402b	C	C	C	NS	A	A	A	A	A
Methane	A	A	A	NS	C	A	A	A	A	A	A	Refrigerant Blend 404a***	A	A	A	NS	A	A	A	A	A	A	A
Methyl Alcohol (Methanol)	A	A	A	A	A	A	A	A	A	A	A	Sea Water	A	A	A	A	A	A	A	A	A	A	NS
Methylene Chloride	NS	NS	NS	NS	NS	A	A	A	A	A	NS	Silver Nitrate	C	A	C	C	C	A	A	A	A	A	A
Methyl Ethyl Ketone	C	C	C	NS	C	A	A	A	A	A	A	Soap Solutions	A	A	A	A	A	A	A	C	A	A	A
Mineral Oil	A	A	A	NS	C	A	A	A	A	A	A	Sodium Bisulfite	A	A	A	A	A	A	A	A	A	A	A
Muriatic Acid	NS	C	NS	NS	NS	A	A	A	A	A	NS	Sodium Carbonate	A	A	A	A	A	A	A	A	A	A	A
Naphtha	A	A	A	C	NS	A	A	A	A	A	A	Sodium Chloride	A	A	A	A	A	A	A	A	A	A	A
Natural Gas	A	A	A	NS	A	A	A	A	A	A	A	Sodium Hydroxide	C	A	C	C	NS	A	A	A	A	C	C
Nickel Sulfate	A	A	A	A	A	A	A	A	A	A	A	Sodium Hypochlorite	NS	NS	NS	C	C	A	A	C	A	C	NS
Nitric Acid, <30%	NS	NS	NS	NS	NS	A	A	NS	A	A	A	Sodium Nitrate	A	A	A	C	C	A	A	A	A	C	C
Nitrogen	A	A	A	A	A	A	A	A	A	A	A	Sodium Silicate	A	A	A	A	A	A	A	A	A	A	C
Nitrogen Dioxide	NS	NS	NS	NS	NS	A	A	NS	A	NS	NS	Sodium Sulfate	A	A	A	A	A	A	A	A	A	A	A
Nitrogen Tetroxide	NS	NS	NS	NS	NS	A	A	NS	A	NS	NS	Sour Crude Oil	A	A	A	NS	C	A	A	A	A	A	A
Octane	A	A	A	NS	C	A	A	A	A	A	A	Steam, Saturated(150psig)	A	A	A	C	C	A	A	A	A	A	A
Oil, Crude	A	A	A	NS	C	A	A	A	A	A	A	Steam, Superheated	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	A
Oil, Mineral	A	A	A	NS	C	A	A	A	A	A	A	Stearic Acid	A	A	A	C	A	A	A	A	A	A	A
Oleum (H2SO4)	NS	NS	NS	NS	NS	A	NS	NS	A	NS	NS	Stoddard Solvent	A	A	A	NS	C	A	A	A	A	A	A
Oxalic Acid	A	A	C	NS	C	A	A	A	A	A	A	Styrene	NS	NS	NS	NS	NS	A	A	A	A	A	A
Oxygen, gas, liquid	NS	NS	NS	NS	NS	A	A	A	A	A	NS	Sulfite Liquors	C	A	C	C	C	A	A	A	A	A	C
Pentane	A	A	A	NS	C	A	A	A	A	A	C	Sulfur (molten)	A	C	C	NS	C	A	A	A	A	A	A
Perchloroethylene	NS	NS	NS	NS	NS	A	A	A	A	A	A	Sulfur Dioxide	NS	C	NS	NS	NS	A	A	A	A	A	A
Petroleum	A	A	A	NS	C	A	A	A	A	A	A	Sulfuric Acid, 20%	NS	NS	NS	NS	NS	A	A	A	A	A	NS
Phenol	NS	NS	NS	NS	NS	A	A	A	A	A	A	Sulfuric Acid, Conc.	NS	NS	NS	NS	NS	A	C	A	A	NS	NS
Phosphoric Acid, 45%	C	C	C	NS	C	A	A	A	A	A	C	Sulfuric Acid, Conc>200°F	NS	NS	NS	NS	NS	A	NS	NS	A	NS	NS
Potassium Chloride	A	A	A	A	A	A	A	A	A	A	A	Sulfuric Acid, Fuming	NS	NS	NS	NS	NS	A	NS	NS	A	NS	NS
Potassium Hydroxide	C	A	A	C	C	A	A	A	A	C	C	SUVA	See Refrigerants										
Potassium Nitrate	C	C	C	C	C	A	A	C	A	A	A	Tar	A	A	A	C	C	A	A	A	A	A	A
Propane	A	A	A	NS	C	A	A	A	A	A	A	Tetrachloroethane	C	C	C	NS	NS	A	A	A	A	A	A
Propylene	NS	NS	NS	NS	NS	A	A	A	A	A	A	Tetrahydrofuran (THF)	NS	NS	NS	NS	NS	A	A	A	A	A	A
Pydrauls, Skydrols	C	C	C	NS	NS	A	A	A	A	C	C	Toluene	NS	NS	NS	NS	C	A	A	A	A	A	A
Pyridine	NS	NS	NS	NS	NS	A	A	A	A	A	A	Transformer Oil	A	A	A	NS	C	A	A	A	A	A	A
Red Sulfite Liquor	NS	NS	NS	NS	NS	A	A	A	A	C	C	Transmission Fluid	A	A	A	NS	C	A	A	A	A	A	A
Red Sulfite Liquor > 200°F	NS	NS	NS	NS	NS	A	A	A	A	C	C	Trichloroethylene	C	C	C	NS	NS	A	A	A	A	A	A
Red Sulfite Liquor > 380°F	NS	NS	NS	NS	NS	C	C	C	A	NS	NS	Triethanolamine	C	C	C	C	A	A	A	A	A	C	C
Refrigerant R-11 **	A	A	A	NS	NS	A	A	A	A	A	A	Turpentine	A	A	A	NS	C	A	A	A	A	A	A
Refrigerant R-12 **	A	A	A	C	A	A	A	A	A	A	C	Urea	A	A	A	A	A	A	A	A	A	A	A
Refrigerant R-22 **	C	C	C	C	A	A	A	A	A	A	A	Varsol	A	A	A	NS	NS	A	A	A	A	A	A
Refrigerant R-113 **	A	A	A	C	A	A	A	A	A	C	C	Vegetable Oil	A	A	A	NS	C	A	A	A	A	A	A
Refrigerant HCFC 123 **	NS	C	C	NS	C	A	A	A	A	-	-	Vinegar	A	A	A	C	A	A	A	A	A	A	A
Refrigerant HCFC 124 ***	NS	C	C	NS	A	A	A	A	A	-	-	Vinyl Acetate	C	C	C	NS	C	A	A	A	A	A	A
Refrigerant HFC 125 ***	C	C	C	NS	A	A	A	A	A	-	-	Vinyl Chloride	NS	NS	NS	NS	NS	A	A	A	A	A	A
Refrigerant HFC 134a ***	A	A	A	C	A	A	A	A	A	-	-	Water	A	A	A	A	A	A	A	A	A	A	A
Refrigerant HCFC 141b	A	A	A	NS	A	A	A	A	A	-	-	White Sulfate Liquor	A	A	A	A	A	A	A	A	A	A	A
Refrigerant HFC 236fa	A	A	A	NS	A	A	A	A	A	-	-	White Spirit	A	A	A	C	C	A	A	A	A	A	A
Refrigerant Blend H 62***	A	A	A	NS	A	A	A	A	A	-	-	Xylene	NS	NS	NS	NS	NS	A	A	A	A	A	A
Refrigerant Blend HP80	C	C	C	NS	A	A	A	A	A	-	-	Zinc Chloride	A	A	A	A	A	A	A	A	A	A	A
Refrigerant Blend HP81	C	C	C	NS	A	A	A	A	A	-	-	Zinc Nitrate	C	C	C	C	C	A	A	C	A	C	C
Refrigerant 402a	C	C	C	NS	A	A	A	A	A	-	-	Zinc Sulfate	A	A	A	A	A	A	A	A	A	A	A

\*\* With Mineral Oil, \*\*\* With Polyol Ester Oil  
Gaskets for chlorine or oxygen service require cleaning before installation.

This information is a general guide only for the selection of a suitable gasket material. The substances listed above are evaluated for their effect on the gasket materials at ambient temperature (-40°F to 100°F, or -40°C to 38°C) unless stated otherwise. For unusual conditions of fluid concentrates, internal pressures or temperature consult your representative. This evaluation is based on laboratory or field tests, or experience; however, no guarantee can be given as to the actual performance experienced by the end user.

There are several fluids used in food which can be sealed by SBR, however due to flavor pickup, we have used "C" caution on these products.

**This Chemical Resistance Chart supersedes and obsoletes all previously issued charts.**

A more complete listing of gasket materials, chemicals and recommendations, and up to date revisions can be found at:

[www.gasketresources.com/chemical-compatibility-check](http://www.gasketresources.com/chemical-compatibility-check)

## Abbreviations

SI	- International Metric Standard	in	- inch
km	- kilometer	ft	- foot
m	- meter	yd	- yard
cm	- centimeter	oz	- ounce
mm	- millimeter	lb	- pound
N	- Newton	L	- liter
MPa	- MegaPascal	Pa	- Pascal
kgf	- kilogram force	g	- gram

## Multiples and sub-multiples of SI units

Factor by which the unit is multiplied		Prefix	Symbol
1,000,000	10 <sup>6</sup>	mega	M
1,000	10 <sup>3</sup>	kilo	k
100	10 <sup>2</sup>	hecto	h
10	10 <sup>1</sup>	deca	da
0.1	10 <sup>-1</sup>	deci	d
0.01	10 <sup>-2</sup>	centi	c
0.001	10 <sup>-3</sup>	milli	m
0.000,001	10 <sup>-6</sup>	micro	μ

## Conversion Factors

A	B	To convert A to B multiply A by	To convert B to A multiply B by
<i>Length</i>			
cm	in	0.3937	2.54
mm	in	0.0394	25.40
m	ft	3.2808	0.3048
in	mils	1000	0.001
<i>Force</i>			
N	lbf	0.22482	4.4482
N	kgf	0.102	9.807
<i>Weight</i>			
kg	lb	2.2046	0.453593
g	oz	0.0352	28.3495
<i>Stress or Pressure</i>			
MPa	psi	145.034	0.006895
MPa	kPa	1000	0.001
N/mm <sup>2</sup>	MPa	1	1
bar	psig	14.504	0.06895
bar	MPa	0.1	10
in. mercury	psig	0.4912	2.035
<i>Torque</i>			
g-cm	in-lb	1150	0.00069
N-m	ft-lb	0.738	1.36
<i>Density</i>			
g/cm <sup>3</sup>	lbs/ft <sup>3</sup>	62.4278	0.016
<i>Volume/Flow</i>			
L	cm <sup>3</sup>	1000	0.001
mL	cm <sup>3</sup>	1	1
ppm (by mass)	mg/kg	1	1
<i>Temperature</i>			
°C	°F	1.8 before adding 32	0.5556 after subtracting 32

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## GASKET RESOURCES INC.

### Our Company

Gasket Resources Inc., (GRI), an ISO 9001:2015 certified company, is market-driven and technology-based, serving customers throughout the world with innovative fluid sealing products.

### Our People

GRI regards people as its most important resource. We foster leadership, individual accountability, and teamwork. Our employees are professionals whose entrepreneurial behavior is result-oriented and guided by personal integrity. In return, our employees can count on opportunities for individual and professional development in an empowering working environment.

### Our Sealing Products

Durlon® sealing products have the widest possible range of service applications, therefore, the number of different types of gaskets required to be inventoried can be greatly reduced. This impacts process safety because limiting the number of gasket styles reduces the chance of installing the wrong gasket in the wrong service.

For these reasons, more and more original equipment manufacturers and industrial consumers are specifying Durlon® gasket materials for their needs.

Durlon® products are used in virtually every industrialized corner of the world. Our gasket materials are manufactured to the highest quality standards and are subjected to continuous testing and rigid quality control. Our cutting and fabrication facility is ISO 9001:2015 certified which ensures unvarying performance on the job.

Our state-of-the-art research and development facility is geared to meet the ever-changing demands required in today's variety of service conditions. Since their inception, Durlon® gasket materials have undergone many enhancements, each incorporating the latest technology to better meet the wide variety of industry's changing needs.

GRI recognizes that today more emphasis is being placed on fugitive emissions via the Clean Air Act in the U.S., and various regulations in other countries. Therefore, one of our prime design objectives is to maximize the sealability of our gasket materials to meet fugitive emissions requirements.

## INNOVATIVE DURLON® FABRICATION ADVANTAGES

### Welded Durlon®

Our innovative welding process enables GRI to manufacture large diameter gaskets with single piece construction.

- All of our 9000 series filled PTFE products can be welded
- Gasket OD sizes 60" and above
- Cost effective alternative to conventional die cutting
- Retains the same physical properties as a die cut gasket
- Conforms to FDA regulations

### Lathe Cut Durlon® 9000

- Cost effective alternative to conventional die cutting
- Eliminates costly center waste
- Custom thicknesses unavailable with sheet gaskets
- Small cross sectional parts that cannot be die cut

### Gasket Cutting Division

GRI complements our partners with a modern, ISO 9001:2015 certified, cutting facility and world class workmanship that can only come from experience. We are proud of our dedicated workforce that averages over 20 years of fabrication experience.

Our fabrication plant, located at our headquarters in Downingtown, PA, includes equipment not found at the most progressive fabrication facilities. These amenities include PTFE welding for large diameter gaskets over 60", Durlon® 9000 lathe cutting, computerized high speed flash cutting equipment, and many more proprietary and innovative production related customer service assets.

If your Durlon® gasketing product is fabricated by Gasket Resources Inc. or our factory trained and dedicated distribution partners, be assured that you are receiving the very best value in the fluid sealing industry.

At Gasket Resources Inc., we focus on creating economical gasket solutions to provide our customers with high-quality products. To learn more about our economy gasket sheets or any of our other superior products, contact us today.



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