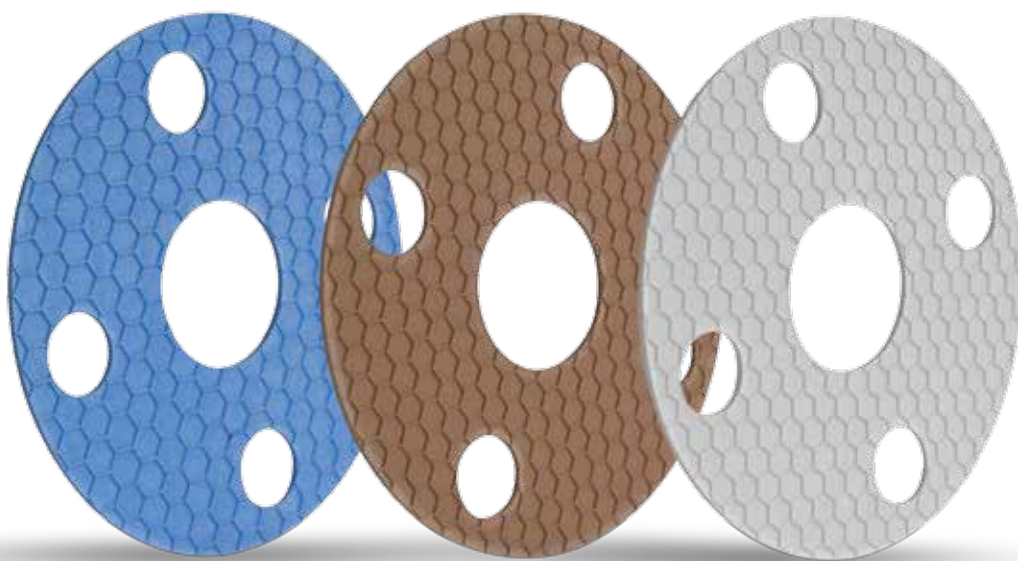




# Garlock GYLON EPIX™

The next generation in PTFE gasketing



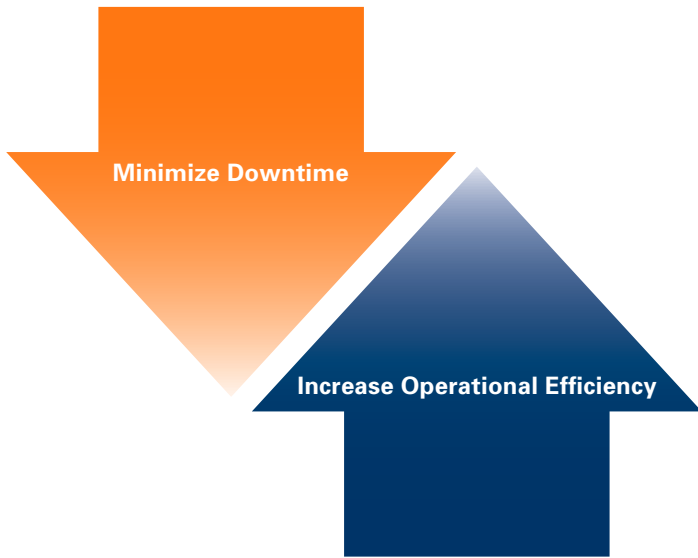
*Leaders in Sealing Integrity*

# Garlock GYLON EPIX™

Industry challenges

## WE UNDERSTAND YOUR GOALS

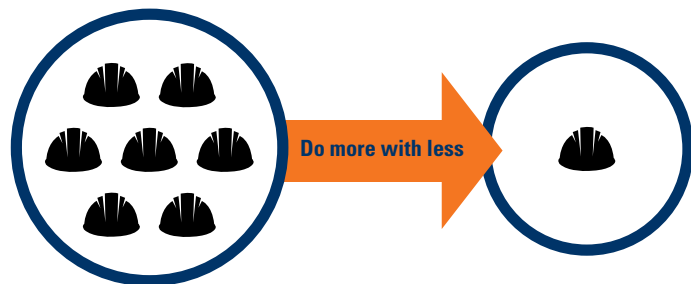
People or machines sitting idle results in products not being made, which affects your bottom line. Garlock is dedicated to helping our customers minimize downtime and increase operational efficiency.



The right combination of people, processes and technology align to optimize your business performance.

## CHALLENGES

- » Conflicting goals
- » Understaffing
- » Under trained maintenance personnel
- » Outsourced labor



Reliability engineers are now responsible for a lot more equipment or areas of the plant than in the past.

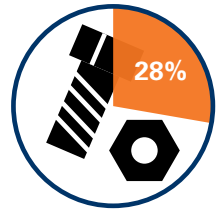
## DID YOU KNOW?

Gasket selection can greatly impact downtime and operational efficiency.

## COMMON GASKETING CHALLENGES

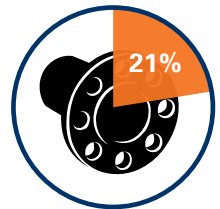
### IMPROPER BOLT LOAD

End-users struggle when it comes to ensuring gaskets are installed to proper bolt loads as gaskets require different loads.



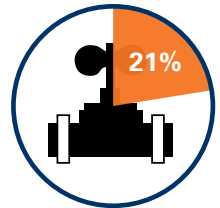
### SEALABILITY

End-users want a gasket that seals tighter. When available assembly stresses are less than ideal.



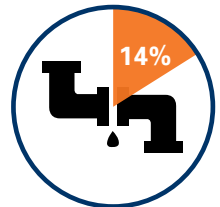
### IMPROVED LOAD RETENTION

End-users struggle with gaskets that leak prematurely due to load loss and need gaskets with improved load retention for better service life.



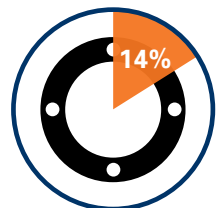
### LEAKAGE

End-users are frustrated by gaskets that leak – particularly when carrying aggressive and corrosive chemicals.



### INSTALLATION ISSUES

End-users are frustrated when equipment damage and unplanned outages happen due to human error and installation mistakes.



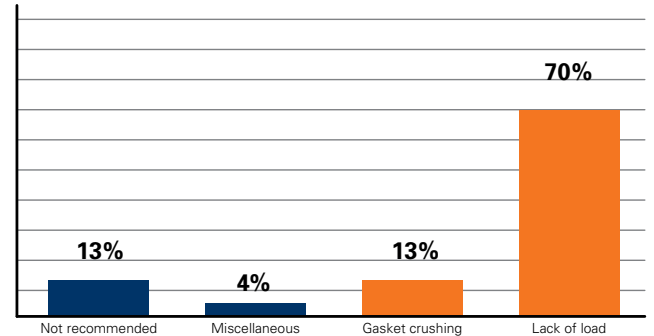
# Garlock GYLON EPIX™

The perfect solution for imperfect flanges

## GASKETING MISCONCEPTION

In a world where we are bombarded with the belief that “more is better” sealing science contradicts that theory with facts that show “thinner is better” when it comes to gaskets, as they provide improved load retention, pressure resistance and sealability. Yet thicker gaskets have their place for uneven, worn or damaged sealing surfaces. So how does a person make the right choice? What if there was a product that could do both?

## WHY GASKETS FAIL



**83% of gasket failures are due to installation errors**

# Introducing GYLON EPIX™

## THERE IS A BETTER WAY

GYLON EPIX™ is a family of gaskets that effectively seals a broader range of applications and is more forgiving during the installation process.

GYLON EPIX™ allows the end user to save valuable turn-around time, reduce re-work, and lower costs, helping them to finish ahead of schedule and under budget.

## INVENTORY SIMPLIFICATION

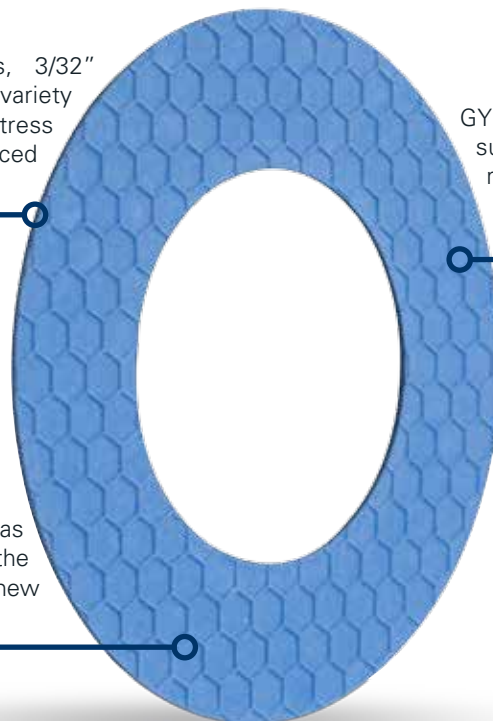
Offered in one universal thickness, 3/32" (2.4mm), eliminating the need to stock a variety of material thicknesses with different stress requirements. This translates to reduced inventory and better sheet utilization.

## IMPROVED LOAD RETENTION

GYLON EPIX™ features a hexagonal surface profile that provides the torque retention and blowout resistance of a thin gasket and the conformability of a thicker gasket.

## TRUSTED MATERIALS

Made from the same PTFE material as standard GYLON® products it eliminates the need for most customers to qualify the new GYLON EPIX™ products.



## Garlock GYLON EPIX™

The perfect solution for imperfect flanges

GYLON EPIX™ is a newly developed family of PTFE gaskets. It is manufactured using a patented, profiled surface based on our proven Fawn, Off-White, and Blue GYLON® to create highly conformable materials for optimum sealing performance.

The innovative GYLON EPIX™, provides superior functional performance by combining the traditional attributes of GYLON® with an innovative surface design. It offers a broader range of applications than traditional PTFE gaskets used in worn and pitted flanges. In addition, GYLON EPIX™ delivers the sealing and load retention properties of  $\frac{1}{16}$ " and the conformability of  $\frac{1}{8}$ ". The hexagonal profile provides improved compressibility and recovery. The profiled surface reduces the contact area during initial compression to concentrate the compressive force of the flange for improved sealability.

Designed for increased compressibility, GYLON EPIX™ improves performance in misaligned flanges. The consolidation of two thicknesses to one reduces the need to inventory multiple thicknesses. Garlock is dedicated to providing real sealing solutions that meet real world sealing needs. With an improved design, color-coded materials and a single thickness, GYLON EPIX™ makes sealing easier.

GYLON EPIX™ has been awarded in excess of 15 patents.

### FEATURES AND BENEFITS

- » One thickness does the job of two.
- » Seal performance and load retention equal of  $\frac{1}{16}$ ".
- » Compressibility and forgiveness/conformability of  $\frac{1}{8}$ ".
- » Patented hexagonal profile creates superb sealing and ability to conform to imperfect flange surfaces.
- » Same materials as traditional GYLON®.

### THE GYLON EPIX™ DIFFERENCE

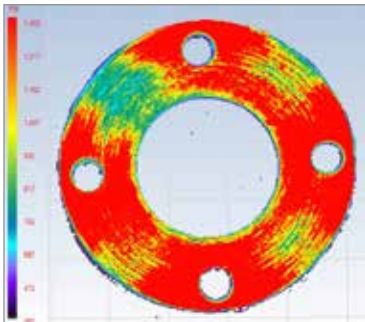


Traditional GYLON®

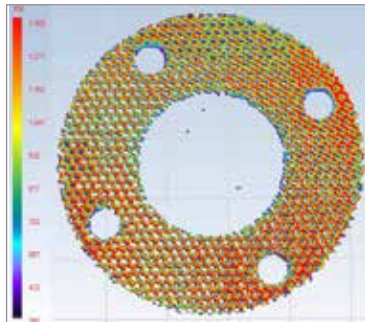


GYLON EPIX™

GYLON EPIX™ and a traditional full face gasket were installed in a 3"-150# flat face flange at 120 ft.lbs. with pressure sensitive film. The film revealed that the traditional material saw heavier loading-near and around the bolts, and lighter loading at the points furthest from the bolts. The GYLON EPIX™ was able to distribute the load more evenly and prevent the low loading phenomenon.



Traditional GYLON®



GYLON EPIX™

The pressure sensitive film was then analyzed with special software that translate the various shades of red into a full color spectrum that provides a better visualization of the stresses that were developed on each of the gaskets. Again, while the traditional gasket saw areas of lower stress (green and blue areas), the hexagonal pattern in the GYLON EPIX™ concentrated and distributed the stress more evenly across the entire gasket.

# Garlock GYLON EPIX™

## Gasket Simplification



### GYLON EPIX™ STYLE 3500 EPX

GYLON EPIX™ Style 3500 EPX is a high performance, silica filled PTFE sheet material designed for use with strong acids, solvents, hydrocarbons, and other aggressive media. Style 3500 EPX withstands a wide range of chemicals for extended service in a wide variety of applications.

#### APPLICATIONS

- » Strong Acids
- » Solvents
- » Hydrocarbons
- » Water
- » Steam
- » Chlorine
- » Cryogenics

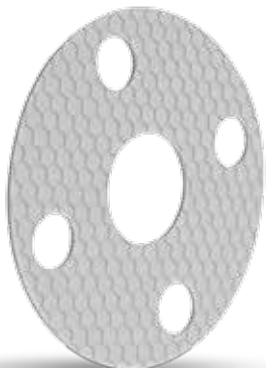


### GYLON EPIX™ STYLE 3504 EPX

GYLON EPIX™ Style 3504 EPX is a high performance, aluminosilicate microsphere filled PTFE sheet material designed for use in moderate concentrations of acids, and caustics, as well as hydrocarbons, refrigerants, and more.

#### APPLICATIONS

- » Moderate concentrations of acids and some caustics
- » Hydrocarbons
- » Solvents
- » Water
- » Refrigerants
- » Cryogenics
- » Hydrogen peroxide



### GYLON EPIX™ STYLE 3510 EPX

GYLON EPIX™ Style 3510 EPX is a high performance, barium sulfate filled PTFE gasketing material. Style 3510 EPX is designed for use where initiating and maintaining an extremely tight seal is critical; these applications include: strong caustics and moderate acids, chlorine, gases, water, steam, hydrocarbons and cryogenics.

#### APPLICATIONS

- » Strong caustics
- » Moderate acids
- » Chlorine
- » Gases
- » Monomers
- » Steam
- » Hydrocarbons
- » Cryogenics & aluminum fluoride

# TECHNICAL DATA

## GYLON EPIX™ APPROVALS & CERTIFICATIONS

	Style 3500 EPX	Style 3504 EPX	Style 3510 EPX
<b>FDA</b>	X	X	X
<b>USDA</b>	X		
<b>ADI/TSE Free</b>	X	X	X
<b>USP VI &lt;87&gt;</b>	X	X	X
<b>USP VI &lt;88&gt;</b>	X	X	X
<b>USP VI &lt;661&gt;</b>		X	
<b>REACH</b>	X	X	X
<b>RoHS 3</b>	X	X	X

Additional certificates for individual styles are available upon request

## DIN EN 13555 CHARACTERISTICS

	Test Method	Units	GYLON EPIX™ Style 3500 EPX	GYLON EPIX™ Style 3504 EPX	GYLON EPIX™ Style 3510 EPX	
<b>Maximum tolerated assembly stress in accordance to DIN EN 13555 Qsmax</b>	68°F (20°C)	EN 13555	psi (MPa)	33,350 (230)	29,000 (200)	33,350 (230)
	212°F (100°C)	EN 13555	psi (MPa)	29,000 (200)	17,400 (120)	23,200 (160)
	302°F (150°C)	EN 13555	psi (MPa)	29,000 (200)	14,500 (100)	20,300 (140)
	392°F (200°C)	EN 13555	psi (MPa)	26,100 (180)	11,600 (80)	17,400 (120)
	482°F (250°C)	EN 13555	psi (MPa)	23,200 (160)	8,700 (60)	14,500 (100)
<b>Minimum stress needed to reach 0.01 [mg/(s*m)]</b>	150-600 psig (10-40 bar)	EN 13555	psi (MPa)	725 (5)	725 (5)	725 (5)
	1,160 psig (80 bar)	EN 13555	psi (MPa)	1,740 (12)	1,450 (10)	1,450 (10)
<b>Maximum Sealability Class at 68°F (20°C) at 2,900 psi (20 MPa) Assembly stress</b>	145-290 psig (10-20 bar)	EN 13555	L[mg/(s*m)]	1.0x10 <sup>-4</sup>	1.0x10 <sup>-4</sup>	1.0x10 <sup>-4</sup>
	580-1,160 psig (40-80 bar)	EN 13555	L[mg/(s*m)]	1.0x10 <sup>-3</sup>	1.0x10 <sup>-3</sup>	1.0x10 <sup>-3</sup>
<b>Maximum sealability class at 68°F (20°C) at 23,200 psi (160 Mpa) assembly stress</b>	580 psig (40 bar)	EN 13555	L[mg/(s*m)]	1.0x10 <sup>-6</sup>	1.0x10 <sup>-5</sup>	1.0x10 <sup>-5</sup>
<b>Initial &amp; Residual Assembly Stress required to achieve sealability of 0.01 [mg/(s*m)] (In accordance with DIN EN 13555 test method)</b>	<b>Corresponding pressure</b>	<b>Initial Assembly Stress (QA)</b>	<b>Residual Assembly Stress</b>	<b>Residual Assembly Stress</b>	<b>Residual Assembly Stress</b>	
	150 psig (10 bar)	1,450 psi (10 Mpa)	435 psi (3 bar)	435 psi (3 bar)	435 psi (3 bar)	
	300 psig (20 bar)	1,450 psi (10 Mpa)	580 psi (4 bar)	580 psi (4 bar)	725 psi (5 bar)	
	600 psig (40 bar)	1,450 psi (10 Mpa)	725 psi (5 bar)	725 psi (5 bar)	725 psi (5 bar)	
	1,160 psig (80 bar)	2,900 psi (20 Mpa)	1,450 psi (10 bar)	1,450 psi (10 bar)	1,450 psi (10 bar)	

NOTE: All leak testing performed with helium gas.

# TECHNICAL DATA

## GENERAL SEALING CHARACTERISTICS

	Style 3500 EPX	Style 3504 EPX	Style 3510 EPX
<b>MATERIAL PROPERTIES</b>			
<b>Color</b>	Fawn	Blue	Off-White
<b>Composition</b>	PTFE w/ silica	PTFE w/ aluminosilicate	PTFE w/ barium sulfate
<b>Temperature range</b>			
<b>Minimum:</b>	-450°F (-268°C)	-450°F (-268°C)	-450°F (-268°C)
<b>Ideal Operating Limit:</b>	400°F (204°C)	400°F (204°C)	400°F (204°C)
<b>Maximum:</b>	See Pressure/Temperature Ratings graph		
<b>Pressure</b>			
<b>Ideal Operating Limit:</b>	750 psig (52 bar)	750 psig (52 bar)	750 psig (52 bar)
<b>Maximum:</b>	See Pressure/Temperature Ratings graph		
<b>TYPICAL PHYSICAL PROPERTIES</b>			
<b>Load Retention (DIN 52913)</b>	50%	50%	50%
<b>Compressibility (ASTM F 36)</b>	47%	52%	43%
<b>Recovery (ASTM F 36)</b>	17%	25%	18%
<b>Tensile strength (ASTM D 1708)</b>	2,000 psi (13.8 N/mm <sup>2</sup> )	2,000 psi (13.8 N/mm <sup>2</sup> )	2,000 psi (13.8 N/mm <sup>2</sup> )
<b>DESIGN &amp; PERFORMANCE VALUES</b>			
<b>Design Factors (ASTM F3149)</b>			
<b>"m" factor:</b>	2.5	2.5	2.5
<b>"y" factor:</b>	2,000 psi (13.8 MPa)	2,000 psi (13.8 MPa)	2,000 psi (13.8 MPa)
<b>Gasket constants (ASTM ROTT)</b>			
<b>Gb:</b>	174 psi	76 psi	248 psi
<b>a:</b>	0.424	0.508	0.368
<b>Gs:</b>	2.03 psi	13.6 psi	0.939 psi
<b>Hot Blowout (ASTM HOBT2)</b>			
<b>Rating at 435 psig:</b>	530°F (277°C)	432°F (222°C)	475°F (246°C)
<b>SEALING CHARACTERISTICS</b>			
<b>Sealability (ASTM F 37 B) Fuel A:*</b>			
<b>Internal pressure = 9.8 psig (0.7 bar)</b>	0.2 ml/hr.	0.2 ml/hr.	0.2 ml/hr.
<b>Gasket load = 1000 psi (6.9 MPa)</b>			
<b>Sealability (ASTM F 37 B) Nitrogen*</b>			
<b>Internal pressure = 30 psig (2 bar)</b>	0.25 ml/hr.	0.15 ml/hr.	0.2 ml/hr.
<b>Gasket load = 3000 psi (20.7 MPa)</b>			
<b>Gas permeability (DIN 3535/6) mg/m-sec</b>	<0.0005	<0.0005	<0.0005
<b>Gas permeability (DIN 3535/4) cc/min</b>	<0.006	<0.006	<0.006

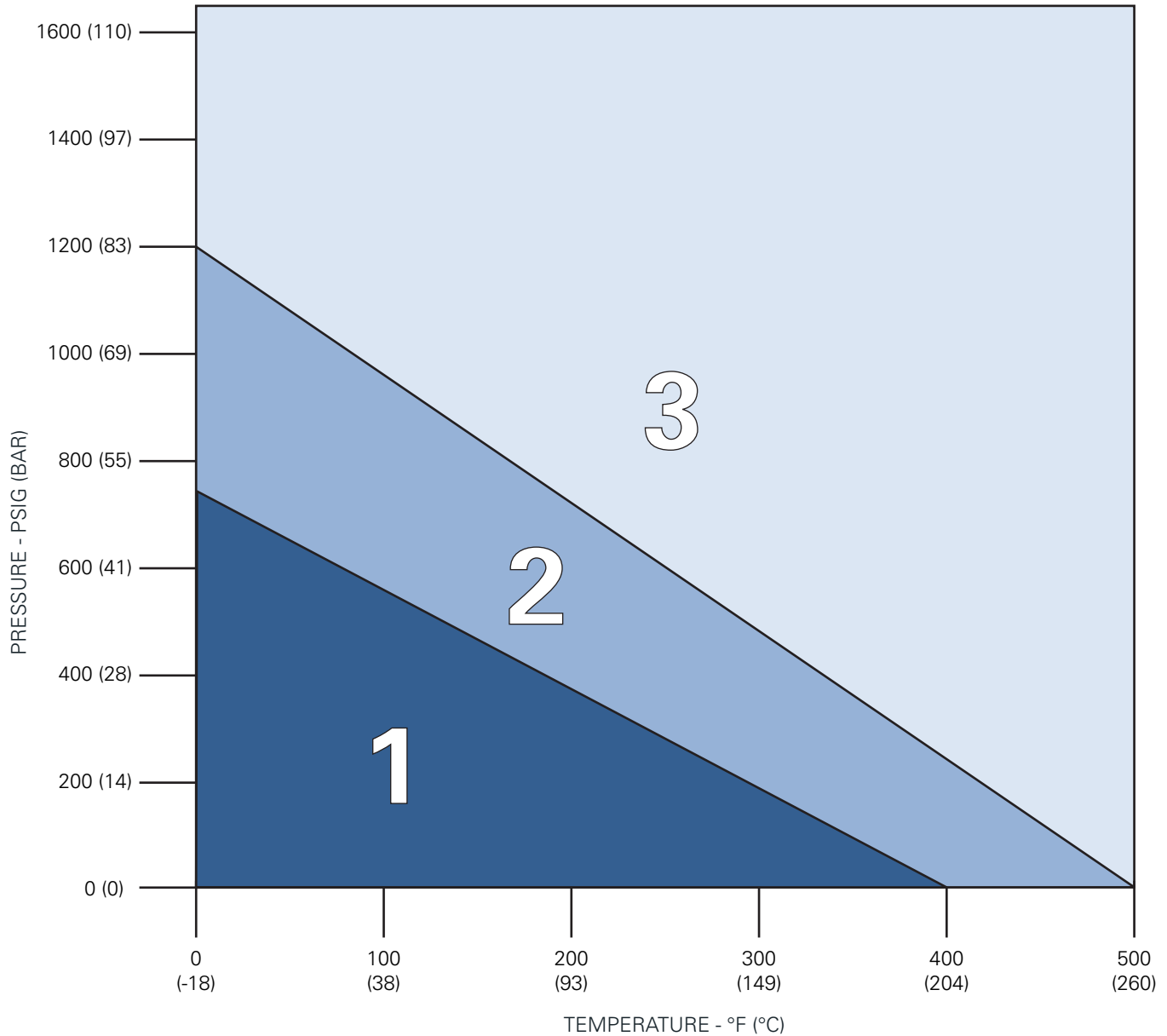
\*0.2" ID x 1.20" OD test gasket size

## AVAILABLE SIZES

	Style 3500 EPX	Style 3504 EPX	Style 3510 EPX
<b>Thickness - inch (mm)</b>	3/32" (2.4mm)	3/32" (2.4mm)	3/32" (2.4mm)
<b>Tolerance - inch (mm)</b>	+/- 0.008 (0.2mm)	+/- 0.008 (0.2mm)	+/- 0.008 (0.2mm)
<b>Sheet Sizes - inch (m)</b>	60"x 60" (1.5m x 1.5m)	60"x 60" (1.5m x 1.5m)	60"x 60" (1.5m x 1.5m)

# TECHNICAL DATA

## PRESSURE/TEMPERATURE RATINGS



**LEGEND:**

1. Suitable for use if chemically compatible and installed using Garlock’s recommended installation practices and assembly stresses.
2. Please consult Garlock Applications Engineering to confirm the suitability with your service conditions.
3. Generally not suitable - please consult Garlock Applications Engineering to confirm the suitability with your service conditions.



# INSTALLATION RECOMMENDATIONS

## FACTORS AFFECTING GASKET PERFORMANCE

A gasket has one basic function: to create a positive seal between two relatively stationary parts. The gasket must do a number of different jobs well to function properly - first, create an initial seal; second, maintain the seal over a desired length of time; third, be easily removed and replaced. Varying degrees of success are dependent on how well the gasket does the following:

1. Seals system fluid.
2. Chemically resists the system fluid to prevent serious impairment of its physical properties.
3. Deforms enough to flow into the imperfections on the gasket seating surfaces to provide intimate contact between the gasket and the sealing surfaces.
4. Withstands system temperatures without serious impairments of its performance properties.
5. Is resilient and creep resistant enough to maintain an adequate portion of the applied load.
6. Has sufficient strength to resist crushing under the applied load, and maintain its integrity when being handled and installed.
7. Does not contaminate the system fluid.
8. Does not promote corrosion of the gasket seating surfaces.
9. Is easily and cleanly removable at the time of replacement.

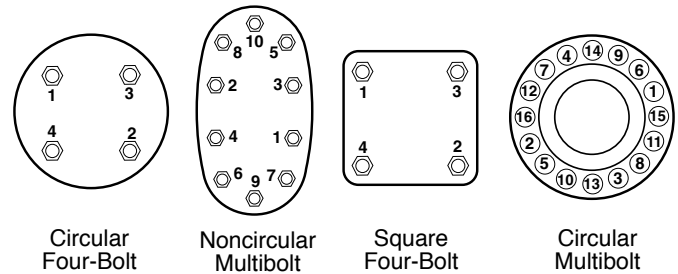
During the gasket product selection process that follows, we recommend that these nine (9) factors be used as a checklist from the viewpoint of the user's degree of need for each factor and the manufacturer's degree of compliance.

## INSTALLATION

A few simple precautionary measures must be observed during installation to ensure the most satisfactory joint.

- » For optimum performance the sealing surface should be no less than ½" wide.
- » Center the gasket on the flange. This is extremely vital where raised faces are involved.
- » Be sure surface finish and flatness are satisfactory.
- » Tighten the bolts to compress the gasket uniformly. This means going from side to side around the joint. See correct bolting pattern below.
- » Use a torque wrench, well-lubricated fasteners, and hardened flat washers to ensure correct initial loading.
- » All bolts should be tightened in one-third increments, according to proper bolting patterns.
- » Make a final check pass at the target torque value moving consecutively from bolt to bolt.
- » Re-torque 12 to 24 hours after initial installation, whenever possible. All applicable safety standards including lockout/tag-out procedures should be observed.
- » Never use liquid or metallic based anti-stick or lubricating compounds on the gaskets. Premature failure could occur as a result.

## CORRECT BOLTING PATTERN



## INSTALLATION RECOMMENDATIONS

### BOLT TORQUE VALUES FOR GYLON EPIX™

ASME B16.5 Class 150# RAISED FACE Flanges with A193 Grade B7 bolts

Nom. Pipe Size inches	# of bolts	Size of Bolts inches	Internal Pressure psig	Minimum Torque ft. lbs.	Preferred Torque ft. lbs.
½	4	½	300	7	28
¾	4	½	300	10	40
1	4	½	300	13	53
1¼	4	½	300	20	60
1½	4	½	300	26	60
2	4	5/8	300	52	120
2½	4	5/8	300	61	120
3	4	5/8	300	89	120
3½	8	5/8	300	50	120
4	8	5/8	300	63	120
5	8	¾	300	88	200
6	8	¾	300	111	200
8	8	¾	300	150	200
10	12	7/8	300	141	320
12	12	7/8	300	187	320
14	12	1	300	238	490
16	16	1	300	226	490
18	16	1 1/8	300	336	710
20	20	1 1/8	300	296	710
24	20	1 ¼	300	422	1000

Minimum torque values based on a minimum gasket stress of 3600 psi. Maximum torque values based on a maximum gasket stress of 15,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

# INSTALLATION RECOMMENDATIONS

## BOLT TORQUE VALUES FOR GYLON EPIX™

ASME B16.5 Class 300# RAISED FACE Flanges with A193 Grade B7 bolts

Nom. Pipe Size inches	# of bolts	Size of Bolts inches	Internal Pressure psig	Minimum Torque ft. lbs.	Preferred Torque ft. lbs.
½	4	½	800	9	28
¾	4	5/8	800	16	51
1	4	5/8	800	21	67
1¼	4	5/8	800	33	102
1½	4	¾	800	48	151
2	8	5/8	800	35	108
2½	8	¾	800	45	141
3	8	¾	800	66	200
3½	8	¾	800	74	200
4	8	¾	800	94	200
5	8	¾	800	117	200
6	12	¾	800	99	200
8	12	7/8	800	160	320
10	16	1	800	185	490
12	16	1 1/8	800	269	710
14	20	1 1/8	800	234	652
16	16	1¼	800	328	912
18	24	1¼	800	371	1000
20	24	1¼	800	409	1000
24	24	1½	800	579	1552

Minimum torque values based on a minimum gasket stress of 4800 psi to 5600 psi (depending on flange size). Maximum torque values based on a maximum gasket stress of 15,000 psi or 60,000 psi bolt stress, whichever occurs first. Contact Garlock Application Engineering if flanges are non-metallic or if bolt grade is other than A193 B7.

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