

GYLON[®] EPIX

The next level in PTFE gasketing



Table of contents

GYLON® – FAMILY OF PTFE GASKETING	3
GASKETING CHALLENGES	4
INDUSTRY CHALLENGES	5
GYLON® EPIX – NEXT LEVEL GASKETING	6
GYLON® EPIX – ENHANCED SEALING PERFORMANCE	7
GYLON® EPIX STYLES	8
TECHNICAL INFORMATION	9

The GYLON® Story

Family of PTFE Gasketing

GYLON® family history

When PTFE* was developed in 1938, the importance of the material to industrial sealing was quickly recognized because of the tremendous chemical resistance characteristics. While use of PTFE as a gasket material increased in industrial applications, complaints about certain properties started to build: skive marks made initial sealing difficult, cold flow caused leakage and premature failure, and temperature/pressure cycling was a problem.

Resistance to cold flow

These drawbacks were eliminated when Garlock introduced GYLON® Fawn, Style 3500, in 1967. The GYLON® process minimizes creep and cold flow normally associated with PTFE products, while retaining other positive characteristics of PTFE. GYLON® Fawn was so innovative that it received Chemical Processing magazine's Vaaler Award in 1968. As the variety and quantity of industrial chemicals increased, Garlock realized that new products would be required to serve the growing market. Two additional GYLON® styles were introduced to meet those demands: GYLON® Blue Style 3504, and GYLON® White Style 3510.

High pressure service, chemical compatibility

As production demands increased, pipe hammering and/or pressure spikes became more common. GYLON® Series HP 3560 and HP 3561 were designed to meet those extreme conditions. These perforated stainless steel-inserted GYLON® gasket materials outperform any other gasketing available for high pressure service where chemical compatibility is a concern.

Unlimited sizes and dimensions

With growing concern over fugitive emissions, the traditional dovetailing method of creating larger sized gaskets no longer met many customer demands. In response, Garlock created the Welded GYLON® process. Welded GYLON® eliminated dovetail leak paths and allowed the use of large gaskets without handling problems or premature blowout. Today, GYLON® gaskets can be thermally bonded (without the use of any adhesive or low melt temperature polymers) to any size or dimension; another breakthrough for Garlock gasketing.

In times where environmental safety combined with cost savings gets more and more important, the well-known performance is not enough anymore. With the next level of gasketing GYLON® EPIX is ready for the changing environment.

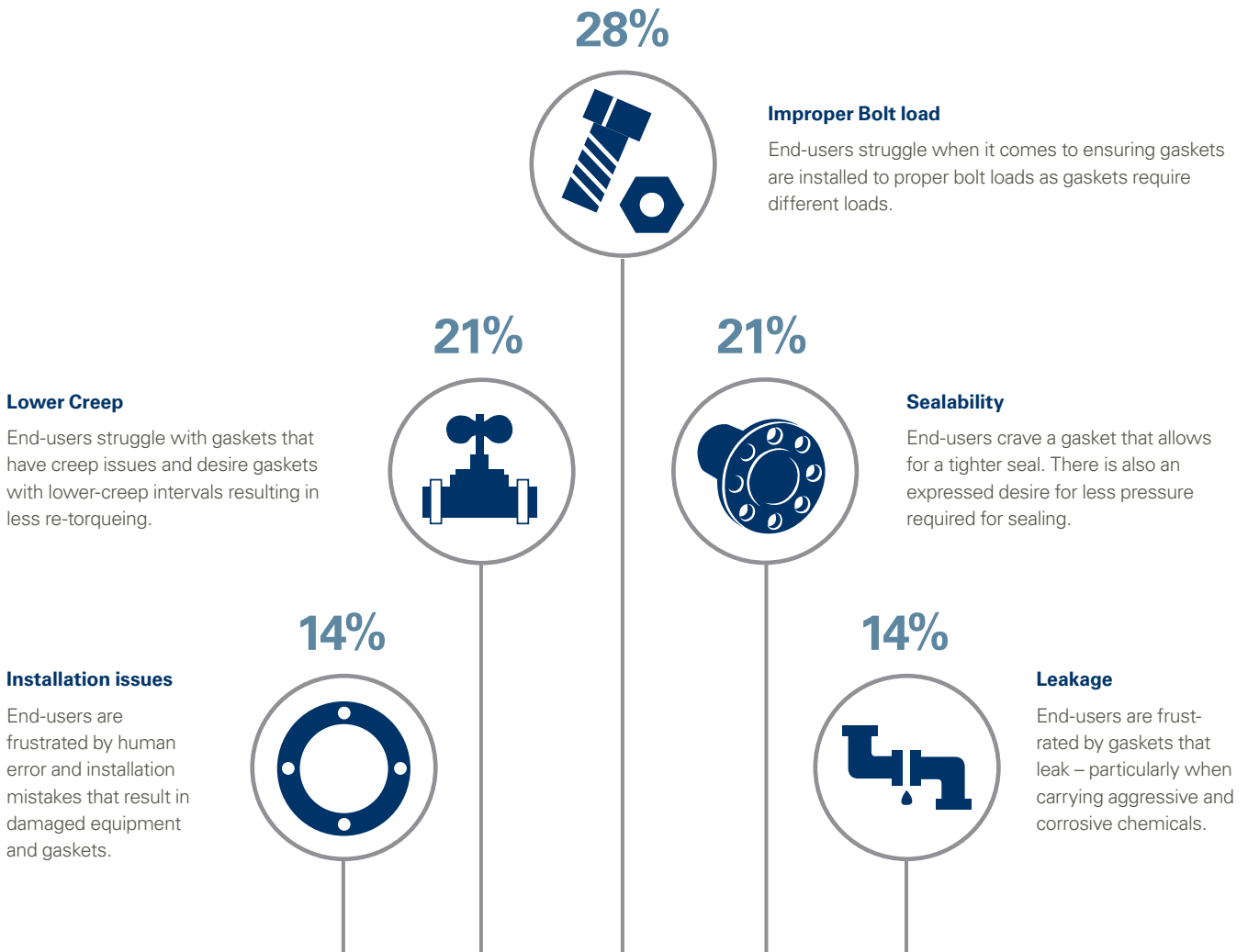
* PTFE – polytetrafluoroethylene

Gasketing Challenges

We heard

We made a survey and ask decision maker in the industry about their common gasketing challenges and found the following

% = Proportion of respondents named the particular challenge



Through the use of a 3rd party research firm, we consulted “gasket specialists” at our end users to assess the decision making process currently in place when it comes to gaskets used in flanged pipes, challenges faced with their current gaskets, frequency of plant shutdowns for maintenance, frequency of scheduled maintenance, etc.

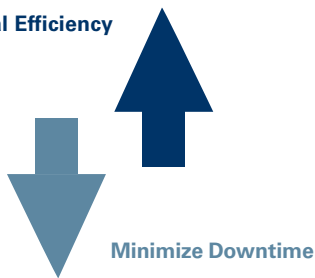
Industry Challenges

We understood

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.

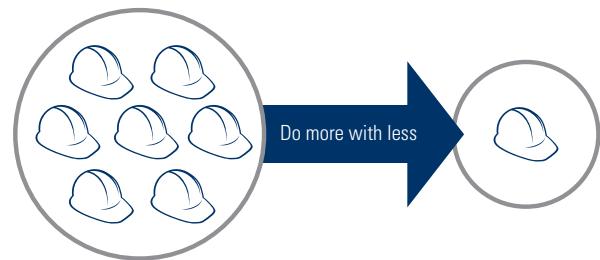
Increase Operational Efficiency



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

Challenges

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

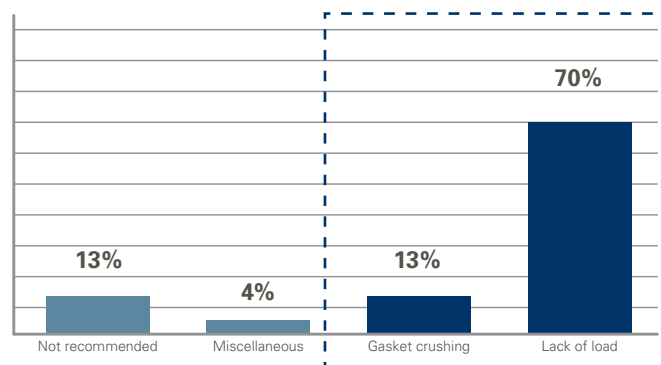


Reliability engineers are now responsible for a lot more equipment or areas of the plant than in the past.

Gasketing misconception

In a world where we are bombarded with the belief that “more is better” sealing science contradicts that theory with facts that shows “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 - review of a hundred failed gaskets



% = Proportion of failure type

83% = of gasket failures are due to installation errors

Introducing GYLON® EPIX

Next level gasketing

There is a better way

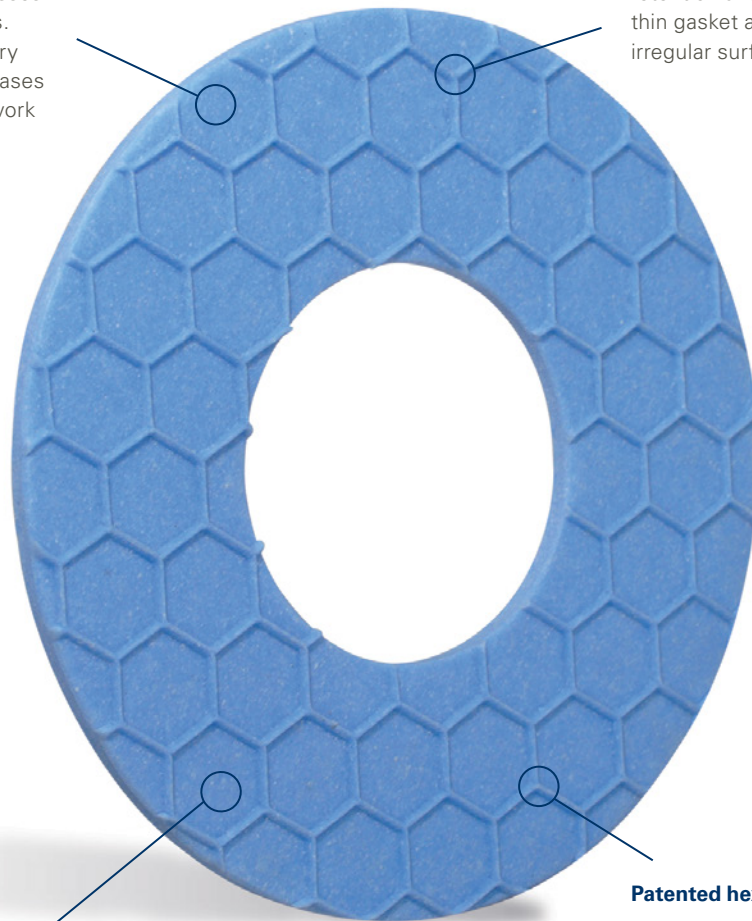
GYLON® EPIX is a family of gaskets that effectively seals a broader range of applications and is more forgiving during the installation process. GYLON® EPIX allows the end user to save valuable turn-around time, reduce re-work, and lower costs, helping them to finish ahead of schedule and under budget.

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. Decreases time and effort to uphold and re-work plant standards.

Improved load retention

GYLON® EPIX features a hexagonal surface profile that provides the torque retention and blowout resistance of a thin gasket and the ability to adapt to irregular surfaces of a thicker gasket.



Trusted material

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

Patented hexagonal profile

Patented hexagonal profile creates superb sealing and ability to conform to imperfect flange surfaces.

GYLON® EPIX

Enhanced sealing performance

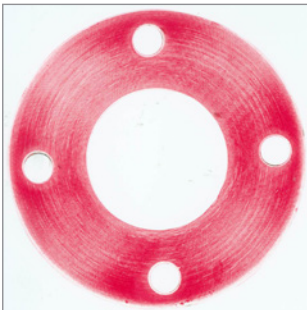
GYLON® EPIX

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

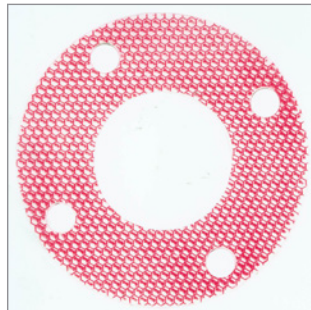
The innovative GYLON® EPIX provides superior functional performance by combining the traditional attributes of GYLON® with an innovative surface design. It offers a broader range of applications than traditional PTFE gaskets. GYLON® EPIX delivers the sealing and load retention properties of 1/16" and the conformability of 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 and to generate high-density-zones within the material, 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. Doing so, GYLON® EPIX also reduces time and effort to uphold and re-work plant standards and piping class calculations. 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.

The GYLON® EPIX difference

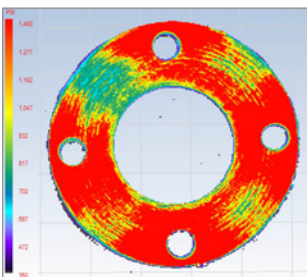


Traditional restructured PTFE

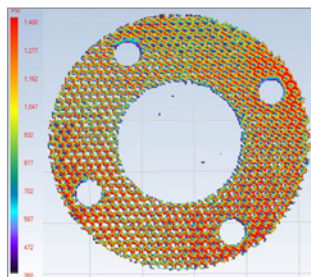


GYLON® EPIX

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 restructured PTFE



GYLON® EPIX

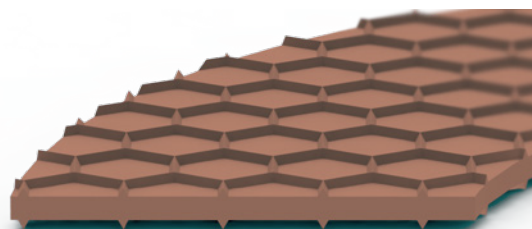
The pressure sensitive film was then analyzed with special software that translate the various shades of red into a full color spectrum that provides a better visualization of the stresses that were developed on each of the gaskets. Again, while the traditional gasket saw areas of lower stress (green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

GYLON® EPIX

Our GYLON® EPIX Styles

GYLON® EPIX Standard Style 3501-E EPX

GYLON® EPIX Style 3501-E EPX is a high performance, silica filled PTFE sheet material designed for use with strong acids, solvents, hydrocarbons, and other aggressive media. GYLON® EPIX Style 3501-E EPX withstands a wide range of chemicals for extended service in a wide variety of applications.



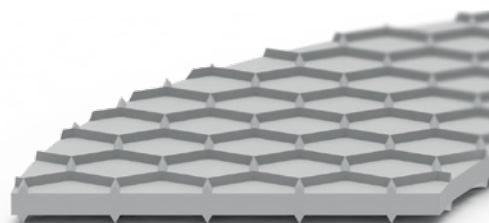
GYLON® EPIX Blue Style 3504 EPX

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. GYLON® EPIX Style 3504 EPX withstands a wide range of chemicals for extended service in a wide variety of applications.



GYLON® EPIX White Style 3510 EPX

GYLON® EPIX Style 3510 EPX is a high performance, barium sulfate filled PTFE gasketing material. GYLON® EPIX 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. GYLON® EPIX Style 3510 EPX withstands a wide range of chemicals for extended service in a wide variety of applications.



Technical Information

Several characteristics and sizes

General sealing characteristics

	GYLON® EPIX Standard Style 3501-E EPX	GYLON® EPIX Blue Style 3504 EPX	GYLON® EPIX White Style 3510 EPX
Color	Brick-Red	Blue	Off-White
Composition	PTFE w/ silica	PTFE w/ aluminosilicate	PTFE w/ barium sulfate
Temperature range			
Minimum:	-268°C (-450°F)	-268°C (-450°F)	-268°C (-450°F)
Ideal Operating Limit:	204°C (400°F)	204°C (400°F)	204°C (400°F)
Maximum:	See pressure / Temperature ratings graph		
Pressure			
Ideal Operating Limit:	52 bar (750 psig)	52 bar (750 psig)	52 bar (750 psig)
Maximum:	See pressure / Temperature ratings graph		
Load Retention (DIN 52913)	50%	50%	50%
Compressibility (ASTM F 36)	47%	52%	43%
Recovery (ASTM F 36)	17%	25%	18%
Tensile strength (ASTM D 1708)	8,3 MPa (1 200 psi)	10,3 MPa (1 500 psi)	8,3 MPa (1 200 psi)
Sealability (ASTM F 37 B) Fuel A:* Internal pressure = 0,7 bar (9,8 psig) Gasket load = 6,9 MPa (1 000 psi)	0,2 ml/hr.	0,2 ml/hr.	0,2 ml/hr.
Sealability (ASTM F 37 B) Nitrogen* Internal pressure = 2 bar (30 psig) Gasket load = 20,7 MPa (3 000 psi)	0,25 ml/hr.	0,15 ml/hr.	0,2 ml/hr.
Gas permeability (DIN 3535/6) mg/m-sec	< 0,0005	< 0,0005	< 0,0005
Gas permeability (DIN 3535/4) cc/min	< 0,006	< 0,006	< 0,006

*0,2" inner diameter x 1,20" outer diameter test gasket size

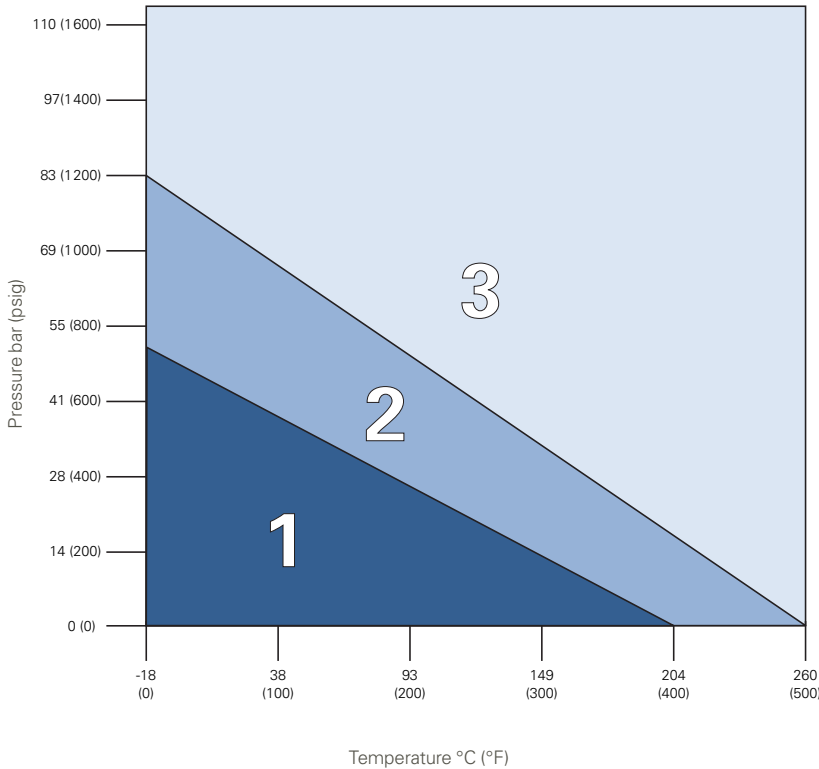
Available sizes

	GYLON® EPIX Standard Style 3501-E EPX	GYLON® EPIX Blue Style 3504 EPX	GYLON® EPIX White Style 3510 EPX
Thickness	2,4 mm (3/32")	2,4 mm (3/32")	2,4 mm (3/32")
Tolerance	0,2 mm (+/- 0,008)	0,2 mm (+/- 0,008)	0,2 mm (+/- 0,008)
Sheet Sizes	1,5 m x 1,5 m (60"x 60")	1,5 m x 1,5 m (60"x 60")	1,5 m x 1,5 m (60"x 60")

Technical Information

Operating range and certificates

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.

Approvals & Certifications

	Standard Style 3501-E EPX	Blue Style 3504 EPX	White Style 3510 EPX
FDA	X	X	X
ADI/TSE Free	X	X	X
USP VI <87>	X	X	X
USP VI <88>	X	X	X
USP VI <661>		X	
REACH	X	X	X
RoHS 3	X	X	X
TA Luft	X	X	X
Blow-out proof	X	X	X
DIN EN 13555	X	X	X

Additional certificates for individual styles are available upon request.

Technical Information

DIN EN 13555 characteristics

DIN EN 13555 characteristics

		Test Method	Units	GYLON® EPIX Style 3501-E EPX	GYLON® EPIX Style 3504 EPX	GYLON® EPIX Style 3510 EPX
Maximum tolerated assembly stress in accordance to DIN EN 13555 Qsmax	20°C (68°F)	EN 13555	MPa (psi)	230 (33 350)	200 (29 000)	230 (33 350)
	100°C (212°F)	EN 13555	MPa (psi)	200 (29 000)	120 (17 400)	160 (23 200)
	150°C (302°F)	EN 13555	MPa (psi)	200 (29 000)	100 (14 500)	140 (20 300)
	200°C (392°F)	EN 13555	MPa (psi)	180 (26 100)	80 (11 600)	120 (17 400)
	250°C (482°F)	EN 13555	MPa (psi)	160 (23 200)	60 (8 700)	100 (14 500)
Minimum stress needed to reach 0,01 [mg/(s*m)]	10-40 bar (150-600 psig)	EN 13555	MPa (psi)	5 (725)	5 (725)	5 (725)
	80 bar (1 160 psig)	EN 13555	MPa (psi)	12 (1 740)	10 (1 450)	10 (1 450)
Maximum Sealability Class at 20°C (68°F) at 20 MPa (2 900 psi) Assembly stress	10-20 bar (145-290 psig)	EN 13555	L[mg/(s*m)]	1,0x10 ⁻⁴	1,0x10 ⁻⁴	1,0x10 ⁻⁴
	40-80 bar (580-1 160 psig)	EN 13555	L[mg/(s*m)]	1,0x10 ⁻³	1,0x10 ⁻³	1,0x10 ⁻³
Maximum sealability class at 20°C (68°F) at 160 MPa (23 200 psi) assembly stress	40 bar (580 psig)	EN 13555	L[mg/(s*m)]	1,0x10 ⁻⁶	1,0x10 ⁻⁵	1,0x10 ⁻⁵
	Corresponding pressure		Initial Assembly Stress (QA)	Residual Assembly Stress	Residual Assembly Stress	Residual Assembly Stress
Initial & Residual Assembly Stress required to achieve sealability of 0,01 [mg/(s*m)] (In accordance with DIN EN 13555 test method)	10 bar (150 psig)		10 MPa (1 450 psi)	3 MPa (435 psi)	3 MPa (435 psi)	3 MPa (435 psi)
	20 bar (300 psig)		10 MPa (1 450 psi)	4 MPa (580 psi)	4 MPa (580 psi)	4 MPa (580 psi)
	40 bar (600 psig)		10 MPa (1 450 psi)	5 MPa (725 psi)	5 MPa (725 psi)	5 MPa (725 psi)
	80 bar (1 160 psig)		20 MPa (2 900 psi)	10 MPa (1 450 psi)	10 MPa (1 450 psi)	10 MPa (1 450 psi)

Note: All leak testing performed with helium gas.

Note:
Properties/applications shown throughout this brochure are typical. Your specific application should not be undertaken without independent study and evaluation for suitability. For specific application recommendations consult Garlock. Failure to select the proper sealing products could result in property damage and/or serious personal injury. Performance data published in this brochure has been developed from field testing, customer field reports and/or in-house testing. While the utmost care has been used in compiling this brochure, we assume no responsibility for errors. Specifications subject to change without notice. This edition cancels all previous issues. Subject to change without notice GARLOCK is a registered trademark for packings, seals, gaskets, and other products of Garlock.
© Garlock Inc 2018. All rights reserved worldwide.

GARLOCK GMBH

an EnPro Industries family of companies

Falkenweg 1, 41468 Neuss, Germany

Tel: +49 2131 349 0

www.garlock.com

Garlock Sealing Technologies

GPT

Garlock PTY

Garlock do Brasil

Garlock de Canada, LTD

Garlock China

Garlock Singapore

Garlock USA

Garlock India Private Limited

Garlock de Mexico, S.A. De C.V.

Garlock New Zealand

Garlock Great Britain Limited

Garlock Middle East