

GYLON[®] TUFF-RAIL[®] Family

Revolutionary tank car manway gaskets

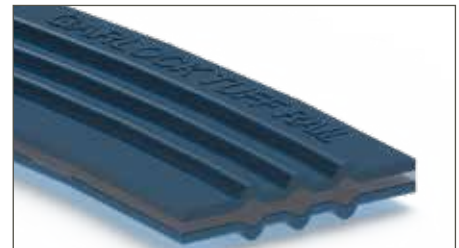


GYLON® 3545 & 3504 TUFF-RAIL®

The Garlock TUFF-RAIL® gasket family is specifically engineered and designed for tank car manway applications. Utilizing a patent pending manufacturing process, the TUFF-RAIL® technology incorporates raised sealing features to help insure a tighter seal and superior bolt load retention in less than ideal bolting conditions. Unlike rubber gaskets that can crush easily or deform and separate after initial use, the TUFF-RAIL® gasket incorporates our industry proven GYLON® materials and has been tested to insure reliability and reusability. TUFF-RAIL® not only offers superior performance over similar PTFE materials, but it also eliminates many issues commonly associated with rubber nozzle style gaskets.

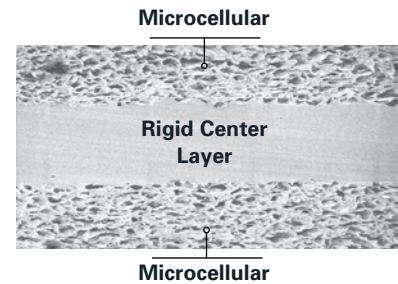
GYLON® 3545 TUFF-RAIL®

Manufactured from 100% pure PTFE and utilizing our proprietary GYLON® process, GYLON® 3545 TUFF-RAIL® gasket is specifically designed to help address those difficult installation and sealing requirements of tank car manways. Formulated to compress and conform, GYLON® 3545 TUFF-RAIL® is easily installed with excellent load retention, maintaining a tight seal even during heavy vibration and thermal cycling. The patent pending technology incorporates raised ribs to insure the gasket performs under the limited bolt load and the narrow seating surface of the nozzle.



VALUES & BENEFITS

- » Manufactured with 100% pure PTFE for universal chemical resistance
- » Proprietary GYLON® 3545 and raised sealing ribs offer excellent creep resistance and long term bolt load retention
- » Highly compressible for low load sealing on less than ideal sealing surfaces
- » Tough, reliable and reusable—ideal for heavy vibration, thermal cycling, and over-torquing
- » Engineered to a single size to fit the most common manways simplifying inventory (AAR-1, UTC-1, TRN-1)
- » Unlimited shelf life and high crush resistance - issues commonly associated with rubber gaskets



GYLON® 3504 TUFF-RAIL®

Extending the use of our patent pending molding technology, GYLON® 3504 TUFF-RAIL® is the latest addition to our TUFF-RAIL® family of products. A blend of aluminosilicate and PTFE, GYLON® 3504 TUFF-RAIL® is an economical option that offers good compressibility and chemical compatibility. Engineered with the same raised sealing ribs, GYLON® 3504 TUFF-RAIL® has been proven to seal and reseal even in the most demanding manway installations.



VALUES & BENEFITS

- » Engineered to a single size to simplify inventory and fit the most common manways (AAR-1, UTC-1, TRN-1)
- » Reusable with unlimited shelf life and high crush resistance - issues commonly associated with rubber gaskets
- » Raised sealing ribs offer excellent creep resistance and long term bolt load retention - ideal for heavy vibration and thermal cycling

GYLON® 3545 & 3504 TUFF-RAIL®

SPECIFICATIONS

| | GYLON® 3545 | GYLON® 3504 |
|---------------------------------------|--|--|
| Temperatures | -450°F (-268°C) to +500°F (260°C) | -450°F (-268°C) to +500°F (260°C) |
| Composition | 100% Microcellular PTFE with rigid PTFE center layer | PTFE with aluminosilicate microspheres |
| Creep Relaxation* (ASTM F38) % | 15 | 40 |
| Compressibility* (ASTM F36) % | 60-70 | 24 - 45 |
| Recovery* (ASTM F36) % | 15 | 30 |

*NOTE:

This is a general guide and should not be the sole means of selecting or rejecting this material. ASTM test results in accordance with F104.

TESTING

MANWAY LEAK TESTING - TORQUE REQUIRED TO PASS

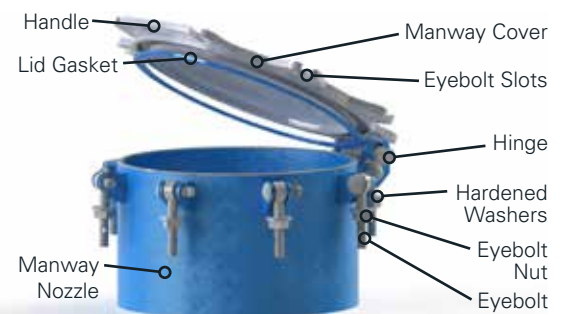
49 CFR 180.605 PNEUMATIC

- » [8] Bolt AAR-1 Manway
- » Using A307, 7/8" bolts
- » Big Blue Leak Detection Fluid
- » 30 psig Visible Leak Test

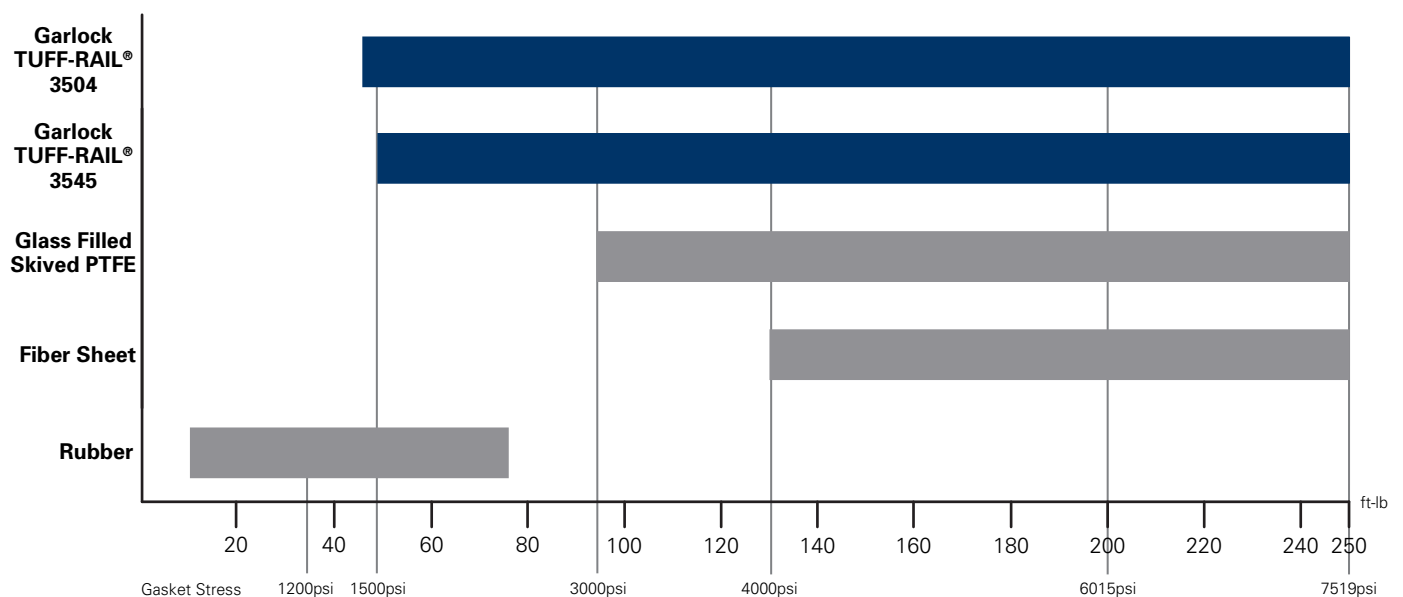
NOTE:

- » Testing indicates effective range of bolt torque that passes 49 CFR visible leak test
- » Garlock TUFF-RAIL® operates successfully over a wider range of loading conditions and chemicals (see graph below)
- » Garlock TUFF-RAIL® can pass leak testing at ~50% less load than similar glass filled PTFE gasket
- » Successfully tested for reusability

TYPICAL GENERAL PURPOSE MANWAY



SEALABILITY TESTING COMPARISONS



GYLON® 3545 & 3504 TUFF-RAIL®

INSTALLATION - GYLON® 3545 & 3504 TUFF-RAIL®

Manway Covers

Gasket Material: GYLON® 3545 (100% PTFE) / GYLON® 3504 PTFE w/ mircospheres

Gasket Dimensions: 19.5" I.D. x 21.5" O.D.

Manway Styles: AAR-1, UTC-1, TRN-1

SWING BOLT TORQUES

6 OR 8 BOLT ASSEMBLIES

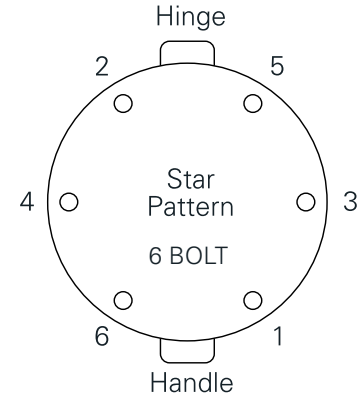
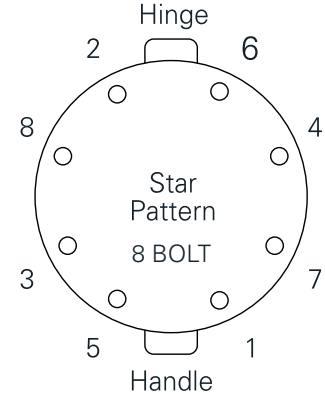
| | 7/8" | 1" |
|----------------------|--------------|--------------|
| Hand tight | 20 ft. lbs. | 20 ft. lbs. |
| 1 st pass | 50 ft. lbs. | 50 ft. lbs. |
| 2 nd pass | 100 ft. lbs. | 150 ft. lbs. |
| 3 rd pass | 133 ft. lbs. | 200 ft. lbs. |
| Final pass | 133 ft. lbs. | 200 ft. lbs. |

NOTE:

The values shown apply for manway bolts with a minimum yield strength of 30,000 psi (such as ASTM A307 grade A/B bolts) and are based on Garlock estimates of allowable bolt loads on swing bolt assemblies. For manways with bolt sizes not shown, please contact Garlock applications engineering at 800.448.6688.

KEYS TO SUCCESS

- » Inspect manway nozzle and cover seating groove for flatness and repair imperfections.
- » Inspect fasteners and associated hardware; lubricate accordingly (JET-LUBE 550® or similar)
- » Apply star pattern bolting sequence as noted
- » Do not exceed maximum torque values listed
- » Client requirements supersede installation guidelines



INSTALLATION & DIMENSIONAL INFORMATION

| GYLON® 3545 & 3504 TUFF-RAIL® Recommended Bolt Load | | | | |
|--|----------------|----------------|--------------|--------------|
| A307 Lubricated | | | | |
| | 7/8" 6 bolt | 7/8" 8 bolt | 1" 6 bolt | 1" 8 bolt |
| Torque | 133 ft. lbs. | 133 ft. lbs. | 200 ft. lbs. | 200 ft. lbs. |
| Stress | 3000 psi | 4000 psi | 4000 psi | 5225 psi |

| Garlock Part Number | Inside Diameter | Outside Diameter | Thickness Rib to Rib |
|----------------------------|-----------------|------------------|----------------------|
| 36045TR-0001 Style 3545 | 19.50" | 21.50" | .220" |
| 36120TR-0001 Style 3504 | 19.50" | 21.50" | .220" |

NOTES:

- » Recommendations based on AAR-1, UTC-1, TRN-1 Manways
- » Torque values are based on 60-85% of bolt yield strengths and a maximum gasket stress of 15,000 psi
- » Lubricating bolts is always recommended
- » Other manway gasket materials and configurations are available upon request



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GARLOCK

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