Manway Gaskets for the Rail Industry

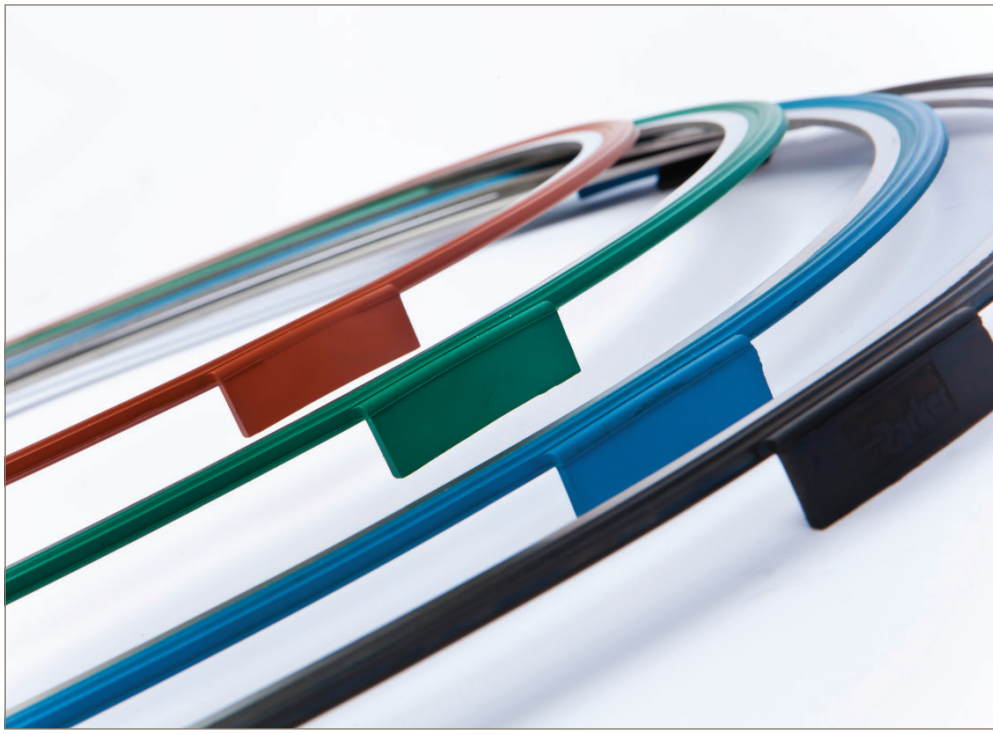
Reduce Labor Operating Costs by 90%

Torque retention design offers ease of assembly and extended life

Parker's Sure Torque manway gasket will improve system performance, simplify assembly and lower your total system cost. The gasket features an over-molded stainless steel compression limiter available in a number of specially engineered compounds to meet a variety of chemical resistance requirements.

Designed to eliminate over 95% of the causes that lead to manway Non-Accidental Releases (NARs), the stainless steel compression limiter enhances sealing for repeated usage (up to 30 shipments) and maintains bolt retention, eliminating the need to retorque.

Parker's geometrical bead design translates to significant labor savings and a dramatic reduction in the risk of personal injury or damage to the manway, which could otherwise result in costly maintenance repairs and loss of business.



Product Feature	Product Benefits
Compression Limiter	■ Reduces 95% of manway related NARs ■ Reduces up to 90% of loading labor costs ■ Can be reused for up to 30 shipments ■ Has a bolt torque loss of <1% ■ Eliminates gasket creep ■ Easy to install/remove ■ Eliminates possibility of dropping gasket into manway
Alignment Tabs	■ Approved for impact wrenches ■ Ensure speedy assembly ■ Allow perfect alignment ■ Provide gasket identification/traceability ■ Enable visual confirmation of gasket placement

Contact Information:

Parker Hannifin Corporation
Integrated Sealing Systems Division
3700 Mayflower Drive
Lynchburg, VA 24501

phone 434 846 6541
fax 434 847 2725

www.parker.com/ISS

Parker

ENGINEERING YOUR SUCCESS.

Manway Nozzle Gasket Installation

Parker's Sure Torque manway gasket is light and easy to handle, with a rigid structure that makes it easy to install and impossible to drop into the manway. The recommended installation and securement procedure is as follows:

Installation

1. Prior to installation, check that the mating surfaces are clean and free of defects and corrosion *(reference M-1003, AAR specification, appendix D)* that could affect a tight joint.
2. Install the gasket appropriate to the commodity to be transported *(see charts, page 3)* so that the four installation tabs *(see figure 1)* are on the outside diameter of the manway nozzle. Close the lid slowly and position the bolts and nuts finger tight.

Securement

Parker's Sure Torque manway gasket is approved for use with impact wrenches. Furthermore, the stainless steel compression limiter allows technicians to torque in accordance with ASTM and the manufacturer's recommendations. (NORMALLY 60% OF BOLT YIELD IS RECOMMENDED.)

Notes:

a) *Cleaning & lubricating bolt threads will reduce torque loss due to friction. Thoroughly hardened steel washers (e.g., ASTM F-436) should be used for even load distribution during gasket installation.* ***DO NOT PUT LUBRICANT ON THE GASKET.***

b) *Tighten the nuts with properly calibrated torque or impact wrenches in a sequential order (see figure 2) as recommended by the AAR, taking a minimum of three passes to achieve the required torque.*

First Pass	10 to 20 ft-lbs
Second Pass	50% of target torque*
Third Pass	100% of target torque*

**Based on bolt manufacturer's specifications.*

Removal

Parker's Sure Torque manway gasket makes it easier to loosen the bolts and remove the gasket. The nozzle does not require any other maintenance, such as cleaning or scraping, thus eliminating unnecessary labor and the possibility of injury or other damage.

Figure 1: *Alignment tabs (4) located on outside of manway nozzle.*

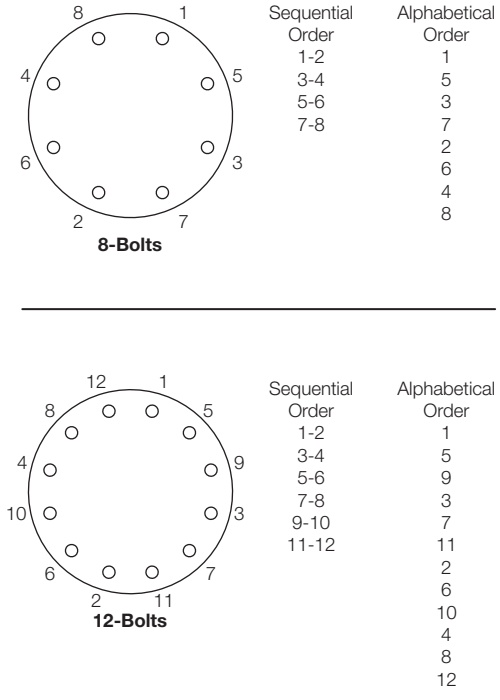


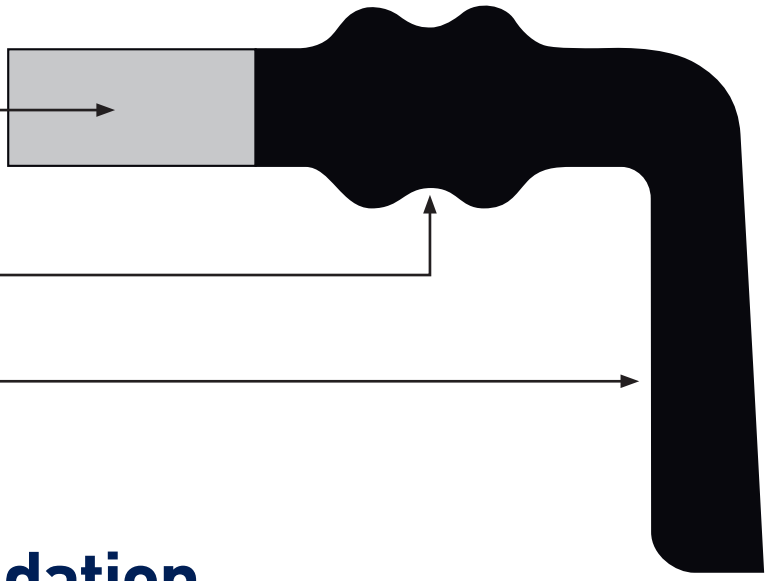
Figure 2: *Bolt securement sequence reference Appendix D of Specifications M-1002 of the AAR.*

Over-Molded Rubber to Metal Design

Stainless steel inner compression limiter maintains bolt torque and prevents the seal from being over compressed.

Outer seal beads are designed for hard joint mating components that will be in full contact when assembled.

Rubber outer alignment tabs (four) make assembly easy and centered every time.



Nozzle Design/Validation

Compared to current seal designs that can lose up to 20% of bolt torque within a 24-hour period, Parker's Sure Torque manway gasket lost <1% (Chart 1) under test conditions. By eliminating gasket relaxation or creep (the leading causes of bolt tension loss), the quality of seal improves exponentially while dramatically lowering the cost of labor, risk of injury and incidence of NARs. The Parker design is engineered to work with the most common nozzle and lid configurations.

Gasket Type	Bolt Torque Lost After 24 Hours	Failure Mode	Number of Manway Closures
PTFE w/Barium Sulfate Filler	-3.7%	leak 125 psi	1
PTFE w/Inorganic Fillers	-6.2%	leak 135 psi	1
Virgin ePTFE	-4.8%	leak 125 psi	1
Formed EPDM Gasket	-21.5%	cut gasket	2
Parker EPDM	-0.6%	none	>30

Chart 1 *Performance data utilized a flat manway nozzle configuration. Failure mode was the type of gasket failure that occurred and how many manway closures it took to fail.*

Customization Options

Each manway nozzle gasket contains four alignment tabs, one of which carries the Parker logo. Customers can request that one or more of the other tabs have brass grommets installed for use in affixing tags (for example, to log shipments/gasket use). Also upon request, Parker offers a unique laser-etched identification code denoting full lot traceability (material type/manufacture date) for each gasket.

Parker ISS Division mixes its own compounds, manufactures these gaskets in the U.S.A. and guarantees consistent performance each and every time. Note: Parker's food compounds have been tested and certified by the FDA.

Material Selection

Parker offers a wide range of elastomers to accommodate the various critical sealing challenges faced in rail transportation, including FDA-certified compounds for the transportation of food products. Contact Parker for additional elastomers and compatibility queries.

Material Properties: *The temperature ranges and resistance to media are to be used as a general reference. Always test under actual service conditions to verify chemical resistance and performance. Additional elastomers can be offered to provide an application-specific seal.*

Contact the Integrated Sealing Systems Division or your local distributor to verify material compatibility.

Material Type	EPDM
Recommended Material	EB253-60
Color	Black
Temperature Range	-60 to 300°F

Acetone	1
Ammonia (Anhydrous)	1
Caustic Soda	1
Chlorine (Dry)	4
Chlorine (Wet)	3
Ethanol	1
Methanol	1
Methyl Ethyl Ketone (MEK)	1
Nitric Acid (Fuming)	4
Petroleum Oil, Crude	4
Phosphoric Acid (Concentrated)	1
Potassium Chloride	1
Sodium Carbonate (Soda Ash)	1
Sulfer (Molten)	1
Sulfuric Acid (Fuming)	3
Toluene	4
Potassium Hydroxide	1
Sodium Hypochloride	1

Chemical Resistance Scale	Excellent
	1

Value Analysis

- Reduces labor costs by up to 90%
- Eliminates 95% of manway-related NAR issues
- Offers long life – 30 shipments or one year (single closure)
- Reduces incidence of injury

6000 Shipments/Tank Cars per Year

	Current	Parker	Savings
Number of Tank Cars/Manway Covers	500	500	
Number of Roundtrip Shipments	12	12	
Total Tank Car Journeys	6000	6000	
Shipments/Usage per Seal*	6	18	
Number of Purchased Seals (annually)	1000	333	
Hourly Labor Cost (fully burdened)†	$43	$43	
Average Seal Replacement Time (hours)**	0.5	0.3	
Average Time to Retorque Manways (hours)	0.35	0	
Annual Manway Replacement Labor Cost	$21,500	$4,300	**$17,200**
Annual Manway Retorquing Labor Cost***	$90,300	$0	**$90,300**
Total Annual Cost	$111,800	$4,300	**$107,500**
Over Three Years	$335,400	$12,900	**$322,500**

			FDA (Certified)	
FKM (66% F)	FKM (66% F)	FKM (70% F)	NBR	EPDM
VW450-65	VB486-65	VG490-70	N1069-70	EJ590-70
Blue	Dark Green	Red	Black	White
-30 to 400°F	-25 to 400°F	-20 to 400°F	-30 to 180°F	-70 to 250°F
4	4	4	4	1
4	4	4	2	1
4	3	2	3	1
1	1	1	2	4
2	1	1	3	3
2	1	1	3	1
4	2	1	4	1
4	4	4	4	1
3	2	1	4	4
1	1	1	1	4
1	1	1	3	1
1	1	1	1	1
1	1	1	1	1
1	1	1	4	1
2	1	1	4	3
2	1	1	4	4
4	4	4	2	1
1	1	1	4	1

Good	Fair	Not Recommended
2	3	4

Value Proposition Assumptions

* Tested for use up to 30X. Parker seal expected to conservatively extend life by 200%.

** Stainless steel construction with tabs requires less than half the time to replace.

*** Each tank car needs to be retorqued conservatively 2X per load (Parker requires no retorquing).

These calculations do not include:

- Reduced injury costs (fewer labor hours reduce incidence of injury)
- Reduced maintenance costs (less retorquing reduces incidence of bolt/nozzle/cover/seal damage – Tank car out of service)
- Reduced NARs (fines/environmental costs)

Data Sources

Source A – Market Analysis - BNSF Survey - 6 respondents

- Average of 511 tanker cars per company
- Average of 12 round trips per year per car
- Seal replaced every 6th trip (twice per year)
- 76% of respondents used elastomeric seal with no reinforcement; cost ~$30 (Salco EPDM seal)

Source B – Simply Hired salary search

- Average railcar maintenance wage = $32.21/hr
- Added 35% to fully burden = $43.48/hr

† Fully burdened includes employer taxes, insurance, medical, vacation, etc.

Source C – Industry face-to-face interviews

- Average time to remove and replace existing seal = 30 minutes
- Average time retorquing = 20 minutes
- All existing seals must be retorqued

Source D – Federal Railroad Administration/Association of American Railroads

- 2011: 572 NRAs out of 300,000 cars or 0.2%
- 511 x 0.2% = 1 potential NRA annually for sample company

Source E – Parker internal testing of manway seals

Customer Testimonials

Customers were invited to comment on their experience with the Parker Sure Torque manway seal.

*"Parker's manway gasket is like nothing else out there. It's **so easy and quick to use**. It's reusable and has significantly **speeded up our loading times**. There is no need to retorque, it lasts forever, seals perfectly and replacing it takes seconds. **It has become our gasket of choice.**"*

*"We ship Crude Sulphate Turpentine. It is obnoxiously smelly and any leak of vapors can cause headaches and sometimes disorientation. After years of experimenting with different gaskets and procedures, **we've finally found the perfect solution** in the Sure Torque."*

*"The Parker gasket is a **one-size-fits-all answer** for the numerous products we move. Our **loading times have substantially decreased** and because of this we are now looking at other ways to increase our throughput."*

*"...all **previous types of gaskets we have used were built backwards compared to this** one. Let's talk about setting up an account, and get a quote so I can get some coming."*

How to Order

20 - **304** - **1** - **1G**

20 — **Nozzle Size** (inches)

304 — **Limiter Material**
304 Stainless Steel
317L Stainless Steel

1 — **Material Suffix**
1 EPDM (black)
2 FKM (blue)
3 FKM (green)
4 FKM (red)
5 NBR (FDA/Black)
6 EPDM (FDA/White)

1G — **Optional**
Price on Request

Brass Grommet
1G one tab
2G two tabs

Watch our video by scanning this QR code on any mobile device.

WARNING:
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS CAN CAUSE EQUIPMENT FAILURE OR DAMAGE, PERSONAL INJURY OR DEATH.

For safe and trouble-free use of these products, it is important that you read and follow the Parker Seal Group Product Safety Guide. This Safety Guide can be referenced and downloaded free of charge at www.parkerseals.com. It is also printed in major Seal Group product catalogs, and can be ordered by telephone without charge as Parker Publication No. PSG 5004 by calling 1-800-C-PARKER.

Information and specifications subject to change without notice and without liability therefor.
Trademarks used herein are the property of their respective owners.

ISS 5814 2014-05

Parker

ENGINEERING YOUR SUCCESS.