



Torque Guidelines

To find torque guidelines specific to your application, flange and gasketing, use the link in the appropriate grey-shaded box.

GORE® Universal Pipe Gasket (Style 800)

EN Standard		ASME Standard
Steel Flange	Ring Gasket on Raised Face Flange	Ring or Full Face Gasket on Raised Face Flange
		Ring Gasket on Flat Face Flange
		Full Face Gasket on Flat Face Flange
GLS Flange Glass-Lined-Steel Flange	Gasket on Glass Lined Steel Flange	Gasket on Glass Lined Steel Flange
FRP Flange Fiberglass Reinforced Plastic Flange	Ring Gasket on Raised Face Flange	Ring or Full Face Gasket on Raised Face Flange

GORE® GR Sheet Gasketing

EN Standard		ASME Standard
Steel Flange	Ring Gasket on Raised Face Flange	Ring or Full Face Gasket on Raised Face Flange
		Ring Gasket on Flat Face Flange
		Full Face Gasket on Flat Face Flange



Sealant Technologies

Torque Guidelines

EN

Flange Type: Raised Face Steel Flange

Gasket Type: Ring Gasket

Product Names: GORE® Universal Pipe Gasket (Style 800)/GORE® GR Sheet Gasketing

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard design steel pipe flanges.*

The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

The intent of this torque table is to find the balance between bolt yield and allowable gasket stress to achieve a long-term reliable seal. This torque table is not intended to communicate the minimum possible torque value to seal GORE® Gaskets. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Ring Gasket



Raised Face Steel Flange

GORE® Universal Pipe Gasket (Style 800) • GORE® GR Sheet Gasketing Bolt Torque: Ring Gasket on Raised Face Steel Flange

DN (mm)	PN 6		PN 10		PN 16		PN 25		PN 40	
	Nm	Ft-lbs	Nm	Ft-lbs	Nm	Ft-lbs	Nm	Ft-lbs	Nm	Ft-lbs
10	25	20	50	35	50	35	50	35	50	40
15	25	20	50	35	50	35	50	35	50	40
20	25	20	50	35	50	35	50	35	50	40
25	25	20	50	35	50	35	50	35	50	40
32	50	35	120	90	120	90	120	90	120	90
40	50	35	120	90	120	90	120	90	120	90
50	50	35	120	90	120	90	120	90	120	90
65	65	50	120	90	120	90	120	90	120	90
80	120	90	120	90	120	90	120	90	120	90
100	120	90	120	90	120	90	250	180	250	180
125	120	90	120	90	120	90	430	320	430	320
150	120	90	250	180	250	180	430	320	430	320
200	120	90	250	180	250	180	430	320	600	440
250	120	90	250	180	430	320	600	440	800	590
300	250	180	250	180	430	320	600	440	800	590
350	250	180	250	180	430	320	800	590	1100	810
400	250	180	430	320	600	440	1100	810	1500	1110
450	250	180	430	320	600	440	1100	810	1500	1110
500	250	180	430	320	800	590	1100	810	1800	1330
600	430	320	600	440	1100	810	1500	1110	2900	2140

TORQUE VALUES REQUIREMENTS

- Use of well lubricated bolts, Grade 24CrMo5 or better
- Use of any available gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to EN1514-1 Form IBC
- Flange dimensions according to EN 1092-1 Type 11 Form B
- Calculated for 40 bar (580 psi) maximum
Please ensure suitability of the pipe class
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Target torque calculation according to ASME PCC-1 Appendix J. Generally 70 % bolt yield is targeted.

* Flanges larger than DN600/NPS24 are usually considered equipment flanges, for which generic torque tables are not provided. Equipment flanges have an internal pressure that is highly application-dependent, which prevents the generation of a generic torque table. As the flange size increases, internal operating pressure plays an increasingly decisive role in determining a torque value.

All technical information and advice given here is based on our previous experiences and/or test results. We give this information to the best of our knowledge, but assume no legal responsibility. Customers are asked to check the suitability and usability in the specific application, since the performance of the product can only be judged when all necessary operating data are available. Specifications are subject to change without notice. Gore's terms and conditions of sale apply to the purchase and sale of the product.

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Torque Guidelines

ASME

Flange Type: Raised Face Steel Flange

Gasket Type: Ring Gasket/Full Face Gasket

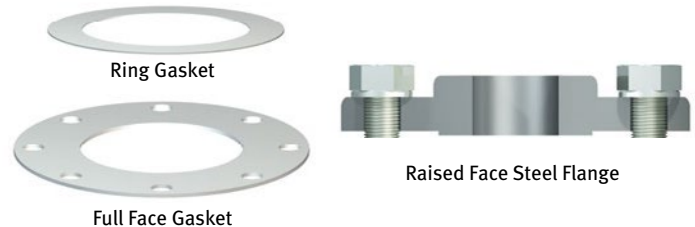
Product Names: GORE® Universal Pipe Gasket (Style 800)/GORE® GR Sheet Gasketing

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard design steel pipe flanges.*

The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

The intent of this torque table is to find the balance between bolt yield and allowable gasket stress to achieve a long-term reliable seal. This torque table is not intended to communicate the minimum possible torque value to seal GORE® Gaskets. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



TORQUE VALUES REQUIREMENTS

- Use of well lubricated ASTM A193 Grade B7 Bolts
- Use of any available gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to ASME B16.21
- Flange dimensions according to ASME B16.5
- Maximum working pressure according to ASME B16.5
Class 150: 20 bar (290 psi)
Class 300: 52 bar (750 psi)
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Target torque calculation according to ASME PCC-1 Appendix J. Generally 70 % bolt yield is targeted.

* Flanges larger than DN600/NPS24 are usually considered equipment flanges, for which generic torque tables are not provided. Equipment flanges have an internal pressure that is highly application-dependent, which prevents the generation of a generic torque table. As the flange size increases, internal operating pressure plays an increasingly decisive role in determining a torque value.

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GORE® Universal Pipe Gasket (Style 800)

GORE® GR Sheet Gasketing

Bolt Torque: Ring or Full-Face Gasket on Raised Face Steel Flange

NPS (in)	Class 150		Class 300	
	Nm	Ft-lbs	Nm	Ft-lbs
1/2	20	15	20	15
3/4	30	25	40	30
1	40	30	55	40
1 1/4	70	50	90	65
1 1/2	80	60	120	90
2	150	110	80	60
2 1/2	160	120	140	100
3	160	120	230	170
3 1/2	160	120	230	170
4	160	120	230	170
5	280	210	230	170
6	280	210	230	170
8	280	210	370	270
10	470	350	540	400
12	470	350	720	530
14	710	520	720	530
16	710	520	1020	750
18	1000	740	1020	750
20	1000	740	1020	750
24	1420	1050	1900	1400

Flange Type: Flat Face Steel Flange

Gasket Type: Ring Gasket

Product Names: GORE® Universal Pipe Gasket (Style 800)/GORE® GR Sheet Gasketing

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard design steel pipe flanges.*

The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

The intent of this torque table is to find the balance between bolt yield and allowable gasket stress to achieve a long-term reliable seal. This torque table is not intended to communicate the minimum possible torque value to seal GORE® Gaskets. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Ring Gasket



Flat Face Steel Flange

TORQUE VALUES REQUIREMENTS

- Use of well lubricated ASTM A193 Grade B7 Bolts
- Use of any available gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to ASME B16.21
- Flange dimensions according to ASME B16.5
- Maximum working pressure according to ASME B16.5
Class 150: 20 bar (290 psi)
Class 300: 52 bar (750 psi)
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Target torque calculation according to ASME PCC-1 Appendix J. Generally 70 % bolt yield is targeted.

* Flanges larger than DN600/NPS24 are usually considered equipment flanges, for which generic torque tables are not provided. Equipment flanges have an internal pressure that is highly application-dependent, which prevents the generation of a generic torque table. As the flange size increases, internal operating pressure plays an increasingly decisive role in determining a torque value.

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GORE® Universal Pipe Gasket (Style 800)
GORE® GR Sheet Gasketing
Bolt Torque: Ring Gasket on Flat Face Steel Flange

NPS (in)	Class 150		Class 300	
	Nm	Ft-lbs	Nm	Ft-lbs
1/2	60	45	80	60
3/4	80	60	150	110
1	80	60	160	120
1 1/4	80	60	160	120
1 1/2	80	60	280	210
2	160	120	160	120
2 1/2	160	120	280	210
3	160	120	280	210
3 1/2	160	120	280	210
4	160	120	280	210
5	280	210	280	210
6	280	210	280	210
8	280	210	470	350
10	470	350	710	520
12	470	350	1000	740
14	710	520	1000	740
16	710	520	1420	1050
18	1000	740	1420	1050
20	1000	740	1420	1050
24	1420	1050	2490	1840



Sealant Technologies

Torque Guidelines

ASME

Flange Type: Flat Face Steel Flange
Gasket Type: Full Face Gasket
Product Name: GORE® Universal Pipe Gasket (Style 800)

To achieve a reliable seal, adequate gasket stress must be applied during installation. The tables provide an estimation of torque for use during assembly of standard pipe flanges.*

The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

The intent of this torque table is to find the balance between bolt yield and allowable gasket stress to achieve a long-term reliable seal. This torque table is not intended to communicate the minimum possible torque value to seal GORE® Gaskets. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Full Face Gasket



Flat Face Steel Flange

TORQUE VALUES REQUIREMENTS

- Use of well lubricated ASTM A193 Grade B7 bolts
- Use of any available gasket thickness
- Installation practices according to ASME PPC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to ASME B16.21
- Flange dimensions according to ASME B16.5
- Maximum working pressure according to ASME B16.5
Class 150: 20 bar (290 psi)
Class 300: 52 bar (750 psi)
- Nut factor $K = 0.15$, Friction factor $\mu = 0.12$
- Target torque calculation according ASME PCC-1 Appendix J. Generally 70 % bolt yield is targeted.

* Standard pipe flanges typically do not exceed DN300/NPS12 for EN and DN600/NPS24 for ASME. Larger flanges are usually considered equipment flanges, for which generic torque tables are not provided. Equipment flanges have an internal pressure that is highly application-dependent, which prevents the generation of a generic torque table. As the flange size increases, internal operating pressure plays an increasingly decisive role in determining a torque value.

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SEAL-209-R1-TEC-EUS-DEC17

GORE® Universal Pipe Gasket (Style 800)

Bolt Torque: Full Face Gasket on Flat Face Steel Flange

NPS (in)	Class 150		Class 300	
	Nm	Ft-lbs	Nm	Ft-lbs
1/2	80	60	80	60
3/4	80	60	160	120
1	80	60	160	120
1 1/4	80	60	160	120
1 1/2	80	60	280	210
2	160	120	160	120
2 1/2	160	120	280	210
3	160	120	280	210
3 1/2	160	120	280	210
4	160	120	280	210
5	280	210	280	210
6	280	210	280	210
8	280	210	470	350
10	470	350	710	520
12	470	350	1000	740
14	710	520	1000	740
16	710	520	1420	1050
18	1000	740	1420	1050
20	1000	740	1420	1050
24	1420	1050	2450	1810



Sealant Technologies

Torque Guidelines ASME

Flange Type: Flat Face Steel Flange
Gasket Type: Full Face Gasket
Product Name: GORE® GR Sheet Gasketing

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard design steel pipe flanges.*

The user must verify these conditions, as outlined, are appropriate for the specific application. The user must confirm that torque values do not exceed pipe manufacturer's torque recommendation.

The intent of this torque table is to find the balance between bolt yield and allowable gasket stress to achieve a long-term reliable seal. This torque table is not intended to communicate the minimum possible torque value to seal GORE® Gaskets. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Full Face Gasket

Flat Face Steel Flange

TORQUE VALUES REQUIREMENTS

- Use of well lubricated SAE J429 Grade 8 bolts
- Use of 1.5 mm (1/16 in) or 3.0 mm (1/8 in) gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to ASME B16.21
- Flange dimensions according to ASME B16.5
- Maximum working pressure according to ASME B16.5
Class 150: 20 bar (290 psi)
Class 300: 52 bar (750 psi)
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Target torque calculation according to ASME PCC-1 Appendix J. Generally 70 % bolt yield is targeted.

* Flanges larger than DN600/NPS24 are usually considered equipment flanges, for which generic torque tables are not provided. Equipment flanges have an internal pressure that is highly application-dependent, which prevents the generation of a generic torque table. As the flange size increases, internal operating pressure plays an increasingly decisive role in determining a torque value.

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GORE® GR Sheet Gasketing				
Bolt Torque: Full Face Gasket on Flat Face Steel Flange				
NPS (in)	Class 150		Class 300	
	Nm	Ft-lbs	Nm	Ft-lbs
1/2	100	75	100	75
3/4	100	75	200	150
1	100	75	200	150
1 1/4	100	75	200	150
1 1/2	100	75	370	270
2	200	150	200	150
2 1/2	Call Gore	Call Gore	370	270
3	Call Gore	Call Gore	370	270
3 1/2	200	150	370	270
4	200	150	370	270
5	370	270	370	270
6	370	270	370	270
8	Call Gore	Call Gore	580	430
10	580	430	880	650
12	580	430	1220	900
14	880	650	1220	900
16	880	650	1760	1300
18	1220	900	1760	1300
20	1220	900	1760	1300
24	1760	1300	2980	2200

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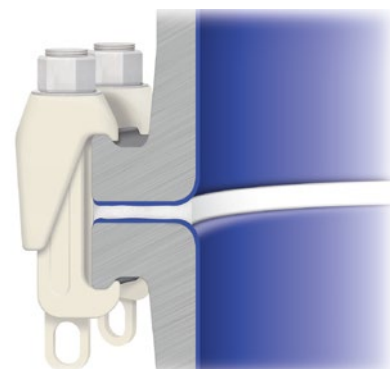
Flange Type: Glass-Lined Steel Flange
Gasket Type: Gasket
Product Name: GORE® Universal Pipe Gasket (Style 800)

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard pipe flanges.

The user must verify these conditions, as outlined, are appropriate for the specific application.

Due to the variation of the glass-lined steel sealing surface by flange manufacturer, the user must confirm that torque values do not exceed the pipe manufacturer's maximum torque recommendation. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Glass-Lined Steel Flange

GORE® Universal Pipe Gasket (Style 800)
Bolt Torque: Gasket on Glass-Lined Steel Flange

DN (mm)	PN 10		
	Bolts Number x Size	Nm	Ft-lbs
15	4 x M12	10	8
20	4 x M12	20	15
25	4 x M12	30	20
32	4 x M16	50	40
40	4 x M16	60	45
50	4 x M16	80	60
65	4 x M16	95	70
80	8 x M16	65	50
100	8 x M16	70	50
125	8 x M16	85	65
150	8 x M20	120	90
200	8 x M20	170	130
250	12 x M20	130	100
300	12 x M20	150	110
350	16 x M20	200	150
400	16 x M24	280	210
450	20 x M24	240	180
500	20 x M24	260	190

TORQUE VALUES REQUIREMENTS

- Use of well lubricated bolts, Grade 24CrMo5 or better
- Use of 6 mm (1/4 in) gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to EN1514-1 Form IBC with reduced inner diameter according to Gore specification
- Flange dimensions according to DIN 2873 PN 10
- Maximum working pressure 10 bar (145 psi)
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Suggested torque values are based on best practices. In general, 20 MPa (2900 psi) average gasket stress is targeted.
- Calculation according to ASME PCC-1 Appendix J

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Torque Guidelines

ASME

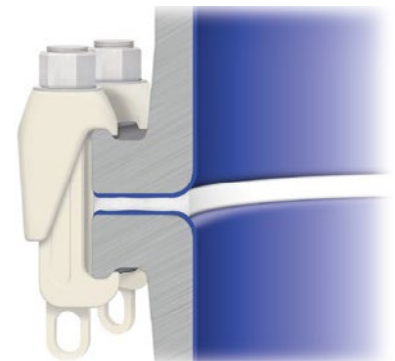
Flange Type: Glass-Lined Steel Flange
Gasket Type: Gasket
Product Name: GORE® Universal Pipe Gasket (Style 800)

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard pipe flanges.

The user must verify these conditions, as outlined, are appropriate for the specific application.

Due to the variation of the glass-lined steel sealing surface by flange manufacturer, the user must confirm that torque values do not exceed the pipe manufacturer's maximum torque recommendation. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Glass-Lined Steel Flange

GORE® Universal Pipe Gasket (Style 800)

Bolt Torque: Gasket on Glass-Lined Steel Flange

NPS (in)	Class 150		
	Bolts Number x Size (in)	Nm	Ft-lbs
1/2	4 x 1/2	10	7
3/4	4 x 1/2	15	11
1	4 x 1/2	20	13
1 1/4	4 x 1/2	20	17
1 1/2	4 x 1/2	30	22
2	4 x 5/8	55	40
3	4 x 5/8	85	60
4	8 x 5/8	55	40
6	8 x 3/4	90	65
8	8 x 3/4	130	95
10	12 x 7/8	120	85
12	12 x 7/8	170	125
14	12 x 1	190	140
16	16 x 1	190	140
18	16 x 1 1/8	270	200
20	20 x 1 1/8	250	185

TORQUE VALUES REQUIREMENTS

- Use of well lubricated ASTM A193 Grade B7 Bolts
- Use of 6 mm (1/4 in) gasket thickness is recommended
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions per ASME B16.21 with reduced inner diameter according to Gore specification
- Flange dimensions (sealing surface) according to DIN 2873 PN 10
Flange backing ring dimensions according to ASME B16.5
- Maximum working pressure 10 bar (145 psi)
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Suggested torque values are based on best practices. In general, 20 MPa (2900 psi) average gasket stress is targeted.
- Calculation according to ASME PCC-1 Appendix J

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Flange Type: Raised Face FRP Flange
Gasket Type: Ring Gasket
Product Name: GORE® Universal Pipe Gasket (Style 800)

To achieve a reliable seal, adequate gasket stress must be applied during installation. This table provides an estimation of torque for use during assembly of standard face dimension FRP pipe flanges.

The user must verify these conditions, as outlined, are appropriate for the specific application.

Due to the wide variation of FRP flange materials, designs, and manufacturing processes, the user must confirm that torque values do not exceed pipe manufacturer's maximum torque recommendation. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



Ring Gasket


Fiber-Reinforced Plastic (FRP)
Raised Face Flange

TORQUE VALUES REQUIREMENTS

- Use of well lubricated bolts, Grade 24CrMo5 or better
- Use of 1.5 mm (1/16 in) or 3.0 mm (1/8 in) gasket thickness
- Installation practices according to ASME PCC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to EN1514-1 Form IBC
- Flange dimensions according to EN 1092-1 Type 11 Form B
- Calculated for 10 bar (145 psi) maximum. Please ensure suitability of the pipe class.
- Friction factor $\mu = 0.12$; Nut factor $K = 0.15$
- Suggested torque values are based on best practices. In general, 10 MPa average gasket stress is targeted.
- Calculation according to ASME PCC-1 Appendix J

GORE® Universal Pipe Gasket (Style 800)
Bolt Torque: Ring Gasket on Raised Face FRP Flange

DN (mm)	PN 10	
	Nm	Ft-lbs
20	11	8
25	15	10
32	25	20
40	30	20
50	40	30
65	50	40
80	30	20
100	35	25
125	45	35
150	60	45
200	85	65
250	65	50
300	75	55
350	100	70
400	140	100
450	120	90
500	140	100
600	190	140

All technical information and advice given here is based on our previous experiences and/or test results. We give this information to the best of our knowledge, but assume no legal responsibility. Customers are asked to check the suitability and usability in the specific application, since the performance of the product can only be judged when all necessary operating data are available. Specifications are subject to change without notice. Gore's terms and conditions of sale apply to the purchase and sale of the product.

For detailed selection criteria, technical information, installation guidelines and the complete listing of local sales offices, please visit gore.com/sealants.

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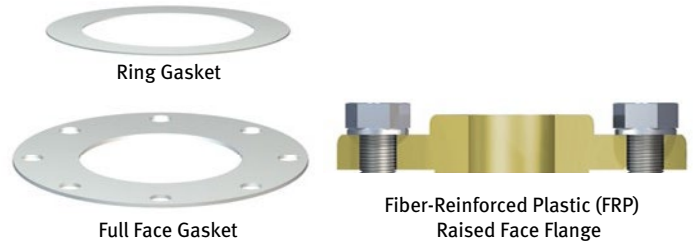
Flange Type: Raised Face FRP Flange
Gasket Type: Ring Gasket/Full Face Gasket
Product Name: GORE® Universal Pipe Gasket (Style 800)

To achieve a reliable seal, adequate gasket stress must be applied during installation. The tables provide an estimation of torque for use during assembly of standard face dimension FRP pipe flanges.

The user must verify these conditions, as outlined, are appropriate for the specific application.

Due to the wide variation of FRP flange materials, designs, and manufacturing processes, the user must confirm that torque values do not exceed pipe manufacturer's maximum torque recommendation. Consult Gore when selecting a lower torque value.

Caution should be used when using this documentation as proof of flange design. It is the user's responsibility to meet all applicable local laws and requirements. This estimation does not account for the influence of flange rotation, flange strength, external forces, temperature expansion, pressure peaks and installation error.



TORQUE VALUES REQUIREMENTS

- Use of well lubricated ASTM A193 Grade B7 Bolts
- Use of 1.5 mm (1/16 in) and 3.0 mm (1/8 in) gasket thickness
- Installation practices according to ASME PPC-1

TORQUE ESTIMATION CONDITIONS

- Gasket dimensions according to ASME B16.21
- Flange dimensions according to ASME B16.5
- Maximum working pressure 10 bar (145 psi)
- Nut factor $K = 0.15$; Friction factor $\mu = 0.12$
- Suggested torque values are based on best practices. In general, 10 MPa (1450 psi) average gasket stress is targeted.
- Calculation according ASME PCC-1 Appendix J

GORE® Universal Pipe Gasket (Style 800)

Bolt Torque: Ring or Full Face Gasket on Raised Face FRP Flange

NPS (in)	Class 150	
	Nm	Ft-lbs
1	10	4
1 ¼	10	8
1 ½	10	8
2	20	16
2 ½	30	20
3	40	30
3 ½	20	15
4	30	20
5	40	30
6	50	40
8	70	50
10	70	50
12	90	65
14	110	80
16	100	75
18	160	120
20	140	100
24	190	140

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