



2027

Flange Adapter & Backup Ring Submittal

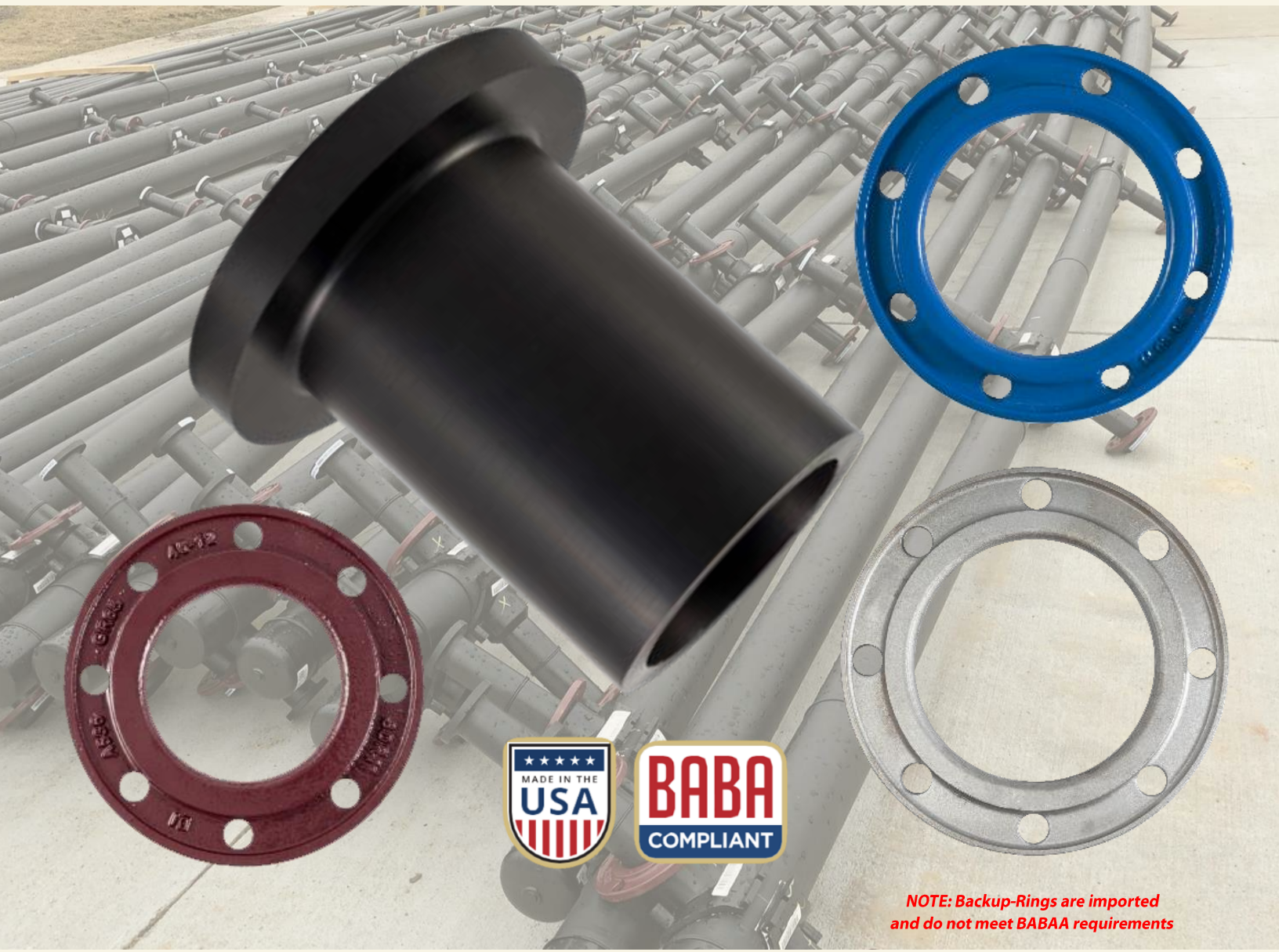


Integrity Fusion Products
Peachtree City, Georgia
1/1/2027



Injection Molded Flange Adapters & Back-Up Rings

Integrity Fusion Products offers a full line of injection molded **IPS** and **DIPS** Non-Beveled HDPE Flange Adapters, and a growing line of 60° Beveled Flange Adapters for butterfly valves; and, a full line of **Fusion Bonded Epoxy Coated Ductile Iron Back-Up Rings**, and class 150 316 Stainless Steel Back-Up Rings that are manufactured in a variety of nominal pipe sizes and SDR's. **Molded HDPE Flange Adapters** from Integrity Fusion Products in our manufacturing facility located in Peachtree City, GA; are manufactured and tested to meet the requirements of ASTM D2513, ASTM D3261, and ANSI/AWWA C901 and C906 for use with outside diameter-controlled pipe and fittings conforming to ASTM D2513, ASTM D3035, and ASTM F-714. All **Back-Up Rings** are manufactured to comply to the drilling and mating requirements in **ANSI/ASME B16.5** and **AWWA C207** for use in applications 24" and smaller; and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications 26" and larger.



NOTE: Backup-Rings are imported and do not meet BABAA requirements

Molded PE3408 / PE4710 / PE100 HDPE Fittings

Molded HDPE Fittings, Flange Adapters, and MJ Adapters manufactured by Integrity Fusion Products at our ISO 9001:2015 facility located in Peachtree City, GA, are all-purpose, injection molded **High-Density Polyethylene Fittings** that are designed and manufactured for use in applications that include, but are not limited to:

- Oil and gas production
- Municipal potable water distribution and service lines
- Stormwater conveyance
- Irrigation
- Mining
- Cable
- Natural gas distribution
- Wastewater conveyance
- Drainage
- Industrial piping applications
- Landfill
- Telecom Conduit



Integrity Fusion Products manufactures **Molded HDPE Fittings** in a variety of sizes, configurations and SDR's that are produced from virgin, pre-blended, NSF listed bi-modal black high density polyethylene resin that has a cell classification of **445574C-CC3** that conforms to **ASTM D3350** and is recognized by the Plastic Pipe Institute as having a **PE3408 / PE4710 / PE100** rating with an **HDB** (Hydrostatic Design Basis) of **1600 psi @ 73° F**.

Injection Molded HDPE Fittings from Integrity Fusion Products are manufactured, tested, certified, and listed in accordance with standards and requirements that meet a wide range of project requirements that include:

- | | |
|--------------------|---|
| ASTM D2513 | - Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings |
| ASTM D3350 | - Specification for Polyethylene Plastic Pipes and Fittings Materials |
| ASTM D3261 | - Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Pipe and Tubing |
| ASTM F714 | - Specifications for HDPE Pipe Dimensions |
| AWWA C901 | - Polyethylene (Pe) Pressure Pipe and Tubing, 3/4 In. Through 3 In. For Water Service |
| AWWA C906 | - Polyethylene (Pe) Pressure Pipe and Tubing, 4 In. Through 65 In. For Water Works |
| FM 1613 | - Approval Standard: Plastic Pipe and Fittings for Underground Fire Protection Service |
| ANSI/NSF 61 | - Plastic Piping System Components & Related Materials |
| ASTM F2880 | - Specification for lap-Joint Type Flange Adapters for use on Polyethylene Pressure Pipe |

Integrity Fusion Products Injection Molded HDPE Fittings are tested in accordance with the following standard ASTM test methods.

- | | |
|-------------------|---|
| ASTM D1598 | - Time-to-Failure of Plastic Pipe Under Constant Internal Pressure. |
| ASTM D1599 | - Short-Term Hydraulic Pressure Failure of Plastic Pipe, Tubing and Fittings. |
| ASTM D2122 | - Test method for Determining Dimensions of Thermoplastic Pipe and Fittings. |

Injection Molded HDPE Fittings from Integrity Fusion Products can be heat fused to any manufacturers' PE pipe, molded fittings, or fabricated fittings manufactured from material made from **PE3408 / PE4710 / PE100** resin that complies with **ASTM D3350**.

Injection Molded HDPE Fittings from Integrity Fusion Products are designed for use on HDPE pressure pipe applications that conform to **ASTM F714, D2513 and D3350** and are pressure rated according to industry guidelines for natural gas and water applications. (TABLE 1)

Conditions for the Required De-Rating of a Molded Fittings MAOP

The material strength of High-Density Polyethylene is inversely dependent on temperature, and its strength decreases at elevated temperatures. The **Maximum Allowable Operating Pressures (MAOP)** for molded PE4710 fittings **must be de-rated for elevated temperatures in all service applications**, (see TABLE 2), including for use in Oil & Gas Gathering Systems installed in Class 1 or Class 2 locations (low population areas not subject to DOT CFR Title 49 Part 192 regulations) or where Federal Codes do not apply. **Including Water, Brine, Dry Natural Gas applications with NO associated hydrocarbons.**

Pressure Rating of IntegriFuse PE4710 Molded Fittings		
Fitting SDR (Standard Dimension Ratio)	MAOP (Design Factor of .63)	MAOP (Gas) (Design Factor of .40)
7/9	333/250	125/125
11/17	200/125	125/80
21	100	64
NOTE: Pressure ratings are based on an operating temperature of up to 73° ambient temperature and will need to be reduced for higher temperatures and certain applications.		

TABLE 1

API Specification 15LE (1995) states "In most circumstances, the HDB obtained at 73° F can be used for applications up to 100° F without further derating" Values in this table use a material design factor of .63 and a Fluid Service Factor of 1.0

The maximum pressure testing and operating temperature of Integrity Fusion Products PE4710 Molded Fittings **should not exceed 140° F.**

Derating PE4710 Fitting MAOP by SDR and Operating Temperature						
Temperature Range	>60° F to ≤80° F	>81° F to ≤90° F	>91° F to ≤110° F	>111° F to ≤130° F	>131° F to ≤140° F	>140° F
f _r Multiplier	1.00	0.90	0.80	0.70	0.60	X
SDR 7	333 psi	300 psi	267 psi	233 psi	200 psi	X
SDR 9	250 psi	225 psi	200 psi	175 psi	150 psi	X
SDR 11	200 psi	180 psi	160 psi	140 psi	120 psi	X
SDR 17	125 psi	113 psi	100 psi	88 psi	75 psi	X
Values in Table 2 use Multipliers and Pressure Ratings calculated using Plastic Pipe Institute HDPEAPP (https://hdpeapp.com/#/pipe)						

TABLE 2

Dry, gaseous hydrocarbons have no adverse effect on our molded fittings normal expected service life, and naturally occurring chemicals in the soil will not attack or cause our fittings to degrade. They do not rust, rot, or corrode; they naturally resist the buildup of scale and other deposits, and they do not support the growth of algae, bacteria, fungi, or other marine life. **HOWEVER, should the fitting be installed in an application where permeating or solvating liquids are present in the pipe or the surrounding soil, such as gasoline, fuel oil, kerosene, crude oil, diesel fuel, liquid hydrocarbons fuels, oilfield production water containing hydrocarbons, and vegetable and mineral oils; the MAOP of the fitting must be further derated.**

Table 3 reflects an added derated MAOP for an HDPE 4710 molded, or molded electrofusion fitting when installed into services and applications subjected to an extended exposure of liquid hydrocarbon concentrations of 2% and greater.

Derating PE4710 Fitting MAOP by SDR for Operating Temperature and Transporting a Media Containing 2% or Greater Hydrocarbon Content						
Temperature Range	>60° F to ≤80° F	>81° F to ≤90° F	>91° F to ≤110° F	>111° F to ≤130° F	>131° F to ≤140° F	>140° F
f _r Multiplier	1.00	0.90	0.80	0.70	0.60	X
SDR 7	166 psi	150 psi	267 psi	116 psi	100 psi	X
SDR 9	125 psi	225 psi	100 psi	175 psi	75 psi	X
SDR 11	100 psi	112 psi	80 psi	70 psi	60 psi	X
SDR 17	62 psi	56 psi	50 psi	44 psi	37 psi	X
Values in Table 3 use an additional fluid service factor of 0.50						

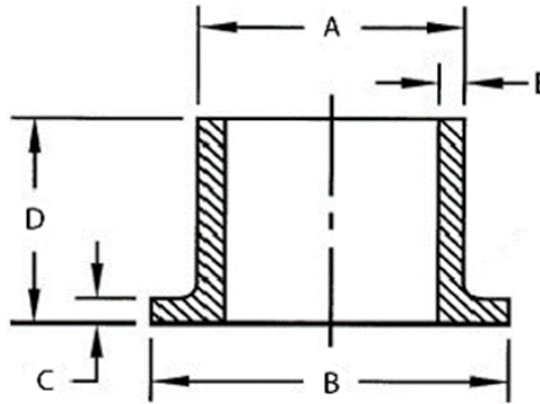
TABLE 3

Fluid Service Factors

Production Water, Brine, Process Water with no associated liquid hydrocarbons	1.0
Dry Natural Gas (no hydrocarbon liquids used in Class 1 and Class 2 locations and in low population area not subject to DOT CFR Title 49 part 192)	1.0
Crude Oil, Wet Natural Gas, Liquid Hydrocarbons, Process Water with >2% liquid hydrocarbons	.5
Gas Distribution piping that is permeated by solvating chemicals, liquid hydrocarbons or liquified gas condensate	.5

Injection Molded Fittings from Integrity Fusion Products have a strong resistance to chemical compounds. For more information on the chemical resistance of PE4710 resin, please reference PPI Technical Report TR-19.

Injection Molded Fittings can be stored outdoors but it is highly recommended that **they** be stored indoors in their original packaging. Black HDPE fittings stored properly indoors have unlimited shelf life.



Product Family:	Injection Molded Butt Fusion Fitting	Fitting Design:	Flange Adapter
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	2" – 36"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	445574C-CC3	Currently Available SDR's:	17, 11, 9, 7
Manufactured and tested to meet requirements of:		ASTM D2513, ASTM D3261, ANSI/AWWA C901 & C906, FM 1613, NSF 61	
For use on pipe and fittings conforming to:		ASTM D2513, ASTM D3035, ASTM F-714	

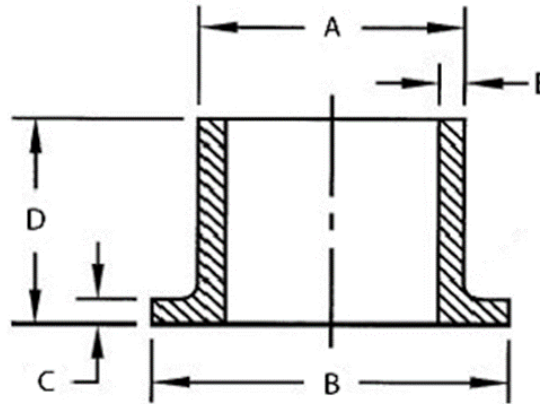
For Material and Testing information, please refer to our Molded Fitting Specification Sheet.

IPS

SDR 17 (standard dimension ratio)

125 PSI (MAOP @ 73.4° F)

Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.38	3.83	0.57	5.65	0.18	0.40	100401	-----
3" IPS	3.50	4.94	0.58	5.90	0.22	0.65	100405	-----
4" IPS	4.50	5.90	0.73	6.50	0.29	1.10	100409	-----
6" IPS	6.50	8.55	1.04	8.20	0.42	3.30	100413	-----
8" IPS	8.62	10.65	1.28	9.20	0.54	5.70	100417	-----
10" IPS	10.65	12.70	1.63	10.25	0.68	9.45	100421	-----
12" IPS	12.70	14.98	1.87	10.80	0.82	14.55	100424	-----
14" IPS	13.96	17.04	1.73	11.15	0.88	18.25	100427	-----
16" IPS	15.92	20.00	1.90	11.96	0.99	27.30	100429	-----
18" IPS	17.94	20.96	1.20	12.45	2.18	32.15	100431	-----
20" IPS	20.06	23.62	2.35	12.00	1.87	53.75	100433	-----
24" IPS	23.38	27.78	2.90	14.75	2.30	59.30	100437	-----



IPS

SDR 11 (standard dimension ratio)

200 PSI (MAOP @ 73.4° F)

Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.37	4.05	0.50	5.75	0.24	0.40	100400	FM 200
3" IPS	3.52	5.05	0.54	5.80	0.34	0.85	100404	FM 200
4" IPS	4.50	6.67	0.71	6.65	0.45	1.75	100408	FM 200
6" IPS	6.60	8.60	1.05	8.10	0.65	4.15	100412	FM 200
8" IPS	8.62	10.65	1.28	9.20	0.54	6.40	100416	FM 200
10" IPS	10.72	12.75	1.60	10.20	1.10	13.20	100420	FM 200
12" IPS	12.65	16.00	1.90	10.75	1.27	21.35	100423	FM 200
14" IPS	13.90	17.10	1.80	11.10	1.37	25.35	100426	-----
16" IPS	15.90	20.00	1.97	12.00	1.53	35.90	100428	-----
18" IPS	17.90	21.05	2.17	12.45	1.75	44.75	100430	-----
20" IPS	19.98	23.50	2.40	13.30	2.02	61.05	100432	-----
24" IPS	23.38	27.78	2.90	14.75	2.30	95.65	100436	-----

IPS

SDR 9 (standard dimension ratio)

255 PSI (MAOP @ 73.4° F)

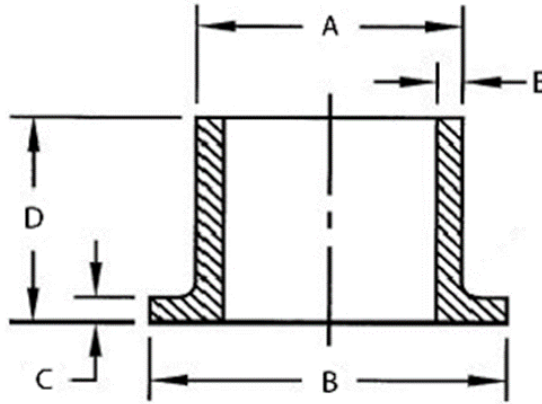
Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.37	4.05	0.50	5.75	0.24	0.50	100403	FM 250
3" IPS	3.52	5.05	0.54	5.80	0.34	1.15	100407	FM 250
4" IPS	4.50	6.46	0.72	5.92	0.53	1.75	100411	FM 250
6" IPS	6.50	8.46	1.03	7.70	0.78	4.60	100415	FM 250
8" IPS	8.60	10.50	1.03	8.40	1.03	8.55	100419	FM 250
10" IPS	10.60	12.78	1.27	11.20	1.27	16.95	100422	FM 250
12" IPS	12.60	15.46	1.92	11.04	1.52	24.45	100425	FM 250

IPS

SDR 7 (standard dimension ratio)

335 PSI (MAOP @ 73.4° F)

Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.37	3.94	0.55	6.10	0.34	0.65	100402	FM 335
3" IPS	3.50	4.95	0.68	5.70	0.54	1.10	100406	FM 335
4" IPS	4.50	6.60	0.93	5.75	0.69	2.20	100410	FM 335
6" IPS	6.65	8.50	1.28	7.90	0.99	5.70	100414	FM 335
8" IPS	8.625	10.63	1.29	18.68	1.232	11.00	100418	FM 335
10" IPS	10.75	12.99	1.55	11.50	1.194	TBD	100451	FM 335
12" IPS	12.75	15.75	1.62	10.83	1.417	TBD	100452	FM 335

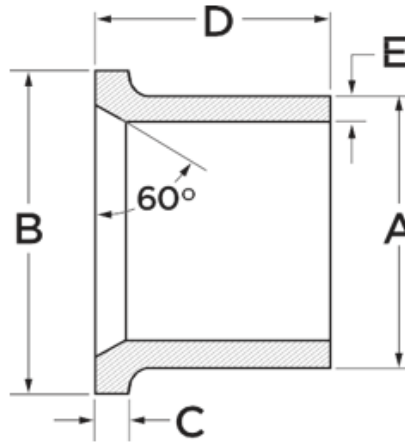


DIPS

SDR 11 (standard dimension ratio)

200 PSI (MAOP @ 73.4° F)

Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
4" DIPS	4.80	6.56	0.68	6.00	0.44	1.65	100446	FM 200
6" DIPS	6.90	8.60	1.00	8.00	0.63	4.35	100447	FM 200
8" DIPS	9.05	10.72	1.25	9.00	0.82	8.00	100448	FM 200
10" DIPS	11.10	12.15	1.35	9.00	1.01	12.20	100449	FM 200
12" DIPS	13.20	15.94	1.81	10.78	1.20	20.08	100450	FM 200



Product Family:	Injection Molded Butt Fusion Fitting	Fitting Design:	Flange Adapter
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	2" – 6"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	445574C-CC3	Currently Available SDR's:	11
Manufactured and tested to meet requirements of:		ASTM D2513, ASTM D3261, ANSI/AWWA C901 & C906, FM 1613, NSF 61	
For use on pipe and fittings conforming to:		ASTM D2513, ASTM D3035, ASTM F-714	

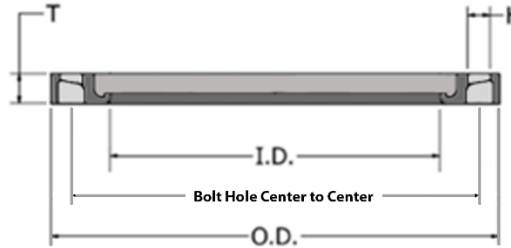
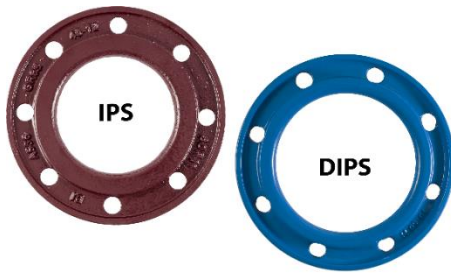
For Material and Testing information, please refer to our Molded Fitting Specification Sheet.

IPS

SDR 11 (standard dimension ratio)

200 PSI (MAOP @ 73.4° F)

Nominal Size	A (OD) [in.]	B [in.]	C [in.]	D (length) [in.]	E (wall) [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.40	4.04	0.64	5.90	0.25	0.40	100470	-----
3" IPS	3.50	5.02	0.80	6.15	0.34	0.85	100472	-----
4" IPS	4.50	6.64	1.20	7.25	0.44	2.20	100474	-----
6" IPS	6.65	8.50	1.37	8.18	6.30	4.40	100476	-----
8" IPS	8.62	10.60	1.82	9.00	1.23	8.55	100478	-----
10" IPS	10.75	12.80	2.24	10.75	1.54	14.55	100480	-----
12" IPS	12.75	15.25	2.55	11.00	1.82	21.80	100482	-----



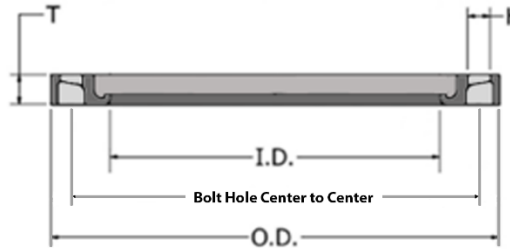
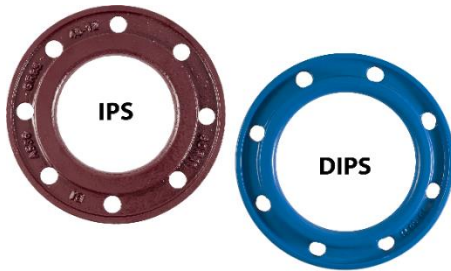
Integrity Fusion Products offers a line of **Convuluted Ductile Iron Backup Rings** manufactured from **ASTM A536 grade 65-45-12** material and are available in a variety of nominal **IPS** and **DIPS** HDPE pipe diameters and SDR ratings. Our **Convuluted Ductile Iron Backup Rings** are designed and manufactured to comply to the drilling and mating requirements in **ANSI/ASME B16.5** and **AWWA C207** for use in applications *24" and smaller*; and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications *26" and larger*. Our **Fusion Bonded Epoxy Coating** offers superior long-term corrosion resistance characteristics over the industry standard Red Oxide primer, or painted epoxy coatings which tend to chip and rust shortly after installation, and as a visual convenience to our customers, our Epoxy Coated Backup Rings are **color coded** as follows: Red indicates an IPS size, and Blue indicates a DIPS size. All Integrity Fusion Ductile Iron Backup Rings, 12" and smaller, have been FM tested and approved. SDR 11 Backup Rings meet all FM 200 requirements, and SDR 7 – 9 Backup rings all meet FM 335 requirements. **Also Available in Red Oxide Primer.**

IPS

SDR 11 (Epoxy Coated Ductile Iron Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.63	0.51	4	0.75	4.79	1.80	100200	FM 200
3" IPS	7.45	3.78	0.51	4	0.75	6.00	2.80	100202	FM 200
4" IPS	9.01	4.77	0.55	8	0.83	7.54	3.80	100204	FM 200
6" IPS	11.00	6.89	0.63	8	0.88	9.52	5.60	100206	FM 200
8" IPS	13.39	8.90	0.83	8	0.86	11.71	9.80	100208	FM 200
10" IPS	16.00	10.95	0.98	12	1.00	14.25	13.30	100210	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	17.00	22.30	100212	FM 200
14" IPS	21.00	14.69	1.40	12	1.18	18.75	31.00	100214	-----
16" IPS	23.60	16.89	1.63	16	1.18	21.25	42.00	100216	-----
18" IPS	25.02	18.46	1.70	16	1.30	22.75	45.00	100218	-----
20" IPS	27.50	20.20	1.81	20	1.25	25.00	58.00	100220	-----
24" IPS	32.05	24.57	2.10	20	1.42	29.50	86.00	100222	-----
28" IPS	36.50	28.25	2.50	28	1.38	34.00	113.0	100224	-----
30" IPS	38.75	30.60	2.60	28	1.38	36.00	141.0	100226	-----
32" IPS	41.75	32.60	2.75	28	1.63	38.50	161.0	100227	-----
36" IPS	46.00	36.60	3.15	32	1.63	42.75	217.0	100228	-----



IPS

SDR 7 (Epoxy Coated Ductile Iron Backup Rings)

355 PSI Class 150 # Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.63	0.75	4	0.75	4.79	2.50	100201	FM 335
3" IPS	7.45	3.78	0.85	4	0.75	6.00	4.00	100203	FM 335
4" IPS	9.01	4.77	0.92	8	0.83	7.54	5.70	100205	FM 335
6" IPS	11.00	6.89	1.00	8	0.88	9.52	8.30	100207	FM 335
8" IPS	13.39	8.90	1.12	8	0.86	11.71	11.40	100209	FM 335
10" IPS	16.00	10.95	1.22	12	1.00	14.25	16.20	100211	FM 335
12" IPS	19.00	13.15	1.48	12	1.00	17.00	26.50	100213	FM 335
14" IPS	21.00	14.70	1.60	12	1.18	18.75	37.00	100215	-----
16" IPS	23.50	16.40	1.82	16	1.18	21.25	50.00	100217	-----
18" IPS	25.01	18.54	1.80	16	1.30	22.75	51.00	100219	-----
20" IPS	27.50	20.50	2.00	20	1.25	25.00	37.00	100235	-----
24" IPS	32.00	24.60	2.20	20	1.42	29.50	96.00	100223	-----

For use in SDR 9 applications @ 255 PSI

For use in SDR 7 applications @ 355 PSI

DIPS

SDR 11 (Epoxy Coated Ductile Iron Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
4" DIPS	9.01	5.00	0.55	8	0.83	7.54	5.10	100260	FM 200
6" DIPS	11.00	7.10	0.63	8	0.88	9.52	7.10	100261	FM 200
8" DIPS	13.39	9.20	0.83	8	0.86	11.71	10.60	100262	FM 200
10" DIPS	16.00	11.30	0.98	12	1.00	14.25	15.70	100263	FM 200
12" DIPS	19.00	13.45	1.25	12	1.00	17.00	24.00	100264	FM 200

DIPS

SDR 7 (Epoxy Coated Ductile Iron Backup Ring)

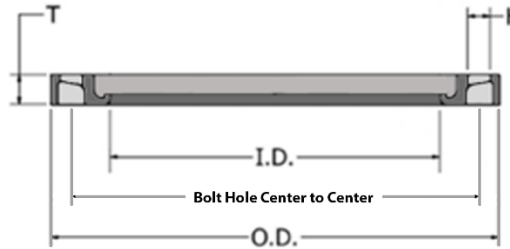
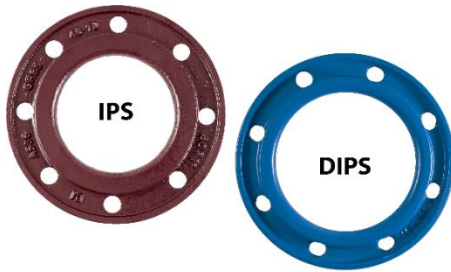
355 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
4" DIPS	9.01	5.00	0.92	8	0.75	7.54	6.20	100229	FM 335
6" DIPS	11.00	7.10	1.00	8	0.88	9.52	8.40	100230	FM 335
8" DIPS	13.39	9.20	1.12	8	0.88	11.71	12.30	100231	FM 335
10" DIPS	16.00	11.30	1.22	12	1.00	14.25	17.70	100232	FM 335
12" DIPS	19.00	13.45	1.48	12	1.00	17.00	29.30	100233	FM 335

For use in SDR 9 applications @ 255 PSI

For use in SDR 7 applications @ 355 PSI

Red Oxide Primer Back-Up Rings


American Water Works
Association


American National Standards Institute



IPS

SDR 11 (Red Oxide Ductile Iron Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.63	0.51	4	0.75	4.79	1.80	100277	FM 200
3" IPS	7.45	3.78	0.51	4	0.75	6.00	2.80	100279	FM 200
4" IPS	9.01	4.77	0.55	8	0.83	7.54	3.80	100281	FM 200
6" IPS	11.00	6.89	0.63	8	0.88	9.52	5.60	100283	FM 200
8" IPS	13.39	8.90	0.83	8	0.86	11.71	9.80	100285	FM 200
10" IPS	16.00	10.95	0.98	12	1.00	14.25	13.30	100287	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	17.00	22.30	100289	FM 200
14" IPS	21.00	14.69	1.40	12	1.18	18.75	31.00	100291	FM 200
16" IPS	23.60	16.89	1.63	16	1.18	21.25	42.00	100293	FM 200
18" IPS	25.02	18.46	1.70	16	1.30	22.75	45.00	100295	FM 200
20" IPS	27.50	20.20	1.81	20	1.25	25.00	58.00	100236	FM 200
24" IPS	32.05	24.57	2.10	20	1.42	29.50	86.00	100297	FM 200

IPS

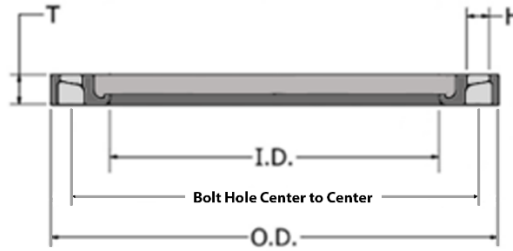
SDR 7 (Red Oxide Ductile Iron Backup Ring)

335 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.63	0.51	4	0.75	4.79	2.50	100278	FM 200
3" IPS	7.45	3.78	0.51	4	0.75	6.00	4.00	100280	FM 200
4" IPS	9.01	4.77	0.55	8	0.83	7.54	5.70	100282	FM 200
6" IPS	11.00	6.89	0.63	8	0.88	9.52	8.30	100284	FM 200
8" IPS	13.39	8.90	0.83	8	0.86	11.71	11.40	100286	FM 200
10" IPS	16.00	10.95	0.98	12	1.00	14.25	16.20	100288	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	17.00	26.50	100290	FM 200
14" IPS	21.00	14.69	1.40	12	1.18	18.75	37.00	100292	-----
16" IPS	23.60	16.89	1.63	16	1.18	21.25	50.00	100294	-----
18" IPS	25.02	18.46	1.70	16	1.30	22.75	51.00	100296	-----
20" IPS	27.50	20.50	2.00	20	1.25	25.00	37.00	100237	-----
24" IPS	32.05	24.57	2.10	20	1.42	29.50	96.00	100298	-----

For use in SDR 9 applications @ 255 PSI

For use in SDR 7 applications @ 355 PSI



Integrity Fusion Products offers a line of class 150 **Convuluted Stainless Steel Backup Rings** manufactured from **ASTM A351CF8M (316) 70/30/30** material and are available in a variety of nominal **IPS** and **DIPS** HDPE pipe diameters and SDR ratings up to 24". For sizes 28" to 36", we offer **ASTM A351CF8M (316) 70/30/30 Flat Plate Style Backup Rings**. Integrity Fusion Products **Stainless Steel Backup Rings** are designed and manufactured to comply with the drilling and mating requirements set forth in **ANSI/ASME B16.5** and **AWWA C207** for use in applications *24" and smaller*, and with **ANSI/ASME B16.47** and **AWWA C207** for use in applications *26" and larger*. All Integrity Fusion Stainless Steel Backup Rings, 12" and smaller, have been FM tested and approved. SDR 11 Backup Rings meet all FM 200 requirements, and SDR 7 – 9 Backup rings all meet FM 335 requirements.

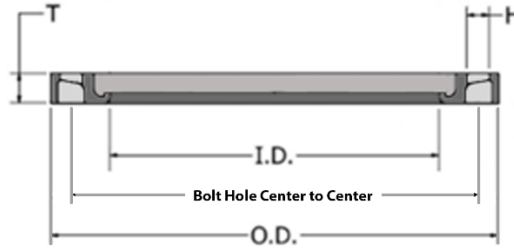
IPS

SDR 11 (316 Stainless Steel Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
2" IPS	6.00	2.63	0.51	4	0.75	4.79	1.80	100241	FM 200
3" IPS	7.45	3.78	0.51	4	0.75	6.00	2.80	100242	FM 200
4" IPS	9.01	4.77	0.55	8	0.83	7.54	3.80	100243	FM 200
6" IPS	11.00	6.89	0.63	8	0.88	9.52	5.60	100244	FM 200
8" IPS	13.39	8.90	0.83	8	0.86	11.71	9.80	100245	FM 200
10" IPS	16.00	10.95	0.98	12	1.00	14.25	13.30	100246	FM 200
12" IPS	19.00	13.15	1.25	12	1.00	17.00	22.30	100247	FM 200
14" IPS	21.00	14.69	1.40	12	1.18	18.75	31.00	100248	-----
16" IPS	23.60	16.89	1.63	16	1.18	21.25	52.35	100249	-----
18" IPS	25.02	18.46	1.70	16	1.30	22.75	52.12	100250	-----
20" IPS	27.50	20.20	1.81	20	1.25	25.00	73.80	100252	-----
24" IPS	32.05	24.57	2.10	20	1.42	29.50	105.50	100253	-----
28" IPS (**)	36.42	28.66	2.76	28	1.42	34.00	138.60	100265	-----
30" IPS (**)	38.78	30.67	2.87	28	1.42	36.00	174.00	100266	-----
32" IPS (**)	41.73	32.52	3.35	28	1.63	38.50	261.10	100267	-----
34" IPS (**)	43.74	34.53	3.25	32	1.63	40.50	303.20	100268	-----
36" IPS (**)	46.06	36.81	3.80	32	1.65	42.75	344.20	100269	-----

**** Double asterisk shows the Backup Ring is a flat plate design**



IPS

SDR 7 - 9 (316 Stainless Steel Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
4" IPS	9.01	4.77	0.55	8	0.83	7.54	6.00	100272	FM 335
6" IPS	11.00	6.89	0.63	8	0.88	9.52	8.55	100273	FM 335
8" IPS	13.39	8.90	0.83	8	0.86	11.71	12.65	100274	FM 335
10" IPS	16.00	10.95	0.98	12	1.00	14.25	19.55	100275	FM 335
12" IPS	19.00	13.15	1.25	12	1.00	17.00	34.55	100276	FM 335

For use in SDR 9 applications @ 255 PSI

For use in SDR 7 applications @ 355 PSI

DIPS

SDR 11 (316 Stainless Steel Backup Ring)

200 PSI Class 150# Bolt Pattern

Nominal Size	OD (in.)	ID (in.)	Thickness (in.)	# Bolt Holes	Hole Dia. (ins)	Bolt Hole Center to Center	Weight [lbs.]	Item Code	FM Class
4" DIPS	9.00	5.00	0.55	8	0.75	7.54	3.80	100254	FM 200
6" DIPS	11.00	7.10	0.63	8	0.88	9.52	5.50	100255	FM 200
8" DIPS	13.50	9.20	0.85	8	0.88	11.71	10.00	100256	FM 200
10" DIPS	16.00	11.30	0.98	12	1.00	14.25	14.10	100257	FM 200
12" DIPS	19.00	13.45	1.25	12	1.00	17.00	24.20	100258	FM 200

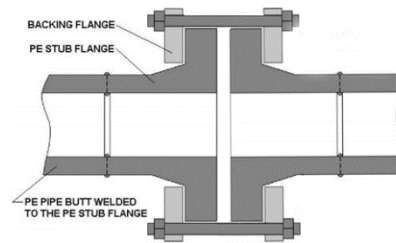
For use in SDR 9 applications @ 255 PSI

For use in SDR 7 applications @ 355 PSI

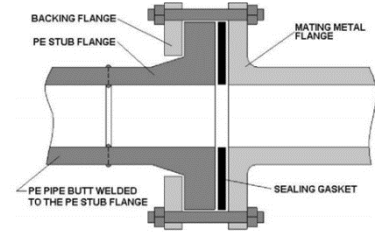
Flange Adapter Installation

Torque Values & Tightening Sequence

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HDPE Flange to HDPE Flange



HDPE Flange to Metal Flange

The Flange Adapter is a high-density polyethylene fitting that allows you to make a mechanical transition to or from a polyethylene-to-polyethylene system or a polyethylene to non-polyethylene system by use of a standard ANSI/AWWA Backup Ring (also known as a metal lap joint flange).

To make this kind of connection you need to have on-hand, a Flange Adapter, (2) Backup Rings or a flanged appurtenance, and a bolt set. The neck of the Flange Adapter is sufficiently long enough so that it can be clamped in a fusion machine or electrofused onto a polyethylene pipe end, but the Backup Ring will need to be placed loosely on the Flange Adapter prior to being fused on the pipe.

Flange Assembly Methods

There are two methods commonly used when making the Flange Adapter connection between various combinations of pipe materials such as HDPE to HDPE; HDPE to Steel; HDPE to Ductile Iron; HDPE to PVC; HDPE to Fiberglass.

- **Non-Gasketed Method**, uses the specified HDPE seating torque initially applied to the HDPE Flange Adapters, followed by a mandatory re-torque applied 4 – 24 hours after completion of the torque application.
- **Gasketed Method**, uses a low gasket seating bolt torque, applied to a soft elastomeric gasket, for lower pressure applications (like landfill gas collection or use with torque limited PVC or fiberglass flanges), followed by the mandatory re-torque 4 – 24 hours later.

Flange Gaskets

Gaskets are not usually needed for properly torqued self-gasketing HDPE flange assemblies. However, gaskets may be needed for applications working at higher pressures or for connections being made between a polyethylene flange and non-polyethylene flanges.

NOTE: IF gaskets are to be used, the gasket materials should be chemically and thermally compatible with the internal fluid and the external environment. They should be of proper hardness, thickness, and style. They should also be recommended by the gasket manufacturer for use with polyethylene flanges. Upon seating, a gasket must be capable of overcoming minor alignment and flange imperfections such as non-parallel flanges, distortion troughs/grooves, surface waviness. Or surface scoring.

When gaskets harder than HDPE are used, the hard gasket seating stress may be more than the HDPE seating stress. When higher seating stress gaskets are used with mating metal flanges, the HDPE may seat on its side of the gasket but may not be able to seat the harder gasket into the metal on the other metal flange face. Hence, there is a limit on the gasket seating stress when other material gaskets are used.

Flange Adapter Installation

Torque Values & Tightening Sequence

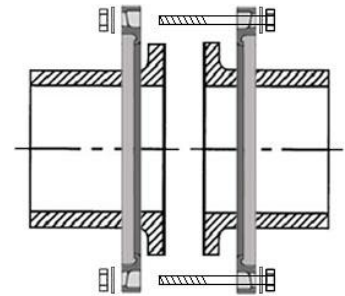
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Flange Assembly

- Before fitting the flange assembly, lubricate the flange bolt threads, washers and nuts with a non-fluid lubricant grease.
- Flange surfaces, and gasket surfaces if being used, must be clean and free of cut or gouges.
- Fit the flange components together loosely.
- Tighten bolts by hand and recheck alignment.
- Adjust alignment if necessary.
- Flange bolts should be tightened to the proper torque value (see Table 1) by turning the nut.
- Tighten the flange nuts according to the sequential numbered patterns provided (see Figure 1).
- Tighten all the bolts in the sequential pattern before changing to a higher torque value.
- Establish a sealing surface pressure by tightening the bolts to a torque value of 5 ft-lbs., then increase torque increments to about 15 ft-lbs. or less.
- Tighten bolts to the torque value recommended.

Caution – Mating flanges must be aligned to each other before tightening. Tightening misaligned flanges can cause leakage or flange failure. Do not try to align flange faces by tightening bolts.

Caution – Improperly assembled flange connections may leak. The assembly for polyethylene flange connections is different from assembly of metallic flange connections. It is important that the installer be aware of the differences. Retightening is essential in achieving a seal.



Caution – Retightening. Polyethylene and the gasket (if used) will undergo compression set that may loosen the bolts. About an hour or so after the final tightening, retighten each flange bolt nut to the final torque value. As before, retighten in the correct pattern sequence and in increments of 15 ft-lbs. or less. For flange adapters 12" and smaller, a second retightening after 4 hours is recommended. For flange adapters larger than 12", the second retightening is recommended after 12 to 24 hours.

Flange Bolts

Flange bolts are typically sized 1/8" smaller than the bolt hole diameter and mating flanges are usually joined together with Hex-head bolts, flat washers and hex nuts, or threaded studs, flat washers and hex nuts. Generally Hex-head and stud bolts are SAE Grade 2 or ASTM A307 Grade B when used to join flanges with rubber gaskets. When using non-rubber gaskets or when using Class 300 back-up rings, higher strength bolts may be needed to provide sufficient clamping force to seal the gaskets. Check with the gasket supplier. Flange bolts must span the entire width of the flange joint and provide sufficient thread length to engage the nut. Flat washers should be used between the nut and the backup ring.

Because the length of bolt is heavily dependent on the specific application, and the type of flanged fitting or appurtenance being bolted to – standard bolt lengths are difficult to provide, and in many applications All-Thread is used in the place of the Hex Head Bolts.

Flange Adapter Installation

Torque Values & Tightening Sequence

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Flange Size	Flange SDR	HDPE to HDPE		HDPE to 150# Flange		Bolt Dia.	Bolt TPI	Stud or Bolt Qty.	Washer Qty.	Socket Size	
		Hex Bolt Length	150# Stud Length	Hex Bolt Length	150# Stud Length					Std Head	Heavy Head
2"	17	3 -1/2"	3 -1/2"	2-3/4"	3-1/4"	5 / 8"	11	4	8	15/16"	1-1/16"
	11										
3"	17	3 -1/2"	3-7/8"	3-1/4"	3-3/4"	5 / 8"	11	4	8	15/16"	1-1/16"
	11										
4"	17	4"	4-1/2"	3-1/2"	4"	5 / 8"	11	8	16	15/16"	1-1/16"
	11										
6"	17	4-1/4"	4-3/4"	3-3/4"	4-1/4"	3 / 4"	10	8	16	1-1/8"	1-1/4"
	11										
8"	17	4-3/4"	5-1/4"	4-1/4"	4-5/8"	3 / 4"	10	8	16	1-1/8"	1-1/4"
	11										
10"	17	5-1/2"	5-7/8"	4-3/4"	5-1/4"	7 / 8"	9	12	24	1-5/16"	1-7/16"
	11	6-1/4"	6-5/8"	5"	5-1/2"						
12"	17	6-1/4"	6-5/8"	5"	5-1/2"	7 / 8"	9	12	24	1-5/16"	1-7/16"
	11	7-1/4"	7-5/8"	5-1/2"	6"						
14"	17	6-3/4"	7-1/4"	5-3/4"	6-1/4"	1"	8	12	24	1-1/2"	1-5/8"
	11	8"	8-1/2"	6-1/4"	6-3/4"						
16"	17	7-1/2"	8"	6"	6-1/2"	1"	8	16	32	1-1/2"	1-5/8"
	11	9"	9-1/2"	6-3/4"	7-1/4"						
18"	17	8 1/4"	8-5/8"	6-3/4"	7-1/4"	1-1/8"	8	16	32	1-1/16"	1-13/16
	11	9-7/8"	10"	7-1/2"	7-7/8"						
20"	17	8-7/8"	9-1/4"	7"	7-1/2"	1-1/8"	8	20	40	1-1/16"	1-13/16
	11	10-1/4"	10-3/4"	7-3/4"	8-1/4"						
24"	17	10-1/8"	10-5/8"	8"	8-1/2"	1-1/4"	8	20	40	1-7/8"	2"
	11	12-1/2"	12-7/8"	9-1/4"	9-3/4"						

NOTICE: This list of bolt lengths is a general guideline to be used for reference purposes only. The lengths given in this list are based on general industry information and may not be appropriate for your specific application.

Bolt Tightening

Multiple rounds of tightening should be used to ensure uniform bolt tightness.

After hand-tightening, a minimum of three (3) rounds of incremental tightening is suggested, tightening to approximately 30% of the target torque value on the first round. Tighten to 50-70% on the second round, and to 100% on the third round.

After the third round, it is recommended that all the bolts should be checked and retorqued to 100% in a circular pattern to ensure that no bolts were inadvertently missed during the tightening sequence. Bolt tightening torque values are provided in Table 1 and are typically sufficient for obtaining a seal. However, if using a gasket, bolts should be tightened to the gasket manufacturers recommended torque for the selected gasket and the application conditions.

The effectiveness of the seal is strongly dependent on field assembly technique. Over tightening rubber gaskets may damage or extrude the gasket. Under tightening could result in blow outs or leakage. Flange connections should be left exposed until leak testing is complete.

NOTE: There are conditions that can affect proper bolt tightening. These include bolt thread condition, thread cleanliness, earlier usage of bolts, lubricants and weather.

Flange Adapter Installation

Torque Values & Tightening Sequence

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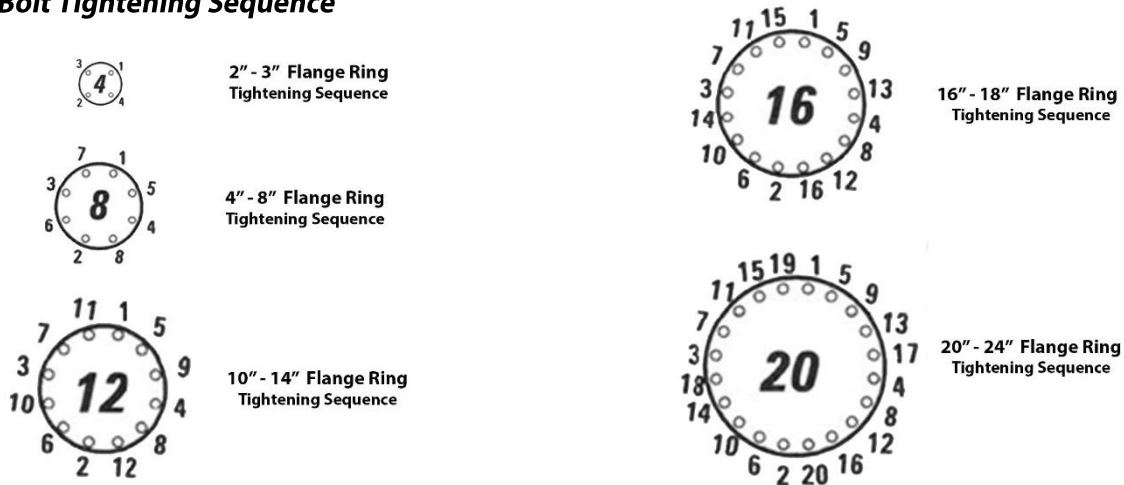
Bolts should be lubricated. Dry bolts require higher torque to provide the same clamping force as lubricated bolts. Lubricate with a non-fluid lubricant grease.

Table 1 - Bolt Torque Values Using Lubricated Bolts

Bolt Size		With Rubber Gasket **	PE to PE With No Gasket	Maximum Torque
In.	TPI	Ft.-lbs.	Ft.-lbs.	Ft.-lbs.
5/8	11	40	60	100
3/4	10	65	100	125
7/8	9	120	150	150
1	8	150	150	200
1-1/8	8	160	160	250
1 1/4	8	220	220	300

** Verify with the gasket supplier that the torque meets minimum clamping force for the gasket.

Figure 1 – Bolt Tightening Sequence



Special Flange Installation Considerations

- Surface and above grade flanges must be properly supported to avoid bending stresses.
- Below grade flange connections to heavy appurtenances such as valves or hydrants or to metal pipes require a support foundation of compacted, stable granular soil (crushed stone), compacted cement stabilized granular backfill, or reinforced concrete.
- Flange connections next to pipes passing through structural walls must be structurally supported to avoid shear and bending loads.
- When flanging to brittle materials such as cast iron, correct alignment and careful tightening are necessary. Polyethylene flange adapters and stub ends are not full-face, so tightening places a bending stress across the flange face. Over-tightening, misalignment, or uneven tightening can break brittle material flanges.

Butterfly Valves

When joining a polyethylene flange adapter to a flanged butterfly valve, the inside diameter of the pipe flange should be checked for valve disk rotation clearance. The open valve disk may extend into the pipe flange. Valve operation may be restricted if the pipe flange interferes with the disk. If disk rotation clearance is a problem, a Beveled Flange Adapter having sufficient clearance to allow the complete opening of standard valves may be obtained from Integrity Fusion Products.

Butterfly valves must be centered in the flange for proper operation. Installing a butterfly valve with the disk rotated open may aid with alignment. After fitting up and tightening flange bolts to the 5 ft.-lbs. torque value, check the valve to ensure that the valve disk can rotate without interference. Realign, if necessary, then tighten up.

Date: November 6, 2024
Re: Buy America Act & BABAA Compliance
Job Name:
Customer:
To:
Attn:

Sample Letter

Integrity Fusion Products is an American owned company specializing in molded HDPE fittings and accessories. Integrity Fusion's production plant is located at 270 Parkade Court, Peachtree City, GA, and has been supplying HDPE related fittings to North America since 2007.

This letter is to confirm that all IntegriFuse brand of molded HDPE **Butt Fittings, Flange Adapters, MJ Adapters, and Stainless-Steel Stiffeners** are all manufactured in the USA, and fully comply with the **Buy America Act (BAA)**, as well as the **Build America, Buy America Act (BABA)**. To include, but not limited to **Title 49 USC Section 50101**.

The following items do comply with BABA:

Part # 100523/100521 - IntegriFuse brand, 6" IPS SDR 9, HDPE MJ Adapter, FM 250
Part # 100531/100529 - IntegriFuse brand, 8" IPS SDR 9, HDPE MJ Adapter, FM 250
Part # 100539/100537 - IntegriFuse brand, 10" IPS SDR 9, HDPE MJ Adapter, FM 250
Part # 100016 - IntegriFuse brand, 6" IPS SDR 9, HDPE Flange Adapter, FM 250
Part # 100020 - IntegriFuse brand, 8" IPS SDR 9, HDPE Molded 45, FM 250
Part # 100043 - IntegriFuse brand, 10" IPS SDR 9, HDPE Molded 45,
Part # 100120 - IntegriFuse brand, 6" IPS SDR 9, HDPE Molded 90, FM 250
Part # 100124 - IntegriFuse brand, 8" IPS SDR 9, HDPE Molded 90, FM 200

Best Regards,



Greg Swindell
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770-632-7530