



2025

Electrofusion Fitting Submittal Package



Integrity Fusion Products
Peachtree City, Georgia
1/1/2025



Injection Molded Electrofusion Fittings

Integrity Fusion Products offers a full line of **IntegriFuse injection molded**, small diameter (**1" – 12"**), and large diameter (**14" – 63"**) **IPS** and **DIPS** Electrofusion Couplers that are manufactured in a variety of nominal pipe sizes and SDR's. All **IntegriFuse Injection Molded Electrofusion fittings** are manufactured and tested to the requirements of **ASTM F1055, ASTM D2513, ASTM D3261, ANSI/AWWA C901** and **C906**, and are **FM tested and approved** for use with outside diameter-controlled pipe and fittings conforming to **ASTM D2513, ASTM D3035, and ASTM F-714**. **IntegriFuse Injected Molded Electrofusion Fittings** can be fused to any manufacturers' PE pipe, molded fittings, or fabricated fittings manufactured from material made from PE3408 / PE4710 / PE100 resin that complies to ASTM D3350. **IntegriFuse Injection Molded Electrofusion Couplers** are designed with **wider fusion zones** that facilitate increased surface melt and larger melt pools, **wider cold zones** for increased flexibility in pipe stab depths, melt flow indicators for visual confirmation of material expansion in the fusion zone, and have no need for pre-heating procedures when fusing in colder temperatures.



Molded PE3408 / PE4710 / PE100 Electrofusion Fittings

Integrity Fusion Products **IntegriFuse Electrofusion Fittings**, 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 **IntegriFuse Electrofusion Fittings** in a variety of sizes and configurations 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**.

IntegriFuse Electrofusion 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
- ASTM F1055 - Standard Specification for Electrofusion Fittings
- 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 IntegriFuse Electrofusion 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.

IntegriFuse Electrofusion Fittings from Integrity Fusion Products can be fused to any manufacturers' PE pipe, molded fittings, or fabricated fittings manufactured from material made from **PE3408 / PE4710 / PE100** resin that complies to **ASTM D3350** and are compatible for cross-fusing to **PE2406/PE2708** pipe or fittings without special fusion instructions.

IntegriFuse Electrofusion 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)

Pressure Rating of IntegriFuse PE4710 Electrofusion 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

Conditions for the Required De-Rating of an Electrofusion Fittings MAOP

The **Maximum Allowable Operating Pressures (MAOP)** for molded PE4710 electrofusion fittings **must be de-rated for elevated temperatures in all service applications**, including 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.*

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 operating temperature of Integrity Fusion Products PE4710 Molded Fittings **should not exceed 140° F.**

Fitting MAOP by SDR vs. Operating Temperature				
SDR	73.4° F	100° F	120° F	140° F
7	333 psi	260 psi	210 psi	166 psi
9	250 psi	195 psi	158 psi	125 psi
11	200 psi	156 psi	126 psi	100 psi
17	125 psi	98 psi	79 psi	63 psi

TABLE 2

Dry, gaseous hydrocarbons have no adverse effect on our molded electrofusion 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.

Table 3 provides an added derated MAOP of a molded electrofusion fitting when installed into services and applications subjected to an extended exposure of liquid hydrocarbon concentrations of 2% and greater.

Values in Table 3 use a material design factor of .63 and a Fluid Service Factor of 0.5

MAOP by SDR Derated for Operating Temperature and Transporting a Media Containing 2% or greater Hydrocarbon Content				
SDR	73.4° F	100° F	120° F	140° F
7	166 psi	129 psi	105 psi	83 psi
9	125 psi	98 psi	79 psi	63 psi
11	100 psi	78 psi	63 psi	50 psi

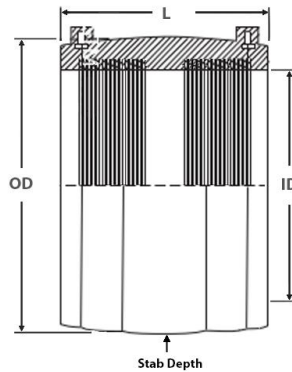
TABLE 3

Fluid Service Factors

Produced 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 <i>Title 49 part 192</i>)	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

IntegriFuse Electrofusion 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.

IntegriFuse Electrofusion 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 an unlimited shelf life.



Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Coupler
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:	4455574-CC3	Currently Available SDR's:	7, 7/9, 11, 11/17
Manufactured and tested to meet requirements of: ASTM F1055, 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 Electrofusion Fitting Specification Sheet.

Call for part #'s for Electrofusion Coupler sizes available with 7/9, and 11/17 SDR's

IPS

SDR 11 (standard dimension ratio)

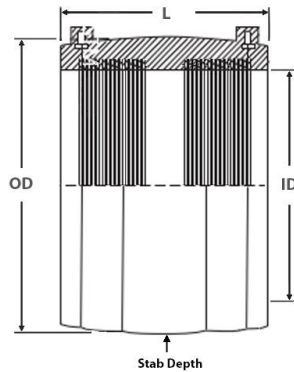
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
1" IPS	1.70	1.315	3.40	1.315	0.10	200302	----
1 1/4" IPS	2.20	1.660	3.70	1.660	0.20	200303	----
1 1/2" IPS	2.70	1.900	3.90	1.900	0.40	200304	----
2" IPS	3.20	2.375	4.60	2.375	0.50	200305	----
3" IPS	4.40	3.500	5.00	3.500	0.90	200307	FM 200 / FM 232
4" IPS	5.90	4.500	5.90	4.500	1.70	200310	FM 200 / FM 232
5" IPS	6.90	5.563	6.50	5.563	2.50	200312	FM 200 / FM 232
6" IPS	8.70	6.625	7.90	6.625	4.60	200314	FM 200 / FM 232
8" IPS	10.7	8.625	8.90	8.625	8.40	200317	FM 200 / FM 232
10" IPS	13.3	10.75	9.80	10.75	14.9	200320	FM 200 / FM 232
12" IPS	15.9	12.75	11.4	12.75	24.5	200323	FM 200 / FM 232

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

Integrifuse Injection Molded Electrofusion Couplers are designed with **wider fusion zones** that facilitate increased surface melt and larger melt pools, **wider cold zones** for increased flexibility in pipe stab depths, melt flow indicators for visual confirmation of material expansion in the fusion zone, and have no need for pre-heating procedures when fusing in colder temperatures

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**



IPS

SDR 7 (standard dimension ratio)

335 PSI Water – 125 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.375	4.750	4.530	2.265	0.60	200306	FM 267 / FM 400
3" IPS	3.500	7.000	5.200	2.600	1.60	200308	FM 267 / FM 400
4" IPS	4.500	9.000	6.300	3.150	3.10	200311	FM 267 / FM 400
6" IPS	6.625	13.25	7.870	3.935	8.20	200315	FM 267 / FM 400
8" IPS	8.625	17.25	9.384	4.692	17.3	200318	FM 267 / FM 400
10" IPS	10.75	21.50	10.83	5.415	31.0	200321	FM 267 / FM 400
12" IPS	12.75	25.50	13.94	6.970	65.0	200324	FM 267 / FM 400

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

DIPS

SDR 11 (standard dimension ratio)

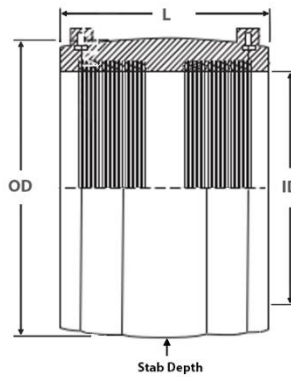
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
4" DIPS	6.00	4.80	6.10	3.05	2.00	200309	FM 200 / FM 232
6" DIPS	8.50	6.90	7.50	3.75	5.10	200313	FM 200 / FM 232
8" DIPS	11.2	9.05	8.60	4.30	10.0	200316	FM 200 / FM 232
10" DIPS	13.6	11.1	9.80	4.90	14.9	200319	FM 200 / FM 232
12" DIPS	16.3	13.2	11.8	5.90	25.6	200322	FM 200 / FM 232

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

Integrity Fusion Products strongly requires that all individuals installing electrofusion fittings in permanent field applications should be done only by individuals who have a strong working knowledge of polyethylene and heat fusion methods, that have been properly trained, qualified, and hold a current training certificate issued from a recognized electrofusion fitting manufacturers authorized instructor, and that have demonstrated their understanding of these requirements by correctly preparing electrofusion test assemblies that have been qualified by recognized ASTM destructive testing. Other stipulations and regulations may apply, depending on fitting size, application, local codes, and/or jurisdictional oversight of other state and local regulating agencies.



Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Coupler
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	14" – 63"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	7, 9/11, 11, 11/17, 17/26
Manufactured and tested to meet requirements of: ASTM F1055, 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 Electrofusion Fitting Specification Sheet.

IntegriFuse Injection Molded Electrofusion Couplers are designed with **wider fusion zones** that facilitate increased surface melt and larger melt pools, **wider cold zones** for increased flexibility in pipe stab depths, melt flow indicators for visual confirmation of material expansion in the fusion zone, and have no need for pre-heating procedures when fusing in colder temperatures

Call for part #'s for Large Diameter Electrofusion Coupler sizes designed for use on variable SDR's; 9/11, 11/17, and 17/26 SDR's – and for Large Diameter Electrofusion Couplers 54" and larger.

Note: 54" and 63" couplers available only in SDR 15.5/17 and 21/33 only.

IPS

SDR 11 (standard dimension ratio)

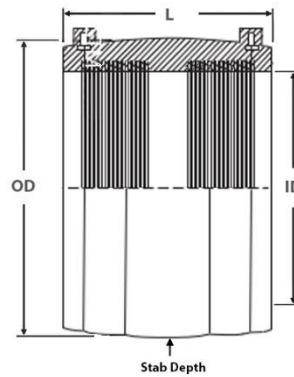
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
14" IPS	17.20	14.00	11.80	5.900	27.00	200326	FM 200 / FM 232
16" IPS	19.80	16.00	13.90	6.950	32.00	200329	FM 200 / FM 232
18" IPS *	22.30	18.00	16.70	8.350	75.00	200332	FM 200 / FM 232
20" IPS *	24.80	20.00	18.00	9.000	97.00	200335	FM 200 / FM 232
22" IPS *	27.40	22.00	19.50	9.750	123.0	200336	FM 200 / FM 232
24" IPS *	30.60	24.00	19.80	9.900	157.0	200338	FM 200 / FM 232
26" IPS **	31.90	26.00	20.20	10.10	171.0	200339	FM 200 / FM 232
28" IPS **	34.50	28.00	20.70	10.35	203.0	200341	FM 200 / FM 232
30" IPS **	37.00	30.00	20.70	10.35	238.0	200343	----
32" IPS **	39.60	32.00	20.70	10.35	274.0	200345	----
34" IPS **	42.10	34.00	21.70	10.85	308.7	200355	----
36" IPS **	44.10	36.00	21.10	10.85	319.7	200347	----
42" IPS **	51.20	42.00	22.60	11.30	465.2	200349	----
48" IPS **	58.70	48.00	26.20	13.10	661.4	200351	----

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

* Shows the fitting has dual fusion coils

** Shows the fitting has a dual fusion coil and requires use of the I Fuse I-105 Processor for fusion



IPS

SDR 7 (standard dimension ratio)

335 PSI Water – 125 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
14" IPS	19.53	14.00	13.78	6.890	70.50	200327	FM 267 / FM 400
16" IPS	22.44	16.00	15.87	7.935	101.0	200330	FM 267 / FM 400
18" IPS *	25.00	18.00	17.91	8.955	140.0	200333	FM 267 / FM 400
20" IPS *	28.00	20.00	18.50	9.250	TBD	200357	FM 267 / FM 400
22" IPS *	30.90	22.00	19.70	9.850	TBD	200358	FM 267 / FM 400
24" IPS *	33.60	24.00	20.70	10.35	TBD	200359	FM 267 / FM 400

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

* - shows the fitting has dual fusion coils

** Shows the fitting has a dual fusion coil and requires use of the I Fuse I-105 Processor for fusion

DIPS

SDR 11 (standard dimension ratio)

200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	L [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
14" DIPS	18.90	15.30	13.90	6.950	45.00	200325	FM 200 / FM 232
16" DIPS	21.30	17.40	16.60	8.300	60.00	200328	FM 200 / FM 232
18" DIPS *	25.00	19.50	17.90	8.950	107.0	200331	FM 200 / FM 232
20" DIPS *	27.40	21.60	19.50	9.750	133.0	200334	FM 200 / FM 232
24" DIPS *	31.90	25.80	20.30	10.15	177.0	200337	FM 200 / FM 232
30" DIPS **	39.60	32.00	20.70	10.35	274.0	200356	Use 32" IPS Coupler
36" DIPS **	47.40	38.30	22.80	11.40		Special Order	-----
42" DIPS **	54.00	44.50	25.20	12.60		Special Order	-----
48" DIPS **		50.80				Special Order	-----

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

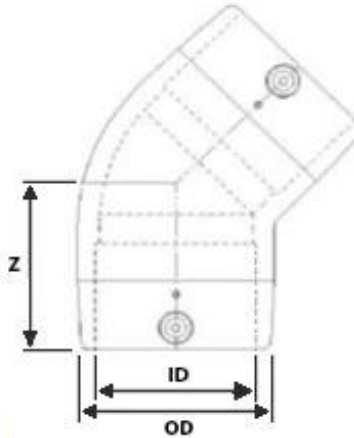
* Shows the fitting has dual fusion coils

** Shows the fitting has a dual fusion coil and requires use of the I Fuse I-105 Processor for fusion

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. *Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"*

Integrity Fusion Products strongly requires that all individuals installing electrofusion fittings in permanent field applications should be done only by individuals who have a strong working knowledge of polyethylene and heat fusion methods, that have been properly trained, qualified, and hold a current training certificate issued from a recognized electrofusion fitting manufacturers authorized instructor, and that have demonstrated their understanding of these requirements by correctly preparing electrofusion test assemblies that have been qualified by recognized ASTM destructive testing. Other stipulations and regulations may apply, depending on fitting size, application, local codes, and/or jurisdictional oversight of other state and local regulating agencies.

45° Elbow



Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	45° Elbow
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	2" – 8"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	11
Manufactured and tested to meet requirements of: ASTM F1055, 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 Electrofusion Fitting Specification Sheet.

IPS

SDR 11 (standard dimension ratio)

200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

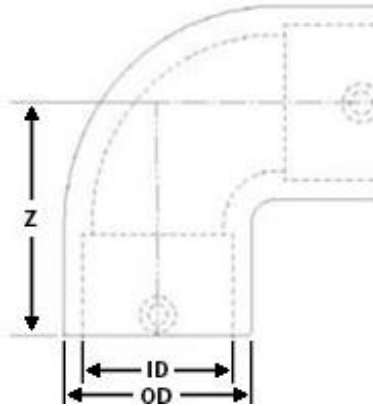
Nominal Size	OD [in.]	ID [in.]	Z [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
2" IPS	2.375	2.7	2.7	-----	0.90	200054	-----
3" IPS	3.500	3.7	3.7	-----	2.10	200055	-----
4" IPS	3.500	4.7	4.7	-----	5.70	200056	-----
6" IPS	4.500	6.3	6.3	-----	8.50	200057	-----
8" IPS	8.625	8.0	6.0	-----	18.5	200058	-----

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

Integrity Fusion Products strongly requires that all individuals installing electrofusion fittings in permanent field applications should be done only by individuals who have a strong working knowledge of polyethylene and heat fusion methods, that have been properly trained, qualified, and hold a current training certificate issued from a recognized electrofusion fitting manufacturers authorized instructor, and that have demonstrated their understanding of these requirements by correctly preparing electrofusion test assemblies that have been qualified by recognized ASTM destructive testing. Other stipulations and regulations may apply, depending on fitting size, application, local codes, and/or jurisdictional oversight of other state and local regulating agencies.

90° Elbow



Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	90° Elbow
Resin Status:	NSF Listed Bi-Modal Virgin Resin – no regrind	Nominal Pipe Sizes:	4" – 8"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	4455574-CC3	Available SDR Range:	11
Manufactured and tested to meet requirements of: ASTM F1055, 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)

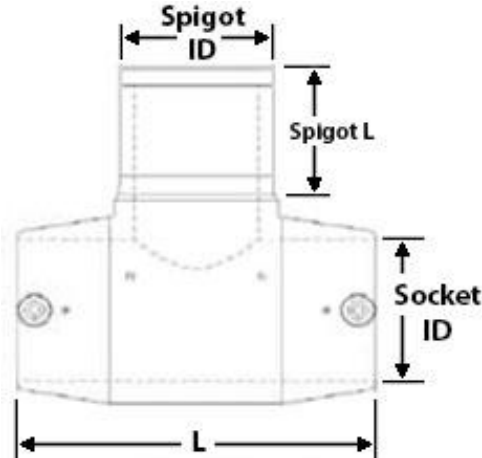
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	OD [in.]	ID [in.]	Z [in.]	Stab Depth [in.]	Weight [lbs.]	Item Code	FM Class
4" IPS	4.500	5.90	5.90	----	6.60	200156	----
6" IPS	6.625	8.40	8.40	----	9.20	200157	----
8" IPS	8.625	10.0	10.0	----	21.8	200158	----

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

Integrity Fusion Products strongly requires that all individuals installing electrofusion fittings in permanent field applications should be done only by individuals who have a strong working knowledge of polyethylene and heat fusion methods, that have been properly trained, qualified, and hold a current training certificate issued from a recognized electrofusion fitting manufacturers authorized instructor, and that have demonstrated their understanding of these requirements by correctly preparing electrofusion test assemblies that have been qualified by recognized ASTM destructive testing. Other stipulations and regulations may apply, depending on fitting size, application, local codes, and/or jurisdictional oversight of other state and local regulating agencies.



Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Equal Tee
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	3/4" – 8"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	11
		Nominal Spigot Sizes:	3/4" – 8"
Manufactured and tested to meet requirements of:		ASTM F1055, 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 [Electrofusion Fitting Specification Sheet](#).

IPS

SDR 11 (standard dimension ratio)

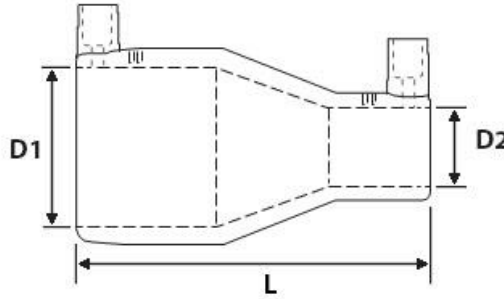
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	Socket ID [in.]	L [in.]	Spigot OD [in.]	Spigot L [in.]	Weight [lbs.]	Item Code	FM Class
3/4" IPS	1.050	4.30	1.050	1.5	0.30	200600	-----
1 1/4" IPS	1.660	5.50	1.660	1.9	0.40	200603	-----
1 1/2" IPS	1.900	6.40	1.900	1.9	0.70	200604	-----
2" IPS	2.375	6.90	2.375	2.7	1.30	200654	-----
3" IPS	3.500	8.20	3.500	3.2	3.30	200655	-----
4" IPS	4.500	10.4	4.500	3.5	5.90	200656	-----
6" IPS	6.625	13.2	6.625	4.0	17.9	200657	-----
8" IPS	8.625	15.5	8.625	4.4	43.9	200658	-----

NOTE: Stab Depths are based on current fitting design and lengths and may be subject to change

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

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Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Reducing Coupler
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Pipe Sizes:	1" – 4"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	11
Manufactured and tested to meet requirements of: ASTM F1055, 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 Electrofusion Fitting Specification Sheet.

IPS

SDR 11 (standard dimension ratio)

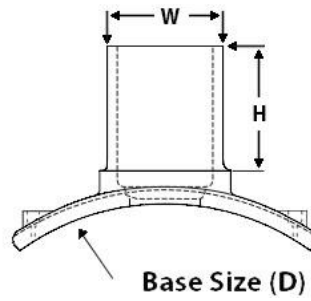
200 PSI Water – 100 PSI Gas (MAOP @ 73.4° F)

Nominal Size	D1 [in.]	L [in.]	D2 [in.]	Weight [lbs.]	Item Code	FM Class
1" IPS x ¾" IPS	1.315	3.50	1.050	0.10	200500	-----
1 ¼" IPS x 1" IPS	1.660	4.60	1.315	0.20	200551	-----
1 ½" IPS x 1" IPS	1.900	5.20	1.315	0.30	200501	-----
2" IPS x ¾" IPS	2.375	5.60	1.050	0.50	200553	-----
2" IPS x 1" IPS	2.375	5.70	1.315	0.50	200554	-----
2" IPS x 1 ¼" IPS	2.375	5.60	1.660	0.50	200555	-----
2" IPS x 1 ½" IPS	2.375	5.00	1.900	0.60	200556	-----
3" IPS x 2" IPS	3.500	6.40	2.375	0.80	200557	-----
4" IPS x 2" IPS	4.500	8.80	2.375	1.60	200558	-----
4" IPS x 3" IPS	4.500	7.70	3.500	1.80	200559	-----

NOTE: Stub Depths are based on current fitting design and lengths and may be subject to change

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

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Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Branch Saddle
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Base Sizes:	2" – 32"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's	11
		Nominal Outlet Sizes:	2" – 12"
Manufactured and tested to meet requirements of: ASTM F1055, 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			

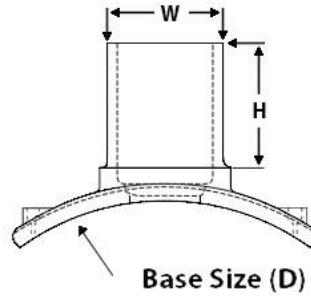
For Material and Testing information, please refer to our Electrofusion Fitting Specification Sheet.

IPS & DIPS Fixed Base Saddles

SDR 11- Pipe Diameter Specific

200 PSI (MAOP @ 73.4° F)

Outlet Size (W) [in.]	Dedicated Base Size (D) [in.]	H [in.]	Weight [lbs.]	Item Code	Straps Incl.	FM Class
2" IPS	2" IPS	3.50		200285	1	----
	3" IPS	3.50		200279	1	----
	4" IPS	3.50		200276	1	----
	4" DIPS	3.50		200275	1	----
4" IPS	6" IPS	4.30		200277	2	FM 220
	10" IPS	4.30		200220	2	FM 220
6" IPS	10" IPS	4.30		200278	2	FM 220
	12" IPS	4.30		200224	2	FM 220
6" DIPS	12" DIPS	7.90		200231	2	FM 220
8" IPS	12" IPS	7.90		200225	2	FM 220
	16" IPS	7.90		TBD	2	----
	18" IPS	7.90		TBD	2	----
	22" IPS	7.90		200211	2	FM 220
	24" IPS	7.90		200282	2	FM 220
	26" IPS	7.90		200213	2	FM 220
	30" IPS	7.90		TBD	2	----
	36" IPS	7.90		TBD	2	----
10" IPS	16" IPS	7.90		TBD	2	----
	18" IPS	7.90		TBD	2	----
	20" IPS	7.90		TBD	2	----
	24" IPS	7.90		TBD	2	----
12" IPS	32" IPS	7.90		200215	2	FM 220



IPS & DIPS Multi- Base Saddles

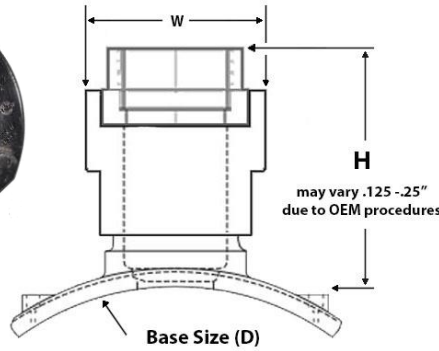
SDR 11- Flexible Saddle Bases Will Fit Multiple Pipe Diameters Pipe Diameter

200 PSI (MAOP @ 73.4° F)

Outlet Size (W) [in.]	Multi-Base Size Range (D) [in.]	H [in.]	Weight [lbs.]	Item Code	Straps Incl.	FM Class
2" IPS	6" IPS – 6" DIPS	3.50		200274	1	----
	8" IPS/DIPS – 10" DIPS	3.50		200200	1	----
	12" IPS/DIPS – 18" IPS	3.50		200203	1	----
	20" IPS/ DIPS – 22" IPS	3.50		200241	1	----
	20" IPS/DIPS – 36" IPS	3.50		200254	2	FM 220
3" IPS	6" IPS – 6" DIPS	3.50		200281	2	FM 220
	8" IPS/DIPS – 10" DIPS	3.50		200217	2	FM 220
	12" IPS/DIPS – 18" IPS	3.50		200223	2	FM 220
	20" IPS/ DIPS – 22" IPS	3.50		200210	2	FM 220
	20" IPS/DIPS – 36" IPS	3.50		200255	2	FM 220
4" IPS	8" IPS – 8" DIPS	4.30		200218	2	FM 220
	12" IPS/DIPS – 16" DIPS	4.30		200206	2	FM 220
	18" IPS/DIPS – 20" DIPS	4.30		200234	2	FM 220
	22" IPS/ DIPS – 26" IPS	4.30		200212	2	FM 220
	28" IPS/ DIPS – 32" IPS	4.30		200272	2	FM 220
	34" IPS – 42" IPS	4.30		200216	2	FM 220
6" IPS	18" IPS/DIPS – 20" DIPS	4.30		200235	2	FM 220
	22" IPS/ DIPS – 26" IPS	4.30		200214	2	FM 220
	28" IPS/ DIPS – 32" IPS	4.30		200273	2	FM 220

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

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Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Transition Saddle
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Nominal Base Sizes:	2" – 36"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	4455574-CC3	Currently Available SDR's:	11
Outlet Material	ANSI/ NSF-372 No-Lead Brass or 316 Stainless Steel	Threaded Outlet:	Over Molderd/ Factory Fused
Thread Patterns	ANSI/AWWA C800 Standard CC or ANSI B1.20 NPT NSF/ANSI-372	Threaded Outlet Sizes:	3/4" – 2"

Manufactured and tested to meet requirements of: ASTM F1055, 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

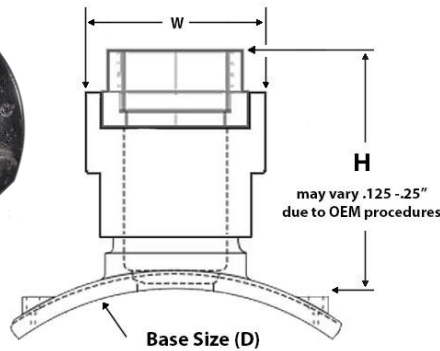
For Material and Testing information, please refer to our Electrofusion Fitting Specification Sheet.

IPS & DIPS Fixed Base Saddles

SDR 11- Pipe Diameter Specific

200 PSI (MAOP @ 73.4° F)

Base Size (D) [in.]	Outlet t Size	Outlet Type	Thread Pattern	H [in.]	W [in.]	Weight [lbs.]	Item Code	Straps Incl.
2" IPS (fixed base)	3/4"	Brass	CC	3.06	2.53		200850	1
	1"	Brass	CC	3.06	2.53		200851	1
	1"	Brass	NPT	3.06	2.53		200852	1
	2"	Brass	NPT	4.37	3.67		200854	1
	1"	316 Stainless	NPT	4.37	2.53		200853	1
	2"	316 Stainless	NPT	4.37	3.67		200855	1
3" IPS (fixed base)	3/4"	Brass	CC		2.53		200841	1
	1"	Brass	CC		2.53		200805	1
	1"	Brass	NPT		2.53		200803	1
	2"	Brass	NPT		3.67		200801	1
	1"	316 Stainless	NPT		2.53		200804	1
	2"	316 Stainless	NPT		3.67		200802	1
4" IPS (fixed base)	3/4"	Brass	CC		2.53		200842	1
	1"	Brass	CC		2.53		200810	1
	1"	Brass	NPT		2.53		200808	1
	2"	Brass	NPT		3.67		200806	1
	1"	316 Stainless	NPT		2.53		200809	1
	2"	316 Stainless	NPT		3.67		200807	1
4" DIPS (fixed base)	3/4"	Brass	CC		2.53		200843	1
	1"	Brass	CC		2.53		200815	1
	1"	Brass	NPT		2.53		200813	1
	2"	Brass	NPT		3.67		200811	1
	1"	316 Stainless	NPT		2.53		200814	1
	2"	316 Stainless	NPT		3.67		200812	1



IPS & DIPS Multi-Base Saddles

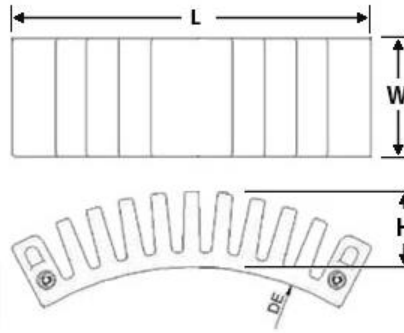
SDR 11 Flexible Saddle Bases Will Fit Multiple Pipe Diameters

200 PSI (MAOP @ 73.4° F)

Base Size (D) [in.]	Outlet Size	Outlet Type	Thread Pattern	H [in.]	W [in.]	Weight [lbs.]	Item Code	# of Straps Incl.
6" IPS / DIPS (multi - base)	3/4"	Brass	CC		2.53		200844	1
	1"	Brass	CC		2.53		200820	1
	1"	Brass	NPT		2.53		200818	1
	2"	Brass	NPT		3.67		200816	1
	1"	316 Stainless	NPT		2.53		200819	1
	2"	316 Stainless	NPT		3.67		200817	1
8" IPS/DIPS – 10" IPS/DIPS (multi - base)	3/4"	Brass	CC		2.53		200845	1
	1"	Brass	CC		2.53		200825	1
	1"	Brass	NPT		2.53		200823	1
	2"	Brass	CC		3.67		200822	1
	1"	316 Stainless	NPT		2.53		200824	1
	2"	316 Stainless	NPT		3.67		200821	1
12" IPS/DIPS – 18" IPS (multi - base)	3/4"	Brass	CC		2.53		200846	1
	1"	Brass	CC		2.53		200830	1
	1"	Brass	NPT		2.53		200828	1
	2"	Brass	NPT		3.67		200826	1
	1"	316 Stainless	NPT		2.53		200829	1
	2"	316 Stainless	NPT		3.67		200827	1
20" IPS/DIPS – 36" IPS (fixed base)	3/4"	Brass	CC		2.53		200848	2
	1"	Brass	CC		2.53		200840	2
	1"	Brass	NPT		2.53		200838	2
	2"	Brass	NPT		3.67		200836	2
	1"	316 Stainless	NPT		2.53		200839	2
	2"	316 Stainless	NPT		3.67		2005837	2

Fusion times for Electrofusion fittings are specifically determined to generate the proper "melt pool" needed to effectively join pipe and fittings based on specific SDR range of the fitting. The standard "rule of thumb" of +/- 1 SDR still applies to electrofusion fittings. SDR 11 Couplers can be fused on SDR 17 or SDR 9 pipe using the same fusion time. For applications with wall thicknesses that exceed +/- 1 SDR, the installer must contact Integrity Fusion Products for barcodes with modified fusion times, if available. **Important Note: "systems installing components containing differing SDR's must be de-rated to the pressure rating of the component possessing the lowest pressure rating"**

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Product Family:	Injection Molded Electrofusion Fitting	Fitting Design:	Flex Restraint
Resin Status:	NSF Listed Bi-Modal Virgin Resin	Fits Nominal Base Sizes:	6" – 63"
Resin Type:	ASTM D3350 designated PE3408/PE4710/PE100	Fits Nominal Pipe Standard:	IPS and DIPS
Resin Cell Class:	4455574-CC3	For Use on SDR Range:	7, 9, 11, 21
Manufactured and tested to meet requirements of: ASTM F1055, 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 Electrofusion Fitting Specification Sheet.

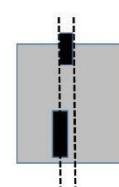
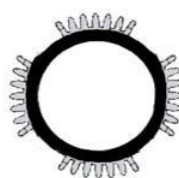
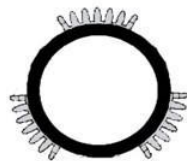
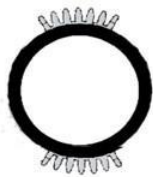
Instead of simply using the outside edges of the Flex Restraint to serve as the fittings cold zone; the design of the **IntegriFuse Electrofusion Flex Restraint** incorporates an innovative fusion coil pattern that includes built in cold zones that results in more consistent melt pools and interfacial pressures being generated in the fusion zone. This unique fusion coil design results in higher axial resistance performance than others in the marketplace.

A Surface Mounted Fitting that Fits on IPS & DIPS Pipe

Nominal Size	L [in.]	W [in.]	H [in.]	Weight [lbs.]	Item Code	Axial Load Restraint Capacity (based on a safety factor of 2)
6" IPS/DIPS – 63" IPS/DIPS	7.50	2.45	1.56	0.42	200400	9,500 LBS

Important Note:

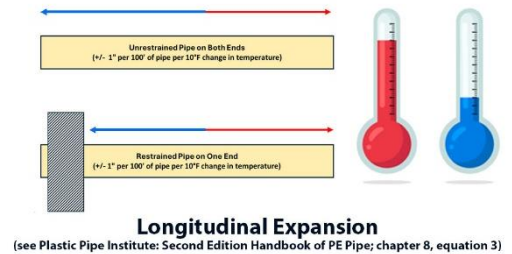
- A design engineer must calculate the amount of thrust force that will result from expansion & contraction to decide the proper quantity of Flex Restraints needed for each application.
- Flex Restraints must be placed equally spaced and equally sectored on the surface of the pipe.
- Flex Restraints must be equally aligned around the circumference of the pipe.



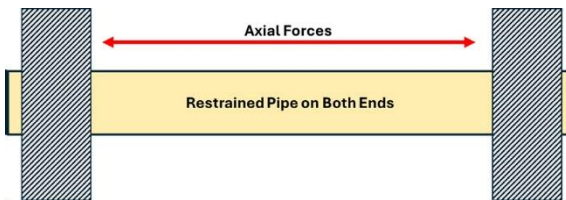
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High-density polyethylene (HDPE) pipe and fittings are well-known to be thermally stable and possess excellent mechanical properties and chemical resistance; that is why as a construction material, HDPE has become increasingly popular in a growing number of applications. However, there is one HDPE material characteristic that often causes confusion and frustration, particularly when used in above ground and submersible applications.

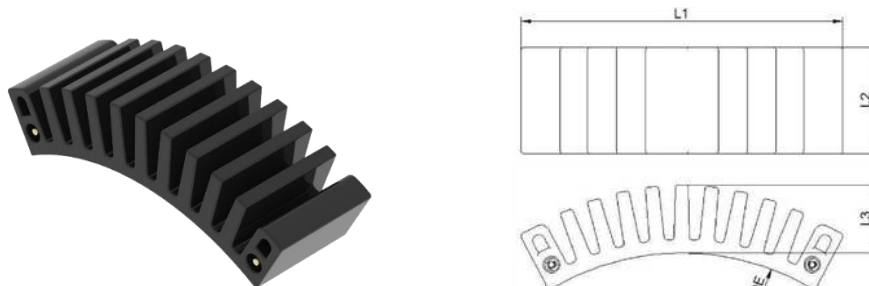
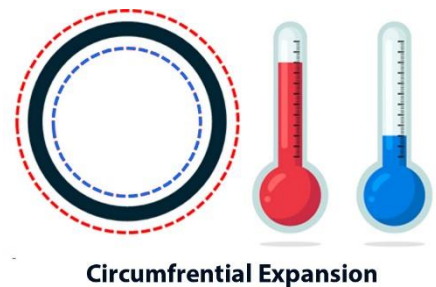
Eventhough HDPE is thermally stable, it is also known to have a high **thermal coefficient of expansion/contraction**, which basically means in simple terms, that an HDPE system will will expand or contract when it experineces changes in temperature. Sure, all pipes expand and contract when they experience fluctuations in temperature, but for HDPE, sudden changes in temperature in **unrestrained**, above and below grade applications will result (as a rule of thumb), in an expansion or contraction of an HDPE pipe **+/- 1" per 100' of pipe per 10°F change in temperature**.



This can result in a significant movement of pipe in unrestrained systems, and conversely, significant amounts of axial force can be generated in semi-restrained pipe systems that can result in unwanted complications and failures; both senarios must somehow be controlled and managed. So being aware of HDPE’s thermal expansion coefficient, and knowing that it can be managed and controlled by the use of Electrofusion Flex Restraints is crucial, and systems should always be designed to account for this potential if fluctuating temperatures are anticipated. The key however, is in how this thermal strain is managed when designing an HDPE piping systems to maximize its overall performance and longevity.



However, what must also be kept in mind, is that the effects of **thermal expansion/contraction** do not just affect HDPE pipe **longitudinally**. They also affect an HDPE pipe **circumfrentially** as well; so both aspects of this expansion and contraction must be taken into consideration when designing a HDPE piping system – particulaly in above ground and submersible applications. In most below ground systems, HDPE pipe does not move after it has been buried, allowed to relax, and acclimated to its surrounding ambient ground temperature. The HDPE system then becomes much more stable than an above ground pipeline due to the soil friction and earth load on the pipe surface and attached appurtenances.



A Surface Mounted Fitting that Fits on IPS & DIPS Pipe

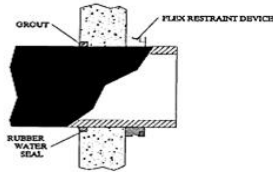
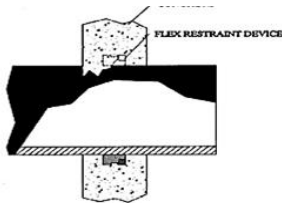
Nominal Size	L [in.]	W [in.]	H [in.]	Weight [lbs.]	Item Code	Axial Load Restraint Capacity (based on a safety factor of 2)
6" IPS/DIPS – 63" IPS/DIPS	7.50	2.45	1.56	0.42	200400	9,500 LBS

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

The **IntegriFuse EF Flex Restraints** are designed to be fused directly onto the OD of HDPE pipe. This a unique electrofusion fitting is specifically designed to be a simple, permanent, and robust electrofusion restraint alternative from traditional thrust collars, water stops, and wall anchors.

IntegriFuse EF Flex Restraints are used in an increasing variety of applications including, but not limited to:

- Wall anchors
- Thrust anchors
- Restricting the movement of submersible concrete anchors
- Temporary under bridge by-pass lines,
- Securing mechsanical connections when connecting HDPE pipe to non-HDPE bell and gasket fittings
- Manhole rehabilitation restraints
- Restricting pull-back forces after slip-lining HDPE
- Anchor points for vertical HDPE applications
- Securing a pipe repair using a mechanical coupling.



The **IntegriFuse Electrofusion Flex Restraint** design incorporates an innovative “next generation” fusion coil pattern that creates a robust fusion joint on the surface OD of HDPE pipes for the purpose of resisting and controlling axial forces created by temperature induced expansion and contraction.

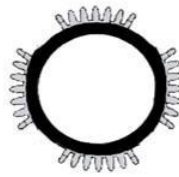
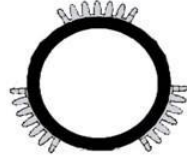
Instead of using the outside edges of the Flex Restraint to serve as the flex restraint cold zone; this second generation design of the IntegriFuse Electrofusion Flex Restraint incorporates an innovative fusion coil pattern that includes built in cold zones that increases our second generation flex restraint performance to 9,500 ft. lbs of axial resistance. A significant increase over the first generations 7,500 ft. lb. design.



Important Note:

- **A design engineer must calculate the amount of thrust force that will result from expansion & contraction to decide the proper quantity of Flex Restraints needed for each application.**
- **Flex Restraints must be equally spaced and equally sectored on the surface of the pipe.**
- **Flex Restraints require a straight-line orientation around the circumference of the pipe.**

(A minimum of 2 Flex Restraints must always be used to equally distribute the forces being resisted. The maximum # of restraints shown in this chart is how many Flex Restraints can be placed on the pipe surface, end-to-end, around its circumference. If the expected axial forces require more Flex Restraints to be used than can be placed in a single line, place another line of equidistantly spaced Flex Restraints with approx. 9 in. between lines.)



Correct Example



Incorrect Example

The data provided in the following table is for use only as a guideline for the designer. The maximum number of restraints per pipe OD in this chart only reflects the total number of Flex Restraints that can be placed in a straight line around the circumference of a specified pipe OD. The designer must calculate and figure out all expansion/contraction forces in their specific application and for calculating the right number of flex restraints to be used for restraining those forces. The designer should consider all other affecting factors.

Pipe OD	Max. # of Restraints**	Pipe OD	Max. # of Restraints**	Pipe OD	Max. # of Restraints**	Pipe OD	Max. # of Restraints**
6"	3	18"	9	30"	15	42"	21
8"	4	20"	10	32"	16	48"	-----
10"	5	22"	11	34"	17	54"	-----
12"	6	24"	12	36"	18	63"	-----
14"	7	26"	13	38"	19		
16"	8	28"	14	40"	20		

****Refers to the maximum number of restraints per pipe OD in this chart only reflects the total number of Flex Restraints that can be placed in a straight line around the circumference of a specified pipe OD.**

Integrity Fusion Products strongly requires that all individuals installing electrofusion fittings in permanent field applications should be done only by individuals who have a strong working knowledge of polyethylene and heat fusion methods, that have been properly trained, qualified, and hold a current training certificate issued from a recognized electrofusion fitting manufacturers authorized instructor, and that have demonstrated their understanding of these requirements by correctly preparing electrofusion test assemblies that have been qualified by recognized ASTM destructive testing. Other stipulations and regulations may apply, depending on fitting size, application, local codes, and/or jurisdictional oversight of other state and local regulating agencies.

Installation Procedure:

Step 1 - Find the desired location for the Flex Restraints. Keep Flex Restraints in their original packaging until ready to place and secure.

Step 2 - Remove all sources of contamination from the surface of the pipe using clean water & dry with clean cloth.

Step 3 – Using an approved marking pen, clearly mark the location where each flex restraint is to be installed. Also highlight the complete fusion area with the pen, as this will provide a visual guide while scraping.

Step 4 – Scrape the area where the Flex Restraint is to be placed making sure to remove the thin layer of oxidation from the pipe surface (**.007" minimum**) using an approved scraper/peeler tool. Scrape/peel the marked area until the required amount of material is removed, and all the pen marks are no longer visible. **(Rasps, grinders & wire brushes/wheels are NOT allowed)**

Step 5 – Clean the scraped area using a 90% or greater solution of Isopropyl Alcohol and a clean lint free rag making sure that the surface area of the pipe where the Flex Restraints are to be applied are free of contaminates. Remove the Flex Restraint from its packaging and clean the fitting base of the Flex Restraint to remove any accidental contamination of these areas. **(NO other cleaning agent is allowed). Do not touch pipe surface or fitting base after cleaning.**

Step 6 – Place the Flex Restraint at once on the prepared surface where it is to be fused and secure it in place with a 2" ratchet strap. 2" Ratchet straps are the required application tool due to the ease of use and more reliable distribution of clamping pressures.

Step 7 – While holding the Flex Restraint in place, tighten the 2" ratchet strap until the Flex Restraints are conformed to the pipe wall. When installing just one Flex Restraint, make sure the ratchet buckle is 180 degrees/opposite the flex restraint before tightening. It is critical to ensure that the base of the Flex Restraint contacts the pipe over the entire fusion area, and no gap can be seen between fitting and the pipe. If more than one Flex Restraint is to be fused, make sure that all fittings are in place before completely securing the ratchet straps, ensuring the ratchet buckle is equidistant between two of the Flex Restraints before tightening.

Step 8 – Start generator, connect the processor leads to the Flex Restraint and enter the fusion data by scanning the bar-code or entering the fusion data in manual mode. Due to the location and/or the number of flex restraints being used; It may be necessary to scan a separate fitting to input the fusion data.

Step 9 – After the fusion cycle has completed, leave the Flex Restraint strapped in place until ALL the fittings have cooled.

***** Note: This abbreviated version of our Electrofusion Instructions is for reference and a reminder. For more complete details concerning job site and installation requirements please refer to our Electrofusion Training and Installation Manual.**





Properly prepared, assembled, and fused Flex Restraints were installed on a pipe sample and tested by applying 3,700 psi to the Flex Restraint joints (the equivalent of 19,700 ft. lbs.) and held for 30 minutes. The test assembly passed and was cut in half to visually inspect the fusion zone for signs of stress and possible failure. None was found.



Properly prepared, assembled, and fused Flex Restraints were installed on a pipe sample and tensile tested to failure. The pipe wall began ripping out at just under 24,000 lbs. ft. lbs...

Available PPI Flex Restraint Calculators

<https://www.plasticpipecalculator.com/ThermalExpansion.aspx>

<https://hdpeapp.com/#/installation/below/anch>

Integrity Fusion Products, Inc. warrants its materials to be free of defects in workmanship under normal use and service, when used for purposes under the conditions for which they are intended for a period of one (1) year.

This warranty shall not apply to any Integrity Fusion Products, Inc. material that has been altered, repaired and/or used in any way, stored outside, or has been subject to misuse, negligence, accident and/or has not been installed in accordance with installation instructions.

This warranty does not cover labor or other costs of installing or repairing the products. Buyer's sole remedy for defective product shall be to receive replacement product as provided in this Limited Warranty. Seller's liability arising out of or related to the product supplied by Integrity Fusion Products shall in no event exceed the original price of the defective product. Seller will not be liable for any consequential, incidental, special, indirect or punitive damages, loss of profits, loss of business opportunity or other loss even if seller knew or should have known of the possibility of such damages or losses. Buyer shall assume all responsibility and expenses for removal, reinstallation and freight charges in connection with the foregoing remedy.

Integrity Fusion Products, Inc. shall not be held liable for any delays caused by shipping any material or equipment by third party shipping companies. Integrity Fusion Products, Inc. shall not be responsible for any delays caused by shipping errors of material and/or equipment.

Any claim regarding shortage or damages from shipment of material must be submitted in writing to Integrity Fusion Products, Inc within 7 days after receipt of shipment. Buyer shall note loss or damage on shipment Bill of Lading and provide a delivery receipt stating such with driver's signature. Loss or damages to materials in transit is the responsibility of the carrier

The buyer must comply with the standard warranty investigation procedures for Integrity Fusion Products which includes providing sample of the product in question and completing Integrity Fusion Products Investigation Report Form. Failure to provide needed and required information and samples for investigation purposes will result in the limited warranty being null and void.

General Electrofusion Requirements

Installation of electrofusion fittings requiring 42V-48V must be carried out using an IntegriFuse or I Fuse 105 Electrofusion processor. For IntegriFuse Electrofusion fittings requiring an amperage of over 80 amps, the IntegriFuse I Fuse 105 Electrofusion Processor is required.

The I Fuse 105 Electrofusion processor is an 8-48-volt output multi-voltage fusion processor with temperature compensating feature operating at 220/230 VAC requiring power supplied through a portable power generator rated at the necessary continuous watts.

If pipe is out of round the use of a Re-Round Clamp is required to ensure proper installation.

Improper scraping, cleaning, and alignment of pipe during the installation procedures results in limited warranty being null and void.

Electrofusion Installation instructions must be adhered to or our Limited Warranty is null and void. Installation of electrofusion fittings must be carried out by properly trained and qualified operator(s). Large diameter fittings require certification by Integrity Fusion Products, Inc.

Integrifuse Valve

The Limited Warranty shall apply only to operations which falls under the guidelines of conditions in which the valve was designed for and for applications of normal use. The limited liability will be null and void in the case that the valve failure was caused by excessive operating or surge pressure, introduction of any chemicals or acids that cause degradation to the seats or stem, excessive water hammer, introduction of abrasives such as sand and or grit, butt fusion of HDPE pipe material with SDR differences greater than 2 (SDR 11 to SDR 17 is not permitted), hot soil conditions, excessive temperature.

Integrifuse Butt Fusion Fittings

The Limited Warranty shall apply only to operations which fall under the guidelines of conditions in which the butt fusion fitting was designed for and for applications of normal use. The limited liability will be null and void in the case that the fitting failure was caused by excessive operating or surge pressure, excessive water hammer, introduction of abrasives such as sand and or grit that have cause abrasion of the fitting, butt fusion of HDPE pipe material with SDR differences greater than 2 (SDR 11 to SDR 17 is not permitted). This warranty does not cover failure resulting from improper fusion by the installer.

Purchaser is responsible for passing on this Limited Warranty to their customer.

Re: Warranty Questions Concerning IntegriFuse Electrofusion Products Installed by Certified Field Technicians Trained by Other Companies

There are three questions that must be addressed concerning the IntegriFuse Electrofusion Product Warranty. The first question regards the **product warranty itself**, the second question regards the **proper installation requirements** of IntegriFuse Electrofusion Products by **individuals not trained by Integrity Fusion Products** and how that may affect our warranty, the third question regards electrofusion **equipment compatibility**, and the fourth question regards the SDR range of the pipe the fitting is being fused on to.

(1) Product Warranty

The IntegriFuse Electrofusion Product Warranty covers the material and workmanship of the product only.

“Warrants its materials to be free of defects in workmanship under normal use and service, when used for the purposes under the conditions for which they are intended for a period of one (1) year excluding the golf and irrigation markets. This warranty shall not apply to any Integrity Fusion Products, Inc. material that has been altered, repaired and/or improperly used in any way, stored outside, or has been subject to misuse, negligence, accident and/or has not been installed in accordance with installation instructions.”

For the **“material and workmanship”** warranty to be valid after the product is installed, requires that the electrofusion product be installed correctly by field technicians properly trained, using approved tooling and procedures in accordance with a manufacturer's factory qualified electrofusion procedure that complies with procedures published by the Plastic Pipe Institute.

- **MAB Generic Electrofusion Procedure for Field Joining of 12 Inch and Small Polyethylene (PE) Pipe (MAB-01-2017, or**
- **MAB Generic Electrofusion Procedure for Field Joining of 14 Inch to 30 Inch Polyethylene (PE) Pipe (MAB-02-2017)**

(2) Electrofusion Training Requirements

For the installation of electrofusion fittings in applications smaller than 24" EF Couplers, Integrity Fusion Products **requires the following** for fusion technicians installing our electrofusion fittings.

Electrofusion Fusion Technicians must:

- have a strong working knowledge of polyethylene and heat fusion.
- have received training from Integrity Fusion Products **or another electrofusion fitting manufacturers authorized electrofusion instructor.**
- have a **valid and current training certificate** from that authorized electrofusion manufacturer or instructor.
- have proven their understanding of these requirements by making the required ASTM F1055 qualified electrofusion assemblies that have been successfully qualified by ASTM F1055 destructive testing methods.

Non-compliance, deviation, or modification to any of the “qualified” electrofusion fitting manufacturers, or PPI’s published electrofusion procedures automatically invalidates the electrofusion product warranty.

(3) Equipment Compatibility

IntegriFuse electrofusion fittings, **other than electrofusion couplers 24” and larger**, are capable of being fused with the IntegriFuse I60, IntegriFuse I105, or other electrofusion processors, with no problem. The installation of electrofusion IntegriFuse electrofusion couplers **24” and larger**, **requires the exclusive use of the IntegriFuse I105 processor.**

Date: November 6, 2024
Re: Buy America Act & TAA 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 the IntegriFuse brand of molded HDPE **Electrofusion Fittings** are all manufactured in **Italy**, and fully comply with the original **Buy America Act (BAA)**. Although the **Buy America Act (BAA)** requires the US government to favor US-made products when making purchases, the **Trade Authorization Act (TAA) of 1974 & 2004** expands to allow products from other countries the U.S. government has a trade agreement with. **Italy** is listed as one of the approved Countries of Origin as listed below.

In addition to domestic products and services, the **TAA** allows contractors to supply products and services from countries with which the US has signed multi-lateral or bi-lateral FTAs, or has otherwise determined to be **TAA-eligible** (Designated Countries). The **Designated Country List** includes the following GPA Countries.

Aruba, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, **Italy**, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan and the United Kingdom."

Conditions of Product approval may be superseded by the **Build America, Buy America Act (BABA)** of 2021.

Best Regards,



Greg Swindell
VP of Operations greg@integrityfusion.com
770-632-7530