

## Molded PE3408 / PE4710 / PE100 Electrofusion Fittings

**IntegriFuse Electrofusion Fittings** manufactured by Integrity Fusion Products, 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.

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

**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)

## 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.** (TABLE 2)

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 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

**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.