

# SUGGESTED SPECIFICATIONS

**Note To Consultants and Designers :** Use this document as a guide when writing specifications for Single Wall Petroplas piping with associated Frialen electro fusion fittings, and/or Double Wall Petroplas piping with associated Frialen electro fusion fittings, which meet or exceed the current Std EPA and UL required protocols.

Client \_\_\_\_\_

Project Name \_\_\_\_\_

Project Number \_\_\_\_\_

## **UL 971 Compliant Marley Petroplas Fluorinated fuel transfer pipe and Frialen Electro Fusion fittings for Underground tanks**

I. **General :** These specifications are provided to prospective bidders and engineering consultants as a guide to understanding the requirements relative to furnishing and installing a buried Marley Petroplas semi-rigid piping for underground liquid storage tanks (UST's), associated with tank and dispenser sumps forming containment areas. The piping, fittings and under dispenser riser pipes are secondarily contained and will have no metallic parts exposed to the environment, in which all joints are contained within the containment chambers. This document will address and describe the capabilities and installation standards of the Marley Petroplas fluorinated pipe system as set forth and in accordance to the requirements USEPA Federal standards for (UST's) as described in 40 CFR parts 280 & 281 and of UL971.

II. **Relevant Documents :** The Marley Petroplas piping system shall meet all of the applicable performance specifications and regulatory agency requirements set forth by the following organizations :

Underwriters Laboratories (UL)  
Institute of Petroleum (IP)  
Shell International Procurement Certification (SIPC)  
South African Bureau of Standards (SABS)  
National Fire Protection Agency (NFPA)  
Environmental Protection Agency (EPA)  
TÜV Rheinland GS Mark (TÜV)  
International Standards Organization (ISO)  
Plastic Pipe Institute (PPI)  
Florida Department of Environmental Quality (DEQ)  
Michigan Department of Environmental Quality (MEQ)  
New York City Fire Department (NYCFD)

III. **Piping and Fittings :**

- a. The primary delivery piping shall be of a double wall construction, with the primary pipe loosely fitting into the secondary pipe. Stand off

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legs on the inside of the secondary pipe will allow rapid communications of leaks to a containment chamber. Both the primary and secondary pipes shall be fluorinated on the inside and outside of the pipe offering the maximum fuel resistance. This fluorination layer will be integrated into the matrix of the pipe thus preventing any possibility of delaminating. Bonded pipe shall not be permitted. All piping shall be resistant to all fuels, namely, Motor Vehicle fuels (MV), High Blend Fuels (HB), Concentrated Fuels (CT) (including E85), Aviation and Marine Fuels (A&M), and Biodiesels. The semi-rigid piping and fittings shall be compatible with the chemicals naturally found in the ground and also against corrosive contaminants. The pipe will be resistant to attack by bacteria. Piping shall have the option of being installed with a flexible, corrugated, double wall fluorinated conduit to ease and permit the removability and replacement of the piping without the need for excavation. Piping shall be supplied in coils or sticks to allow continuous piping runs between tank and dispenser sumps and dispenser sump to dispenser sump. All joints to be made in a sump or transition sump. The pipe used will carry the UL971 listing marks from Underwriters Laboratories. The piping will have a 30 year manufacturing warranty. Piping will have a bend radius of 25 times the OD of the pipe, with an operating temperature range of -40°F (-40°C) and +140°F (+60°C). The primary pipe shall be capable of being pressure tested to 150psi, while the secondary pipe shall be capable of being **tested to 50psi using electro fusion test boots, or 5psi using the flexible rubber test boots**. The primary and secondary piping shall also be rated for vacuums of up to -14.5psi. Maximum flow rates per pipe size are listed below:

Pipe size	Diesel flow rate	Gasoline flow rate	Working pressure
3/4"	20 gallons/minute	20 gallons/minute	150psi
1"	31 gallons/minute	31 gallons/minute	150psi
1 1/4"	49 gallons/minute	49 gallons/minute	150psi
1 1/2"	77 gallons/minute	77 gallons/minute	150psi
2"	116 gallons/minute	116 gallons/minute	150psi
3"	296 gallons/minute	297 gallons/minute	110psi
4"	367 gallons/minute	369 gallons/minute	110psi

- b. Fittings will be electro fusion type, and of an HDPE material. The manufacturer of these fittings is Frialen. Fittings which include couplers, elbows, tees and HDPE to steel terminations will be electro fused to the pipe. Only fittings supplied by the manufacturer may be used and will all carry an Underwriters Laboratories listing to UL971. Fittings which are electro fused may only be fused using equipment specifically designed to do so and supplied by the manufacturer. The electro fusion machine must have a double check system with error and memory facility, a printing facility, while having the ability to sense ambient temperature in order auto correct the welding times. The

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memory, error reporting and printing facilities shall be used for all installations. All electro fusion fittings shall be individually bar coded as a method of being singularly identified by the electro fusion welder, and preventing the operator with tampering with temperatures and welding times. This bar code shall be entered either with a scanner or manually. The fittings shall also have a traceability barcode in order to trace the fitting manufacture to the raw materials.

- c. The underground piping and the associated electro fusion fittings and terminations, coming in contact with the ground environment shall be made of non-metallic material, or will have the ability to be encapsulated by non-metallic components which prevent corrosion.
- d. The underground piping and associated fittings shall be designed in such a way that the system will be strong enough for its intended use. The intended use is defined as follows: primary fuel delivery (pressure and suction), normal vent, stage II vapor recovery and secondary containment. The piping shall be able to withstand loading pressures associated with direct burial from backfilling of the pipe, without collapsing, cracking or breaking due to ground movement. The piping system shall further be able to withstand pressures associated with ground water.
- e. All primary and secondary piping shall be connected in such a way as to permit pressure integrity testing of both pipes, during installation and periodically when the piping is in service. The interstitial space between the primary and secondary pipes shall be connected using a connector tube, which permits connectivity of the entire secondary system of each product line from a single location on each line.
- f. The single or double wall piping shall be capable of a bending radius of 25 times the outside diameter of the pipe, with out any kinking, breaking or cracking. The bend radii are laid out in table below:

<b>Pipe size</b>	<b>Bend Radius</b>
0.75"	18"
1"	25"
1¼"	31"
1½"	37"
2"	50"
3"	75"
4"	100"

- g. Penetrations into sumps shall be made either with high Nitrile entry boots or with fluorinated LDPE electro fusion entry boots. All parts of the penetration boots in contact with the environment shall be manufactured of non-metallic components, while inside the sump any metallic screws shall be manufactured from brass. Test boots shall be used inside the sumps. Test boots shall also be manufactured of high

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Nitrile rubber and will have a Schroeder valve to allow testing of the interstitial space between the primary and secondary pipe. For maximum seal ability the entry boots shall be installed in a hole drilled out to the following dimensions:

Rubber Boot size	Hole saw dimensions
1½"/2" entry boot	2" 7/8 or (2.76")
2½", 3", 4"	4" 7/8 or (4.80")

Electro Fusion Boot size	Hole saw dimensions
2" entry boot	3½"
3"	5"



317 Vicki Towers Lane  
St Augustine Florida, 32092

Tel : (904) 940 8863  
Fax : (425) 955 8722

[www.innovativepetroleum.com](http://www.innovativepetroleum.com)