



Franklin Fueling Systems

Recommended Fuel Piping Specification

For UPP Piping, UL-971

1.0 General

The primary delivery piping system shall be for suction or pressure applications and have semi-rigid coaxial type double wall construction, with the primary pipe loosely fitting into the secondary pipe. This loose fit allows for detection and containment of any eventual leak from the primary pipe into the secondary pipe. All pipe and fittings are designed for direct burial and pipe runs can be joined without the use of transition sumps.

Direct buried fittings shall be true double wall construction with no bridging from the primary to the secondary pipe. Secondary fittings shall be pressure rated for a minimum of 50 psig. The piping system shall be compatible with chemicals naturally found in the ground and resistant to bacterial attack. Piping shall be supplied in flexible coils for longer pipe runs with no joints where feasible, or in sticks for conventional piping installations.

All pipe, fittings and penetration fittings are to be listed by Underwriters Laboratories UL971 and ULC/ORD-C971-2005 for Nonmetallic Underground Piping for Flammable Liquids and approved for use for Normal Vent, Vapor Recovery and Product Piping. All piping shall meet the UL971 standard for all four test fuels: MV, CT, HB, AM (see section 3.0 for description).

Where desired coaxial or single wall pipe may be installed within a 4" dual layer thermoplastic corrugated pipe chase to permit replacement of the pipe without the need of excavation. Pipe shall be available in 1.5" thru 4" diameter and provide bend radius, burst pressures, pressure ratings, vacuum ratings and operational temperatures as listed in Table A below.

Piping used for vapor recovery shall be CARB approved.

All fittings, penetration fittings and pipe couplers shall be an electrofusion type and made of HDPE material. Fittings, include couplers, elbows, tees, termination fittings with integral nickel plated brass threads, unions or flanges and penetration fittings. Only fittings supplied by the manufacturer may be used and shall carry the UL971 listing. All fittings and pipe which are electrofused may only be fused using the fusion welder supplied by the manufacturer. The electrofusion welder shall be a constant current welder and shall automatically recognize the type and size of fitting along with the ambient temperature when connected to apply the correct amount of energy to provide a successful weld. This automated welder alleviates any operator adjustments to provide a successful weld. Field bonded, swedged, glued or mechanical joined pipe and fittings shall not be allowed.

Penetration fittings when used in conjunction with HDPE tank, dispenser or transition sumps shall be the 300 electrofusion series as manufactured by UPP, made of HDPE and fusion welded only. Use of rubber style penetration fittings is not allowed. When tank, dispenser or transition sumps are made of fiberglass construction, penetration fittings shall be the FEB series as manufactured by UPP to provide a rubber-less entry fitting.

Secondary containment terminating reducers used for terminating the secondary piping to the primary piping inside of tank, transition or dispenser sumps shall be made of HDPE and fusion welded only. Terminating reducer shall include an integral test port for use in future testing of the secondary containment piping system. Test ports may have internal valves removed to provide draining of primary pipe leaks into low point accumulation sumps.

Table A.

| Size | Description | | Weight In Lbs/ft | Pressure Rating @ 75°F (Psig) | Ave Burst (psi) @ 75°F | Bend Rad @ 75°F | Operation Temp |
|------|---|-----------|------------------------|-------------------------------------|---------------------------------|-----------------------|-------------------|
| 1 ½" | 1 ½" Double Wall Pipe- 33ft Stick | Primary | 1.18 | 90 | 580 | 3'3" | -22° to 122°F |
| 1 ½" | 1 ½" Double Wall Pipe- 33ft Stick | Secondary | 1.18 | 58 | 300 | 3'3" | -22° to 122°F |
| 1 ½" | 1 ½" Double Wall Pipe-165ft Coil | Primary | 1.18 | 90 | 580 | 3'3" | -22° to 122°F |
| 1 ½" | 1 ½" Double Wall Pipe-165 ft Coil | Secondary | 1.18 | 58 | 300 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe-33ft Stick | Primary | 1.45 | 90 | 580 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe- 33ft Stick | Secondary | 1.45 | 58 | 300 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe-38ft Stick | Primary | 1.45 | 90 | 580 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe-38ft Stick | Secondary | 1.45 | 58 | 300 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe- 100 ft – 165 ft Coil | Primary | 1.45 | 90 | 580 | 3'3" | -22° to 122°F |
| 2" | 2" Double Wall Pipe-100 ft – 165 ft Coil | Secondary | 1.45 | 58 | 300 | 3'3" | -22° to 122°F |
| 3" | 3" Double Wall Pipe-19ft-38ft Stick | Primary | 2.90 | 90 | 580 | 13'2" | -22° to 122°F |
| 3" | 3" Double Wall Pipe-19ft-38ft Stick | Secondary | 2.90 | 58 | 300 | 13'2" | -22° to 122°F |
| 4" | 4" Double Wall Pipe-19ft Stick | Primary | 3.71 | 90 | 580 | 13'2" | -22° to 122°F |
| 4" | 4" Double Wall Pipe-19ft Stick | Secondary | 3.71 | 58 | 300 | 13'2" | -22° to 122°F |
| 2" | 2" Single Wall Vent/Vapor-19ft Stick | Primary | .70 | 90 | 580 | 3'3" | -22° to 122°F |
| 3" | 3" Single Wall Vent/Vapor-19ft Stick | Primary | 1.44 | 90 | 580 | 9'10" | -22° to 122°F |

2.0 References

- NFPA 30, “ Flammable and Combustible Liquids Code”
- NFPA 30A, “ Code for Motor Fuel Dispensing Facilities and Repair Garages”
- NFPA 37, “Stationary Combustion and Gas Turbines”
- Underwriters Laboratories – UL-971
- PEI/RPI-100 “Recommended Practices for Installation of Underground Liquid Storage Systems”
- PEI/RPI-200 “Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling”
- PEI/RPI-800 “Recommended Practices for Installation of Bulk Storage Systems”
- USEPA – 40 CFR Parts 280 & 281 Federal UST Standards
- PPI – Plastic Pipe Institute
- NYCFD – New York City Fire Department C of A Approval # 5143

3.0 Compatibility

The piping system and fittings shall be resistant to all of the following:

- A. Motor Vehicle Fuels (MV) - petroleum based hydrocarbon fuel typically found in consumer dispensing, boiler operations, and emergency generation systems using gasoline or diesel fuels including blended fuels with a maximum 15% MTBE or Methanol or 30% Ethanol.
- B. Concentrated Fuels (CT) - Alternate un-blended fuels for up to 100% concentrations of Toluene, Methanol and Ethanol.
- C. High Blend Fuels (HB) - Fuels with higher than normal gasoline blends with maximum 50% Methanol or Ethanol.
- D. Aviation and Marine Fuels (AM) - Specialty aviation and Marine use fuels for up to 100% kerosene or leaded gasoline

4.0 Underground Piping- Materials and construction

Primary & Secondary Pipe and Fittings

Material-All primary piping shall be a single-wall “UPP” brand, as manufactured by Franklin Fueling Systems. All primary piping shall have a pressure rating of 90 psig and a vacuum rating of 26.6 inches of Hg. All secondary containment piping shall be “UPP” brand, as manufactured by Franklin Fueling System. All secondary containment piping shall have a pressure rating of 58 psig and a vacuum rating of 15 inches of Hg.

The primary pipe shall consist of three integrated layers:

- Black outer structural layer of the pipe is a High Density Polyethylene (HDPE) grade, PE80 or PE100 which allows the use of electrofusion couplers and fittings to construct the pipeline system.
- The intermediate layer is a tie-layer (adhesive) which permanently bonds the polyethylene layer to the polyamide barrier layer.
- The yellow inner barrier layer of UPP Extra pipe is specially formulated “fuel proof” Polyamide which is resistant to absorption and permeation of all motor fuels as described in section 3.0.

4.1 Fittings

All primary couplings, sump entry fittings, and miscellaneous piping appurtenances shall be “UPP” brand for double-wall, as manufactured by Franklin Fueling Systems. The fittings shall be permanently attached to the primary pipe by electrofusion (or as otherwise specified by the manufacturer).

All secondary containment fittings, sump entry fittings and test boots shall be “UPP” brand as manufactured by Franklin Fueling Systems, and shall allow for 100% inspection of the primary joint pressure test before being fully air-testable itself.

5.0 Delivery, Storage and Handling:

Pipe and fittings shall be protected from damage due to impact and point loading. Pipe shall be properly supported to avoid damage due to flexural strain. The contractor shall not allow dirt, debris or other extraneous materials to get into the pipe and fittings.

6.0 Installation and Training:

The piping system shall be installed as specified on contract drawings or at the discretion of the installing contractor to provide a complete pipe conveyance system as required for the project. Pipe sizes shall be as shown on the contract drawings.

All pipe and fittings installed or constructed in the field shall be assembled and fusion-welded by employees of the contractor who have been trained and certified by the manufacturer. When required, the pipe manufacturer's authorized trainer shall train the contractor's employees in the proper assembly and fusion-welding procedures necessary for the project.

The piping system shall be installed in strict accordance with the manufacturers current installation published installation instructions. The installing contractor shall be responsible for all necessary specialty tools and consumables required for a complete testable piping installation.

7.0 Testing Underground Product Piping

7.1 General

Contractor shall notify, where required, any authorities having jurisdiction in advance of any piping tests. Prior to pressure testing, the piping must be isolated from any tanks, pumps, boilers or dispensers. An air pressure test must be performed on the primary and secondary piping to detect any leaks that may exist. Test pressure to be in accordance with UPP Product Installation Manual. All testing shall be in compliance with the pipe manufacturer's installation instructions.

7.2 Prior to Backfill

All new piping shall be tested before being covered, enclosed, or placed into service. Test pressure to be in accordance with UPP Product Installation Manual. On double-wall secondary piping systems, after the inner pipe test has been concluded, the contractor must pressure test the secondary containment piping at the air pressure required by the local inspector.

7.3 After Backfilling

After backfilling, all underground primary lines shall be tested with a precision testing system by a third party independent testing company.

7.4 Tightness Certificate

Upon completion of the test, the Contractor shall provide a “Certificate of Tightness” to the Owner prepared by the independent testing company.

8.0 Tank, Transition and Dispenser Sumps

All Tank Sumps, Transition Sumps and or Dispenser Sumps shall be made of HDPE and manufactured or otherwise as recommended by Franklin Fueling Systems.

9.0 Acceptable Manufacturer and Products:

All pipe, fittings and specialty components for a complete fuel delivery system shall be as manufactured by Franklin Fueling Systems and branded as the UPP pipe system or an approved equal.

10.0 Warranty

The piping system manufacturer shall provide a warranty against defects in the pipe and fittings. Refer to Franklin Fueling Systems warranty document #FFS-0189.



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