

SECTION 23 11 13 FACILITY FUEL-OIL PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The underground fuel delivery piping system shall be Smartflex as manufactured by Nupi Americas, Inc. for suction or pressure applications and shall be semi-rigid coaxial type double wall construction. Smartflex is a system of electrofusion fittings and composite pipes with impermeable layers. This coaxial design shall allow for migration of leaks from the primary pipe into the secondary pipe and then to a designated low point accumulation sump. All vent and or vapor recovery piping shall be Smartflex semi-rigid single wall construction.

All pipe, fittings and sump entries are Underwriters Laboratories UL971 listed for Underground Nonmetallic Primary, Secondary, Normal vent and Vapor recovery piping for Flammable Liquids and approved for use with:

(MV) Motor Vehicle Fuels,

(CT) Concentrated Fuels,

(HB) Hi Blend Fuels and

(A&M) Aviation and Marina Fuels.

The piping system shall also be CARB approved for vapor recovery and listed by ULC/ORD-C971-2005

1.2 RELATED SECTIONS

- A. Division 02: Existing Conditions
- B. Section 22 05 00: Basic Materials and Methods
- C. Division 31: Earthwork
- D. Section 23 13 00: Facility Underground Fuel-Oil, Storage Tanks
- E. Section 23 13 23: Facility Aboveground Fuel-Oil, Storage Tanks

1.3 REFERENCES

- A. NFPA 30, "Flammable and Combustible Liquids Code"
- B. NFPA 30A, "Code for Motor Fuel Dispensing Facilities and Repair Garages"
- C. NFPA 37, "Stationary Combustion and Gas Turbines"
- D. Underwriters Laboratories – UL-971

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- E. PEI/RPI-100 “Recommended Practices for Installation of Underground Liquid Storage Systems”
- F. PEI/RPI-200 “Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling”
- G. PEI/RPI-800 “Recommended Practices for Installation of Bulk Storage Systems ”
- H. USEPA – 40 CFR Parts 280 & 281 Federal UST Standards
- I. NYCFD – New York City Fire Department C of A
- J. CARB-California Air Resource Board

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Contract Specification Sections.
- B. Product Data: Include identification materials and devices; and sizes, dimensions, capacities, pressure ratings, settings and operating characteristics for the following:
 - 1. Each type and size of fuel storage tanks.
 - 2. Fuel storage tank accessories and specialty fittings.
 - 3. Fuel pipe, fittings and penetration fittings.
 - 4. Tanks sumps, transition sumps, dispenser sumps.
- C. Shop Drawings: Include storage tanks, accessories, pipe sizes, valves and specialties. Include details of piping. Indicate interface, required clearances and spatial relationship between piping, adjacent utilities and proximate structures.
- D. Test Reports: As specified in other Sections.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of fuel distribution components and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered if submitted to engineer 15 days prior to bid due date.
- B. The piping system shall be installed as specified on contract drawings and or at the discretion of the responsible installing contractor to provide a complete and tested pipe conveyance system as required for the project and per Federal EPA, State and local environmental protection authorities.

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1.6 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.

1.7 PROJECT CONDITIONS

A. Perform site survey, research public utility records and verify existing utility locations. Contact utility-locating service for area where project is located.

1.8 WARRANTY

A. The piping system for fluid delivery and venting shall be provided by a single manufacture for single source responsibility. The manufacturer shall provide a 30 year warranty against manufacturer's defects in pipe, fittings and specialty components. Use of multiple pipe manufactures shall not be allowed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. All pipe, fittings and specialty components for a complete fuel delivery system shall be branded Smartflex as manufactured by NUPI Americas, Inc. Houston, TX #877-228-3448, Perma-Pipe Inc. or Ricwil Pipe Systems.
2. All Tank Sumps and Transition Sumps shall be made of FRP as manufactured by S. Bravo Systems, Inc. Commerce, CA. Dispenser Sumps shall be made of HDPE or FRP as manufactured by Nupi Americas, Inc. or S. Bravo Systems.

2.2 Fuel Piping

A. Piping shall be manufactured of HDPE (PE100) with inner and outer pipe liners made of PVDF (Fluoropolymer). All pipe and fittings are designed for direct burial and pipe runs can be joined or repaired underground without the use of transition sumps. 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 with no joints for longer pipe runs or in sticks for conventional stick piping installations.

B. Double wall piping shall be available in 1" thru 4" primary pipe diameters and employ an internal and external PDVF liner. The secondary pipe shall employ an internal PA liner. Smartflex double wall piping shall be model **TSMAXPD** series. Bend radius, burst pressures, pressure ratings, vacuum

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- C. ratings and operational temperatures are listed in Figure A below.
- D. Single wall vent and vapor piping shall be available in 1" thru 4" diameters and employ an internal EVOH (Polyolefin) liner. Smartflex single wall vent and vapor piping shall be model **T SMAUXP** series. Bend radius, burst pressures, pressure ratings, vacuum ratings and operational temperatures are listed in Figure A below.
- E. Smartflex fittings and entries shall be UL971 listed electrofusion type and made of molded HDPE with nylon based polymers. Fittings include couplers, reducers, elbows, tees, termination fittings with integral bronze threads, unions, flanges and entry fittings.
- F. See project drawings for pipe sizes and runs.
- G. All Smartflex fittings and pipe are to be electrofused using the Model No. **SSEL8404** automatic fusion welder supplied by Nupi Americas, Inc. and shall be complete with barcode hand scanner and integral Bluetooth communication for printing welding and test reports to local PC. The electro fusion welder shall automatically recognize the type and size of fitting via hand scanners along with the ambient temperature to apply the correct amount of energy to provide a successful weld. This automated welder alleviates any operator adjustments to provide a successful weld. The voltage required for any of the fittings shall be less than 40 volts and all joints must be fully testable within 20 minutes post fusion. Field bonded, pressed, glued or mechanical joined pipe and fittings shall not be allowed.
- H. Terminating reducers used for terminating the secondary piping to the primary piping inside of tank, transition or dispenser sumps shall be fusion welded only. Terminating reducers shall include an integral test / drain port for use in future testing of the secondary containment piping system and or draining primary pipe leaks into low point accumulation sumps. Rubber terminating reducers shall not be allowed.

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Figure A.

Size	Description	Primary Pipe Size OD	Secondary Pipe Size OD	Primary Max psig Rating @ 68°F	Secondary Max psig Rating @ 68°F	Bend Radius @ 68°F
Double Wall						
1"	Double Wall Pipe	1"	2"	116	58	23"
1.5"	Double Wall Pipe	1.5"	2"	116	58	35"
2"	Double Wall Pipe	2"	2.5"	116	58	45"
3"	Double Wall Pipe	3"	5"	116	58	na
4"	Double Wall Pipe	4"	5"	116	58	na
Single Wall						
1.5"	Single Wall Pipe	1.5"	na	116	58	23"
2"	Single Wall Pipe	2"	na	116	58	35"
3"	Single Wall Pipe	3"	na	116	58	na
4"	Single Wall Pipe	4"	na	116	58	na

PART 3 EXECUTION

3.1 EXAMINATION

3.2 INSTALLATION & TESTING

- A. The piping system shall be installed as specified on contract drawings and or at the discretion of the installing contractor to provide a complete pipe conveyance system as required for the project.
- B. All pipe and fittings installed or constructed in the field shall be assembled and fusion welded by mechanics of the contractor who have been satisfactorily trained and certified by the manufacturer. When required, Nupi Americas shall provide an authorized trainer on sight to train the contractor's mechanics in the proper assembly and fusion welding procedures necessary for the project.
- C. The piping system shall be installed and tested in strict accordance with the manufacturers current installation instructions or AHJ. The installing contractor shall be responsible for all necessary specialty tools and consumables required for a complete testable piping installation.

END OF SECTION