

## **SECTION 33 52 43.11 - FUEL SYSTEM PIPING SPECIALTIES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Components specified in this section shall be considered fuel system specialties. The Contractor shall be responsible for providing a complete installation of these items, which shall include all labor and materials required.
- B. The work and components specified in this section are directly related to, but not limited to, Section 33 52 43.13 - Aviation Fuel Pipe, Fittings, and Installation.
- C. This section of the specification includes piping specialty items that are not considered general piping materials, but are contiguous to the overall piping system.
- D. The Contractor shall provide the necessary labor and materials to install the items specified herein, and as indicated on the Contract Drawings.
- E. All materials shall be of a domestic manufacturing process and shall be certified as such in the Compliance Submittals.
- F. All components shall be suitable for use in aviation fuel systems with the characteristics specified in Section 33 52 43.13 - Aviation Fuel Pipe, Fittings, and Installation.

#### **1.2 RELATED SECTIONS**

- A. Section 09 97 13.00 - Fuel System Coatings
- B. Section 33 52 43.00 - Fuel System General Provisions
- C. Section 33 52 43.13 - Aviation Fuel Pipe, Fittings, and Installation
- D. Section 33 52 43.15 - Fuel System General Valves
- E. Section 33 52 43.25 - Fuel System Service Pits and Access Covers

#### **1.3 REFERENCES**

- A. American Petroleum Institute (API)
- B. American Society of Mechanical Engineers
- C. Underwriters Laboratory (UL)
- D. Oil Companies Materials Association (OCMA)
- E. American Society of Mechanical Engineers (ASME)

- F. Factory Mutual (FM)

#### **1.4 SUBMITTALS**

- A. Submit as specified in Section 01 33 00 and Section 33 52 43.00.
- B. Product Data:
  - 1. Insulating Kits
  - 2. Pipe Sleeves
  - 3. Pipe Sleeve Seal
  - 4. Pipe Sleeve Insulators
  - 5. Sleeve Boots
  - 6. Low Point Drain Pump Out Connection
  - 7. High Point Vent Connection
  - 8. Vault Sump Pump Out Connection
  - 9. High Point Vent Connection
- C. Quality Assurance
  - 1. Design Data
  - 2. Test Reports

#### **1.5 QUALITY ASSURANCE**

- A. All piping specialties shall be in compliance with the applicable codes and standards such as ASTM, ANSI, API, etc. as specified in Section 33 52 43.00 - Fuel System General Provisions.
- B. The Contractor shall prepare and provide compliance submittals for all piping specialties including the manufacturer, type, materials, and certifications required.
- C. For the purpose of standardization and conformance, components will be specified using a manufacturer name and model number. It should be noted, the term "or approved equal", will be added so as not to limit to the manufacturer listed.
- D. No foreign made equipment, fittings, bolts, or any other accessory may be used in this work. All such items shall be American made, manufactured in the United States of America. If any foreign items are found within the work supplied under this contract, the Contractor shall remove and replace them with American made items at no additional charge to the Owner.
- E. The manufacturers specified within this section shall have products in satisfactory use in similar applications for a minimum of five years.

### **PART 2 - MATERIALS**

#### **2.1 INSULATING KITS**

- A. Insulating kits shall be used as indicated on the drawings to electrically isolate all hydrant pit valves from the cathodic protection system. Insulating kits are also to be used where above grade piping transitions to below grade piping.

- B. The gasket material is required to be fireproof and pass the requirements of the API 6FB, 3rd edition fire test. When required, the gasket material shall be manufactured by Pikotek Model VCFS, Advance Products & Systems LLC Model SSAFS, or approved equal.
- C. Joints shall consist of weldneck flanges or a weldneck flange with mating valve flange and a flange insulation gasket.
- D. The insulation gasket assembly shall consist of a PTFE spring-energized primary sealing element and an E-ring secondary seal all seated in a metal core or a Phyllosilicate secondary seal seated in a kammprofile retainer. The gasket assembly shall have 750-800 VPM dielectric strength and 65,000 PSI to 66,000 PSI compressive strength. The gaskets have a thickness of .308-inches for pipe diameters sized 6-inches to 14-inches for Pikotek product. The gaskets have an uncompressed thickness of .348-inches and .274 inches compressed for APS product.
- E. Washers shall be Grade 1050 heat treated to ASTM F436 steel washers with high dielectric coating of 2-5 mils thick. Dielectric strength shall be compatible with minimum insulating values of insulating sleeves and gaskets. Furnish double quantity of insulating and cadmium-plated steel washers for "full" insulation of flanges.
- F. Insulating sleeves shall be of spiral wound Mylar, 1/32-inch wall thickness length as required to match thickness of two series 150 raised face flanges plus insulation. Gasket shall provide "full" insulation of studs, minimum dielectric strength shall be 4000 VPM.
- G. Flange assemblies shall provide a minimum resistance of 1,000 ohms measured between each stud and both flanges (when dry).

## **2.2 PIPE SLEEVES**

- A. To center, support, insulate and protect piping as it passes the concrete walls and slabs, a pipe sleeve unit or series of components shall be used. Components shall be PSI Link-Seal Model WS, Advance Products & Systems InnerLynx, or approved equal.
- B. Sleeve sizes through 10-inches shall be Schedule 40 steel pipe or standard wall thickness. Sleeve sizes 12-inches and larger shall have a 0.375-inch wall thickness or standard wall thickness.
- C. Provide an anchor collar of the same type of steel as the sleeve. The collar shall be welded all around on both sides to the sleeve at the point on the sleeve that positions at the mid-point of the structural wall or pad when the sleeve is in place.
- D. Sleeves shall be 2-inch nominal pipe sizes larger for pipes less than 4-inch diameter and two pipe sizes larger for pipes 4-inch nominal diameter and larger. Coordinate sleeve dimension with sleeve seal specified herein.
- E. Sleeves through walls and pads shall be cast in place. Piping shall be installed centered in sleeve. Use one link seal unit at each end of the sleeve through walls to keep the containment pipe in proper alignment.
- F. Firmly bolt a pipe insulator around the fuel pipe to prevent damage to the pipe coating. Shoe height of runners shall be as required to center the pipeline in the sleeve. Insulator shall be a segmented collar molded of high-density polyethylene with runners.

- G. To protect the seals and insulators, install a boot to permit ample movement of the carrier pipe in a lengthwise, side, and vertical direction. The boot shall be oil, jet fuel, and water-resistant double-accordion bellows-type molded. The bands shall be 1/2-inch-wide stainless steel thumb-screw type with rounded edges which are easily tightened by hand or by pliers.
- H. Existing or active piping may require the use of a split-case pipe sleeve. The roundness of the pipe sleeve is critical for the integrity of the pipe sleeve seal. The contractor shall purchase a split-case pipe sleeve directly from manufacturer. Contractor shall follow all manufacturer's instructions when welding together split-case pipe sleeve around piping.

## **2.3 PIPE SLEEVE SEAL**

- A. Provide and install expanding seals at the end of all fuel piping buried in a casing and for pit penetrations. Seal shall be as manufactured by PSI Link-Seal Model OS-316 or Advance Products & Systems InnerLynx Model OS-316 and shall be suitable for -40 to 210 degrees standard insulating type. The casing shall always be electrically isolated from the carrier. Casing shall be 2 pipe sizes larger than the carrier pipe.
- B. The sleeve shall be configured with minimum dimensions and characteristics shown on the drawings. Sleeves may be field fabricated or may be supplied by PSI or APS. Regardless, dimensions called out on the drawings shall be maintained as a minimum.
- C. Maintain electrical isolation from sleeve to rebar and from sleeve to piping.
- D. Contractor shall include the test port option from the pipe sleeve seal manufacturer. This option shall be provided by the manufacturer. Install a "V" modification to PSI's Link-Seal model or the Test Port to Advance Product Systems' InnerLynx which serves as a test port to test the interstitial space inside the link seal/InnerLynx and verify a complete seal. After installing the Link Seal/InnerLynx, the Contractor shall complete a pressure test by pressurizing the interstitial space to 20 psig for 5 minutes. Contractor shall repair any damage to complete a successful leak test.

## **2.4 PIPE SLEEVE INSULATORS**

- A. Insulator shall be a segmented collar molded of high-density polyethylene with runners. Components shall be manufactured by PSI, Advance Products & Systems, or approved equal.
- B. Shoe height of runners shall be as required to center the pipeline in the sleeve.
- C. Insulator shall be bolted around the fuel pipe without damage to the coating.

## **2.5 SLEEVE BOOTS**

- A. One-piece sleeve boots shall be oil, chemical, and water-resistant double accordion bellows type molded. The boot shall be slipped on the fuel pipe before any tie-in weld is made. Wrap-around boots with a butyl mastic seal may be used for connections to existing piping. Components shall be manufactured by PSI, Advance Products & Systems Model AM (or AW for wrap-around seal), or approved equal.
- B. Boot shall permit ample movement of the carrier pipe lengthwise, side, and vertical direction.

- C. The boot shall be a minimum of 3/8" thick with circumferential ribs molded in the inner surface where bands are applied to increase the contact pressure for a tighter joint.
- D. The bands shall be 1/2-inch wide stainless steel thumb screw type with rounded edges which are easily tightened by hand or pliers.
- E. The boot shall have an extra thickness at the sleeve edge to protect the boot from damage during backfill.
- F. The remainder of the boot shall be a minimum of 1/8-inch thick.

**2.6 LOW POINT DRAIN PUMP OUT CONNECTION**

- A. Provide a 2-1/2 inch aircraft standard bayonet fueling adapter to facilitate low point drain pump out operations from hydrant system piping. Adapter shall include a pressure dust cap and 2-1/2 inch NPT outlet.

**2.7 VAULT SUMP PUMP OUT CONNECTION**

- A. Vaults shall have dedicated sump connection pipes to remove contaminated water from vault.
- B. Provide a 2-1/2 inch aircraft standard bayonet fueling adapter to facilitate vault sump pump out operations. Adapter shall include a pressure dust cap and 2-1/2 inch NPT outlet.

**2.8 HIGH POINT VENT CONNECTION**

- A. High point vents shall include a hose adapter to facilitate the venting of the fuel pipe.
- B. 1-inch High Point Vent: The quick connect coupling shall be a 1-inch OPW Type #633-A female NPT Kamlok with dust cap or approved equal.
- C. 2-1/2 inch High Point Vent: Provide a 2-1/2 inch aircraft standard bayonet fueling adapter to facilitate high point pump out operations from hydrant system piping. Adapter shall include a pressure dust cap and 2-1/2 inch NPT outlet.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. All components shall be installed in the piping system as indicated on the Contract Drawings. Where exact dimensions are not indicated, the drawings may be scaled to determine an approximate location.
- B. The Contractor shall be responsible for providing the necessary labor and materials to install the component.
- C. The Contractor shall be responsible for providing the proper clearances of all components to assure adequate operational and maintenance clearances.
- D. Install all components in accordance with manufacturer's instructions. Properly torque bolts, etc. as required.

### **3.2 INSPECTION AND TESTING**

- A. The work will be inspected for approved manufacturer, component type and final installation.
- B. The Contractor shall be responsible for the adjustments of all devices to assure proper function of the device is provided.

**END OF SECTION 33 52 43.11**