

SECTION 33 52 43.25 - FUEL SYSTEM SERVICE PITS AND ACCESS COVERS

PART 1 - GENERAL

1.1 SUMMARY:

- A. This section includes the prefabricated aircraft fueling pits of fiberglass construction.

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 43.11 - Fuel System Piping Specialties
- D. Section 33 52 43.13 - Aviation Fuel Pipe, Fittings, and Installation
- E. Section 33 52 43.15 - Fuel System General Valves
- F. Section 33 52 43.24 - Fuel System Inspection, Testing, and Flushing

1.3 REFERENCES:

- A. American Petroleum Institute (API):
 - 1. 1584 – Four-Inch Hydrant System Components and Arrangements
- B. National Electric Manufacturer's Association (NEMA):
 - 1. 250-1997 - Enclosures for Electrical Equipment (1000 volts maximum)
- C. U.S. Department of Transportation:
 - 1. AC 150/5320-6C - Airport Pavement Design and Evaluation.
- D. Joint Inspection Group (JIG)
 - 1. Bulletin 90 - Hinged Hydrant Pit Lids

1.4 COMPLIANCE SUBMITTALS

- A. The manufacturer of all service pits shall supply installation instructions. The manufacturer shall become familiar with the project site and the soil conditions in which the pits are to be installed. If necessary, the manufacturer shall modify his standard installation instructions to accommodate the specifics of this project and to ensure a proper installation.
- B. Submit as specified in Section 01 33 00.00 and 33 52 43.00.

C. Product Data

1. Prefabricated aircraft hydrant pit
 - a. Hydrant pit control valve
 - b. Hydrant pit strainer
 - c. Manual valves
 - d. Pipe and fittings
 - e. Insulating flange kit
 - f. Coatings
2. Prefabricated low point drain
 - a. Pipe and fittings
 - b. Manual valves
 - c. Hose adaptors
 - d. Coatings
3. Prefabricated high point vent
 - a. Pipe and fittings
 - b. Manual valves
 - c. Hose adaptors
 - d. Coatings
4. Prefabricated valve vault access cover and ladder

D. Shop Drawings

1. Drawings shall include complete assembly layouts of internal piping and components with all dimensional information included.
 - a. Prefabricated aircraft hydrant pit
 - b. Prefabricated low point drain
 - c. Prefabricated high point vent

E. Quality Assurance

1. Test Reports
 - a. Pit Cover Load Test
 - b. Pit Cover Environmental Tests
 - c. Pre-Installation Hydrostatic Test of Fiberglass Pits
 - d. Post-Installation Hydrostatic Test of Fiberglass Pits
 - e. Link Seal Pressure Tests

1.5 QUALITY ASSURANCE

- A. All equipment shall be supplied from a company regularly engaged in the manufacture of the items specified herein and whose products have been in similar service at airports for a minimum of 10 years.
- B. When two or more units of the same class of equipment are required they shall be the products of a single manufacturer.

- C. All cover assemblies and pits as installed shall be capable of accommodating wheel loads of any aircraft in commercial service. Cover shall comply with D.O.T. AC 150/5320-6C, Appendix 3. Submit test reports from an independent test company stating and certifying that the pit or cover as manufactured, meets this requirement with a maximum 0.450-inch full load deflection at center and deflection "rebound" within 0.020-inch after load release
- D. Weight bearing mating flange surfaces of the pits and corresponding covers shall be flat to within 0.050-inch total indicator reading.
- E. Where water resistant covers are specified, the manufacturer shall submit test reports from an independent test company certifying the following:
 - 1. The totally submerged cover shall pass less than 100 ml of water per hour when cycled through hot (160 degrees F) and cold (-40 degrees F) conditions and also when subjected to seal contamination.
 - 2. The cover and pit assembly shall pass the hose-down test of NEMA 250.
- F. All service pits shall be prefabricated in the factory, including all internal piping and components. The pits shall be shipped to the site as a complete assembly with all internal piping in place and link seals installed. Valves may be shipped separately for installation in the field.

PART 2 - PRODUCTS

2.1 GENERAL:

- A. Unless otherwise specified, the pipe penetrations through the pit wall shall be sealed by means of link seals as detailed on the drawings. Link seals shall be torqued in a star pattern to promote even tightening. Prior to backfill, the interstitial space between link seals shall be pressure tested to 5 psig.
- B. Carrier pipe shall extend a minimum of 8-inches outside of pit wall for field connection.

2.2 IDENTIFICATION OF EQUIPMENT:

- A. Provide identification tags with minimum 1/2" high lettering, corresponding to the valve or device label indicated on the Contract Drawings. Tags shall be made of stainless steel 1/32- inch thick with contrasting color for the engraved color. Locate tag so it is easily visible.
- B. For service pits containing dual high or low point piping connections, identify the fuel main associated with each valve (east line, west line, etc.). Secure tags to the components using a metal chain. Similar identification shall be provided for valves located within valve vault access covers.
- C. Provide tags for the following equipment: Isolation Valves, High Point Vents and Low Point Drains.

2.3 PREFABRICATED AIRCRAFT HYDRANT PIT (SIDE ENTRY):

- A. General:

1. Pit shall consist of a molded prefabricated fiberglass hydrant pit. Pit shall come complete with valves and piping. The pit shall be side entry.
2. Hydrant pit shall be:
 - a. Cavotec/Dabico Model D236WPHD8SFLF-FHAS-6-48D with steel flange per plan detail.
 - b. Or Approved Equal.
3. Service lettering on the cover shall read "Fuel".

B. Pit Cover Door and Frame:

1. Cover door shall be of single hinged construction.
2. Entire cover assembly shall be removable.
 - a. Cover and frame shall be all primary metal cast aluminum, alloy No. A356.2, per Fed. Spec. QQ-A-601F, with T-6 heat treat per Mil. Spec. H-6088F, with no exceptions.
3. Service lettering shall be abrasion/corrosion/chemical-resistant color-coded.
4. Door(s) shall have: a maximum 35-lb. lift to open and close, a minimum 18" diameter pit access, and hand-hole(s) with a minimum 1.4" depth and 14 cu. in. volume.
5. Door(s) shall use a non-load bearing, internally mounted hinge mechanism.
6. Door shall have a lay flat hinge mechanism to allow the pit lid to lay flat when opened.
7. Door(s) shall have a high visibility orange disk on its underside(s).
8. Highest pit internal component shall be accessible from a maximum of 4" from pit top.
9. Prototype test report, for each cover style, shall be submitted and the test shall have been conducted by an independent testing company in the following manner: cover loading over each (or each of two spaced at a maximum of 36" on centers for pit with inside length greater than 60") 200 sq. in. (or 95 sq. in. for 11" O.D. cover) footprint(s) shall withstand a minimum 1,000 PSI (or 740 PSI for 11" O.D. cover) load with a maximum 0.150" full load deflection at center indicator(s) and deflection "rebound" within 0.025" after load release.
10. Shall also comply with D.O.T. AC 150/5320-6C.
11. Shall be free of visible porosity, cavity areas, fillers, weldments and paint to hide them.
12. Load-bearing mating flange surfaces of the pit and cover shall be flat to within 0.050" total indicator reading.
13. Cover shall be water resistant with a replaceable seal at the mating surface. The seal face shall not be load bearing.
 - a. Door seal shall automatically engage a sloped wall when cover door is seated in the closed position without any secondary latching motions. Seal shall be affixed without mechanical fasteners or adhesives, have a minimum field life of 1 year, and be ozone/UV-resistant.
 - b. Sealing surface shall be separate from load-bearing surface.
 - c. Prototype cover's environmental test report shall be submitted and the test shall have been conducted by an independent testing company in the following categories and standards:
 - 1) Totally submerged cover shall pass less than 100 ml of water per hour following: a) hot (160 degrees F) and cold (-40 degrees F) cycling conforming to Mil Std 810, and b) seal contamination (cover seal & sealing flange coated with sand and soil mixture).

- 2) Cover shall pass corrosion and hose-down tests equal to NEMA 250 standards for Type 6 exterior enclosures except that cover shall be tested in 6" deep standing water.
- 3) Cover frame shall have its own seal.

C. Fiberglass pit

1. Pit shall be prefabricated per the plan detail dimensions.
2. Pit shall be fiberglass with a galvanized steel top flange to be integrally bonded to the fiberglass in a non-bolted arrangement.
3. Integral top flange shall require no extraneous corrosive material, weldments or strongbacks to support the cover.

D. Hydrant Pit Equipment:

1. Hydrant pits shall be furnished complete with hydrant control valve, shutoff valve, strainer, insulating flange, fittings and piping as detailed.
2. All valves, equipment and piping provided shall comply with the requirements as specified in corresponding sections within this specification.

E. Hydrant Control Valve:

1. Valve inlet shall be 4-inch 150 lb. Outlet adapter shall meet API Bulletin 1584.
2. Valve body shall be ductile iron epoxy coated.
3. Valve shall be serviceable such that upper valve assembly and pilot valve assembly may be removed with the unit under pressure.
4. All seals shall be field replaceable.
5. Provide dust cap.
6. Hydrant control valve to be Carter Model 60554 with Option V pilot and Option M dry break to match existing hydrant valves in service at the Airport.

F. Hydrant Pit Strainer:

1. Strainer flange shall be 4-inch, 12-gage stainless steel.
2. Strainer cone shall be 4-inch, 16-gage cone.
3. Strainer shall have 3/16-inch diameter holes on 1/4-inch centers, staggered; 100% of 4-inch pipe opening.

2.4 LOW POINT DRAIN PIT

A. General:

1. Pit shall consist of a molded prefabricated fiberglass low point drain pit. Pit shall come complete with valves and piping accessories. Cover shall be of water-resistant construction.
2. Service lettering shall read "Fuel Low Point Drain".
3. Cover shall provide a minimum 18" diameter opening.

B. Pit Cover Door and Frame:

1. Cover door shall be of single hinged construction.
2. Entire cover assembly shall be removable.

- a. Cover and frame shall be all primary metal cast aluminum, alloy No. A356.2, per Fed. Spec. QQ-A-601F, with T-6 heat treat per Mil. Spec. H-6088F, with no exceptions.
 3. Service lettering shall be abrasion/corrosion/chemical-resistant color-coded.
 4. Door(s) shall have: a maximum 35-lb. lift to open and close, a minimum 18" diameter pit access, and hand-hole(s) with a minimum 1.4" depth and 14 cu. in. volume.
 5. Door(s) shall use a non-load bearing, internally mounted hinge mechanism.
 6. Door(s) shall have a high visibility orange disk on its underside(s).
 7. Highest pit internal component shall be accessible from a maximum of 4" from pit top.
 8. Prototype test report, for each cover style, shall be submitted and the test shall have been conducted by an independent testing company in the following manner: cover loading over each (or each of two spaced at a maximum of 36" on centers for pit with inside length greater than 60") 200 sq. in. (or 95 sq. in. for 11" O.D. cover) footprint(s) shall withstand a minimum 1,000 PSI (or 740 PSI for 11" O.D. cover) load with a maximum 0.150" full load deflection at center indicator(s) and deflection "rebound" within 0.025" after load release.
 9. Shall also comply with D.O.T. AC 150/5320-6C.
 10. Shall be free of visible porosity, cavity areas, fillers, weldments and paint to hide them.
 11. Load-bearing mating flange surfaces of the pit and cover shall be flat to within 0.050" total indicator reading.
 12. Cover shall be water resistant with a replaceable seal at the mating surface. The seal face shall not be load bearing.
 - a. Door seal shall automatically engage a sloped wall when cover door is seated in the closed position without any secondary latching motions. Seal shall be affixed without mechanical fasteners or adhesives, have a minimum field life of 1 year, and be ozone/UV-resistant.
 - b. Sealing surface shall be separate from load-bearing surface.
 - c. Prototype cover's environmental test report shall be submitted and the test shall have been conducted by an independent testing company in the following categories and standards:
 - 1) Totally submerged cover shall pass less than 100 ml of water per hour following: a) hot (160 degrees F) and cold (-40 degrees F) cycling conforming to Mil Std 810, and b) seal contamination (cover seal & sealing flange coated with sand and soil mixture).
 - 2) Cover shall pass corrosion and hose-down tests equal to NEMA 250 standards for Type 6 exterior enclosures except that cover shall be tested in 6" deep standing water.
 - 3) Cover frame shall have its own seal.
- C. Fiberglass pit
1. Pit shall be prefabricated per the plan detail dimensions.
 2. Pit shall be fiberglass with a galvanized steel top flange to be integrally bonded to the fiberglass in a non-bolted arrangement.
 3. Integral top flange shall require no extraneous corrosive material, weldments or strongbacks to support the cover.
- D. Low Point Drain Pit Equipment:

1. Low point drain pits shall be furnished complete with shutoff valve, hose adaptor, fittings and piping as detailed.
2. All valves, equipment and piping provided shall comply with the requirements as specified in corresponding sections within this specification.

2.5 HIGH POINT VENT PIT

A. General:

1. Pit shall consist of a molded prefabricated fiberglass high point vent pit. Pit shall come complete with valves and piping accessories. Cover shall be of water-resistant construction.
2. Service lettering shall read "Fuel High Point Vent".
3. Cover shall provide a minimum 18" diameter opening.

B. Pit Cover Door and Frame:

1. Cover door shall be of single hinged construction.
2. Entire cover assembly shall be removable.
 - a. Cover and frame shall be all primary metal cast aluminum, alloy No. A356.2, per Fed. Spec. QQ-A-601F, with T-6 heat treat per Mil. Spec. H-6088F, with no exceptions.
3. Service lettering shall be abrasion/corrosion/chemical-resistant color-coded.
4. Door(s) shall have: a maximum 35-lb. lift to open and close, a minimum 18" diameter pit access, and hand-hole(s) with a minimum 1.4" depth and 14 cu. in. volume.
5. Door(s) shall use a non-load bearing, internally mounted hinge mechanism.
6. Door(s) shall have a high visibility orange disk on its underside(s).
7. Highest pit internal component shall be accessible from a maximum of 4" from pit top.
8. Prototype test report, for each cover style, shall be submitted and the test shall have been conducted by an independent testing company in the following manner: cover loading over each (or each of two spaced at a maximum of 36" on centers for pit with inside length greater than 60") 200 sq. in. (or 95 sq. in. for 11" O.D. cover) footprint(s) shall withstand a minimum 1,000 PSI (or 740 PSI for 11" O.D. cover) load with a maximum 0.150" full load deflection at center indicator(s) and deflection "rebound" within 0.025" after load release.
9. Shall also comply with D.O.T. AC 150/5320-6C.
10. Shall be free of: visible porosity, cavity areas, fillers, weldments and paint to hide them.
11. Load-bearing mating flange surfaces of the pit and cover shall be flat to within 0.050" total indicator reading.
12. Cover shall be water resistant with a replaceable seal at the mating surface. The seal face shall not be load bearing.
 - a. Door seal shall automatically engage a sloped wall when cover door is seated in the closed position without any secondary latching motions. Seal shall be affixed without mechanical fasteners or adhesives, have a minimum field life of 1 year, and be ozone/UV-resistant.
 - b. Sealing surface shall be separate from load-bearing surface.
 - c. Prototype cover's environmental test report shall be submitted and the test shall have been conducted by an independent testing company in the following categories and standards:

- 1) Totally submerged cover shall pass less than 100 ml of water per hour following: a) hot (160 degrees F) and cold (-40 degrees F) cycling conforming to Mil Std 810, and b) seal contamination (cover seal & sealing flange coated with sand and soil mixture).
- 2) Cover shall pass corrosion and hose-down tests equal to NEMA 250 standards for Type 6 exterior enclosures except that cover shall be tested in 6" deep standing water.
- 3) Cover frame shall have its own seal.

C. Fiberglass pit

1. Pit shall be prefabricated per the plan detail dimensions.
2. Pit shall be fiberglass with a galvanized steel top flange to be integrally bonded to the fiberglass in a non-bolted arrangement.
3. Integral top flange shall require no extraneous corrosive material, weldments or strongbacks to support the cover.

D. High Point Vent Pit Equipment:

1. High point vent pits shall be furnished complete with shutoff valve, hose adaptor and piping as detailed.
2. All valves, equipment and piping shall comply with the requirements as specified in corresponding sections within this specification.

2.6 VALVE VAULT ACCESS COVER & LADDER

A. Access Cover Door and Frame

1. Cover shall have integral, automatic latches with no above grade protrusions. Latches shall be interconnected so that operation of one latch will activate the other latch.
2. Cover shall be one piece with torsion spring assist such that it will open to 90 degrees with a maximum 35 lb. lift and close with a maximum 50 lb. push. The cover shall have a hold open bar that locks the cover in the open position.
3. Floor grating shall be cut to accommodate valves and handles. Cut locations are to be reinforced with welded banding applied to all cut edges.
4. Cover and frame shall be all primary metal cast aluminum, alloy No. A356.2, per Fed. Spec. QQ-A-601F, with T-6 heat treat per Mil. Spec. H-6088F.
5. Service lettering shall be abrasion/corrosion/chemical-resistant color coded.
6. Cover shall have hand-holes with a minimum 1.4" depth and 14 cu. in. volume, and integral automatic latches.
7. Cover shall not pop open when a latch is released and shall be designed to fail-safe open once lifted beyond the 80-degree point in the opening arc.
8. Highest pit internal component shall be accessible from a maximum of 5.5" from pit top in non-arm/latch areas.
9. Cover shall have high visibility orange panels on both the topside and underside.
10. Prototype test report, for each cover style, shall be submitted and the test shall have been conducted by an independent testing company in the following manner: cover loading over each (or each of two spaced at a maximum of 36" on centers for pit with inside length greater than 60") 200 sq. in. footprint(s) shall withstand a minimum 1,000 PSI load with a maximum 0.150" full load deflection at center indicator(s) and deflection "rebound" within 0.025" after load release.

11. Cover shall also comply with D.O.T. AC 150/5320-6C.
 12. Cover shall be free of visible porosity, fillers, weldments and paint to hide them.
 13. Load-bearing flange surfaces of the pit and cover shall be flat to within 0.050" total indicator reading.
 14. Cover shall be water resistant with a replaceable seal at the mating surface.
 15. Door seal shall automatically engage a sloped wall when cover door is seated in the closed position without any secondary latching motions. Seal shall be affixed without mechanical fasteners or adhesives, have a minimum field life of 1 year and be ozone/UV-resistant.
 16. Sealing surface shall be separate from load-bearing surface.
 17. Prototype cover's environmental test report shall be submitted and the test shall have been conducted by an independent testing company in the following categories and standards:
 - a. Totally submerged cover shall pass less than 100 ml of water per hour following: a) hot (160 degrees F) and cold (-40°F) cycling conforming to Mil Std 810, and b) seal contamination (cover seal & sealing flange coated with sand and soil mixture).
 - b. Cover shall pass corrosion and hose-down tests equal to NEMA 250 standards for Type 6 exterior enclosures except that cover shall be tested in 6" deep standing water.
 - c. Cover frame shall have its own seal.
- B. Cover Manufacturer Model: Valve vault access covers shall be manufactured by Cavotec with sizes as shown on the drawings.
- C. Ladder Assembly
1. Covers shall be complete with a ladder assembly where indicated on the drawings. Each ladder assembly shall include an adjustable floor mount.
 2. Ladder shall have telescoping arms to extend abovegrade when access cover is in the open position and can be retracted to close the cover.
 3. Ladder shall be galvanized steel construction.
 4. Ladder shall conform to OSHA requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Contractor shall execute the installation of all service pits in accordance with the manufacturer recommendations. Contractor shall provide personnel during fuel system paving activities to assist in the proper installation of service pits and service pit covers.
- B. Fuel System Service Pits – One piece molded fuel pits will require the paving contractor to pour panels containing fuel pits separately from continuous ramp paving activities. Contractor shall remain onsite during pavement placement to ensure proper completion of pits including installation of reinforcement and crowning of pavement surrounding pits.

3.2 TESTING

- A. All pit covers shall be tested for proper operation.
- B. Prior to fiberglass pits being installed, fill all pits with water and monitor the water level for 24 hours. The test will be considered acceptable if there is no reduction in the water level within the pit for a 24-hour period.
- C. After fiberglass pits have been installed and backfilled, fill all pits with water and monitor the water level for 24 hours. The test will be considered acceptable if there is no reduction in the water level within the pit for a 24-hour period.
- D. Pressure test the link seals in each pit at 5 psi for 5 minutes or in accordance with manufacturer's recommendations, whichever is more stringent.

END OF SECTION 33 52 43.25