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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS

CEGS-15101 (4/99)

Superseding
CEGS-15101 (11/98)

GUIDE SPECIFICATION FOR CONSTRUCTION

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SECTION 15101

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04/99

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SECTION 15101

CONTROL VALVES, FUELING SYSTEM
04/99

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NOTE: This guide specification covers the requirements for diaphram type automatic control valves used in aircraft refueling systems as apart of the Air Force Type III Standard (78-24-28-88). This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-345-700 for military construction and in accordance with ER 1110-2-1201 for Civil Works construction.

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PART 1 GENERAL

1.1 REFERENCES

****

NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest change (Notice) to this guide specification. During the reference reconciliation process, SPECSINTACT will automatically remove references from this paragraph that have been removed from the text.

****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.5	(1988; Errata) Pipe Flanges and Flanged Fittings
ASME B16.24	(1991; Errata) Cast Copper Alloy Pipe Flanges, Class 150, 300, 400, 600, 900, 1500, and 2500, and Flanged Fittings, Class 150 and 300

ASME BPV VIII Div 1	(1992; Addenda Dec 1992, Dec 1993, Dec 1994) Boiler and Pressure Vesser Code; Section VIII, Pressure Vessels Division 1 - Basic Coverage I

AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM)

ASTM A 194/A 194M	(1996) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High Temperature Service
ASTM A 216/A 216M	(1993) Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High Temperature Service
ASTM A 269	(1996) Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A 320/A 320M	(1994a, R1995) Standard Specification for Alloy Steel Bolting Materials for Low-Temperature Service
ASTM A 536/A 536M	(1984) Standard Specifications for Ductile Iron Castings
ASTM A 743/A 743M	(1995) Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application
ASTM B 26/B 26M	(1992a) Standard Specification for Aluminum Alloy Sand Castings
ASTM D 751	(1989) Standard Test Method for Coated Fabrics
ASTM D 2000	(1990) Standard Classification System for Rubber Products in Automotive Applications

MILITARY SPECIFICATIONS (MS)

MS MIL-A-8625	(1989; Rev E, Am. 1) Anodic Coatings, for Aluminum and Aluminum Alloys
MS MIL-I-17563	(1985; Rev B)Impregnants for Aluminum, Copper, Iron, Magnesium and Zinc Alloy Castings

MILITARY STANDARDS (MIL-STD)

MIL-STD 276	(1956; Basic) Impregnation of Porous NonFerrous Metal Castings

NATIONAL FIRE PROTECTION AGENCY (NFPA)

NFPA 70	(1996) National Electrical Code

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J 200	(1991) Classification System for Rubber Materials
SAE J 429	(1983) Mechanical and Material Requirements for Externally Threaded Fasteners

1.2 AVAILABILITY

Control valves specified herein shall be of one manufacturer. The valve manufacturer shall also produce the hydraulically-operated pilots.

1.3 SUBMITTALS

****

NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

Indicate submittal classification in the blank space using "GA" when the submittal requires Government approval or "FIO" when the submittal is for information only.

****

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Control Valves; GA.

For each type control valve required and specified, submit sectional drawings of main valve and control pilot systems.

SD-01 Data

Control Valves; GA.

For each type control valve required and specified, submit the following:

a. Flow diagrams.

b. Operational description of the control valve and pilot control system.

c. Complete valve assembly list of materials, along with material Certificates of Conformance, used in the manufacture of the control valves and pilot systems.

SD-13 Certificates

Previous Air Force/Military Projects; GA.

Qualified Engineers; GA.

Field Assistance; GA.

Provide the following:

a. Proof of experience on previous Air Force/Military projects.

b. Number of qualified (factory trained) engineers available to provide startup support.

c. Written assurance as to ability to respond to specified time for field assistance.

SD-09 Reports

Control Valves; FIO.

Before shipment, each individual control valve shall be operationally tested and adjusted by manufacturer under actual flow conditions utilizing a hydrocarbon test fluid with a specific gravity comparable to [JP-4] [JP-5] [JP-7] [JP-8] fuel. Manufacturer shall submit certified records of test data.

SD-19 Operation and Maintenance Manuals

Operation and Maintenance Manuals; GA.

Operation and maintenance information shall be submitted for each individual type control valve specified herein. Refer to Section 01730 FACILITY OPERATION AND MAINTENANCE MANUAL for the information to be submitted.

PART 2 PRODUCTS

2.1 DESIGN CONDITIONS

Shall be as specified in Section 15050 MECHANICAL EQUIPMENT, FUELING. Components to be suitable for ANSI Class 150 (275 psig at 100 degrees F.).

2.2 CONTROL VALVE CONSTRUCTION

2.2.1 General

Control valves shall be single-seated globe type, diaphragm actuated, hydraulically operated valves. Valves shall consist of three (3) major components: the valve body, valve cover, and diaphragm assembly. The diaphragm assembly shall be the only moving part. In the event of diaphragm failure, valve shall fail closed against flow, unless otherwise indicated. The main valve shall be drip-tight when closed. Each valve shall have an external indicator to show the position of the valve disc at all times. Control valves shall be shipped from the factory as a complete assembly with all pilot controls and pilot auxiliary piping properly installed on the main valve. Materials which come in contact with the fuel shall be resistant to the effects of and

not harmful to aircraft engine fuel and shall be aluminum or stainless steel unless noted otherwise. [High level shut-off valve bodies shall be electroless nickel plated ductile iron.] Materials for control valves, and items to be mounted on the valves shall be as follows:

****

NOTE: PROVIDE PER COMMAND FUELS FACILITY ENGINEER'S DIRECTION.

****

2.2.1.1 Bodies, Bonnets, and Covers

Shall be constructed of one of the following materials:

a. Aluminum conforming to ASTM B 26/B 26M, Type 356-T6 anodized in accordance with MS MIL-A-8625, Type II and surface coated in accordance with MIL-STD 276/MS MIL-I-17563.

b. Cast steel conforming to ASTM A 216/A 216M, Grade WCB internally plated with chromium, nickel or internally electroless nickel plated.

c. Cast stainless steel conforming to ASTM A 743/A 743M.

[d. Ductile iron conforming to ASTM A 536/A 536M, electroless nickel plated.]

e. Bodies shall have flanged inlet and outlet connections. Valve shall have a screwed bottom drain plug.

2.2.1.2 Valve Seats

****

NOTE: PROVIDE PER COMMAND FUELS FACILITY ENGINER'S DIRECTION.

****

Shall be stainless steel in accordance with ASTM A 743/A 743M. It shall be possible to remove the valve seat while the valve is connected in the line. Valve seat and upper stem bearing shall be removable and screwed in the body and/or cover. The lower stem bearing must be concentrically contained in the valve seat and shall be exposed to flow on all sides. The diameter of the valve seat shall be the same size as the inlet and/or outlet flanges of the main valve.

2.2.1.3 Valve Discs

Shall contain a resilient, synthetic rubber disc conforming to ASTM D 2000 (SAE J 30200) having a rectangular cross section, contained on three and one-half (3-1/2) sides by a disc retainer and a disc guide, forming a drip tight seal against the seat. The disc shall be usable on either side. The disc guide shall be the contoured type capable of holding disc firmly in place during high differential pressure conditions that may develop across the seating surface. The disc retainer shall be capable of withstanding rapid closing shocks.

2.2.1.4 Diaphragm Assembly

Shall form a sealed chamber in the upper portion of the valve, separating the operating fluid from the line pressure. The diaphragm assembly shall contain a valve stem which is fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. Valve body and cover shall be sealed by the diaphragm. Valve stem shall be stainless steel. The bearing material shall be compatible with the fuel specified and shall not contain zinc coated metals, brass, bronze, or other copper bearing alloys. The diaphragm shall be of a nonwicking material or design, with a minimum of two (2) layers of nylon fabric bonded with a minimum of three (3) layers of synthetic rubber (valves 2-1/2 inches and smaller one layer of nylon fabric). The edge area of the center hole for the valve stem shall be sealed by vulcanization. Materials to be resistant to aromatics of up to 50 percent in accordance with ASTM D 2000 (SAE J 200). The diaphragm must have a MULLINS-burst rating according to ASTM D 751 of a minimum of 600 psi per layer of nylon fabric. All diaphragm sizes must be cycle tested to a minimum of 100,000 cycles, by alternately applying pressure under the diaphragm (main valve pressure) and above the diaphragm (cover chamber pressure). That test shall be certified by the manufacturer. The diaphragm shall not be used as a seating surface. The diaphragm must be fully supported by the body and cover in either the open or closed position.

2.2.1.5 Bolts, Screws and Nuts

a. For Cast Aluminum and Cast Steel Body Valves.

(1) Bolts and Screws, cadmium plated steel in accordance with SAE J 429, Grade 5.

(2) Nuts, cadmium plated steel in accordance with ASTM A 194/A 194M, Grade 2 H.

b. For Stainless Steel Body Valves. Bolts, Screws and Nuts, ASTM A 320/A 320M, Grade B8M C.1.1.

2.2.1.6 Pilot Control System and Auxiliary Piping

Shall be stainless steel, seamless, fully annealed tubing conforming to ASTM A 269, Grade TP316, Rockwell hardness B80 or less. Wall thickness for 1/2-inch tubing to be 0.049-inch.. All screwed connections shall be made by conic unions (NPT). Tubing connections shall not be welded or sealed with O-ring.

2.2.1.7 Pilot Valves

Shall have [stainless steel bodies conforming to ASTM A 743/A 743M][aluminum bodies conforming to ASTM B 26/B 26M Type 356-T6 anodized in accordance with MS MIL-A-8625] with stainless steel internal working parts. Disc and diaphragm assemblies shall be as specified herein before. The setting of adjustable type pressure operated pilot valves shall be easily adjusted by means of a single adjusting screw. The adjusting screw shall be protected by a threaded cap drilled to accommodate a lead-seal wire and a lock nut shall be provided on the adjusting screw to lock it in position at the desired setting. The lead seal wire shall be installed after final acceptance of the system.

****
NOTE: PER COMMAND FUELS FACILITY ENGINEER DIRECTION.
****

2.2.1.8 Solenoids

Solenoids for operation of pilot valves shall be housed in an explosion-proof case suitable for Class I, Division 1, Group D with maximum temperature rating of ("T2D" -419 degrees F), hazardous locations as defined in NFPA 70. Solenoids shall operate on 120 volts, 60 cycle, single phase, alternating current. A manual type operator or needle valve to bypass the solenoid valve shall be provided for emergency manual operation.

2.2.2 Serviceability of Main Valve Internal Parts

Main valve movable parts including strainers, valve seat, stem bearings, and control system shall be replaceable without removing the main valve from the line. All nonmetallic parts shall be replaceable.

2.2.3 Total Lengths

The total valve length does not include the orifice plate flange (when used). If the control valve being supplied has the orifice plate built into its flange, the spacer provided shall bring the valve face-to-face dimension equal to those listed below plus 0.0875 of an inch. The lengths of the valves shall be equal for the following materials: cast stainless steel, cast steel and cast aluminum.

SIZE INCHES	VALVE LENGTH (INCHES)
1-1/2	8.5
2	9.375
3	12
4	15
6	20
8	25.4
10	29.8
12	34
14	39
16	41.375

Tolerance shall be $\pm$0.030 of an inch for size one and one-half inches (1-1/2") through eight inches (8") and $\pm$0.060 on an inch for size 10 thru 16 inches.

Control valves not meeting these face to face dimensions shall be supplied with spacers suitable for the proper installation of the valve.

2.2.4 Flanges

	MATERIAL	SEALING SURFACE
A:	Cast Steel, ASME B16.5 Class 150	Raised Face

B:	Cast Stainless Steel, ASME B16.5 Class 150	Raised Face
C:	Cast Aluminum, Suitable for minimum working pressure of 275 psig at 100 degrees F.	Flat Face
[D:	Ductile Iron, ASME B16.24 Class 150	Flat Face]

****

NOTE: PER COMMAND FUELS FACILITY ENGINEER DIRECTION.

****

The mating flange shall be made the same as above.

2.2.5 Identification

2.2.5.1 Main Valve Body

The following shall be cast into the main valve body:

a. Pressure Class
b. Size
c. Material
d. Foundry Heat Number and Identification
e. Manufacturer
f. Flow Pattern

2.2.5.2 Main Valve Cover

The following shall be cast into the main valve cover:

a. Size
b. Material
c. Foundry Heat Number and Identification

2.2.5.3 Brass Name Plates

Brass name plates shall be fastened to the valve. Body name plates shall list the following:

a. Size
b. Model Number
c. Stock Number
d. Manufacturer/Supplier
e. Manufacturer's Inspection Stamp

2.2.5.4 Inlet Name Plate

Inlet name plate shall list the following:

a. Size
b. "Inlet" Marking
c. Assembly Model Number
d. Part Number

2.2.5.5 Outlet Name Plate

Outlet name plate shall list the "Outlet" Marking.

2.2.5.6 Pilot Valves

Pilot valves shall be tag identified. The tag shall also have the field adjusted start up setting stamped on it.

2.3 MATERIALS

The type of materials which come in contact with the fuel, if not specified herein before, shall be noncorrosive.

2.4 INDIVIDUAL CONTROL VALVE OPERATIONAL REQUIREMENTS

Operation, performance, and special features of the individual control valves shall be as specified herein.

2.4.1 High Liquid Level Shut-Off Valve (HLV-1 AND HLV-2)

2.4.1.1 Size

Eight-inch (8")

2.4.1.2 Flow

1200 GPM

2.4.1.3 Operation

High liquid level shut-off valve shall be hydraulically operated and shall be provided with a tank exterior mounted float. Activation point of the float for opening and closing the high liquid level shut-off valve shall be as shown on the drawings. Upon a rise in fluid level to the float activation point, the float control system shall cause the main valve to close tightly. The main valve shall remain closed until a drop in tank fluid level occurs. Upon a drop in fluid level beneath the float activation point, the float control shall cause the main valve to open completely.

2.4.1.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.4.1.5 Manual Test Feature

Manual testing of high level shut-off valve and exterior mounted float's automatic opening and closing feature shall be possible.

2.4.1.6 Strainer

A 40-mesh stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

2.4.1.7 Pressure Sensitive Close Feature

If the upstream pressure rises to 150 psi or above while closing, the valve will stop closing or open slightly until the pressure is less than 150 psi.

****
NOTE: PROVIDE PER COMMAND FUELS FACILITY ENGINEER DIRECTION.
****

2.4.2 Non-Surge Check Valve (CV-1 THRU CV-6)

2.4.2.1 Size

Six-inch (6"); two-inch (2") for FTP-1

2.4.2.2 Flow

650 GPM; 50 GPM for FTP-1.

2.4.2.3 Operation

Nonsurge check valve shall open slowly. Opening speed shall be adjustable from two (2) to 30 seconds without affecting closing of valve. Factory set for 15 seconds. The nonsurge check vales shall fail closed against reverse flow in check condition.

2.4.2.4 Quick closure

Valve closure to be rapid, closing quickly when outlet pressure exceeds inlet pressure.

2.4.2.5 Flow Control

Valve to limit flow to 650 GPM (CV-1 thru CV-5), 50 GPM (CV-6). Sensing shall be by orifice. Valve to modulate to limit flow without hunting. Rate of flow to be manually adjustable.

2.4.2.6 Strainer

A 40-mesh, stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

2.4.2.7 Emergency Shut-off Operation

Open/closed valve, solenoid operated. Closure shall be accomplished within 10 seconds upon power failure or activation of an emergency-stop pushbutton.

2.4.2.8 Solenoid Control

****
NOTE: PER COMMAND FUELS FACILITY ENGINEER DIRECTION. FUNCTION CAN ALSO BE DONE VIA A MANUAL VALVE.
****

Solenoid control shall be as indicated on the drawings.

2.4.3 Issue and Receiving Filter Separator Control Valve (FSCV-1 Thru FSCV-7)

2.4.3.1 Size

Six-inch (6")

2.4.3.2 Flow

600 GPM

2.4.3.3 Operation

Filter Separator Control Valve shall limit flow to 600 GPM. Controlling to be by orifice. Rate of flow to be manually adjustable.

2.4.3.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.4.3.5 Water Slug Shut-Off

****

NOTE: DO A HYDRAULIC ANALYSIS ON THE TRANSFER LINE TO SEE IF THE WATER SLUG SHUT-OFF SHOULD BE DELETED FROM THE RECEIPT FILTER SEPARATORS.

****

Valve shall close rapidly when water is sensed at filter separator sump high level as indicated by Float Control Valve float position. Manual testing of operation shall be possible.

2.4.3.6 Shut-Off Feature at Maximum Differential Pressure

****

NOTE: COORDINATE SELECTION OF THIS FEATURE WITH THE COMMAND FUELS FACILITY ENGINEER AND FOR USE ON LONG TRANSFER LINES.

****

Valve shall close rapidly when differential control pilot increases to preset point. Resetting of the differential control pilot shall be manually reset after each shutoff.

2.4.4 Issue and Receiving Filter Separator Float Control Valve with Manual Tester (FC-1 THRU FC-7)

2.4.4.1 Operation

Float shall ride on the fuel-water interface inside filter separator sump. Activation shall initiate water slug shutoff of filter separator valve.

2.4.4.2 Float Control Pilot and Tester

The filter separator housing sump shall be fitted with a float control pilot valve assembly made of stainless steel. The pilot valve is connected to the filter separator control valve. An integral float control tester shall provide a means to remove a portion of the float ball ballast allowing the float to rise, verifying operation of the water slug and flow control valve, the integrity of the float ball.

2.4.5 Back Pressure Control Valve (BPCV-1)

2.4.5.1 Size

Six-inch (6")

2.4.5.2 Flow

0-2400 GPM

2.4.5.3 Operation

****
NOTE: TO BE DETERMINED BY SYSTEM HYDRAULICS.
****

Back pressure control valve shall modulate to maintain constant inlet pressure. Set-point shall be adjustable with a range of 20 psig to 200 psig. Factory set at 130 psig.

2.4.5.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.4.5.5 Solenoid Control

Solenoid control valve shall be as indicated on the drawings.

2.4.5.6 Speed Control

Valve shall close slowly without affecting the opening speed and shall be factory set for eight (8) seconds. Closing time to be adjustable with a range of two (2) to 30 seconds. Valve opening time shall be 1.0 second maximum.

2.4.6 Pressure Control Valve (PCV-1)

2.4.6.1 Size

Two-inch (2").

2.4.6.2 Flow

50 GPM under normal operating conditions.

2.4.6.3 Operation

Pressure control valve shall modulate to control inlet pressure and shall have adjustable set-point with a range of 20 psig to 200 psig. Factory set at 75 psig.

2.4.6.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.4.6.5 Solenoid Control

Solenoid control of valve shall be as indicated on drawings.

2.4.6.6 Speed Control

Provide separate opening and closing speed controls each adjustable between one (1) and 30 seconds. Factory set at three (3) seconds for opening speed and one (1) second for closing speed.

2.4.7 Defuel/Flush Valve (D/FV-1)

2.4.7.1 Size

Eight-inch (8").

2.4.7.2 Flow

300 to 2400 GPM.

2.4.7.3 Operation

Valve shall modulate to control inlet pressure and shall have adjustable set-point with a range of 20 psig to 200 psig. Factory set at 80 psig.

2.4.7.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.4.7.5 Solenoid Control

The valve shall be provided with two (2) solenoid controls and shall operate as indicated on drawings.

2.4.7.6 Speed Control

Valve shall open slowly without affecting the closing speed and shall be factory set for three seconds. Opening time to be adjustable with a range of 2 to 30 seconds.

2.4.8 Hydrant Control Valve (HCV)

2.4.8.1 Size

****

NOTE: SELECT 4-INCH FOR USE WITH PANTOGRAPH AND 4-INCH OR 6-INCH FOR USE WITH HYDRANT HOSE TRUCK, PER COMMAND FUEL FACILITIES ENGINEER DIRECTION.

****

[Four-inch (4")] [Six-inch (6")].

2.4.8.2 Flow

****

NOTE: SELECT 600 GPM FOR 4-INCH VALVE AND 1200 GPM FOR 6-INCH VALVE.

****

[600][1200] GPM.

2.4.8.3 Operation

Hydrant control valve shall modulate, by use of a liquid sensing line from [pantograph][refueler] venturi, and regulate at a maximum pressure at the skin of the aircraft of 45 psig at any flow rate from 50 GPM to [600][1200] GPM. Pressure to be adjustable with a range of 15 psi to 75 psi. Valve, adapter and 90-degree hydrant coupler pressure drop shall not exceed [9 psi at 600][28 psi at 1200] GPM with the valve fully open.

2.4.8.4 Quick Closure

****
NOTE: SELECT 600 GPM OR 1200 GPM BASED ON HYDRANT CONTROL VALVE SIZE SELECTION.
****

Valve shall close rapidly when outlet pressure exceeds control set-point. Valve shall limit the surge pressure on the aircraft to a maximum of 120 psig when fueling at [600 GPM with an aircraft tank valve closure of 0.5 of a second] [1200 GPM with an aircraft tank valve closure of 0.8 of a second]. The valve shall reopen when the outlet pressure drops below the set-point of the pilot if the deadman control lever is still depressed.

2.4.8.5 Deadman Control

****
NOTE: SELECT DEADMAN CONTROL OPTION, HYDRAULIC FOR PANTOGRAPH, PNEUMATIC FOR REFUELER TRUCKS.
****

Deadman shall be [hydraulically][pneumatically] connected to the pilot system of main valve. Valve shall open when deadman control lever is pressed and shall close valve when the lever is released to bleed air from the hydrant hose truck. On rupture of the deadman hose between outlet of deadman control and main valve pilot system, there shall be no fuel leakage. Main valve shall close in five (5) seconds maximum when deadman is released or when one of the deadman hose couplers is disconnected.

2.4.8.6 Defuel

Valve shall be capable of reverse flow at the rate of 300 GPM at 165 psig.

2.4.8.7 Speed Control

Valve shall open slowly without affecting the closure rate. Provide adjustable speed control with a range of two (2) to 30 seconds.

2.4.8.8 Thermal Relief

Valve to open for pressure equalization and return flow when downstream pressure exceeds upstream pressure.

2.4.8.9 Adapter

Valves shall be provided with type adapter as indicated on drawings. Provide metal sealing cover connected to the adapter. Adapter shall have pressure equalizing feature.

2.4.8.10 Strainer

A 40-mesh stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

2.4.9 Overfill Valve for Product Recovery Tank (OV-1)

2.4.9.1 Size

Two-inch (2").

2.4.9.2 Capacity

50 GPM.

2.4.9.3 Operation

Hydraulically operated overfill valve shall close automatically upon rising to Product Recovery Tank 80 percent fill level. Valve shall open automatically upon falling below Product Recovery Tank 80 percent fill level.

2.4.9.4 Control Float

Automatic opening and closing of the valve shall be initiated by a control float located within the Product Recovery Tank. Control float shall be provided with a manual tester, mounted external to the tank, for testing of overfill valve operation.

2.4.9.5 Pressure Reservoir

Valve shall be provided with a pressure reservoir to supply required hydraulic pressure for operation. Reservoir pressure to be supplied by Fuel Transfer Pump (FTP-1). Valve shall close upon loss of reservoir pressure. Reservoir shall be a one gallon capacity bladder-type tank, ductile iron constructed, tested and stamped in accordance with ASME BPV VIII Div 1 for a working pressure of 125 psi and precharged with air. The tank will be epoxy lined. The tank will be fitted with an air charging valve and pressure gauge.

2.4.9.6 Thermal Relief

Overfill valve shall be provided with a pressure sustaining control valve that shall automatically, upon inlet pressure rising to 200 psig, open allowing thermal relief around overfill valve. Pressure sustaining valve shall automatically close upon inlet pressure dropping below 200 psig.

2.4.9.7 Limit Switch

Limit switch shall be provided with valve for remote indication of valve open or closed position. Valve closed position will become an alarm condition the pump control panel (PCP).

2.4.9.8 Strainer

Pressure reservoir inlet line shall be provided with a shut-off valve, strainer and check valve.

2.4.10 Truck Fill Stand Control Valve (TFV)

2.4.10.1 Size

Four-inch (4").

2.4.10.2 Flow

600 GPM.

2.4.10.3 Operation

Valve shall modulate to regulate downstream to 35 psig at a flow rate of 50 GPM to 600 GPM. Pressure shall be adjustable with a range of 15 psi TO 75 psi.

2.4.10.4 Quick Closure

Valve shall close rapidly when outlet pressure exceeds control set-point. Valve shall limit the surge pressure on the bottom loader of a tank truck to a maximum of 85 psig when filling at 600 GPM with a tank truck valve closure of 0.5 of a second. The valve shall reopen when the outlet pressure drops below the set-point of the pilot if the deadman control lever is still depressed.

2.4.10.5 Opening Speed Control

Valve shall control the opening speed of the main valve. The control shall be adjustable with a range of two (2) to 30 seconds. Factory set at ten (10) seconds.

2.4.10.6 Deadman Control

Deadman shall be hydraulically connected to the pilot system of the main valve. Valve shall open when deadman control lever is pressed and shall close the valve when the lever is released. On rupture of the deadman hose between outlet of deadman control and main valve pilot system, there shall be no fuel leakage. Main valve shall close in two (2) seconds maximum when one of the deadman hose couplers is disconnected. Length of hose shall be 10 feet.

2.4.10.7 Thermal Relief

Valve to open for pressure equalization and return flow when downstream pressure exceeds upstream pressure.

2.4.10.8 Strainer

A 40-mesh stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

PART 3 EXECUTION

3.1 VALVE TESTING AND START-UP SUPPORT

The Contractor shall provide the services of a factory trained and certified service engineer employed by the valve manufacturer to verify

that each valve has been properly installed and to verify valves were factory operationally tested, adjusted and set per these specifications. The service engineer shall assist the Contractor in the valve start-up adjustment process and will remain on site until all control valves function as required by the contract documents.

3.1.1 Standard 1-Year Warranty Period

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NOTE: MODIFY HOURS FOR PROJECTS OUTSIDE THE UNITED STATES.
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If a problem attributable to the valve's manufacturer or installation arises after the initial system start-up has been accomplished, and after system final acceptance date, the Contractor shall have [48] hours from the time of notification that a problem exists to solve the problem. The problem shall be solved to the satisfaction of the [Contracting Officer, the Base Civil Engineer and/or the Command Fuel Facilities Engineer] [Contracting Officer]. If the Contractor cannot effectuate a proper resolution to the problem as outlined above in the [48][__] hour period, the Contractor shall provide a factory trained engineer from the manufacturer of the valve within [48] hours after the expiration of the Contractor's initial [48][__] hour period to effectuate a resolution of the problem above. All services provided by the valve manufacturer shall be at no cost to the Government. When it has been determined by the Contractor, Contracting Officer, and the valve manufacturer's representative that the valve(s) cannot be repaired in its installed position in the fuel system, it shall be replaced with a new valve and pilot assembly within [48][__] hours after the initial 96-hour period listed above expires and at no cost to the Government.

3.2 TRAINING

The manufacturer shall conduct two eight- (8-) hour training classes for Liquid Fuels Maintenance Technicians which include valve overhaul procedures, pilot overhaul procedures, valve adjustments, and valve diagnostics. The manufacturer shall provide a four-inch (4") valve mock-up with various trim components (i.e., rate of flow, solenoid control, and speed control features) to be used during training. Video taping of training shall be allowed. The four-inch (4") valve mock-up shall become the property of the Government and shall be turned over to the Contracting Officer.

-- End of Section --