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USACE / NAVFAC / AFCESA / NASA **UFGS-33 52 43.14 (February 2010)**

Preparing Activity: USACE

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated October 2011
****

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SECTION 33 52 43.14

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SECTION 33 52 43.14

AVIATION FUEL CONTROL VALVES
02/10

****
NOTE: This guide specification covers the requirements for diaphragm type automatic control valves used in aircraft refueling systems constructed to the requirements of the DoD Type III/IV/V, and Cut'n Cover Hydrant Refueling System Standards.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
****

PART 1 GENERAL

****
NOTE: DoD Type III systems shall conform to Standard Design 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM (TYPE III). DoD Type IV/V systems shall conform to Standard Design 078-24-29 AIRCRAFT DIRECT FUELING SYSTEM (TYPE IV) DESIGN.
****

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in

the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

****

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.

ASME INTERNATIONAL (ASME)

ASME B16.24	(2006) Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500
ASME B16.5	(2009) Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME BPVC SEC VIII D1	(2007; Addenda 2008; Addenda 2009) BPVC Section VIII-Rules for Construction of Pressure Vessels Division 1

ASTM INTERNATIONAL (ASTM)

ASTM A194/A194M	(2010a) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
ASTM A216/A216M	(2008) Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service
ASTM A269	(2010) Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A320/A320M	(2011) Standard Specification for Alloy/Steel and Stainless Steel Bolting Materials for Low-Temperature Service
ASTM A536	(1984; R 2009) Standard Specification for Ductile Iron Castings
ASTM A743/A743M	(2006; R 2010) Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant,

	for General Application
ASTM B26/B26M	(2009) Standard Specification for Aluminum-Alloy Sand Castings
ASTM D 2000	(2008) Standard Classification System for Rubber Products in Automotive Applications
ASTM D 751	(2006) Coated Fabrics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2011; TIA 11-1; Errata 2011) National Electrical Code

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS 3216	(2005; Rev G) Fluorocarbon (FKM) Rubber High-Temperature - Fluid Resistant Low Compression Set 70 To 80
SAE J200	(2008) Classification System for Rubber Materials
SAE J429	(1999) Mechanical and Material Requirements for Externally Threaded Fasteners

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-A-8625	(1993; Rev F; Am 1 2003) Anodic Coatings, for Aluminum and Aluminum Alloys

1.2 ADMINISTRATIVE REQUIREMENTS

Design conditions shall be as specified in Section 33 52 43.11 AVIATION FUEL MECHANICAL EQUIPMENT. Components shall be suitable for ANSI Class 150 (2 MPa 275 psig at 38 degrees C 100 degrees F).

a. Control valves specified herein shall be of one manufacturer. The valve manufacturer shall also produce the hydraulically-operated pilots. For each type control valve required and specified, submit the following:

(1). Flow diagrams.
(2). Operational description of the control valve and pilot control system.
(3). Complete valve assembly list of materials, along with material Certificates of Conformance, used in the manufacture of the control valves and pilot systems.
(4). sectional drawings of main valve and control pilot systems.

b. 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.

c. Operation and maintenance information shall be submitted for each

individual type control valve specified herein. Refer to Section 01 78 23.33 OPERATION AND MAINTENANCE MANUALS FOR AVIATION FUEL SYSTEMS for the information to be submitted.

1.3 SUBMITTALS

****

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Control Valves[; G][; G, [_____]].

SD-03 Product Data

Control Valves[; G][; G, [_____]].

SD-06 Test Reports

Control Valves; .

SD-07 Certificates

Previous Air Force/Military Projects[; G][; G, [_____]].
Qualified Engineers[; G][; G, [_____]].
Field Assistance[; G][; G, [_____]].

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals[; G][; G, [_____]].

1.4 QUALITY ASSURANCE

1.4.1 Field Assistance

Provide the following:

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

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

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

1.4.2 Training

The manufacturer shall conduct two eight 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 100 mm 4-inch 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 or provided at the time of the class, and an attendance roster maintained by the Contractor. The 100 mm 4-inch valve mock-up shall become the property of the Government and shall be turned over to the Contracting Officer. Submit copies of the Operation and Maintenance Manuals for approval.

1.5 WARRANTY

****
NOTE: Modify hours for projects outside the UNITED STATES.
****

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, [48] [_____] hours from the time of notification that a problem exists is allowed 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, 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.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

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

2.2 CONTROL VALVES

2.2.1 General

Control valves shall be single-seated globe type, diaphragm actuated, hydraulically operated valves. Valves shall consist of 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 stainless steel, or electroless nickel plated ductile iron unless noted otherwise. [High level shut-off valve bodies shall be electroless nickel plated ductile iron.] [Valves at exterior locations shall be stainless steel. Open canopies are considered an exterior location.] 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. Cast steel conforming to ASTM A216/A216M, Grade WCB internally plated with chromium, nickel or internally electroless nickel plated.

b. Cast stainless steel conforming to ASTM A743/A743M.

c. Ductile iron conforming to ASTM A536, electroless nickel plated.

d. 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 Engineer's direction.
****

Valve seats shall be stainless steel in accordance with ASTM A743/A743M. 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

Valve discs shall contain a resilient, fluoroelastomer (FKM), commonly referred to as Viton disc conforming to SAE AMS 3216 having a rectangular cross section, contained on 3.5 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

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 2 layers of nylon fabric bonded with a minimum of 3 layers of synthetic rubber (valves 62 mm 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 J200). The diaphragm must have a MULLINS-burst rating according to ASTM D 751 of a minimum of 4.14 MPa 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 Ductile Iron, and Cast Steel Body Valves.

(1) Bolts and Screws, cadmium plated steel in accordance with SAE J429, Grade 5.

(2) Nuts, cadmium plated steel in accordance with ASTM A194/A194M, Grade 2 H.

b. For Stainless Steel Body Valves. Bolts, Screws and Nuts, ASTM A320/A320M, Grade B8M C.1.1.

2.2.1.6 Pilot Control System and Auxiliary Piping

Pilot Control System and auxiliary piping shall be stainless steel, seamless, fully annealed tubing conforming to ASTM A269, Grade TP316, Rockwell hardness B80 or less. Wall thickness for 13 mm 1/2-inch tubing to be 1.2 mm 0.049-inch. Threaded connections shall be used in pilot system piping and shall be o-ring type with FKM o-rings. Tubing connections shall not be welded.

2.2.1.7 Pilot Valves

Pilot valves shall have [stainless steel bodies conforming to ASTM A743/A743M] [aluminum bodies conforming to ASTM B26/B26M Type 356-T6 anodized in accordance with 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. Spare wire seals and the "embossing" tool will be turned over to the Contracting Officer for the LFM shop.

****
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 (216 degrees C 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 2.2 mm 0.0875 inch. The lengths of the valves shall be equal for the following materials: cast stainless steel, cast steel, and ductile iron.

SIZE mminches	VALVE LENGTH mminches
381-1/2	2168.5

SIZE mminches	VALVE LENGTH mminches
502	2349.375
753	30512
1004	38115
1506	50020
2008	63525.4
25010	74529.8
30512	85034
35014	97539
40016	103441.375
Note: Tolerance shall be ±0.75 mm0.03 inch for size 38 mm 1-1/2 inches through 200 mm 8 inches and ±1.5 mm0.06 inch for size 250 thru 400 mm 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

****
NOTE: Per Command Fuels Facility Engineer direction.
****

MATERIAL	SEALING SURFACE
Cast Steel, ASME B16.5 Class 150	Raised Face
Cast Stainless Steel, ASME B16.5	Raised Face Class 150
Ductile Iron, ASME B16.24 Class 150	Flat Face
Note: 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 valve shall have the field adjusted start up setting engraved on a plastic tag, white with black lettering.

2.3 INDIVIDUAL CONTROL VALVE OPERATIONAL REQUIREMENTS

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

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

2.3.1.1 Size

200 mm 8-inch

2.3.1.2 Flow

75 L/s 1200 GPM

2.3.1.3 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.

2.3.1.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.3.1.5 Manual Test Feature

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

2.3.1.6 Strainer

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

2.3.1.7 Pressure Sensitive Close Feature

If the upstream pressure rises to 1 MPa 150 psi or above while closing, the valve will stop closing or open slightly until the pressure is less than 1 MPa 150 psi.

****
NOTE: Provide per Command Fuels Facility Engineer direction.
****

[2.3.1.8 Minimum Differential Pressure Feature

The valve shall be equipped with a minimum differential pressure pilot to maintain a differential pressure across the valve. Pressure shall be adjustable with a range of 34 to 170 kPa 5 to 25 psi.

][2.3.1.9 Opening and Closing Feature

The valve shall be equipped with an adjustable differential pressure pilot and a quick cover exhaust system to allow the valve to open in 3-4 seconds when pressure is greater than [_____] [1.1] kPa [_____] [170] psig.

][2.3.1.10 Solenoid Control

The valve shall be provided with solenoid control and shall operate as indicated.

]2.3.2 Non-Surge Check Valve (CV-1 THRU CV-6)

2.3.2.1 Size

150 mm6-inch; 50 mm 2-inch for FTP-1

2.3.2.2 Flow

[60] [40] L/s [950] [650] GPM; 13 L/s 50 GPM for FTP-1.

2.3.2.3 Operation

Non-surge 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.

2.3.2.4 Quick closure

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

2.3.2.5 Flow Control

Valve to limit flow to [60] [40] L/s [950] [650] GPM (CV-1 thru CV-5), 13 L/s 50 GPM (CV-6). Sensing shall be by orifice. Valve to modulate to limit flow without hunting. Rate of flow to be manually adjustable and utilize a downstream orifice plate holder.

2.3.2.6 Strainer

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

2.3.3 Non-Surge Check/Air Block Valve (AB/CV-1 THRU AB/CV-[ ])

2.3.3.1 Size

100 mm 4 inch

2.3.3.2 Flow

0-[21] [40] L/s0-[340] [640] GPM.

2.3.3.3 Operation

Backpressure control pilots will cause main valve to modulate to maintain constant inlet pressure. There shall be 3 backpressure control pilots, A, B, and C. Pilot A shall be solenoid enabled and set at pressure which corresponds with unloading pump flow rate of 38 L/s 600 GPM. Pilot B shall be solenoid enable and set at pressure which corresponds with unloading pump flow rate of 19 L/s 300 GPM. Pilot C shall be a 50 mm 2 inch solenoid controlled control valve set at pressure corresponding with unloading pump flow rate of 10 L/sec 150 GPM. All pilots are to have 125-1250 kPa 20-200 PSIG range.

2.3.3.4 Speed Control

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 valves shall fail closed against reverse flow in check condition.

2.3.3.5 Check Feature

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

2.3.3.6 Solenoid Control

Solenoid control of valve shall be as indicated on the drawings.

2.3.3.7 Strainer

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

2.3.4 Filter Separator Control Valve (FSCV-1 Thru FSCV-7)

2.3.4.1 Size

150 mm 6-inch

2.3.4.2 Flow

[56] [36] L/s [900] [600] GPM

2.3.4.3 Operation

Filter Separator Control Valve shall limit flow to [56] [36] L/s [900] [600] GPM. Controlling to be by orifice. Rate of flow to be manually adjustable and utilize a downstream orifice plate holder.

2.3.4.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.3.4.5 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.

[2.3.4.6 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.

]2.3.4.7 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.

2.3.4.8 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.

2.3.5 Filter Separator Float Control Valve and Tester (FC-1 THRU FC-7)

2.3.5.1 Operation

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

2.3.5.2 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, and the integrity of the float ball.

2.3.6 Back Pressure Control Valve (BPCV-1)

2.3.6.1 Size

150 mm 6-inch

2.3.6.2 Flow

0-[151] [170] L/s0-[2400][2700] GPM

2.3.6.3 Operation

****
NOTE: To be determined by system hydraulics. For the Type IV System, pantograph is required, inlet pressure will vary based on manufacturer, size, and number of legs.
****

Back pressure control valve shall modulate to maintain constant inlet pressure. Set-point shall be adjustable with a range of 1.3 to 13 MPa 20 to 200 psig. Factory set at [860] [550] [_____] kPa [130] [80] [_____] psig, and 1.1 MPa 160 psig.

2.3.6.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.3.6.5 Solenoid Control

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

2.3.6.6 Speed Control

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

[2.3.6.7 Opening Feature

The valve shall be equipped with cover quick exhaust system to allow the valve to open in 3-4 seconds when pressure is greater than [_____] [1.1] MPa [_____] [170] psig.

]2.3.7 Pressure Control Valve (PCV-1)

2.3.7.1 Size

50 mm 2-inch.

2.3.7.2 Flow

3 L/s 50 GPM under normal operating conditions.

2.3.7.3 Operation

Pressure control valve shall modulate to control inlet pressure and shall have adjustable set-point with a range[s] of 0.13 to 1.3 MPa 20 to 200 psig. Factory set at 500 kPa 75 psig[, and 667 kPa 50 psig].

2.3.7.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.3.7.5 Solenoid Control

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

2.3.7.6 Speed Control

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

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

2.3.8.1 Size

203 mm 8-inch.

2.3.8.2 Flow

19 to [151] [170] L/s 300 to [2400] [2700] GPM.

2.3.8.3 Operation

Valve shall modulate to control inlet pressure and shall have adjustable set-point with a range of 0.125 to 1.25 MPa 20 to 200 psig. Factory set at 550 kPa 80 psig.

2.3.8.4 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

2.3.8.5 Solenoid Control

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

2.3.8.6 Speed Control

Valve shall open slowly without affecting the closing speed and shall be factory set for 3 seconds. Opening time to be adjustable with a range of 2 to 30 seconds.

2.3.9 Hydrant Control Valve (HCV)

2.3.9.1 Size

****
NOTE: Select 100 mm (4-inch) for use with pantograph and 100 or 150 mm (4 or 6-inch) for use with hydrant hose truck, per COMMAND FUEL FACILITIES Engineer direction.
****

[100] [150] mm [4] [6] inch

2.3.9.2 Flow

****
NOTE: Select 38 L/s (600 GPM) for 100 mm (4-inch) valve and 76 L/s (1200 GPM) for 150 mm (6-inch) valve.
****

[38] [76] L/s [600] [1200] GPM.

2.3.9.3 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 330 kPa 45 psig at any flow rate from 3 to [38] [76] L/s 50 to [600] [1200] GPM. Pressure to be adjustable with a range of 103 to 515 kPa 15 to 75 psi. Valve, adapter and 90-degree hydrant coupler pressure drop shall not exceed [7 MPa at 38 L/s 9 psi at 600 GPM] [21 MPa at 76 L/s28 psi at 1200 GPM] with the valve fully open.

2.3.9.4 Quick Closure

****
NOTE: Select 38 L/s (600 GPM) or 76 L/s (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 800 kPa 120 psig when fueling at [38 L/s 600 GPM with an aircraft tank valve closure of 0.5 second] [76 L/s 1200 GPM with an aircraft tank valve

closure of 0.8 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.

2.3.9.5 Deadman Control

****
NOTE: Select deadman control option, hydraulic for pantograph, pneumatic for refueler trucks. Verify type of deadman control to select with the MAJCOM.
****

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 5 seconds maximum when deadman is released or when one of the deadman hose couplers is disconnected.

2.3.9.6 Defuel

Valve shall be capable of reverse flow at the rate of 19 L/s 300 GPM at 1.1 MPa 165 psig. Valve shall be capable of defueling regardless of nozzle pressure created by the R-12.

2.3.9.7 Speed Control

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

2.3.9.8 Thermal Relief

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

2.3.9.9 Adapter

Valves shall be provided with type adapter as indicated on drawings. Adapter shall have pressure equalizing feature and have a vacuum tight dust cap.

2.3.9.10 Strainer

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

[2.3.9.11 Minimum Differential Pressure Feature

The valve shall be equipped with a minimum differential pressure pilot to maintain a differential pressure across the valve. Pressure shall be adjustable with a range of 34 to 170 kPa 5 psi to 25 psi (150 mm6-inch valve only)

]2.3.10 Overfill Valve for Product Recovery Tank (OV-1)

2.3.10.1 Size

50 mm 2-inch.

2.3.10.2 Capacity

3 L/s50 GPM.

2.3.10.3 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.

2.3.10.4 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.

2.3.10.5 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)using 13 mm 0.5-inch tubing connected upstream of the pump non-surge check valve. Valve shall close upon loss of reservoir pressure. Reservoir shall be a 4 L 1 gal capacity bladder-type tank, carbon steel constructed, tested and stamped in accordance with ASME BPVC SEC VIII D1 for a working pressure of 800 kPa 125 psi and precharged with air of 80-100 kPa 13-15 psig. The tank will be epoxy lined. The tank will be fitted with an air charging valve and pressure gauge.

2.3.10.6 Thermal Relief

Overfill valve shall be provided with a pressure sustaining control valve that shall automatically, upon inlet pressure rising to 1.3 MPa 200 psig, open allowing thermal relief around overfill valve. Pressure sustaining valve shall automatically close upon inlet pressure dropping below 1.3 MPa 200 psig.

2.3.10.7 Limit Switch

Limit switch shall be single pole, single throw contract (SPST) and provided with valve for remote indication of valve open or closed position. Valve closed position will become an alarm condition at the pump control panel (PCP).

2.3.10.8 Strainer

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

2.3.11 Truck Fill Stand Control Valve (TFV)

2.3.11.1 Size

100 mm 4-inch.

2.3.11.2 Flow

38 L/s 600 GPM.

2.3.11.3 Operation

Valve shall modulate to regulate downstream pressure to 200 kPa 35 psig at a flow rate of 3 to 38 L/s 50 to 600 GPM. Pressure shall be adjustable with a range of 100 to 518 kPa 15 TO 75 psi. Valve solenoid shall be connected to the overfill protection system.

2.3.11.4 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 585 kPa 85 psig when filling at 38 L/s 600 GPM with a tank truck valve closure of 0.5 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.

2.3.11.5 Opening Speed Control

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

2.3.11.6 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 2 seconds maximum when one of the deadman hose couplers is disconnected. Length of hose shall be 4.6 m 15 feet.

2.3.11.7 Thermal Relief

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

2.3.11.8 Strainer

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

2.3.11.9 Solenoid Control

****
NOTE: For use with ground proving system.
****

Solenoid control of valve shall operate as indicated on drawings.

2.3.12 Pantograph Control Valve (PTCV)

****
NOTE: Select use of pantograph control valve per COMMAND SERVICE HEADQUARTERS direction.
****

2.3.12.1 Size

100 mm4-inch.

2.3.12.2 Flow

38 L/s 600 GPM.

2.3.12.3 Operation

Valve shall modulate, by use of a liquid sensing line from the pantograph venturi, and regulate downstream to 379 kPa 55 psig at a flow rate of 3.8 to 38 L/s 50 to 600 GPM. Pressure shall be adjustable with a range of 103 to 517 kPa 15 to 75 psi.

2.3.12.4 Closing Speed Control

Valve shall control the closing speed of the main valve. The control shall be adjustable with a range of 2 to 30 seconds. Factory set at 10 seconds.

[2.3.12.5 Thermal Relief

****
NOTE: For use Type IV Aircraft direct Fueling stations.
****

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

]2.3.12.6 Strainer

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

2.3.13 Flushing Valve (FV-1)

2.3.13.1 Size

150 mm6-inch.

2.3.13.2 Flow

0-91 L/s0-1200 GPM.

2.3.13.3 Operation

Valve shall open and close by means of hydraulic line pressure.

2.3.13.4 Solenoid Control

Solenoid control of valve shall operate as indicated on drawings.

2.3.14 Pantograph Pressure Control Valve (PPCV-1 thru PPCV-[ ])

****
NOTE: Quantity based on number of Aircraft direct Fueling stations. One per station.

****

2.3.14.1 Size

38 mm1-1/2-inch.

2.3.14.2 Operation

Valve shall open and close by means of hydraulic line pressure. Initial setting shall be 517 kPa 75 PSIG and shall be field adjustable between 345-690 kPa 50-100 PSIG. Final field pressure setting of valve shall be equal to 10 percent above recorded line pressure at 45 L/s 600 GPM flow rate.

2.3.14.3 Check Valve Feature

Valve shall close rapidly when outlet pressure exceeds inlet pressure.

PART 3 EXECUTION

3.1 VALVE TESTING AND START-UP SUPPORT

Provide the services of a factory trained and certified service engineer authorized/sanctioned/certified 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.

-- End of Section --