

**NAVFAC  
SPECIFICATION**

**NF313-08 (4998360)  
CONSTRUCT  
DEFUEL/REFUEL AREA,  
FRC EAST MCAS CP**

**AMENDMENT #0003**

## **IMPORTANT**

**This amendment should be acknowledged when your proposal is submitted. Failure to acknowledge the amendment may constitute grounds for rejection of the proposal.**

**If your proposal has been submitted prior to the receipt of this amendment, acknowledgement should be made by telegram, which should state whether the price contained in your proposal is to remain unchanged, is to be decreased by an amount, or is to be increased by an amount. The acknowledgement must be received prior to proposal opening time.**

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>			1. CONTRACT ID CODE	PAGE 1	OF PAGES 2
2. AMENDMENT/MODIFICATION NO. 0003	3. EFFECTIVE DATE 11/7/2011	4. REQUISITION/PURCHASE REQ. ---	5. PROJECT NO. (If applicable)		
6. ISSUED BY <b>CG MCAS Cherry Point FACILITIES, ROICC B-163, CURTIS ROAD PSC BOX 8006 CHERRY POINT, NC 28533</b>		7. ADMINISTERED BY (If other than item 6.)		Code	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)  <b>AMENDMENT MUST BE ACKNOWLEDGED WITH YOUR PROPOSAL</b>			<input checked="" type="checkbox"/>	9A. AMENDMENT OF SOLICITATION PROJECT #NP313-08 (4998360)	
				9B. DATED (SEE ITEM 11) 1/28/2010	
			<input type="checkbox"/>	10A. MODIFICATION OF CONTRACT/ORDER NO.	
				10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE				

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers  is extended  is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning 1 copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

**12. ACCOUNTING AND APPROPRIATION DATA (if required)**

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS,  
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

- A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14. ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
- B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATION CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103 (b).
- C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
- D. OTHER: (specify type of modification and authority)

E. IMPORTANT: Contractor  is not  is required to sign this document and return **original** to the issuing office.

**14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)**

**NF313-08 (4998360) CONSTRUCT DEFUEL/REFULE AREA, FRC EAST, MARINE CORPS AIR STATION, CHERRY POINT, NORTH CAROLINA**

The purpose of this amendment is to provide the below changes to the RFP:

The proposal due date is hereby changed to 7 Dec 2011 at 1400

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR (Same as Item 8)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____	16C. DATE SIGNED
(Signature of person authorized to sign)		(Signature of Contracting Officer)	

Best and Final Amendment Information Sheet

4998360, FRC PROJECT #NF313-08, CONSTRUCT DEFUEL/REFUEL AREA, FLEET READINESS CENTER EAST

**Changes in testing requirements for pipes are established with this amendment:**

\*\*For both the compressed air and pipe fueling specification the hydrostatic test was eliminated and the pneumatic test is still required.

\*\*The x-ray weld testing requirement for the fuel pipe specification was eliminated.

**SPECIFICATION SECTION 01 33 00, SUBMITTAL PROCEDURES**

Delete the existing submittal register at the end of this section and replace with a new submittal register.

**SPECIFICATION SECTION 22 15 14, GENERAL SERVICE COMPRESSED-AIR SYSTEMS, LOW PRESSURE**

Delete this section and replace it with a revised section of same number (+“R” after the number) and name:

SECTION 22 15 14 R, GENERAL SERVICE COMPRESSED-AIR SYSTEMS, LOW PRESSURE.

**SPECIFICATION SECTION 33 52 43.00 20, AVIATION FUEL DISTRIBUTION AND DISPENSING**

Delete this section and replace it with a revised section of same number (+“R” after the number) and name:

SECTION 33 52 43.00 20 R, AVIATION FUEL DISTRIBUTION AND DISPENSING.

The revised submittal register and specification sections are included as a part of this amendment.

End of amendment

# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION  
Construct Defuel Refuel Area FRC East

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
		01 35 29	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7.1	G												
			ACTIVITY HAZARD ANALYSIS (AHA)	1.8	G												
			SD-06 Test Reports														
			Reports	1.12	G												
			Accident Reports	1.12.1	G												
			Monthly Exposure Reports	1.12.3	G												
			SD-07 Certificates														
			Contractor Safety Self-Evaluation Checklist	1.4	G												
			Machinery & Mechanized Equipment Certification Form	3.5.3	G												
		01 57 19.00 20	SD-06 Test Reports														
			Laboratory Analysis	3.5.2	G												
			Erosion and Sediment Control Inspection Reports	3.2.2	G												
			Storm Water Inspection Reports for General Permit	3.2.2	G												
			SD-11 Closeout Submittals														
			Waste Determination Documentation	3.5	G												
			Disposal Documentation for Hazardous and Regulated Waste	3.6.1	G												
			Contractor 40 CFR Employee Training Records	1.5.4	G												

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	Solid Waste Management Report	3.4.1	G												
			Contractor Hazardous Material Inventory Log	3.5.1	G												
			Contractor Hazardous Material Inventory Log	3.6	G												
			Hazardous Waste/Debris Management	3.13.1	G												
		01 77 00.00 20	SD-10 Operation and Maintenance Data														
			Equipment/Product Warranty List	1.4.1	G												
			SD-11 Closeout Submittals														
			As-Built Drawings	1.3.1	G												
			Utility As-Built Drawings	1.3.2	G												
			Equipment/Product Warranty Tag	1.4.2	G												
			Certification of EPA Designated Items	1.2	G												
			Form DD1354	1.6	G												
			Checklist for Form DD1354	1.6	G												
		02 41 00	SD-07 Certificates														
			Demolition Plan	1.10	G												
		03 30 53	SD-06 Test Reports														
			Concrete Mixture Proportions	1.3.4													
			Compressive Strength Testing	3.8	G												
		22 00 00	SD-02 Shop Drawings														
			Plumbing System	3.6.1													
			SD-03 Product Data														

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
		22 00 00	Fixtures	2.4													
			Water heaters	2.7													
			Backflow prevention assemblies	3.6.1.1													
			Welding	1.5.1													
			Plumbing System	3.6.1													
			SD-06 Test Reports														
			Tests, Flushing and Disinfection	3.6	G												
			Test of Backflow Prevention Assemblies	3.6.1.1	G												
			SD-07 Certificates														
			Materials and Equipment	1.3													
			Bolts	2.1.1													
			SD-10 Operation and Maintenance Data														
			Plumbing System	3.6.1	G												
		22 07 19	SD-02 Shop Drawings														
			Installation Drawings	3.1													
			SD-03 Product Data														
			Adhesives	2.2													
			Coatings	2.7													
			Insulating Cement	2.3													
			Insulation Materials	2.1													
			Jacketing	2.6													
			Tape	2.8													
			SD-08 Manufacturer's Instructions														
			Insulation Materials	2.1	G												

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
		22 15 14	SD-02 Shop Drawings														
			Installation Drawings	1.5													
			Aboveground Piping Materials	2.2													
			Underground Piping Materials	2.1													
			SD-03 Product Data														
			Equipment and Performance Data	1.3													
			Piping Materials	1.5													
			Piping Specialties	2.3													
			Supporting Elements	2.6													
			Valves	2.4													
			Accessories	3.1.1													
			Miscellaneous Materials	2.5													
			SD-05 Design Data														
			Design Analysis and Calculations	1.3													
			Flow Rates	1.3	G												
			Air Distribution	1.3	G												
			Pressure Requirements	1.3	G												
			Equipment and Performance Data	1.3													
			SD-06 Test Reports														
			compressed Air Systems Testing	3.2	G												
			Valve-Operating Tests	3.2.1	G												
			Drainage Tests	3.2.1	G												
			Pneumatic Testing	3.2.1	G												
			SD-07 Certificates														

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/ DATE RCD FRM APPR AUTH
		22 15 14	Piping Materials	1.5													
			Supporting Elements	2.6													
			Valves	2.4													
			Miscellaneous Materials	2.5													
			SD-10 Operation and Maintenance Data														
			Operation and Maintenance Manuals	1.4	G												
		26 20 00	SD-03 Product Data														
			Circuit breakers	2.6.1													
			SD-06 Test Reports														
			600-volt wiring test	3.2.2	G												
		33 05 23.13	SD-02 Shop Drawings														
			Record Drawings	3.11	G												
			SD-03 Product Data														
			Manufacturer's Catalog Data	1.3													
			SD-07 Certificates														
			Drill Rod	2.1													
			SD-08 Manufacturer's Instructions														
			Material Safety Data Sheets	1.3	G												
			SD-11 Closeout Submittals														
			Work Complete Logs of Guided Directional Drill Operations	3.11	G												
		33 52 43.00 20	SD-02 Shop Drawings														
			Aviation fuel distribution and dispensing system	2.1.1													



## SECTION 22 15 14

## GENERAL SERVICE COMPRESSED-AIR SYSTEMS, LOW PRESSURE

02/09

## PART 1 GENERAL

## 1.1 REFERENCES

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

## ASME INTERNATIONAL (ASME)

ASME B16.3	(2006) Malleable Iron Threaded Fittings, Classes 150 and 300
ASME B16.5	(2009) Standard for Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24
ASME B16.9	(2007) Standard for Factory-Made Wrought Steel Buttwelding Fittings
ASME B18.2.2	(1987; R 2005) Standard for Square and Hex Nuts
ASME B31.3	(2008) Process Piping
ASME B40.100	(2005) Pressure Gauges and Gauge Attachments
ASME BPVC	(2007) Boiler and Pressure Vessel Codes

## ASTM INTERNATIONAL (ASTM)

ASTM A 181/A 181M	(2006) Standard Specification for Carbon Steel Forgings, for General-Purpose Piping
ASTM A 183	(2003; R 2009) Standard Specification for Carbon Steel Track Bolts and Nuts
ASTM A 197/A 197M	(2000; R 2006) Standard Specification for Cupola Malleable Iron
ASTM A 234/A 234M	(2007) Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
ASTM A 307	(2007b) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 53/A 53M	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

- ASTM C 920 (2008) Standard Specification for Elastomeric Joint Sealants
- ASTM D 2000 (2008) Standard Classification System for Rubber Products in Automotive Applications
- MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)
- MSS SP-58 (2009) Standard for Pipe Hangers and Supports - Materials, Design and Manufacture
- MSS SP-69 (2003; R 2004) Standard for Pipe Hangers and Supports - Selection and Application
- MSS SP-72 (1999) Standard for Ball Valves with Flanged or Butt-Welding Ends for General Service
- U.S. GENERAL SERVICES ADMINISTRATION (GSA)
- FS L-C-530 (Rev C) Coating, Pipe, Thermoplastic Resin

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submit Installation Drawings for low-pressure compressed air systems in accordance with paragraphs entitled, "Drawings," "Aboveground Piping Materials," and "Underground Piping Materials," of this section.

SD-03 Product Data

Submit Equipment and Performance Data for piping systems.

Submit manufacturer's catalog data for the following items:

- Piping Materials
- Piping Specialties
- Supporting Elements
- Valves
- Accessories
- Miscellaneous Materials

SD-05 Design Data

Submit Design Analysis and Calculations for low-pressure compressed air systems for the following in accordance with paragraph entitled, "General Requirements," of this section.

- Flow Rates; G
- Air Distribution; G
- Pressure Requirements; G

Equipment and Performance Data submitted for piping systems shall show conformance with ASME Code.

SD-06 Test Reports

Submit test reports for the following items in accordance with paragraph entitled, "Compressed Air Systems Testing," of this section.

compressed Air Systems Testing; G  
Valve-Operating Tests; G  
Drainage Tests; G  
Pneumatic Testing; G

Each acceptance test shall require the signature of the Contracting Officer and two record copies shall be delivered to the Contracting Officer after acceptance.

SD-07 Certificates

Submit certificates for the following items showing conformance with the referenced standards contained in this section.

Piping Materials  
Supporting Elements  
Valves  
Miscellaneous Materials

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G Submit in accordance with paragraph entitled, "Operation and Maintenance," of this section.

1.3 GENERAL REQUIREMENTS

Equipment and Performance Data submitted for piping systems shall show conformance with ASME Code.

Certificates for Riser Alarm Equipment and Sprinkler Heads shall be submitted meeting referenced standards contained within this section.

Design Analysis and Calculations for low-pressure compressed air systems shall consist of Flow Rates, Air Distribution, Pressure Requirements and Insulation Requirements meeting requirements for referenced standards contained in this section.

1.4 OPERATION AND MAINTENANCE

Contractor shall submit 6 copies of the Operation and Maintenance Manuals 30 calendar days prior to testing the low-pressure compressed air System. Update and resubmit data for final approval no later than 30 calendar days prior to contract completion.

1.5 DRAWINGS

Submit Installation drawings for low-pressure compressed air systems in accordance with paragraphs entitled, "Aboveground Piping Materials" and "Underground Piping Materials," of this section.

Shop drawings shall be accompanied by curves indicating that an essentially flat reduced pressure curve for the capacity demand of the system will be met by the proposed valves.

Submit complete shop drawing data for pipe attachments for approval.

In lieu of separate hangers, the Contractor may submit for approval a shop drawing of trapeze hangers with a solid or split-ring clamp which he proposes to furnish.

## PART 2 PRODUCTS

### 2.1 UNDERGROUND PIPING MATERIALS

#### 2.1.1 Piping Types

Type BCS-PS black carbon steel piping with polyethylene sheath shall conform to ASTM A 53/A 53M, Type E, in sizes through 10 inch iron pipe size (ips). Pipe wall shall be 0.375 inch thick.

Thermoplastic sheath shall conform to FS L-C-530. Make sheath joints with thermally fitted shrinking sleeves applied with factory-approved shrinking devices. Make taped fitting protection and repairs in accordance with manufacturer's instructions. Electrical flaw detection testing at the factory shall require 10,000 volts to be impressed across the sheath. Sheath breakdown voltage shall be not less than 13,000 volts.

#### 2.1.2 Fittings

Fittings shall be long radius butt weld carbon steel conforming to ASTM A 234/A 234M and ASME B16.9 to match pipe wall thickness. Pipe bending is not permitted. Aboveground terminal fittings shall be 150-pound working steam pressure (wsp) forged steel weld neck flanges to match wall thickness, conforming to ASME B16.5 and ASTM A 181/A 181M Class 60.

### 2.2 ABOVEGROUND PIPING MATERIALS

#### 2.2.1 Compressed Air Systems 125 Psig and Less

##### 2.2.1.1 Type GCS Galvanized Carbon Steel

Pipe 1/2 through 10 inches shall be Schedule 40, seamless, galvanized steel, conforming to ASTM A 53/A 53M, Grade B, Type E. Type F is acceptable for sizes less than 2 inches.

Fittings 2 inches and under shall be 150-psig wsp, banded, galvanized, malleable iron, screwed, conforming to ASTM A 197/A 197M, ASME B16.3

Unions 2 inches and under shall be 300-psig wsp, female, screwed, galvanized, malleable iron with brass-to-iron seat and ground joint.

### 2.3 PIPING SPECIALTIES

#### 2.3.1 Grooved Pipe Couplings and Fittings

Couplings shall have a housing fabricated in at least two parts of malleable iron castings. Coupling gasket shall be molded synthetic rubber conforming to requirements of ASTM D 2000. Coupling bolts shall be oval-neck track-head type with hexagonal heavy nuts, conforming to

ASTM A 183.

Fabricate pipe fittings used with couplings of malleable iron castings. Where a manufacturer's standard size malleable iron fitting pattern is not available, fabricated fittings may be used.

Fabricate fittings from Schedule 40, in accordance with ASTM A 53/A 53M, Grade B, seamless steel pipe. Long radius seamless welding fittings with wall thickness to match pipe, conforming to ASTM A 234/A 234M and ASME B16.9.

## 2.4 VALVES

### 2.4.1 Ball Valves (BAV)

Ball valves shall conform to MSS SP-72. Valves shall be Style 1.

Grooved end ball valves may be used provided that the manufacturer certifies valve performance in accordance with MSS SP-72.

Rate valves for service at not less than 175 psi at 200 degrees F.

Valve bodies in sizes 2 inch ips and smaller shall be screwed end connection type constructed of Class A copper alloy.

Balls and stems of valves 2 inch ips and smaller shall be Class C corrosion-resistant steel alloy with hard chrome plate. Electroless nickel plating is acceptable.

Design valves for flow from either direction and seal equally tight in either direction.

Valves shall have full pipe size flow areas.

Valves with ball seals kept in place by spring washers are not acceptable. All valves shall have adjustable packing glands. Seats and seals shall be tetrafluoroethylene.

Valve body construction shall be such that torque from a pipe with valve in installed condition shall not tend to disassemble the valve by stripping setscrews or by loosening body end inserts or coupling nuts. Torque from a pipe shall be resisted by a one-piece body between end connections or by bolts in shear where body is of mating flange or surface-bolted construction.

## 2.5 MISCELLANEOUS MATERIALS

### 2.5.1 Bolting

Flange and general-purpose bolting shall be hex-head and shall conform to ASTM A 307, Grade B. Heavy hex-nuts shall conform to ASME B18.2.2. Square-head bolts shall not be acceptable.

Grooved couplings shall utilize bolts and nuts of heat treated carbon steel conforming to ASTM A 183.

### 2.5.2 Elastomer Calk

Polyurethane base elastomer calking material shall be a two-component type conforming to ASTM C 920.

### 2.5.3 Pipe Thread Compounds

Use tetrafluorethylene tape not less than 3 mils thick in compressed air systems for pipe sizes to and including 1 inch ips. Tetrafluoroethylene dispersions and other suitable compounds may be used for other applications upon approval by the Contracting Officer.

## 2.6 SUPPORTING ELEMENTS

Contractor shall provide all necessary piping system components and miscellaneous required supporting elements. Supporting elements shall be suitable for stresses imposed by system pressures and temperatures, and natural and other external forces.

Supporting elements shall be UL-listed and conform to requirements of ASME B31.3, MSS SP-58, and MSS SP-69, except as otherwise noted. Type devices specified herein are defined in MSS standards unless otherwise noted.

### 2.6.1 Horizontal Pipe Attachments

Piping in sizes to and including 2 inch ips shall be supported by Type 6 solid malleable-iron pipe rings except that split-band-type rings may be used in sizes up to 1 inch ips.

### 2.6.2 Vertical Pipe Attachments

Vertical pipe attachments shall be Type 8.

## PART 3 EXECUTION

### 3.1 ABOVE GROUND PIPING SYSTEM INSTALLATION

#### 3.1.1 Piping Systems

Fabricate and install piping systems in accordance with ASME B31.3, MSS SP-69, ASME BPVC, and applicable AWS requirements.

Fabricate pipe to measurements established on the job and carefully work into place without springing or forcing.

Pipe, tubing, fittings, valves, equipment, and Accessories shall be clean and free of all foreign material before being installed in their respective systems. Clean pipe by a method approved by the Contracting Officer. Purge lines with dry, oil-free compressed air after erection, but purging shall not be relied upon for removing all foreign matter. Purge lines at a velocity equal to 1-1/2 times maximum normal flow velocity. During the progress of construction, protect open ends of pipe, fittings, and valves at all times to prevent the admission of foreign matter. Except when connections are actually underway, install plugs or caps on all pipe and component openings. Plugs or caps shall be commercially manufactured products.

Install piping straight and true, with approved offsets around obstructions and with necessary expansion bends or fitting offsets essential to a satisfactory installation and as may be necessary to increase headroom or to avoid interference with the building construction, electric conduit, or facilities equipment.

Use standard long sweep pipe fittings for changes in direction. No mitered joints or unapproved pipe bends shall be permitted.

Pipe bends in seamless pipe may be made with hydraulic benders in the field for pipe sizes to 4 inch ips, upon approval of the Contracting Officer. Radius of pipe bends shall be not less than five nominal pipe diameters.

Tee connections shall be made with screwed tee fittings or grooved tee fittings, or, where pipe is being welded, branch connections shall be made with either welding tees or forged branch outlet fittings, either being acceptable without size limitations. Branch outlet fittings shall be forged, flared for improved flow where attached to the run, reinforced against external strains, and designed to withstand full burst-pressure strength requirements. Provide tool space between parallel piping runs whenever threaded unions or couplings are installed.

Horizontal piping shall have a grade of 1 inch per 100 feet.

Use eccentric reducers where required to permit proper drainage of pipe lines. Do not permit bushings for this purpose. Provide drain valves in piping systems at low points. Pipe drains shall consist of 1/2 inch globe valves with renewable disks and 3/4 inch hose adapter.

Perform installation of piping in a manner that will prevent stresses and strains from being imposed on connected equipment.

Make expansion bends in steel pipe from pipe sections and long-radius welding elbows in sizes 1 inch and larger. Expansion U-bends shall be cold sprung and welded into the line. Anchor line before removing the spreader from the expansion U-bend.

### 3.1.2 Joints

Ream pipe ends before joint connections are made.

Make up screwed joints with joint compound.

Apply joint compounds to the male thread only, and exercise care to prevent compound from reaching the interior of the pipe.

### 3.1.3 General Service Valve Locations

Provide valves to permit isolation of branch piping and each equipment item from the balance of the system, to allow safe and convenient access without moving equipment, and to require a minimum of piping and equipment disassembly.

Provide valves in piping mains and branches at equipment and equipment items.

## 3.2 COMPRESSED AIR SYSTEMS TESTING

Prior to acceptance of the work, pressure-test completed systems in the presence of the Contracting Officer.

Testing shall be done in two stages: preliminary stage and acceptance stage, including gage tests.

Perform no testing until personnel not directly involved in the test have been evacuated from the area.

Contractor may conduct tests for his own purposes, but preliminary testing and the acceptance test shall be conducted as specified.

### 3.2.1 Preliminary Stage Tests

Tests shall be pneumatic and shall use dry, oil-free compressed air. Use carbon dioxide or nitrogen in metallic systems.

Testing of any system for any purpose shall include preliminary testing by swabbing joints under test with standard high-strength film soap solution and observing for bubbles at internal pressures not in excess of 5 psi. When testing reveals that leakage exceeds specified limits, isolate and repair the leaks, replace defective materials where necessary, and retest the system until specified limits are met. Remake leaking gaskets with new gaskets and new flange bolting, and discard used bolting and gaskets.

Other than standard piping flanges, plugs, caps and valves, only use commercially manufactured expandable elastomer plugs for sealing off piping for test purposes. Published safe test pressure rating of any plug used shall be not less than three times the actual test pressure being applied. During pneumatic testing or hydrostatic testing, evacuate personnel from areas where plugs are used.

Remove components that could be damaged by test pressure from piping systems to be tested.

Perform Valve-Operating Tests and Drainage Tests according to referenced standards.

Check piping system components, such as valves, for proper operation under system test pressure.

No test media shall be added to a system during a test for a period specified or determined by the Contracting Officer.

Duration of a test will be determined by the Contracting Officer and will be for a minimum of 15 minutes with a maximum of 24 hours. Test may be terminated by direction of the Contracting Officer at any point after it has been determined that the leakage rate is within limits.

Prepare and maintain test records of all piping systems tests. Records shall show Governmental and Contractor test personnel responsibilities, dates, test gage identification numbers, ambient temperatures, pressure ranges, rates of pressure drop, and leakage rates.

Irrespective of the amount of measured leakage, immediately repair visible leaks or defects in the pipeline.

### 3.2.2 Test Gages

Contractor's test gages shall conform to ASME B40.100 and have a dial size of 8 inches or larger. Maximum permissible scale range for a given test shall be such that the pointer during a test shall have a starting position at midpoint of the dial or within the middle third of the scale range. Certification of accuracy and correction table shall bear a date within 90 calendar days prior to test use, test gage number, and the project number,

unless otherwise approved by the Contracting Officer.

### 3.2.3 Acceptance Pressure Testing

Testing shall take place during steady-state ambient temperature conditions.

Test ferrous piping systems at 1-1/2 times maximum operating pressure. Maintain test pressure for a period of not less than 2 hours with an allowable pressure drop of 2 psi during that time unless otherwise approved by the Contracting Officer.

### 3.3 COMPRESSED AIR SYSTEM CLEANING

Remove rust and dirt from the bore and exterior surface of all piping and equipment. Clean pipeline strainers, temporary and permanent, during purging operations, after startup, and immediately prior to final acceptance by the Government.

Flush and clean new steel piping with a suitable degreasing agent, until visible, grease, dirt, and other contaminants have been removed. Degreased waste material including the degreaser itself shall be disposed of in accordance with written instructions received from the Environmental authority having jurisdiction through the Contracting Officer and in accordance with all Local, State and Federal Regulations.

### 3.4 COMPRESSED AIR SYSTEMS IDENTIFICATION

Label and arrow piping at each point of entry and exit of piping passing through walls; at each change in direction, such as at elbows and tees; and in congested or hidden areas, at each point required to clarify service or indicate a hazard. Also label each riser.

In long straight runs, locate labels at distances visible to each other, but in no case shall the distance between labels exceed 75 feet. Labels shall be legible from the primary service and operating area.

-- End of Section --

## SECTION 33 52 43.00 20

## AVIATION FUEL DISTRIBUTION AND DISPENSING

11/09

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN PETROLEUM INSTITUTE (API)

API Spec 6D	(2008; Errata 2008; Errata 2008; Errata 2009; Addendum 2009) Specification for Pipeline Valves
API Std 1529	(2005) Aviation Fueling Hose and Hose Assemblies
API Std 607	(2005; Errata 2008) Fire Test for Soft-Seated Quarter-Turn Valves

## AMERICAN WELDING SOCIETY (AWS)

AWS A5.4/A5.4M	(2006) Stainless Steel Electrodes for Shielded Metal Arc Welding
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## ASME INTERNATIONAL (ASME)

ASME B16.11	(2009) Forged Fittings, Socket-Welding and Threaded
ASME B16.21	(2005) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.39	(2009) Standard for Malleable Iron Threaded Pipe Unions; Classes 150, 250, and 300
ASME B16.5	(2009) Standard for Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24
ASME B16.9	(2007) Standard for Factory-Made Wrought Steel Buttwelding Fittings
ASME B31.1	(2007; Addenda 2008; Addenda 2009) Power Piping
ASME B31.3	(2008) Process Piping

## ASTM INTERNATIONAL (ASTM)

ASTM A 182/A 182M	(2009a) Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for
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## High-Temperature Service

ASTM A 193/A 193M	(2009) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A 194/A 194M	(2009) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
ASTM A 312/A 312M	(2009) Standard Specification for Seamless, Welded, and Heavily Worked Austenitic Stainless Steel Pipes
ASTM A 36/A 36M	(2008) Standard Specification for Carbon Structural Steel
ASTM A 403/A 403M	(2009) Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
ASTM D 229	(2009b) Rigid Sheet and Plate Materials Used for Electrical Insulation
ASTM F 436	(2009) Hardened Steel Washers

## MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-58	(2009) Standard for Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	(2003; R 2004) Standard for Pipe Hangers and Supports - Selection and Application

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 30	(2007; Errata 2008) Flammable and Combustible Liquids Code
NFPA 407	(2007; Errata 2007; AMD 1 2007; AMD 2 2008; AMD 3 2009) Standard for Aircraft Fuel Servicing
NFPA 70	(2008; AMD 1 2008) National Electrical Code - 2008 Edition

## SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AS5877	(2007; Rev A) Aircraft Pressure Refueling Nozzle
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## U.S. DEPARTMENT OF DEFENSE (DOD)

MS 29514	(Rev C; Notice 1; Notice 2) Flange, Adapter Locking, Pressure Fuel Servicing (ASG)
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## 1.2 DEFINITIONS

In ASME B31.3 and NFPA 30 publications, the advisory provisions shall be considered mandatory, as though the work "shall" had been substituted for "should" wherever it appears; reference to the "authority having jurisdiction" and "owner" shall be interpreted to mean the Contracting Officer.

## 1.3 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

Aviation fuel distribution and dispensing system

### SD-03 Product Data

Pipe

Valves

Fuel nozzles

Male adapters

Hose reels

Hose

Safety cabinet

Fittings

## 1.4 QUALIFICATIONS OF WELDERS

Each welder shall be qualified by test using equipment, procedures and a base metal and electrode or filler wire from the same compatible group number that will be encountered in field welding. Procedures and welders shall be qualified in accordance with Section IX, ASME Boiler and Pressure Vessel Code. Welders qualified by another employer may be accepted as permitted by ASME B31.1. The Contracting Officer shall be notified 24 hours in advance of tests and the test shall be performed at the work site if practicable. The Contracting Officer shall be furnished a copy of qualified procedures and a list of names and identification symbols of qualified welders. The welder shall apply his assigned symbol near each weld he makes as a permanent record.

## 1.5 REGULATORY REQUIREMENTS

Conform to the safety and fire regulations of the Station Fire Department when work is in progress. Obtain a "Hot Work" permit each day before performing welding or burning.

## PART 2 PRODUCTS

## 2.1 SPECIAL REQUIREMENTS

## 2.1.1 Detail Drawing

Submit drawings showing aviation fuel distribution and dispensing system including types, sizes, location, and installation details for:

- a. Pipe hangers and supports

## 2.1.2 Metal

Metal contacting the fuel shall be stainless steel.

## 2.1.3 System

Capacity and efficiency of equipment shall not be less than that indicated. System components, including piping, equipment, valves, and accessories shall be suitable for maximum working pressure of ANSI Class 150 275 psig at 100 degrees F.

## 2.2 STAINLESS STEEL PIPING

ASTM A 312/A 312M, Grade 304L, Schedule 10 minimum wall thickness for pipe sizes larger than 2 inches; Schedule 40 for pipe sizes 2 inches and smaller.

## 2.3 FITTINGS FOR STAINLESS STEEL PIPING

## 2.3.1 Socket Welding Fittings

ASME B16.11, except stainless steel shall conform to ASTM A 182/A 182M, Grade F304L.

## 2.3.2 Buttwelding Fittings

ASME B16.9, except stainless steel shall conform to ASTM A 403/A 403M, Class WP, Type 304L, of the same weight as the pipe in which the fittings are installed.

## 2.3.3 Flanges

ASME B16.5, Class 150, Raised Face Type, except stainless steel shall conform to ASTM A 182/A 182M, Grade F304L.

## 2.3.4 Unions

ASME B16.39, Class 150, except stainless steel shall conform to ASTM A 312/A 312M, Type 304L.

## 2.4 WELDING FOR STAINLESS STEEL PIPING

## 2.4.1 Process for Stainless Steel

ASME B31.3, Gas Tungston Arc Process or Gas Metal Arc Process.

#### 2.4.2 Welding Electrodes

AWS A5.4/A5.4M, E308L electrodes.

### 2.5 GASKETS, BOLTS, NUTS AND WASHERS

#### 2.5.1 Gaskets

ASME B16.21, composition ring 0.0625 inch thick, of one piece factory cut, resistant to the effects of aviation hydrocarbon fuels and manufactured of fire-resistant materials. Provide full-face gaskets for flat-face flanged joints, and ring gaskets for raised-face flanged joints.

#### 2.5.2 Bolts

ASTM A 193/A 193M, Grade B8. Extend no less than two full threads beyond the nut with the bolts tightened to the required torque.

#### 2.5.3 Nuts

ASTM A 194/A 194M, Grade 8.

#### 2.5.4 Washers

ASTM F 436, flat circular stainless steel washers. Provide washers under bolt heads and nuts.

#### 2.5.5 Electrically Isolating (Insulating) Gaskets for Flanges

Provide ASTM D 229 electrical insulating material of 1000 ohms minimum resistance. Material shall be resistant to the effects of aviation hydrocarbon fuels. Provide full face insulating gaskets between flanges. Provide full surface 0.03 inch thick wall thickness, spiral-wound mylar insulating sleeves between the bolts and the holes in flanges; bolts may have reduced shanks of a diameter not less than the diameter at the root of threads. Provide 0.125 inch thick high-strength phenolic insulating washers next to flanges and flat circular stainless steel washers over insulating washers and under bolt heads and nuts. Provide bolts 0.5 inch longer than standard length to compensate for the thicker insulating gaskets and the washers under bolt heads and nuts.

#### 2.5.6 Electrically Isolating Unions

Provide with same electrical insulating materials as specified for electrically isolating flanges.

### 2.6 VALVES

Steel body except stainless steel shall be Type 304L or Type 316, and aluminum alloys shall be 3003, 6061-T6, or 356-T6, suitable for working pressure of ANSI Class 150 275 psig at 100 degrees F. Flanged end connections, except as modified herein. Nonaluminum sizes smaller than 2 inches and aluminum sizes smaller than one inch may have union end connections, or threaded end connections with a union on all but one side of the valve. Viton or Teflon with metal backup seals.

#### 2.6.1 Ball Valves

API Spec 6D, ANSI Class 150, full bore. Conform to fire test requirements

of API Std 607. Provide nonlubricated double seated type capable of handling two-way shutoff, with weather-proof worm-gear operators, except valves 6 inches and smaller may be lever operated with 10 positions or infinitely adjustable positions between full open and full close. Balls in valve sizes 14 inches and larger shall have trunnion type support bearings. Valves in carbon steel piping shall have steel bodies with chromium-plated or nickel-plated steel balls. Valves in stainless steel piping and aluminum piping shall have Type 316 stainless steel bodies and balls. Valves shall have stainless steel stems and trim, and Viton or Teflon seats, body seals, and stem seals.

## 2.7 PIPING ACCESSORIES

### 2.7.1 Pipe Hangers and Supports

MSS SP-58 and MSS SP-69, of the adjustable type, except as modified herein or indicated otherwise. Provide steel pipe hangers and supports. The finish of rods, nuts, bolts, washers, hangers, and supports shall be hot-dip galvanized.

#### 2.7.1.1 Pipe Protection Shields

MSS SP-58 and MSS SP-69, Type 40, except material shall be Type 316 stainless steel. Provide at each slide type pipe hanger and support.

#### 2.7.1.2 Miscellaneous Metal

ASTM A 36/A 36M, standard mill finished structural steel shapes, hot-dip galvanized.

#### 2.7.1.3 Anchors, Bolts, Nuts, Washers and Screws

Hot-dip galvanized steel, except provide Type 316 stainless steel bolts, nuts, washers, and screws under piers.

## 2.8 EQUIPMENT

### 2.8.1 Pantograph Fueling Stations

#### 2.8.1.1 Fueling Hose

NFPA 407 and API Std 1529, Grade 3, Type A or Type C, semi-hardwall, 2 inch hose designed for use with the specified fuel for a working pressure of 300 psig. Hose shall be constructed of braided synthetic cord surrounded by an interior rubber tube and an exterior rubber cover. Provide permanent brass couplings and bonding wire wrapped a minimum of 10 coils around the exterior of the hose and connected to both couplings.

#### 2.8.1.2 Nozzles

SAE AS5877, 2.5 inch fueling nozzle of the type designed for the single point fueling of aircrafts at a flow rate of 600 gpm with a maximum pressure drop of 30 psi, and a 2.5 inch hose end regulator to limit the downstream pressure to 55 psig maximum, a dry break coupling with 60-mesh stainless steel strainer, and fuel sample connection tapping.

#### 2.8.1.3 Nozzle Adapters

Provide 2.5 inch nozzle adapter with self-closing valve in accordance with

MS 29514 and 4 inch flange mounting and dust cap.

#### 2.8.1.4 Pressure Gage Quick Disconnect and Fuel Sample Connectors

Quick disconnects shall be compatible throughout the piping systems, fit in 0.375 inch ports and extend outward less than 0.84 inch from the port boss. Provide an aluminum dust plug with chain.

### 2.9 BONDING

NFPA 70 for materials and workmanship. The fuel piping system shall be bonded in metallic contact to provide electrical continuity to fixed and moving components for grounding the entire system. Provide jumpers to overcome the insulating effects of gaskets, paints, or nonmetallic components. Minimum size ground conductor shall be No. 6, with single covered, flexible, stranded, copper conductor, Type RR-USE. Provide dielectric connection in riser pipe for underground piping protected by impressed current.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Provide exterior aviation fuel distribution systems including above ground piping, dispensing hardware and related work. Install piping straight and true to bear evenly on supports. Install valves with stems horizontal or above. Install flanges and unions at valves, connections to equipment, and where indicated. The work includes installing piping up to and including the pumping equipment and valves. Provide each system complete and ready for operation. Equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.3 and NFPA 30, except as modified herein.

#### 3.1.1 Protection Against Hazardous Conditions

The piping and the surrounding area shall be inspected for explosive vapors prior to work and frequently during the course of the work. If, in the opinion of the Contracting Officer, a hazardous condition exists, work shall cease until such condition has been corrected.

#### 3.1.2 Safety

NFPA 30 and NFPA 407; safety rules shall be strictly observed. The flash points of fuels in degrees Fahrenheit are as follows:

<u>FUELS</u>	<u>FLASH POINT</u>
Aviation Gasoline (Avgas)	Minus 50
Jet Fuel JP-4	Minus 20
Jet Fuel JP-5	Plus 140
Jet Fuel JP-7	Plus 150

#### 3.1.3 Cleaning of Piping

Keep the interior and ends of new piping and existing piping affected by the Contractor's operations thoroughly cleaned of water and foreign matter. Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of pipe and fittings to prevent entry of water and foreign matter.

Inspect piping before placing into position.

3.2 PIPE AND FITTINGS

Inspect, test, and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for connections. Reducing branch connections in steel piping may be made with forged branch outlet reducing fittings for branches two or more pipe sizes smaller than mains. Branch outlet fittings shall be forged, flared for improved flow where attached to the run, reinforced against external strains, and designed to withstand full pipe bursting strength. Stub type connections are prohibited. Jointing compound for pipe threads shall be polytetrafluoroethylene (PTFE) pipe thread paste or PTFE powder and oil. Pipe nipples 6 inches long and shorter shall be Schedule 80 pipe. Make changes in piping sizes through tapered reducing pipe fittings.

3.2.1 Fittings and End Connections

Install threaded fittings and end connections for sizes less than one inch; threaded or socket-welding or buttwelding fittings and end connections for sizes one to 2 inches; threaded connections for threaded valves, traps, strainers, and threaded connections to equipment; buttwelding fittings and end connections for sizes 2.5 inches and larger; and flanged connections for flanged valves, traps, strainers, and flanged connections to equipment.

3.2.2 Pipe Hangers and Supports

Install additional hangers and supports for the concentrated loads in piping between hangers and supports, such as for valves. Install ASTM A 36/A 36M miscellaneous steel shapes as required. Support piping as follows:

Nominal Pipe Size (Inches)	One and Under	1.5	2	3	4	6	8	10	12
Maximum Hanger Spacing (Feet)	7	9	10	12	14	17	19	22	23

3.2.3 Anchors, Bolts, Nuts, Washers, and Screws

Install where required for securing the work in place. Sizes, types, and spacings of anchors and bolts not indicated or specified shall be as required.

3.3 PROTECTIVE COATINGS FOR ABOVEGROUND CARBON STEEL PIPING

3.3.1 Damaged Materials

For above ground piping, fittings, couplings, irregular surfaces of pipe and existing piping affected by the Contractor's operations shall be clean, dry, grease free, and primed before application of tape. Waterproof shrink sleeves may be provided using electric heating method in lieu of tape and shall overlap the pipe coating not less than 6 inches. Pipe and adhesive undercoat surfaces to be wrapped with tape shall be primed with a compatible primer prior to application of tape. Primer shall be as recommended by tape manufacturer and approved by pipe coating manufacturer.

3.4 FIELD QUALITY CONTROL

3.4.1 Inspections

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

3.4.2 Piping Tests

Before final acceptance of the work, test each system as in service to demonstrate compliance with contract requirements.

3.4.2.1 Pneumatic Test

Pneumatically test each piping system to 25 psig, examine joints with soap solution. Gradually increase to 50 psig and hold for 1 hour. The pneumatic test is more hazardous than a hydrostatic test, therefore, special safety measures, including the wearing of face masks, shall be taken during testing under pressure. Only authorized personnel shall be permitted in the area during pneumatic testing.

3.4.3 Equipment Acceptance Tests

3.4.4 System Acceptance Test

-- End of Section --