

SECTION G3000M

SITE HEATING, VENTILATING, AND AIR CONDITIONING
07/02

G3000M GENERAL

A. SYSTEM DESCRIPTION

[Provide an exterior heat distribution [steam and condensate return system] [high temperature hot water return supply system complete and ready for operation.]

[Provide an exterior buried [chilled water] [heating hot water] distribution system complete, and ready for operation.]

[Provide natural gas distribution system complete, and ready for operation.] [The system shall include [main gas regulator [and meter].]

[[Phasing of work] [and provision of temporary equipment or highline] will be required to maintain continuous utility service to existing installations during construction.]

B. SYSTEM REQUIREMENTS

[a. The [steam] [high temperature hot water] supply system shall have an operating temperature of ____ degrees F (____ degrees C) and an operating pressure of ____ psig (____ Kpa)]. [Condensate] [High temperature hot water] return system shall have an operating temperature of ____ degrees F (____ degrees C) and an operating pressure of ____ psig. (____ Kpa)]

[a. The [chilled water] [low temperature heating hot water] piping system shall be suitable for working pressure of [125] psig ([862] kPag) at [250] degrees F ([121] degrees C).

[a. The natural gas shall have an operating pressure of ____ psig (____ Kpa).]

C. CRITERIA

The exterior distribution system design and installation shall comply with SWDIV SECTION G3000TG "TECHNICAL GUIDANCE FOR Site HVAC. Adhere to the technical guide preference where applicable and as modified by this document.

SWDIV TECHNICAL GUIDANCE can be found on Southwest Division Internet homepage at

<http://www.efdsw.navfac.navy.mil/CapitalImprovements/BusinessLineServices.htm>

D. COMPLIANCE VERIFICATION

Compliance with the requirements for the site HVAC system will be determined by a review of the design and construction submittals and by field inspection. See Document 00911, "Project Kickoff And Design Completion", for submittal requirements. See Section 01330, Submittal Procedures, for Submittal Descriptions (SD-xx) and requirements.

Verification of satisfactory system performance shall be via Performance Verification Testing, as detailed in this section.

E. DESIGN SUBMITTALS

Design Analyses and Drawings

SD-02 Design Drawings

[Demolition plan]

Piping site plan and elevation views or profiles.

Piping sections and details

System components (valve box, manholes, connections, valving, pipe support, thrust block, [expansion loops and bends], etc.)

Site landscape and pavement repair plans and details

[Cathodic protection plans and details]

SD-05 Design Data

Design analysis for the distribution system, including complete calculations for pipe sizing

[Pipe stress and system expansion calculations per ASME B31.1]

[Design life calculations for cathodic protection system].

Specifications

Submit manufacturer's data sheets per Document 00911, "Project Kickoff And Design Completion" for all items of the Site HVAC System if available. If manufacturer's data is unavailable, submit prescriptive construction specifications per Document 00911 to specify the quality, characteristics, performance factors, efficiency, installation procedures, and testing and certification requirements.

F. CONSTRUCTION SUBMITTALS

SD-03 Product Data

Piping system (pipe, fittings, valves, strainers, traps, etc.)

Factory-prefabricated pre-insulated piping system.

Valve manhole

Sump pumps

Cathodic protection system

Work plan including utility outage, field and operational test schedules

Proposed test procedure and proposed sample test data sheets for each required test

Manufacturer's quality assurance plan for fabrication, delivery, storage, installation, and testing of the system.

Test reports in booklet form showing all factory field tests performed to prove compliance with specified performance criteria.

SD-07 Certificates

Certificate of Satisfactory Operation certifying that at least 3 systems installed by the direct buried piping systems manufacturer within the previous 5 years are operating satisfactorily. The certificate shall indicate the locations, type of system, size of system, point of contact including phone number for information verification.

Certificate of Compliance, notarized statement signed by the contractor and system manufacturer's principals certifying that the system has been installed satisfactory per contract and per manufacturer's design and recommendations.

Certification of Acceptability of all welds made in the field from independent testing firms stating that welds inspected have met the specified acceptability standards.

[National Association of Corrosion Engineers (NACE) certified Cathodic Protection Specialist qualifications]

Certification of welder's procedures and qualifications

SD-09 Manufacturer's Field Reports

Daily written report from representative of the system manufacturer, whenever the representative is required to be at the jobsite.

SD-10 Operation and Maintenance Data

Distribution system, Data Package

[Manhole sump pumps, Data Package 2]

[Cathodic protection system, Data Package 3]

G. CATHODIC PROTECTION.

1. [Cathodic protection system shall be anode header wire system using No. 6 high molecular weight polyethylene header wire (HMWPE).]

2. System shall be designed by a National Association of Corrosion Engineers (NACE) certified Cathodic Protection Specialist.

H. EXTERIOR DISTRIBUTION SYSTEM INSTALLATION, INSPECTION AND TESTING

Materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, testing, and repair of the site steam and condensate, high temperature hot water, chilled water and heating hot water distribution system shall be in accordance with the approved manufacturer procedure.

[Provide factory-trained field technical assistance for material unloading, field joint installation instruction, piping installation and testing. Manufacturer representative shall inspect the system before backfill and provide written approval and certification of the installation.]

G3040 HEATING DISTRIBUTION

Pre-engineered and factory fabricated piping system including all required component such as carrier pipes, and fittings, insulation, protective casing, anchors, guides, pipe supports, expansion loops and bends, and cathodic protection for the system supplied.

G3041 STEAM SUPPLY

CARRIER PIPE

Steam and high temperature hot water supply piping shall be steel, seamless or electric-resistance welded.

CASING

Casing shall be smooth-wall steel, electric resistance spiral welded with minimum wall thickness of 0.250 inch (6 mm).

INSULATION

Minimum insulation thickness shall be in accordance with TABLE-1 in SWDIV SECTION G3000TG "TECHNICAL GUIDANCE FOR Site HVAC.

G3042 CONDENSATE RETURN

CARRIER PIPE

Condensate and high temperature hot water return piping shall be steel, seamless or electric-resistance welded.

CASING

Casing shall be smooth-wall steel, electric resistance spiral welded with minimum wall thickness of 0.250 inch (6 mm).

INSULATION

Minimum insulation thickness shall be in accordance with TABLE-2 in SWDIV SECTION G3000TG "TECHNICAL GUIDANCE FOR Site HVAC.

All piping in the manhole shall be insulated with [aluminum] [stainless steel] jacket.

G3043 HOT WATER SUPPLY SYSTEM (PIPING)

A. HIGH TEMPERATURE HOT WATER

High temperature hot water supply same as D3041. High temperature hot water return same as D3042.

B. HEATING HOT WATER

Same as G3051.

G3044 PUMPING STATIONS

See D3000 for primary hot water pumping station requirements.

A. REINFORCED CONCRETE MANHOLES

Manholes shall be concrete reinforced with deformed steel bars. Construct manhole base and sides in one monolithic pour. Manhole shall include cast-iron steps, steel or aluminum lid and a sump pit.

B. MANHOLE SUMP PUMP

Provide an electric motor operated sump pump in each manhole. Minimum and additional requirement as specified in the technical guidance.

G3050 COOLING DISTRIBUTION

Pre-engineered and factory fabricated piping system including all required component such as carrier pipes, and fittings, insulation, protective casing, anchors, guides, pipe supports, expansion loops and bends. Include requirements for a cathodic protection system if required for the location.,

G3051 CHILLED WATER PIPING

CARRIER PIPE

Chilled water and heating hot water piping shall copper tubing with solder joint fittings.

Or steel, electric resistance welded seamless. Provide with butt welding fittings or socket-welded for smaller joints.

or high-density polyethylene carrier pipe made from a high-density, high molecular weight resin with injection molded fittings

CASING

Factory applied conduit shall be compound extruded seamless PVC Plastic Pipe, or filament wound fiberglass RTR plastic pipe, or high-density polyethylene (HDPE). Conduit material, size and thickness in accordance with SWDIV SECTION G3000TG "TECHNICAL GUIDANCE FOR Site HVAC.

INSULATION

Carrier pipe insulation shall be factory applied polyurethane or polyisocyanate. The insulation shall completely fill the annular space between the service pipe and jacket and shall be bonded to both.

All fittings and components shall be designed and factory fabricated. Field insulation of fittings will not be allowed.

[Provide isolation valves on supply and return lines at take-offs for service to each building. Valves shall be located in valve boxes.]

All piping shall be hydrostatically test piping prior to burying.

G3053 PUMPING STATIONS

See SECTION D3000 for chilled water primary pumping requirements.

See G3044 for reinforced concrete manhole and manhole sump pump requirements

G3054 COOLING TOWERS ON SITE

See SECTION D3000 for cooling tower requirements.

G3060 FUEL PIPING

A. NATURAL GAS DISTRIBUTION SYSTEM

Provide natural gas distribution system including all pipe, fittings, valves, valve box and gas main regulator station as required. Contractor is responsible for providing the complete natural gas system to the facility.

[Obtain natural gas pressures from the [local utility company, _____] [Base Utilities]. The point of connection is at _____.
[Coordinate application or permit and provision of gas meter and/or pressure regulator with local utility company]]

MATERIALS AND EQUIPMENT

- a. Aboveground: Black steel pipe. Provide corrosion protection.
- b. Underground: Polyethylene (PE) pipe. Provide [detectable aluminum for plastic backed tape] [detectable magnetic plastic tape]]
- c. Steel Pipe Fittings: Provide black malleable iron threaded fittings or butt-welding fittings or flanged fittings
- d. Polyethylene Fittings: Heat fusion fittings.
- e. Below Ground Polyethylene Valves: Provide PE valves only for underground PE piping
- f. Transition Fittings: Steel to plastic (PE)with tapping tee or sleeve.
- g. Valve Boxes: Street valve box with the word "GAS" cast into the box cover.
- [h. Gas Main Regulator Station: [Underground vault] [aboveground.] installation. [Provide enclosures or bollards around the aboveground gas main regulator station.]

PRESSURE TESTS AND SYSTEM PURGING

Pressure tests all piping system. After completing pressure test and before testing a gas contaminated line, purge line with nitrogen to remove air and gas.

-- End of Section --