UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2021
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SECTION 21 12 00

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05/11

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-- End of Section Table of Contents --

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USACE / NAVFAC / AFCEC / NASA	**UFGS-21 12 00 (May 2011)**

Preparing Activity: NAVFAC	**Superseding**
	UFGS-21 12 00 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2021

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SECTION 21 12 00

STANDPIPE SYSTEMS
05/11

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NOTE: This guide specification covers the requirements for dry and wet standpipe and hose systems for fire extinguishing in multi-story and multi-level buildings.

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 item(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).

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NOTE: Standpipe system requirements must conform to the current edition of UFC 3-600-01, "Fire Protection Engineering for Facilities" and NFPA 14.

****

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NOTE: Project drawings should indicate the following information:

1. Location and detail of each standpipe supply riser, alarm valve, water motor alarm, fire department inlet connection, pressure/flow switch, fused disconnect switch, and associated electrical connections;

2. Location where each standpipe system begins including connection to water distribution system

piping;

3. Location of standpipe system control valves, post indicator valves, or wall indicator valves;

4. Location of fire hose cabinets when required, also indicate when fire extinguishers will be stored within the fire hose cabinet;

5. Details of anchoring piping, including pipe clamps and tie rods, or mechanical retainer glands.

****

PART 1 GENERAL

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 Reference Identifier (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.

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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 WATER WORKS ASSOCIATION (AWWA)

AWWA C651	(2014) Standard for Disinfecting Water Mains

ASTM INTERNATIONAL (ASTM)

ASTM C1036	(2016) Standard Specification for Flat Glass

FM GLOBAL (FM)

FM APP GUIDE	(updated on-line) Approval Guide http://www.approvalguide.com/

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH (FCCCHR)

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13	(2019; Errata 19-1; Errata 19-2; TIA 19-1; TIA 19-2; TIA 19-3; TIA 19-4; Errata 19-3; Errata 20-4; TIA 19-5; TIA 19-6) Standard for the Installation of Sprinkler Systems
NFPA 14	(2019; TIA 19-1) Standard for the Installation of Standpipes and Hose Systems
NFPA 24	(2019; TIA 19-1) Standard for the Installation of Private Fire Service Mains and Their Appurtenances
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 72	(2019; TIA 19-1; ERTA 1 2019) National Fire Alarm and Signaling Code

UNDERWRITERS LABORATORIES (UL)

UL Fire Prot Dir	(2012) Fire Protection Equipment Directory

1.2 RELATED REQUIREMENTS

Section 23 03 00.00 20 BASIC MECHANICAL MATERIALS AND METHODS applies to this section with additions and modifications specified herein.

1.3 SYSTEM DESCRIPTION

Design and provide new [manual dry Class I][combination] [automatic] [wet Class I] standpipe [and fire sprinkler] system[s] as shown.

1.4 SYSTEM DESCRIPTION

****

NOTE: Design standpipe systems in accordance with the current edition of MIL-HDBK-1008 and NFPA 14. Provide pipe-sizing calculations to the Division Fire Protection Engineer (FPE) for review. Class I standpipes are for fire department use only and will normally be the type provided. Wet standpipes must be protected from freezing. It is NAVFAC policy not to provide hose on standpipes except in unique situations as approved by the Division FPE. In low and intermediate height buildings (up to 75-ft in height), use of manual-dry standpipes is normally dictated by economics. In high rise buildings, the time required to fill the piping with water and the pressure involved normally dictate automatic standpipes.

The following clarification is provided regarding the design of standpipe systems. The two primary factors to consider are type of system (manual vs. automatic) and system design pressures. Unless otherwise directed by the Division FPE, standpipe systems shall be designed as follows:

1. For buildings less than 75-ft, standpipe systems shall be designed as “Manual Standpipe Systems” as defined in NFPA 14. The system piping shall be hydraulically designed to provide the required flow rate at a minimum residual pressure of 65 psi at the hydraulically most remote 2½-inch hose connection. In combination sprinkler-standpipe systems, necessary fire booster pumps shall be sized to support the sprinkler demand only. The fire department shall supplement the standpipe system via the fire department connections to provide the necessary flow and pressure. The water supply must be evaluated to ensure the available capacity will support the minimum standpipe system flow rates.

2. For buildings 75-ft up to 150-ft in height, standpipe systems shall be designed as “Automatic Standpipe Systems”as defined in NFPA 14. Fire pumps shall be sized to consider the standpipe demand as specified in NFPA 14. The system piping shall be hydraulically designed to provide the required flow rate at a minimum residual pressure of 65 psi at the hydraulically most remote 2½-inch hose connection.

3. In buildings 150-ft in height and greater, standpipe systems shall be designed as “Automatic Standpipe Systems”as defined in NFPA 14. Fire pumps shall be sized to consider the standpipe demand as specified in NFPA 14. The system piping shall be hydraulically designed to provide the required flow rate at a minimum residual pressure of 100-psi at the hydraulically most remote 2½-inch hose connection.

****

System design and manufacturer's products shall be in accordance with the required and advisory provisions of NFPA 14 except as modified herein. [Standpipe system shall be designed by hydraulic calculations.][Provide sprinkler portion of system under Section 21 13 13 WET PIPE SPRINKLER SYSTEMS, FIRE PROTECTION.] Each system [shall be designed for earthquakes and]shall include materials, accessories, and equipment inside and outside the building necessary to provide each system complete and ready for use. Devices and equipment shall be UL Fire Prot Dir listed or FM APP GUIDE approved for fire protection service. In the publications referred to herein, the advisory provisions shall be considered to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears; reference to the "authority having jurisdiction" shall be interpreted to mean the [[_____] Division] [Engineering Field Activity [_____]], Naval Facilities Engineering Command, Fire Protection Engineer. [The work shall begin at [the points indicated][_____].]

1.4.1 Residual Pressure

The minimum residual pressure at the outlet of the most remote 64 mm hose connection shall be 448.2 kPa 65 psig [689.5 kPa 100 psig] while the system is discharging at the required design flow rates.

1.4.2 Friction Losses

Calculate losses in piping in accordance with the Hazen-Williams formula with 'C' value of 120 for steel piping, 150 for copper tubing, and 140 for cement-lined ductile-iron piping.

[1.4.3 Water Supply

Base hydraulic calculations on a static pressure of [_____] kPa psi (gage with [_____] L/m gpm available at a residual pressure of [_____] kPa psi (gage) at the [junction with the existing water distribution piping system.] [Base hydraulic calculations on operation of fire pump[s] provided in Section 21 30 00 FIRE PUMPS.]

]1.4.4 Standpipe System Drawings

Prepare in accordance with the requirements for "Plans and Specifications" as specified in NFPA 14. Each drawing shall beA1 841 by 594 mm 34 by 22 inches. Plans shall be drawn to a scale not less than 1 mm equals 100 mm 1/8 inch scale Do not commence work until the design of each system and the various components have been approved. Show data essential for proper installation of each system. Show details, plan view, elevations, and sections of the systems supply and piping. Show piping schematic of systems supply, devices, valves, pipe, and fittings. [Submit drawings signed by a registered fire protection engineer.] Show:

a. Room, space or area layout and include pipe supports and hangers.

b. Field wiring diagrams showing locations of devices and points of connection and terminals used for all electrical field connections in the system, with wiring color code scheme.

1.5 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters 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.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

The fire protection engineer, [[_____] Division] [Engineering Field Activity [_____]], Naval Facilities Engineering Command will review any approve all submittals in this section requiring Government approval.

SD-02 Shop Drawings

Standpipe System; G[, [_____]]

SD-03 Product Data

Aboveground Pipe and Fittings; G[, [_____]]

Mechanical Couplings; G[, [_____]]

Pipe Hangers and Supports; G[, [_____]]

Valves, including Gate, Check, and Hose; G[, [_____]]

Fire Department Connections; G[, [_____]]

[Alarm Valves; G[, [_____]]]

[Water Motor Alarms; G[, [_____]]]

[Pressure Switch; G[, [_____]]]

[Waterflow Detector; G[, [_____]]]

[Fire hose Cabinets; G[, [_____]]]

Valve Tamper Switch; G[, [_____]]

[Backflow Preventer; G[, [_____]]]

Buried Pipe and fittings; G[, [_____]]

Data which describes more than one type of item shall be clearly marked to indicate which type the Contractor intends to provide. Submit one original for each item and clear, legible, first-generation photocopies for the remainder of the specified copies. Incomplete or illegible photocopies will not be accepted. Partial submittals will not be accepted.

SD-06 Test Reports

Preliminary Tests; G[, [_____]]

Acceptance Tests; G[, [_____]]

Submit for all inspections and tests specified under paragraph entitled "Field Quality Control."

SD-07 Certificates

Qualifications of Installer; G[, [_____]]

Submit installers qualifications as required under paragraph entitled "Qualifications of Installer."

SD-10 Operation and Maintenance Data

Alarm Valves, Data Package 3; G[, [_____]]

Backflow Preventer, Data Package 3; G[, [_____]]

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Furnish one complete package prior to the time that final acceptance tests are performed, and furnish the remaining before the contract is completed. Inscribe the following identification on the cover: the words OPERATION AND MAINTENANCE MANUAL, the location of the building, the name of the Contractor, system manufacturer and the contract number. The instructions shall be legible and easily read, with large sheets of drawings folded in. The package shall include: schematic drawings showing piping; circuit drawings; installation instructions; maintenance instructions; safety precautions, diagrams, and illustrations; test procedures; performance data; and parts list.

SD-11 Closeout Submittals

System As-Built Drawings; G[, [_____]]

1.6 QUALITY ASSURANCE

1.6.1 Qualifications of Installer

****

NOTE: The experience clause in this guide specification has been approved by a Level I, Contracting Officer in accordance with the requirements of Naval Facilities Acquisition

Supplement (NFAS).
NFAS can be found at the following link:
https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_forbusinesse
The paragraph in this guide specification may be used without further approval or request for waiver.
****

Prior to commencing work, submit data showing that the Contractor has successfully installed fire extinguishing standpipe systems of the same type and design as specified herein, or that he has a firm contractual agreement with a subcontractor having the required experience. Include the names and locations of at least two installations where the Contractor, or the subcontractor referred to above, has installed such systems. Indicate the type and design of each system, and certify that the system has performed satisfactorily for a period of at least 18 months.

Qualifications of System Technician: Installation drawings, shop drawing and as-built drawings shall be prepared, by or under the supervision of, an individual who is experienced with the types of works specified herein, and is currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with minimum Level-III certification in Automatic Sprinkler System program. Contractor shall submit data for approval showing the name and certification of all involved individuals with such qualifications at or prior to submittal of drawings.

1.6.2 System As-Built Drawings

Upon completion, and before final acceptance of the work, submit a complete set of as-built drawings of each system. Submit A1 841 by 594 mm 34 by 22 inch reproducible as-built drawings on mylar film with title block similar to full size contract drawings. Furnish as-built(record) working drawings in addition to the as-built drawings required by Division 1, "General Requirements."

1.7 DELIVERY, STORAGE AND HANDLING

Protect stored equipment from weather, humidity and temperature variations, dirt, dust, and other contaminants.

PART 2 PRODUCTS

2.1 ABOVEGROUND PIPING SYSTEMS

****
NOTE: Include bracketed text for wet pipe systems only.
****

Provide fittings for changes in direction of piping and for connections. Make changes in piping sizes through tapered reducing pipe fittings; bushings will not be permitted. Perform welding in the shop; field welding will not be permitted. [Conceal piping in areas with suspended ceiling.]

2.1.1 Pipe and Fittings

****
NOTE: Designer shall consider specifying

high-pressure fittings where applicable. Consult the Division FPE for guidance.
****

NFPA 14, except as modified herein. Steel piping shall be Schedule 40 for sizes less than 200 mm 8 inches, and Schedule 30 or 40 for sizes 200 mm 8 inches and larger. Fittings shall be welded, threaded, or grooved-end type. Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into the pipe when pressure is applied will not be permitted. Rubber gasketed grooved-end pipe and fittings with mechanical couplings shall be permitted in pipe sizes 40 mm 1.5 inches and larger. Fittings shall be UL Fire Prot Dir listed or FM APP GUIDE approved for use in [dry] [wet] pipe sprinkler systems. Fittings, mechanical couplings, and rubber gaskets shall be supplied by the same manufacturer. Steel piping with wall thickness less than Schedule 30 shall not be threaded.[Side outlet tees using rubber gasketed fittings shall not be permitted.] Pipe and fittings shall be metal.

2.1.2 Pipe Hangers and Supports

Provide in accordance with NFPA 14.

2.1.3 Valves

NFPA 14. Provide valves of types approved for fire service. Hose and gate valves shall open by counterclockwise rotation. Provide isolation and check valves as required by NFPA 14. Isolation valves shall be OS&Y type. Check valves shall be flanged clear opening swing-check type with flanged inspection and access cover plate for sizes 100 mm 4 inches and larger.

2.1.3.1 Hose Valves

****
NOTE: Where nozzle pressures may exceed 862 kPa 125 psi for Class I standpipes, specify pressure regulating valves. Specify 690 kPa 100 psi for all Class I standpipes unless otherwise requested by the Division FPE. Indicate on drawings which valves are to be pressure regulating type.
****

Provide bronze [pressure regulating type] hose valve with 65 mm 2 1/2 inch National Standard male hose threads, and 65 mm 2 1/2 inch NH female by 40 mm 1 1/2 inch IPT male reducer with cap and chain. [Equip valve with a device to regulate pressure at the outlet to a pressure not exceeding [690] [_____] kPa [100] [_____] psi [under both flow and no-flow conditions].]

2.1.4 Identification Signs

NFPA 14. Attach properly lettered and approved metal signs to each valve and alarm device.

[2.1.5 Waterflow Test Connection

****
NOTE: Include for wet pipe systems only.
****

Provide test connections approximately 1.83 m 6 feet above the floor for each standpipe system or portion of each standpipe system equipped with an alarm device; locate downstream and adjacent to each alarm actuating device. Provide test connection piping to a location where the discharge will be readily visible and where water may be discharged without property damage. Discharge to janitor sinks or similar fixtures shall not be permitted. Provide discharge orifice equivalent to 15 mm 1/2 inch sprinkler orifice. [The penetration of the exterior wall shall be no greater than [2 feet 0.61 meter] [_____] above finished grade.]

][2.1.6 Main Drains

****
NOTE: Include for wet pipe systems only.
****

Provide separate drain piping to discharge at safe points outside each building or to sight cones attached to drains of adequate size to readily receive the full flow from each drain under maximum pressure. Provide auxiliary drains as required by NFPA 13 and NFPA 14.

]2.1.7 Pipe Sleeves

Provide where piping passes entirely through walls, floors, roofs and partitions. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, roofs and partitions. Provide one inch minimum clearance between exterior of piping and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation. Seal space at both ends of the sleeve or core-drilled hole with plastic waterproof cement which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal. In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with UL listed fill, void, or cavity material.

2.1.7.1 Sleeves in Masonry and Concrete Walls, Floors, and Roofs

Provide hot-dip galvanized steel, ductile-iron, or cast-iron sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth. Extend sleeves in floor slabs 76 mm 3 inches above finished floors.

2.1.7.2 Sleeves in Partitions

Provide 26 gage galvanized steel sheet.

2.1.8 Escutcheon Plates

Provide one piece or split hinge type metal plates for piping passing through walls, floors, and ceilings in both exposed and concealed spaces. Provide polished stainless steel plates or chromium-plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces. Securely anchor plates in place.

2.1.9 Fire Department Connections

****

NOTE: Consult Division FPE for diameter and thread type for fire department hose connections in use.
****

Provide connections approximately one meter 3 feet above finish grade, of the approved two-way type with [[65] [_____] mm[2.5] [_____] inch National Standard] female hose threads with plug, chain, and identifying fire department connection escutcheon plate.

[2.1.10 Alarm Valves

****
NOTE: Include for wet pipe systems only.
****

Provide variable pressure type alarm valve complete with retarding chamber, alarm test valve, alarm shutoff valve, drain valve, pressure gages, accessories, and appurtenances for the proper operation of the system. The alarm shut-off valve in the piping between the alarm valve and the alarm pressure switch shall be a UL listed electrically supervised quarter-turn valve. Connection of switch shall be under Section [28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE.] [28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE.] [28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE.] [28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE.]

][2.1.11 Water Motor Alarms

****
NOTE: Include for wet pipe systems only.
****

Provide alarms of the approved weatherproof and guarded type, to sound locally on the flow of water in each corresponding standpipe. Mount alarms on the outside of the outer walls of each building. Provide separate drain piping directly to exterior of building.

][2.1.12 Pressure Switch

****
NOTE: Include for wet pipe systems only.
****

Provide switch with circuit opener or closer [SPDT contacts] for the automatic transmittal of an alarm over the facility fire alarm system. Connect into the building fire alarm system. Alarm actuating device shall have mechanical diaphragm controlled retard device adjustable from 10 to 60 seconds and shall instantly recycle.

][2.1.13 Waterflow Detector

****
NOTE: Include for wet pipe systems only.
****

Provide vane-type waterflow detector. Provide detector with adjustable retard feature to prevent false alarms caused by momentary water surges. Connect into the building fire alarm system. [Alarm actuating device shall have mechanical diaphragm controlled retard device adjustable from

10 to 60 seconds and shall instantly recycle.] Provide detector [at the base of each standpipe riser above main check valve] [where indicated] in accordance with manufacturers instructions.

][2.1.14 Fire Hose Cabinets

Provide [recessed] [semi recessed] [surface]-mounted cabinets where indicated. Cabinets shall be prime grade, cold-rolled, reannealed, process-leveled, furniture steel. Fabricate cabinet from 20 gage steel and door and trim from 18 gage steel. Provide fully welded joints ground smooth. On each jamb, provide at least two anchors or reinforcements spaced approximately 610 mm 24 inches apart for building in or attaching the cabinets to adjacent construction. Doors shall be flush hollow metal type with fully welded joints ground smooth and full glazed opening. Provide door with continuous hinge, latch and pull. Hinge door for 180 degree opening. Glass shall conform to ASTM C1036 and shall be Type II (flat wired glass), Class 1 (clear), Form 1 (wired, polished both sides), Quality q 8 (glazing quality), diamond or square wire mesh, 6.35 mm 1/4 inch thick. Factory finish cabinet inside and out with one coat of enamel applied over a primer. Interior finish color shall be white. Exterior finish color shall be [_____]. [Fabricate cabinet with sufficient interior space to store one fire extinguisher.]

][2.1.15 Valve Tamper Switch

****
NOTE: Include for wet pipe systems only.
****

Provide valve tamper switch(es) to monitor the open position of valve(s) controlling water supply to the standpipe system. Switch contacts shall transfer from the normal (valve open) position to the off-normal (valve closed) position during the first two revolutions of the hand wheel or when the stem of the valve has moved not more than one-fifth of the distance from its normal position. Switch shall be tamper resistant. Removal of the cover shall cause switch to operate into the off-normal position.

][2.1.16 Fire Pumps

Provide as specified in Section 21 30 00 FIRE PUMPS.

][2.1.17 Backflow Preventer

Provide [reduced pressure principle] [double check] valve assembly backflow preventer with OS&Y gate valve on both ends. Each check valve shall have a drain. Backflow prevention assemblies shall have current "Certificate of Approval from the Foundation for Cross-Connection Control and Hydraulic Research, FCCCHR List. Listing of the specific make, model, design, and size in the FCCCHR List shall be acceptable as the required documentation."

]2.2 BURIED PIPING SYSTEMS

2.2.1 Buried Pipe and Fittings

****
NOTE: For pipe sizes larger than 305 mm 12 inches, method for pipe anchorage including pipe clamps and

rods shall be shown on the drawings.
****

****
NOTE: Requirements for buried piping systems 1.52 m 5 feet beyond the building walls shall be specified in Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING. Careful coordination is required to insure that materials rated for fire service are specified.
****

NFPA 24, outside coated, cement lined, ductile iron pipe and fittings for piping under the building and to a point 1.52 m 5 feet outside the building walls. Anchor the joints in accordance with NFPA 24 using pipe clamps and steel rods. Minimum pipe size shall be 150 mm 6 inches. Minimum depth of cover shall be [_____] [one meter] [3] feet. Piping more than 1.52 m 5 feet outside the building walls shall be provided under Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING.

2.2.2 Buried Utility Warning and Identification Tape

Provide detectable tape in accordance with Section 31 00 00 EARTHWORK.

2.3 ELECTRICAL WORK

****
NOTE: Edit Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and include as part of the project specification.
****

****
NOTE: When project includes requirement for a building fire alarm system, include Section 28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE, Section 28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE, Section 28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE, or Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE in the project specification. When project requires only tying into an existing building fire alarm system, fire alarm wiring should be specified in this section. Edit this paragraph to suit project requirements.
****

Provide electrical work associated with this section under Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, except for fire alarm wiring. Provide fire alarm wiring and connection to fire alarm systems under Section [28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE] [28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE] [28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE] [28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE] [this section in accordance with NFPA 70 and NFPA 72].

[2.3.1 Wiring

****
NOTE: Delete this paragraph if [Section 28 31 60

INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE] [Section 28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE] [Section 28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE] [Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE] is included in the project specification.
****

Provide fire alarm wiring and connections to fire alarm systems, under this section and conforming to NFPA 70, and NFPA 72. Wire for 120 volt circuits shall be No. 12 AWG minimum solid conductor. Wire for low voltage DC circuits shall be No. [14] [16] AWG minimum solid conductor. All wiring shall be color coded. Wiring, conduit and devices exposed to water or weather shall be weatherproof. Wiring, conduit and devices located in hazardous atmospheres, as defined by NFPA 70 [and as shown], shall be explosion proof. All conduit shall be minimum 20 mm 3/4 inch size. Identify circuit conductors within each enclosure where a tap, splice or termination is made. Identify conductors by plastic coated self sticking printed markers or by heat-shrink type sleeves. Attach the markers in a manner that will not permit accidental detachment.

]PART 3 EXECUTION

3.1 EXCAVATION, BACKFILLING, AND COMPACTING

****
NOTE: Edit Section 31 00 00 EARTHWORK and include as part of the project specification.
****

Provide under this section as specified in Section 31 00 00 EARTHWORK.

3.2 CONNECTIONS TO EXISTING WATER SUPPLY SYSTEMS

****
NOTE: Coordinate with Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING for this work.
****

Connections to existing water supply system are specified in Section 33 11 00 WATER UTILITY DISTRIBUTION PIPING.

3.3 STANDPIPE SYSTEM INSTALLATION

****
NOTE: Include bracketed text for wet pipe systems only.
****

Equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with the NFPA standards referenced herein. Install piping straight and true to bear evenly on hangers and supports. [Conceal piping to the maximum extent possible. Piping shall be inspected, tested and approved before being concealed.] Provide fittings for changes in direction of piping and for all connections Make changes in piping sizes through standard reducing pipe fittings; do not use bushings. Cut pipe accurately and work into place without springing or forcing. Ream pipe ends and free pipe and

fittings from burrs. Clean with solvent to remove all varnish and cutting oil prior to assemble. Make screw joints with PTFE tape applied to male thread only.

3.4 DISINFECTION

****
NOTE: Delete this paragraph for dry pipe systems and when the water supply for a wet pipe system is non-potable water.
****

Disinfect new water piping from the point of connection at the water main and existing water piping affected by the Contractor's operation in accordance with AWWA C651. Exercise caution when mixing chlorine disinfectant solutions. Fill piping systems with solution containing minimum of 50 parts per million of free available chlorine and allow solution to stand for a minimum of 24 hours. Flush solution from systems with clean water until maximum residual chlorine content is not greater than 0.2 parts per million. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit results prior to new water piping being placed into service.

3.5 FIELD PAINTING

Field painting of fire extinguishing standpipe system shall be specified in Section 09 90 00 PAINTS AND COATINGS. Field painting requirements for "Fire Extinguishing Sprinkler Systems" shall apply.

3.5.1 Piping Labels

Provide permanent labels in mechanical rooms, spaced at 6 meters 20 foot maximum intervals along pipe, indicating "STANDPIPE."

3.6 ELECTRICAL WORK

****
NOTE: Edit Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and include as part of the project specification
****

****
NOTE: When project includes requirement for a building fire alarm system, include Section 28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE, Section 28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE, Section 28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE, or Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE in the project specification. When project requires only tying into an existing building fire alarm system, fire alarm wiring should be specified in this section. Edit this paragraph to suit project requirements.
****

Provide electrical work associated with this section under Section 26 20 00

INTERIOR DISTRIBUTION SYSTEM, except for fire alarm wiring. Provide fire alarm wiring and connection to fire alarm systems under Section [28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE] [28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE] [28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE] [28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE] [this section in accordance with NFPA 70 and NFPA 72].

[3.6.1 Wiring

****
NOTE: Delete this paragraph if [Section 28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE] [Section 28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE] [Section 28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE] [Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE] is included in the project specification.
****

Provide fire alarm wiring and connections to fire alarm systems, under this section in accordance with NFPA 70, and NFPA 72. Provide wiring in rigid metal conduit or intermediate metal conduit, except electrical metallic tubing may be used in dry locations not enclosed in concrete or where not subject to mechanical damage. Do not run low voltage DC circuits in the same conduit with AC circuits.

]3.7 FLUSHING

Flush the piping system with potable water in accordance with NFPA 14. Continue flushing operation until water is clear, but for not less than 10 minutes.

3.8 FIELD QUALITY CONTROL

Prior to initial operation, inspect equipment and piping systems for compliance with drawings, specifications, and manufacturer's submittals. Perform tests in the presence of the Contracting Officer to determine conformance with the specified requirements.

3.8.1 Preliminary Tests

****
NOTE: Specify hydrostatic test not less than 1379 kPa or 345 kPa 200 psi or 50 psi above the maximum working pressure when the maximum working pressure is greater than 1034 kPa 150 psi. Include bracketed text for wet pipe systems only.
****

Each piping system shall be hydrostatically tested at [1379] [_____] kPa (gage) [200] [_____] psig in accordance with NFPA 14 and NFPA 24 and shall show no leakage or reduction in gauge pressure after 2 hours. The Contractor shall conduct complete preliminary tests, which shall encompass all aspects of system operation. [Individually test alarms, and all other components and accessories to demonstrate proper functioning. Test water flow alarms by flowing water.] When tests have been completed and all necessary corrections made, submit to the Contracting Officer a signed and

dated certificate, similar to that specified in NFPA 13, attesting to the satisfactory completion of all testing and stating that the system is in operating condition. Also include a written request for a formal inspection and test.

3.8.2 Formal Inspection and Tests (Acceptance Tests)

The [[_____] Division] [Engineering Field Activity [_____]], , Naval Facilities Engineering Command, Fire Protection Engineer, will witness formal tests and approve all systems before they are accepted. The system shall be considered ready for such testing only after all necessary preliminary tests have been made and all deficiencies found have been corrected to the satisfaction of the Contracting Officer and written certification to this effect is received by the Division Fire Protection Engineer. Submit the request for formal inspection at least 15 working days prior to the date the inspection is to take place. Experienced technicians regularly employed by the Contractor in the installation of both the mechanical and electrical portions of such systems shall be present during the inspection and shall conduct the testing. All instruments, personnel, appliances and equipment for testing shall be furnished by the Contractor. [The Government will furnish water for the tests.] All necessary tests encompassing all aspects of system operation shall be made including the following, and any deficiency found shall be corrected and the system retested at no cost to the Government.

3.8.2.1 Flow Test

****
NOTE: Include bracketed text for dry pipe systems only.
****

Perform flow tests of each standpipe riser in accordance with NFPA 14. Affix [0-1379] [0-2068] kPa [0-200] [0-300] psi pressure gauges to lowest hose valve and next-to-highest hose valve. Connect lined, 65 mm 2 1/2 inch diameter fire hose with underwriter's playpipe to highest hose valve and flow at least 946 L/m 250 gpm for 5 minutes from standpipe to a safe location outside the building. [For dry pipe system, supply system through 65 mm 2 1/2 inch fire hose connected to the nearest fire hydrant which is approximately [_____] meters feet away.] Furnish hose, nozzles and fittings required for this test.

[3.8.2.2 Alarm Testing

****
NOTE: Include for wet pipe systems only.
****

a. Each pressure switch, waterflow detector, and water motor gong shall be activated by flow of water.

b. Each valve tamper switch shall be activated by partially closing the associated control valve.

c. Alarm annunciation at the fire alarm control panel shall be verified.

d. Circuit supervision shall be demonstrated.

]3.8.3 Additional Tests

When deficiencies, defects or malfunctions develop during the tests required, all further testing of the system shall be suspended until proper adjustments, corrections or revisions have been made to assure proper performance of the system. If these revisions require more than a nominal delay, the Contracting Officer shall be notified when the additional work has been completed, to arrange a new inspection and test of the system. All tests required shall be repeated prior to final acceptance, unless directed otherwise.

-- End of Section --