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NAVFAC IGS-13930 (JULY 2002)  
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Supercedes IGS-13930 (01/02)  
Preparing Activity: LANTNAVFACENGCOM Based on UFGS-13930N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

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SECTION 13930

WET-PIPE FIRE SUPPRESSION SPRINKLERS  
07/02

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NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

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NOTE: This guide specification covers requirements for automatic wet-pipe fire extinguishing sprinkler systems for heated areas. System requirements must conform to Military Handbook MIL-HDBK-1008A, "Fire Protection for Facilities Engineering Design and Construction" and NFPA 13, "Installation of Sprinkler Systems." This guide specification is to be used in the preparation of project specifications in accordance with MIL-HDBK-1006/1.

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NOTE: Following information shall be shown on project drawings:

1. Location and detail of each sprinkler system supply riser, alarm valve, water motor alarm, fire department inlet connection, pressure or flow switch, fused disconnect switch, and associated electrical connections.
2. Location where each sprinkler system begins including connection to water distribution system piping.
3. Location of sprinkler system control valves, post indicator valves, or wall indicator valves.
4. Area of sprinkler system coverage when system is protecting partial areas.

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

6. Indicate existing sprinkler piping layout and sprinkler heads on project drawings only if existing sprinkler system is being modified and such layout is necessary for clarity.

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Comments and suggestion on this specification are welcome and should be directed to the technical proponent of the specification. A listing of the technical proponents, including their organization designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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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 in the text by the basic designation only.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME/ANSI A17.1 (1996) Safety Code for Elevators and Escalators

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C651 (1992) Disinfecting Water Mains

FACTORY MUTUAL ENGINEERING AND RESEARCH CORPORATION (FM)

FM P7825 (1999) Approval Guide

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

FCCCHR-USC List of Approved Backflow Prevention Assemblies

ITALIAN ELECTROTECHNICAL COMMITTEE (CEI) PUBLICATIONS

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**NOTE: A CEI Norm is an Italian technical normative**

for electrical systems recognized by Italian Law,  
submitted by a private organization "Comitato  
Elettrotecnico Italiano" for the Italian  
territory, available in the Italian language and  
only in some cases in English.

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CEI 64-8 (1998) Electrical installations of  
buildings

ITALIAN LAWS AND NORMS (D.M.)(LAW)(CIRC.)

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**NOTE: Italian laws and normatives are the  
legislative regulations and decrees issued by the  
Italian government in the form of laws, norms,  
decrees, circulars, and letters. These Laws and  
Decrees concur together with Norms and Standards  
in forming the governing directives for  
construction.**

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D.P.R. 29 (May 1963, n. 1497) Requirements for  
Elevators and Freight Elevators for  
Private Use

Circ. n. 190 Potable Water Distribution in Buildings.  
Criteria for Controls and Prescriptions to  
Avoid Potable Water Contamination

ITALIAN NATIONAL ASSOCIATION FOR UNIFICATION OF STANDARDS (UNI)

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**NOTE: A UNI Norm is a technical normative  
recognized as Italian Law, submitted by a private  
organization "Ente Nazionale Italiano di  
Unificazione" for Italy and is available only in  
the Italian language. It is the National Standard.**

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UNI 8863 (1987) Unalloyed steel seamless and welded  
tubes suitable for screwing in accordance  
with UNI ISO 7/1

UNI 9157 (1988) Water supply - Back flow preventer  
- Characteristics and tests

UNI 9489 (1989) Fire fighting equipment - Sprinkler  
fire extinguishing systems

UNI 9760/2 (1991) Nuclear plants - Supports,  
attachments and anchors for piping -  
Material

UNI 9760/3 (1991) Nuclear plants - Supports, attachments and anchors for piping - Design

UNI 9760/4 (1991) Nuclear Plants - Supports, attachments and anchors for piping - Fabrication and installation

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC. (MSS)

MSS SP-58 (1993) Pipe Hangers and Supports - Materials, Design and Manufacture

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13 (1999) Installation of Sprinkler Systems

NFPA 24 (1995) Installation of Private Fire Service Mains and Their Appurtenances

NFPA 70 (1999) National Electrical Code

UNDERWRITERS LABORATORIES INC. (UL)

UL FPED (1999) Fire Protection Equipment Directory

UL 262 (1994; R 1998) Gate Valves for Fire-Protection Service

UL 789 (1993; R 1994) Indicator Posts for Fire-Protection Service

1.1.1 Conflicts in Criteria

If a conflict exists between references, the more stringent reference shall be utilized. Proposed resolution of such conflicts shall be presented to the EFA-MED Fire Protection Engineer for approval prior to any action being taken.

[1.3 SYSTEM DESCRIPTION

Design and provide [new and modify existing] automatic wet pipe fire extinguishing sprinkler systems for complete fire protection coverage throughout [\_\_\_\_\_].

]1.4 SPRINKLER SYSTEM DESIGN

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**NOTE: Areas smaller than 279 sq meters, use pipe schedules. Areas larger than 279 sq meters, use pipe schedules or hydraulic calculations. Open areas larger than 929 sq meters, use hydraulic calculations. When hydraulic calculations are not included, delete paragraphs entitled "Water**

Distribution," "Density of Application of Water,"  
"Sprinkler Discharge Area," "Outside Hose  
Allowances," "Friction Losses," and "Water Supply."

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NOTE: Select last bracketed statement for buildings  
in seismic zones 3 and 4, and only essential and  
high risk buildings in seismic zone 2. Refer to  
NAVFAC P-355. Coordinate with structural designer.

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Design automatic wet pipe fire extinguishing sprinkler systems in accordance with the required and advisory provisions of NFPA 13, except as modified herein, by [pipe schedules for [\_\_\_\_\_] [ordinary] [extra] hazard occupancy] [or] [hydraulic calculations for uniform distribution of water over the design area]. Discharge from individual heads in the hydraulically most remote area shall be between 100 percent and 120 percent of the specified density. Each system shall include materials, accessories, and equipment inside and outside the building to provide each system complete and ready for use. Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Locate sprinkler heads in a consistent pattern with ceiling grid, lights, and air supply diffusers. Provide sprinkler heads and piping system layout. Devices and equipment for fire protection service shall be UL FPED listed or FM P7825 and approved for use in wet pipe sprinkler systems. Design systems for earthquake protection.

[1.4.1 Location of Sprinkler Heads

Heads in relation to the ceiling and the spacing of sprinkler heads shall not exceed [that permitted by NFPA 13 for [\_\_\_\_\_] [ordinary] [extra] hazard occupancy.][ [\_\_\_\_\_] sq meter per head.] Uniformly space sprinklers on the branch piping.

]1.4.2 Water Distribution

Distribution shall be uniform throughout the area in which the sprinkler heads will open. Discharge from individual heads in the hydraulically most remote area shall be 100 percent of the specified density.

1.4.3 Density of Application of Water

Size pipe to provide the specified density when the system is discharging the specified total maximum required flow. Application to horizontal surfaces below the sprinklers shall be [\_\_\_\_\_] L/m per sq meter.

1.4.4 Sprinkler Discharge Area

Area shall be the hydraulically most remote [\_\_\_\_\_] sq meter area as defined in NFPA 13.

1.4.5 Outside Hose Allowances

Hydraulic calculations shall include an allowance of [\_\_\_\_\_] L/m for outside hose streams.

1.4.6 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.

1.4.7 Water Supply

Base hydraulic calculations on a static pressure of [\_\_\_\_\_] kPa (gage) with [\_\_\_\_\_] L/m available at a residual pressure of [\_\_\_\_\_] kPa (gage) at the [junction with the water distribution piping system.] [base of the sprinkler piping riser.] [Base hydraulic calculations on operation of fire pumps provided in Section 13920, "Fire Pumps."]

1.4.8 Detail Drawings

Prepare A1 841 x 594 mm detail working drawings of sprinkler heads and piping system layout in accordance with NFPA 13, "Working Drawings (Plans)." 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. Show point to point electrical wiring diagrams. [Submit drawings signed by a registered fire protection engineer.]

1.4.9 As-Built Drawings

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

1.5 SUBMITTALS

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**NOTE:**

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

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

submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Recommended codes for Army projects are "RE" for Resident Engineer approval, "ED" for Engineering approval, and "AE" for Architect-Engineer approval. Codes following the "G" typically are not used for Navy projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.

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Submit the following in accordance with Section 01330, "Submittal Procedures." [The EFA-MED Division, Naval Facilities Engineering Command, Fire Protection Engineer, will review and approve all submittals in this section requiring Government approval.]

SD-02 Shop Drawings

Sprinkler heads and piping system layout; G

Electrical wiring diagrams; G

SD-03 Product Data

Piping; G

[Alarm valves; G]

Valves, including gate, check, and globe; G

[Water motor alarms; G]

Sprinkler heads; G

Pipe hangers and supports; G

[Pressure] [or] [flow] switch; G

Fire department connections; G

Mechanical couplings; G

Backflow Preventer; G

Annotate descriptive data to show the specific model, type, and size of each item.

SD-05 Design Data

Sprinkler system design; G

Submit [computer program generated] hydraulic calculations to substantiate compliance with hydraulic design requirements. Submit name of software program used.

SD-06 Test Reports

Preliminary tests on piping system; G

SD-07 Certificates

Qualifications of installer; G

SD-10 Operation and Maintenance Data

Alarm valves, Data Package 3; G

Backflow preventer, Data Package 3

Submit in accordance with Section 01781, "Operation and Maintenance Data."

SD-11 Closeout Submittals

As-built drawings of each system; G

1.6 QUALITY ASSURANCE

1.6.1 Qualifications of Installer

Prior to installation, submit data showing that the Contractor has successfully installed systems of the same type and design as specified herein, or that Contractor has a firm contractual agreement with a subcontractor having such required experience. Data shall include names and locations of at least two installations where the Contractor, or the subcontractor referred to above, has installed such systems. Indicate type and design of each system and certify that each system has performed satisfactorily in the manner intended for not less than 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 Italian Rolls of Engineering with a minimum of 10 years experience. 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 Product Qualifications

All products, devices, and equipment shall be UL listed or FM approved.

## PART 2 PRODUCTS

### 2.1 SOURCE MANUFACTURERS

#### 2.1.1 Sprinkler Systems

The following manufacturers provide sprinkler system components that generally comply with these specifications:

Sprinkler Viking Italia S.R.L.  
Via Leonardo Da Vinci 46/B  
1 - 20030 Senago - MI  
Tel: 39-2-99010112  
Fax: 39-2-99010041

La Politermica S.C.A.R.L.  
Via Macello, 51  
39100 Bolzano  
Tel: 0471/971430  
Fax: 0471/981127

Politermica Distribution S.R.L. - Italy  
Via San Giacomo 260  
39055 Laives (Bz)  
Tel: 39-0471-252091  
Fax: 30-0471-254058

### 2.2 ABOVEGROUND PIPING SYSTEMS

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] [and] [\_\_\_\_\_].

#### 2.2.1 Sprinkler Piping

NFPA 13, UNI 8863, and UNI 9489, except as modified herein. [Steel piping shall be Schedule [10] [or] [40] for sizes less than 200 mm, and Schedule [10] [30] or [40] for sizes 200 mm and larger.] Fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded 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 and larger. Fittings shall be UL FPED listed or or FM Approved and approved for use in 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. Refer to Table 1 below for steel pipe data. Side outlet tees shall not be permitted. [Sprinkler pipe and fittings shall be metal.]

Table 1 Steel Pipe Data

Nominal Pipe Size mm	Pipe Schedule Number	Wall Thickness mm	Inside Diameter mm
25	10	2.77	27.86
25	40	3.38	26.64
32	10	2.77	36.63
32	40	3.56	35.05
40	10	2.77	42.72
40	40	3.68	40.89
50	10	2.77	54.79
50	40	3.91	52.50
65	10	3.05	66.93
65	40	5.16	62.71
80	10	3.05	82.80
80	40	5.49	77.93
100	10	3.05	108.20
100	40	6.02	102.26
150	10	3.40	161.47
150	40	7.11	154.05
200	10	3.76	209.52
200	30	7.04	205.00
200	40	8.18	202.72
250	10	4.19	264.70
250	30	7.80	257.50
250	40	9.27	254.50
300	10	4.57	314.70
300	30	8.38	307.10
300	40	10.31	303.20

2.2.2 Sprinkler Heads

Provide nominal 13.5 mm orifice sprinkler heads. O-rings will not be permitted in sprinkler heads. Release element of each head shall be of the [\_\_\_\_\_] [intermediate] temperature rating or higher as suitable for the specific application. Provide polished stainless steel ceiling plates or chromium-plated finish on copper alloy ceiling plates, and chromium-plated pendent sprinklers below suspended ceilings. [Provide corrosion-resistant sprinkler heads and sprinkler head guards as required by NFPA 13 and UNI 9489.] Provide spare sprinkler heads in accordance with NFPA 13 and UNI 9489. Deflector shall not be more than 80 mm below suspended ceilings. Ceiling plates shall not be more than 12.7 mm deep. Ceiling cups shall not be permitted.

2.2.3 Cabinet

Provide metal cabinet with extra sprinkler heads[, including a representative sample of dry pendent type sprinklers] and sprinkler head wrench adjacent to each alarm valve. The number and types of extra sprinkler heads shall be as specified in NFPA 13 and UNI 9489.

[2.2.4 Alarm Valves

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.

#### ]2.2.5 Water Motor Alarms

Provide alarms of the approved weatherproof and guarded type, to sound locally on the flow of water in each corresponding sprinkler system. Mount alarms on the outside of the outer walls of each building at a location as directed. Provide separate drain piping directly to exterior of building.

#### ]2.2.6 [Pressure] [or] [Flow] Switch

Provide switch with circuit opener or closer for the automatic transmittal of an alarm over the facility fire alarm system. Connection of switch shall be under Section [13851, "Exterior Fire Alarm System, Closed Circuit Telegraphic Type"] [13852, "Interior Fire Detection and Alarm System".] [Alarm actuating device shall have mechanical diaphragm controlled retard device adjustable from 10 to 60 seconds and shall instantly recycle.]

#### 2.2.7 Pipe Hangers and Supports

Provide in accordance with NFPA 13, UNI 8863, and UNI 9489. Attach to steel joists with MSS SP-58, Type 19 or 23 clamps and retaining straps as per UNI 9760/2, UNI 9760/3, and UNI 9760/4. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor.

#### 2.2.8 Valves

NFPA 13 and UNI 9489. Provide valves of types approved for fire service. Gate valves shall open by counterclockwise rotation. [Provide [a rising stem] [an OS&Y] [a wall indicator] valve beneath each alarm]. [Check valves shall be flanged clear opening swing-check type with flanged inspection and access cover plate for sizes 100 mm and larger.] [Provide OS&Y gate valve in piping to sprinklers protecting elevator hoistways, machine rooms, and machinery spaces in accordance with ASME/ANSI A17.1 and D.P.R. 29.] Each OS&Y gate valve shall be supervised; minimum contact ratings shall be 2.5 amps at 24 volt DC. Provide supervision against valve closure or tampering of valve.

#### 2.2.9 Backflow Preventer

Provide reduced pressure principle 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-USC. Listing of the specific make, model, design, and size in the FCCCHR-USC and/or UNI 9157 shall be acceptable as the required documentation.

#### 2.2.10 Identification Signs

UNI 9489. Attach properly lettered and approved metal signs to each valve and alarm device. [Permanently affix hydraulic design data nameplates to the riser of each system.]

#### 2.2.11 Test Connections

##### 2.2.11.1 Inspector's Test Connection

Provide test connections approximately 2 meters above the floor for each sprinkler system or portion of each sprinkler system equipped with an alarm device; locate at the hydraulically most remote part of each system. Provide test connection piping to a drain location that can accept full flow where the discharge will be readily visible and where water may be discharged without property damage. [Discharge to a floor drain shall be permitted only if the drain is sized to accommodate full flow.] Discharge to janitor sinks or similar fixtures shall not be permitted. Provide discharge orifice of same size as corresponding sprinkler orifice. [The penetration of the exterior wall shall be no greater than [0.61 meter] [\_\_\_\_\_] above finished grade.]

##### [2.2.11.2 Backflow Preventer Test Connection

Provide downstream of the backflow prevention assembly listed hose valves with 65 mm National Standard male hose threads with cap and chain. Provide one valve for each 16 L/s of system demand or fraction thereof. Provide a permanent sign in accordance with paragraph entitled "Identification Signs" which reads, "Test Valve."

##### ]2.2.12 Main Drains

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 UNI 9489. Provide precast concrete splash block under each exterior drain discharge. [The penetration of the exterior wall shall be no greater than [0.61 meter s] [\_\_\_\_\_] above finished grade.] [Main drain shall also serve as the backflow preventer test connection. Site main drain pipe and valve to support flow at system demand.]

#### 2.2.13 Fire Department Connections

Provide 100 mm Siamese [\_\_\_\_\_] type connections approximately one meter above finish grade, of the approved two-way type with 65 mm National Standard female hose threads with plug, chain, and identifying fire department connection escutcheon plate.

### 2.3 BURIED WATER PIPING SYSTEMS

#### 2.3.1 Pipe and Fittings

Provide outside-coated, cement-mortar lined, ductile-iron pipe or high density polyethylene pipe (HDPE), and fittings conforming to NFPA 24 and UNI 9489 for piping under the building and outside of building walls. Anchor joints in accordance with NFPA 24 and UNI 9489. Provide concrete thrust block at the elbow where the pipe turns up toward the floor, and restrain the pipe riser with steel rods from the elbow to the flange above the floor. Minimum inside diameter pipe size shall be 150 mm. Minimum depth of cover shall be [600 mm only pedestrian traffic] [800 mm if with vehicle traffic] [one meter] at finish grade. [Piping beyond 1.50 meters outside of building walls shall be provided under Section 02510, "Water Distribution."]

#### [2.3.2 Valves

Provide as required by NFPA 24 and UNI 9489. Gate valves shall conform to UL 262 and shall open by counterclockwise rotation.

#### ][2.3.3 Post Indicator Valves

Provide with operating nut located about one meter above finish grade. Gate valves for use with indicator post shall conform to UL 262. Indicator posts shall conform to UL 789. Provide each indicator post with one coat of primer and two coats of red enamel paint.

#### ][2.3.4 Valve Boxes

Except where indicator posts are provided, for each buried valve, provide cast-iron, ductile-iron, or plastic valve box of a suitable size. Plastic boxes shall be constructed of acrylonitrile-butadiene-styrene (ABS) or inorganic fiber-reinforced black polyolefin. Provide cast-iron, ductile-iron, or plastic cover for valve box with the word "WATER" cast on the cover. The minimum box shaft diameter shall be 133 mm. Coat cast-iron and ductile-iron boxes with bituminous paint applied to a minimum dry-film thickness of 0.254 mm.

#### ][2.3.5 Buried Utility Warning and Identification Tape

Provide detectable aluminum foil plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping. Tape shall be detectable by an electronic detection instrument. Provide tape in rolls, 80 mm minimum width, color coded for the utility involved with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall read "CAUTION BURIED WATER PIPING BELOW" or similar wording. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

#### ]2.4 PIPE SLEEVES

Provide where piping passes entirely through walls, floors, and roofs. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, and roofs. Provide 25 mm 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 rated walls and fire rated floors, seal both ends of pipe sleeves or core-drilled holes with UL listed fill, void, or cavity material.

- a. 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.
- b. Sleeves in Other Than Masonry and Concrete Walls, Floors, and Roofs: Provide 0.56 mm galvanized steel sheet.

## 2.5 ESCUTCHEON PLATES

Provide split hinge metal plates for piping entering walls, floors, and ceilings in exposed 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.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with NFPA 13, except as modified herein. Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings. Keep the interior and ends of new piping and existing piping affected by 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 piping to prevent entry of water and foreign matter. Inspect piping before placing into position. Provide Teflon pipe thread paste on male threads.

#### 3.1.1 Electrical Work

Provide electrical work associated with this section under Section 16402, "Interior Distribution System," except for control [and fire alarm] wiring. [Provide fire alarm system under Section 13852, "Interior Fire Detection and Alarm System."] Provide control [and fire alarm] wiring[, including connections to fire alarm systems,] under this section in accordance with NFPA 70 and CEI 64-8. Provide wiring in rigid metal conduit or intermediate metal conduit, except electrical metallic tubing conduit may be used in dry locations not enclosed in concrete or where not subject to mechanical damage.

#### 3.1.2 Disinfection

Disinfect the new water piping and existing water piping affected by

Contractor's operations in accordance with AWWA C651 and the applicable norms of Circ. n. 190. Fill piping systems with solution containing minimum of 50 milligram per kilogram (mg/kg) of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with domestic water until maximum residual chlorine content is within the range of 0.2 to 0.5 mg/kg, or the residual chlorine content of domestic water supply. Obtain at least two consecutive satisfactory bacteriological samples from new water piping, analyze by a certified laboratory, and submit results prior to the new water piping being placed into service. Disinfection of systems supplied by nonpotable water or not inter-connected to potable water distribution systems is not required.

### 3.1.3 Connections to Existing Water Supply Systems

Use tapping or drilling machine valve and mechanical joint type sleeves for connections to be made under pressure. Bolt sleeves around the main piping; bolt valve to the branch connection. Open valve, attach drilling machine, make tap, close valve, and remove drilling machine, all without interruption of service. Notify the Contracting Officer in writing at least [\_\_\_\_\_] [15] days prior to connection date; receive approval before any service is interrupted. Furnish materials required to make connections into existing water supply systems, and perform excavating, backfilling, and other incidental labor as required. [Furnish] [Government will furnish only] the labor and the tapping or drilling machine for making the actual connections to existing systems.

### 3.1.4 Buried Piping System

Bury tape with the printed side up at a depth of 305 mm below the top surface of earth or the top surface of the subgrade under pavements.

## 3.2 FIELD QUALITY CONTROL

Perform test to determine compliance with the specified requirements in the presence of the Contracting Officer. Test, inspect, and approve piping before covering or concealing.

### 3.2.1 Preliminary Tests

Hydrostatically test each system at 1379 kPa (gage) for a 2 hour period with no leakage or reduction in pressure. Flush piping with potable water in accordance with NFPA 13 and UNI 9489. Piping above suspended ceilings shall be tested, inspected, and approved before installation of ceilings. Test the alarms and other devices. Test the water flow alarms by flowing water through the inspector's test connection. When tests have been completed and corrections made, submit a signed and dated certificate, similar to that specified in NFPA 13 and UNI 9489.

### 3.2.2 Formal Tests and Inspections

Do not submit a request for formal test and inspection until the preliminary test and corrections are completed and approved. Submit a written request for formal inspection at least [\_\_\_\_\_] [15] days prior to inspection date. An experienced technician regularly employed by the

system installer shall be present during the inspection. At this inspection, repeat any or all of the required tests as directed. Correct defects in work provided by the Contractor, and make additional tests until the systems comply with contract requirements. Furnish appliances, equipment, [water,] electricity, instruments, connecting devices, and personnel for the tests. [The Government will furnish water for the tests.] The EFA-MED Division, Naval Facilities Engineering Command, Fire Protection Engineer, will witness formal tests and approve systems before they are accepted.

### 3.3 FIELD PAINTING

Field painting of fire extinguishing sprinkler system shall be specified in Section 09900, Paints and Coatings."

-- End of Section --