DIVISION 21: FIRE SUPPRESSION

SECTION 21 0500 - COMMON REQUIREMENTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe, fittings, valves, and connections for sprinkler systems.

1.2 SUMMARY

A. Furnish and install an automatic fire sprinkler protection system as described in Contract Documents.
   1. System shall be installed beginning with connection to the new building service main located as shown and work shall include but not necessarily be limited to the following areas:
      a. New construction
   2. Provide double check valve on fire sprinkler service lines.
   3. Furnish and install post indicator valves on all fire line services.

1.3 RELATED REQUIREMENTS

A. Section 21 1300 - Wet Pipe Fire Suppression Sprinklers: Sprinkler systems design.

1.4 REFERENCE STANDARDS

A. ASTM A 795/A 795M - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use; 2008.

B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010.

C. NFPA 13 - Standard for the Installation of Sprinkler Systems; National Fire Protection Association; 2010.

D. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

E. UL 262 - Gate Valves for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

F. UL 312 - Check Valves for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.5 APPLICABLE CODES AND ORDINANCES

A. The following form a part of this specification:
   1. National Fire Protection Association Pamphlets: Standards of the National Fire Protection Association for the Installation of Sprinkler and Fire Protection Equipment.
      a. Pamphlet No. 13, 13D, 13R, 14, and applicable standards.
      b. Pamphlet No. 231, 231C and applicable standards.
      c. And as approved over this geographical area
   2. International Building Code
   3. International Fire Code
   4. Underwriter's Laboratories, Inc. Publications: List of Inspected Fire Protection Equipment and Materials.

5. Applicable state and local codes and ordinances pertaining to fire protection systems and equipment.
6. Requirements of State Fire Marshal.
7. Requirements of Local Fire Marshal.
8. Safety Code for Elevators and Escalators.
9. Life Safety Code.

B. Work in Idaho must be done by an Idaho licensed sprinkler contractor and plans submitted to and approved by the office of the Idaho State Fire Marshal.

C. The contractor shall notify the Idaho State Fire Marshall and the Local Fire Department to witness the test of the fire sprinkler system.

1.6 VERIFICATIONS AND REQUIREMENTS

A. Fire Sprinkler Contractor shall verify adequacy of the water service to the building.

B. Fire Sprinkler Contractor shall also check with the Local City Fire Marshal, the State Fire Marshal and the Fire Rating Bureau to determine requirements for the following:
1. Fire department connections
2. Test connections
3. Exterior and interior piping
4. Spacing of heads
5. Rating of building
6. Stand pipes

1.7 FEES AND PERMITS

A. Fees or permits required to furnish and install the fire protection system shall be included as part of this Section of the Contract Documents.

1.8 PIPE SIZING

A. Fire Sprinkler Contractor shall be required to size all piping for this project using the Hydraulic Calculation Method in accordance with requirements of National Fire Protection Association Pamphlet No. 13 for Hydraulically Designed Sprinkler Systems

1.9 SUBMITTALS

A. See General Section – for submittal procedures.

B. Product Data: Provide manufacturers catalogue information. Indicate valve data and ratings.

C. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
1. Fire Sprinkler Contractor shall submit complete layouts to underwriters having jurisdiction and the State Fire Marshal for approval prior to submission to Architect.
   a. Particular attention shall be paid in layout to coordination of sprinkler piping and structural system of beams and mechanical ductwork. Notations shall be made on shop drawings where pipes are required to pass thru beams.
   b. Wall sprinkler shall be used in ramp areas where headroom is at a minimum and shall be arranged so as not to conflict with egress and door swings.
   c. Careful coordination shall be given to avoid changing ceiling lighting systems as shown on drawings.

d. Sprinklers must be spaced equally with lights and ceiling diffusers.
e. No fabrication of piping shall be done until piping drawings are accepted by the Architect, the Mechanical Engineer and State Fire Marshal.

2. The Fire Protection Sprinkler Contractor shall submit drawings that have been prepared and overseen by a NICET Certified Engineering Technician in fire protection with a minimum, Level 3 rating, or by a Professional Engineer in fire protection. This person shall be employed and be a staff member of the Fire Protection Contractor and shall be required to certify that the drawings are in accordance with the specifications and all regulatory requirements. All drawings shall be signed by the CET or stamped and signed by the Professional Engineer.
3. All area with exposed structure, piping shall neatly follow and be held tight to the line of the deck. When approved by the Architect, piping may follow the line of the exposed structure.

D. Project Record Documents: Record actual locations of components and tag numbering.

E. Operation and Maintenance Data: Include installation instructions and spare parts lists.

1.10 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer: The sub-contractor for the fire protection system shall be duly licensed by the state, county and city in which the project is being constructed. The fire sprinkler contractor must be engaged in the installation of the types of automatic fire sprinkler system required for this project and be fully familiar with all local conditions, specified codes and requirements. Prior to installation, submit data for approval showing that the Fire Sprinkler Contractor has successfully installed Automatic Fire Sprinkler Systems of the type and design as specified herein.

C. Designer: The designer for the fire sprinkler system shall be a staff employee of the “Installer” and shall be either a licensed Fire Protection Engineer in the State of Idaho, or a Certified Engineering Technician in Fire Protection, Level III (NICET Level III). Registration or certification shall be active during the entire contract period. The designer shall certify that the drawings and installation are in accordance with the intent of the plans and specifications. The designer shall make a complete and final inspection of the installation, including operating all alarms, control valves, checking all piping, seismic bracing, hangers, etc. After checking all components of the system, the designer shall provide a letter stating the installation is complete, operational and in accordance with approved plans and specifications. If changes have been made in the installation since the plans were approved, the designer shall correct the shop drawings and provide as-built drawings to the Owner with the letter.

D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.

E. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

F. Final Inspection: The Sprinkler Contractor CET or PE responsible for overseeing this project shall make a complete and final inspection of the installation, checking out all alarms, valves, piping, seismic bracing, hangers, etc., conduct a final main drain test on the system, and provide documentation of this final inspection

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers, with labeling in place.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 - PRODUCTS

2.1 FIRE PROTECTION SYSTEMS

A. Sprinkler Systems: Conform work to NFPA 13.

B. Welding Materials and Procedures: Conform to ASME Code.

2.2 BURIED PIPING

A. Steel Pipe: ASTM A 53/A 53M Schedule 40 or ASTM A 795 Standard Weight, black , with AWWA C105 polyethylene jacket, or double layer, half-lapped polyethylene tape.
   1. Steel Fittings: ASME B16.9, wrought steel or buttwelded; with double layer, half-lapped polyethylene tape.
   2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings.
   3. Joints: Welded in accordance with AWS D1.1.
   4. Casing: Closed glass cell insulation.

2.3 ABOVE GROUND PIPING

A. Steel Pipe: ASTM A 795 Schedule 10 or ASTM A 53 Schedule 40, black.
   1. Steel Fittings: ASME B16.9, wrought steel or buttwelded.
   2. Cast Iron Fittings: ASME B16.1, flanges and flanged fittings, ASME B16.4 and threaded fittings.
   3. Malleable Iron Fittings: ASME B16.3 and threaded fittings.
   4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

2.4 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm): Malleable iron, adjustable swivel, split ring.

B. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Wall Support for Pipe Sizes to 3 inches (80 mm): Cast iron hook.

E. Wall Support for Pipe Sizes 4 inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.

F. Vertical Support: Steel riser clamp.

G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

H. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

PART 3 - EXECUTION

3.1 FIRE SPRINKLER CONTRACTOR

A. It is the responsibility of the Fire Sprinkler Contractor to inspect the job site prior to fabricating materials. The Fire Sprinkler Contractor shall coordinate the design with all plans and other contractors so that construction can be done without problems. The Fire Sprinkler Contractor shall call for a meeting with all trades to coordinate and sequence installation with the progress of other mechanical and structural systems, and work out spaces for all of the work. By doing so, the project will proceed at the General Contractor's completion schedule.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. Install sprinkler system and service main piping, hangers, and supports in accordance with NFPA 13.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, to not interfere with use of space and other work.

D. Areas Subject to Freezing Temperatures:
   1. Branches serving these areas may contain a cold weather valve and anti-freeze loop or dry heads.

E. Group piping whenever practical at common elevations.

F. Sleeve pipes passing through partitions, walls, and floors.

G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

H. Pipe Hangers and Supports:
   1. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
   2. Place hangers within 12 inches of each horizontal elbow.
   3. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
   4. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
   5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
   6. Provide copper plated hangers and supports for copper piping.

7. Prime coat exposed steel hangers and supports. Refer to Painting Section. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

I. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain bottom of pipe level.

J. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Refer to General Painting Section.

K. Do not penetrate building structural members unless indicated and approved in writing by the Structural Engineer.

L. Provide sleeves when penetrating footings, floors, and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

M. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

N. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

O. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.

P. Provide gate valves for shut-off or isolating service.

Q. Provide drain valves at main shut-off valves, low points of piping and apparatus.

R. Work shall be executed and inspected in accord with laws, ordinances, rules and regulations of local authorities having jurisdiction over such work. Should any change in the drawings or specifications be required to conform to these ordinances, Fire Sprinkler Contractor shall notify the Architect-Engineer at time of submitting his bid. After entering into the contract, Fire Sprinkler Contractor shall be held to complete all necessary work to meet local requirements without expense to Owner.

S. Sprinkler system shall be installed such that spacing of sprinkler heads in relation to ceiling shall not exceed that permitted for type of ceiling construction involved.

T. General Contractor is required under contract stipulations to leave chases and openings in walls, floors, ceilings, partitions and beams, etc., provided Fire Sprinkler Contractor shall furnish to General Contractor full information as to locations, dimensions, etc., of such chases and openings including the provision and proper setting of all sleeves and other equipment in advance of construction of work so as to cause no delay in work.

U. Should any cutting of walls, floors, ceilings, partitions, etc., be required for proper installation of the work or apparatus of Fire Sprinkler Contractor due to his failure in giving the General Contractor proper information at time required, such cutting shall be done at his own expense and in a manner acceptable to Architect-Engineer. All drilling and patching for anchor bolts, hangers, and other supports shall be subject to approval of Architect-Engineer.

V. Siamese connections and watermains to sprinkler room shall be provided by Fire Sprinkler Contractor and connections to sprinkler system shall be by Fire Sprinkler Contractor.

W. Conduits and wiring for alarm contacts, power wiring from starter to motor, and starter shall be provided and wired complete by Electrical Contractor for testing by Fire Sprinkler Contractor. Control wiring from starter to control and safety devices shall be provided and wired by Fire Sprinkler Contractor.

3.4 FIELD TESTING

A. All portions of the system shall be hydrostatically tested.

B. Flushing of underground piping shall be done in accord with National Fire Protection Association.

C. On completion of the work, system shall be tested by full flow.
   1. Each control valve for each sprinkler system shall be tested by use of an inspector's test valve or the application of heat to sprinkler head most remote from the valve.
   2. All alarms and other devices shall be tested.
   3. All appliances and equipment for testing shall be furnished by Fire Sprinkler Contractor.
   4. Expenses, except for water and electricity used in connection with the tests, shall be defrayed by Fire Sprinkler Contractor.
   5. On completion of tests by Fire Sprinkler Contractor, any defects detected shall be corrected by Fire Sprinkler Contractor at his own expense and additional tests made until systems are proved satisfactory.
   6. Fire Sprinkler Contractor shall submit to Architect-Engineer a certificate covering materials and tests, similar to that specified by National Fire Protection Association, with a request for formal inspection at least five working days prior to date of inspection. The State and Local Fire Marshalls shall also be notified to witness this test. At such inspection any or all of required tests shall be repeated as directed by the Architect-Engineer.

END OF SECTION 21 0500

SECTION 21 1319 – WET-PIPE AUTOMATIC SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, General Provisions of Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Furnish and install complete fire sprinkler system as specified in Contract Documents.

B. Products Installed But Not Furnished Under This Section:
   1. Firestopping

1.3 SUBMITTALS

A. Shop Drawings:
   1. Size sprinkler system by one of following methods:
      a. Pipe schedule method in accordance with NFPA 13
      b. Hydraulic calculation design method based on water supply evaluation performed at building site.
   2. Submittal Procedure:
      a. After award of Contract and prior to purchase of equipment, submit seven sets of shop drawings with specifications and hydraulic calculations, if pipe schedule method is not used, to Architect and two sets to local jurisdiction having authority for fire prevention for review.
      b. After integrating Architect's and local jurisdiction's comments into drawings, licensed certified fire protection engineer of record submitting fire sprinkler system design construction documents shall stamp, sign, and date each sheet of shop drawings and first page of specifications and calculations.
      c. Submit stamped documents to area office and local jurisdiction having authority for fire prevention for final approval.
      d. After final approval, submit four copies of approved stamped documents to Architect.
      e. Failure of system to meet requirements of authority having jurisdiction shall be corrected at no additional cost to Owner.

1.4 QUALITY CONTROL

A. Qualifications:
   1. Installer shall be licensed by jurisdiction having authority over installed fire protection systems for location of Project. Furnish verified list of similar projects installed during past five years minimum.
   2. Engineer for fire protection system shall be licensed fire protection engineer certified by NICET to level three minimum and engaged in design of fire protection systems. Engineer shall be responsible for overseeing preparation of shop drawings, hydraulic calculations where applicable, and system installation. Engineer shall make complete inspection of installation. Engineer shall provide corrected record drawings to Owner with letter of acceptance. Engineer shall certify that installation is in accordance with Contract Documents.

B. Requirements of Regulatory Agencies:
   1. Unless noted otherwise, system shall conform to:

a. NFPA 13 - 1989 Light & Ordinary Hazard Occupancies
b. NFPA 24 - 1987
c. NFPA 101 - 1991
d. Requirements of local water department and local authority having jurisdiction for fire protection.
e. Applicable rules, regulations, laws, and ordinances.
f. Underwriter's Laboratories Publication, "Fire Protection Equipment Directory", January 1990.
g. Comply with backflow prevention requirements and, if required, include device in hydraulic calculations.

1.5 MAINTENANCE

A. Extra Materials:
1. Furnish twelve spare heads of each type and temperature rating used, properly boxed with sprinkler head wrench.

PART 2 - PRODUCTS

2.1 PIPE

A. Above Ground:
1. Schedule 40 black welded steel meeting requirements of ASTM A 795-89, "Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use."

2.2 FITTINGS

A. Flanged, Welded, & Screwed:
1. Carbon Steel meeting requirements of ASTM A 105-87a, "Specification for Forgings, Carbon Steel, for Piping Components."

B. Grooved Pipe Coupling System:
1. Victaulic Coupling
2. ITT Grinnell Coupling

2.3 VALVES

A. Butterfly Valve:
1. UL/FM approved
2. Indicating type
3. Approved Manufacturers:
a. Mueller:
1) Model B-3250-00 Wafer type with valve tamper switch
2) Model B-3250-52 Grooved ends type with valve tamper switch
b. Nibco:
1) Model WD3510-4 Wafer type with valve tamper switch
2) Model GD1765-4 Grooved type with valve tamper switch
c. Norris Model NW285AC-2K Wafer type with optional tamper switch
d. Pratt Model IBV

B. Gate Valve:
1. UL/FM approved
2. Outside Screw and Yoke Type (O.S.&Y)
3. Class 150 psi

4. Approved Manufacturers:
    a. Nibco Model F-637-31 Flanged Ends
    b. Mueller Model A-2073-6 Flanged Ends

C. Ball Valves:
1. UL/FM approved
2. Valve tamper switch
3. Approved Manufacturers:
    a. Milwaukee Model BBSC with threaded ends
    b. Nibco Model T-505 with threaded ends
    c. Nibco Model G-505 with grooved ends

D. Check Valve - Swing Check
1. ½" to 3" horizontal check
2. Regrinding type
3. Renewable disk
4. Bronze Class 125 with threaded ends
5. Approved Manufacturers -
    a. Nibco Model KT-403-W
    b. Walworth Figure 412

E. Check Valve - Swing Check
1. 2-1/2" to 12" Horizontal check
2. Bolted bonnet
3. Raised face Flanges
4. Bronze mounted w/ductile iron body
5. 125 Lb. Class.a
6. Approved Manufacturers:
    a. Nibco Model F-938-31
    b. Walworth Fig. 883F
    c. Mueller Model A-2120-6

F. Check Valve - Wafer type
1. 4" to 8" Cast iron body
2. 175 psi minimum working pressure
3. Rubber Seat
4. Approved Manufacturers:
    a. Nibco Model W-900-W
    b. Mueller A-2102

G. Alarm Check Valve:
1. Approved Manufacturers:
    a. Reliable Model E with gauges and drain
    b. Viking Model E-1 with gauges and drain
    c. Star Model F with gauges and drain

H. Retard Chamber:
1. Self draining
2. Approved Manufacturers:
    a. Reliable Model E-1
    b. Viking Model C
    c. Star Model D

I. Inspector's Test Valve:
1. Ductile iron body with threaded ends
2. Combination sight glass/orifice

3. Bronze top works
4. Approved Manufacturer:
    a. Victaulic Testmaster Alarm Test Module Style 718

2.4 SPRINKLER HEADS

A. Concealed pendent:
1. Flush ceiling profile
2. Adjustable cover
3. UL/FM approved
4. Approved Manufacturers:
    a. Reliable Model G-4 "Adjustable Concealer"
    b. Central Model AA Adjustable Concealed Sprinkler with ceiling plate
    c. Star Model PH-1 "Phantom 1"

B. Horizontal Sidewall Sprinkler:
1. UL/FM approved
2. Recess adjustable
3. Use Viking Model A-1 chrome plated sprinkler guard where guards are required
4. Approved Manufacturers:
    a. Reliable Model F-1 with Reliable recessed, 2-piece escutcheon Model GF1
    b. Viking Model M HSW with Viking recessed, 2-piece escutcheon Model E-1
    c. Star Model J with Star Nova Series recessed escutcheon

C. Pendent and Upright Sprinkler:
1. UL/FM approved
2. Use Reliable Model C-1 chrome plated sprinkler guard where guards are required.
3. Use Reliable Model C flush chrome escutcheon.
4. Approved Manufacturers:
    a. Reliable Model G
    b. Viking Model M
    c. Central Model A
    d. Star Model E

D. Adjustable Drop Nipple:
1. Steel tube, oxide coated.
2. Double o-ring seal.
3. 175 psi minimum working pressure.
4. Approved Manufacturers:
    a. CECA - Cold Extrusion Company of America
    b. Central Model "Alpha"

2.5 WATER FLOW ALARM

A. Mechanical Flow Alarm - Water Gong.
1. UL/FM approved.
2. Approved Manufacturers:
    a. Reliable Model C
    b. Viking Model F-1
    c. Central Model F
    d. Star Model CD

2.6 PRESSURE GAUGES

A. Mechanical Water Pressure Gauges:

1. UL/FM approved.
2. 3-1/2 inch diameter dial.
3. 0-300 psi in 5 psi increments.
4. Approved Manufacturers:
    a. Reliable Model UA
    b. Trerice model 500

2.7 PRESSURE DETECTORS

A. Electrical Water Pressure Switch:
1. UL/FM approved.
2. Switch activates on pressure rise between 4-8 psi.
3. Two single pole double throw switches.
4. Automatic reset.
5. Approved Manufacturers:
    a. Reliable Model J54-8295
    b. Potter Electric Signal Co Model PS10

2.8 TAMPER SWITCH

A. Weather and Tamper Resistent Switch.
1. UL/FM approved.
2. Two Single Pole Double Throw Switches.
3. Approved Manufacturer:
    a. Potter Electric Signal Co Model PCVS

2.9 FIRE DEPARTMENT CONNECTION

A. Two-way Inlet with Single Clapper.
1. Polished Brass.
2. 3/4 Inch Straight Design Automatic Drain Device by Potter-Roemer Fig. 5982.
3. Round "AUTO. SPKR." Identification Plate, Polished Brass by Potter-Roemer Fig. 5962.
4. Approved Manufacturer:
    a. Potter-Roemer Fig. 5710
    b. Reliable Model B

PART 3 - EXECUTION

3.1 INSTALLATION

A. Connect system to flange provided under Section 02 669.

B. Install system to drain. Drain trapped piping in accordance with NFPA 13 3-3.3.
1. Install main drain from riser.
2. Install auxiliary drains in low points of piping system and inspector's test valve drain to mechanical pad located outside building unless otherwise directed by Architect.

C. Install piping system so it will not be exposed to freezing temperatures.

D. Do not use dropped, damaged, or used sprinkler heads.

E. Install piping per NFPA 13, Paragraph 3-6.1.2.

F. Install sprinkler lines concealed.

G. Install tamper switches and pressure flow detectors where located by Architect.

H. Install water powered motor gong on exterior wall in accordance with Manufacturer's instructions.

I. Install automatic ball drip device in lowest point of piping to fire department connection and drain to exterior of building.

J. Install firestopping at pipe penetrations through fire-rated floors, walls, and partitions.

K. Brace and support system to meet seismic zone requirements for building site.

3.2 FIELD QUALITY CONTROL

A. Tests, Inspection:
   1. Test system according to "Contractor's Material & Testing certificate for Above Ground Piping" NFPA-13, figure 1-10.1(a).
   2. Tests shall be witnessed by Architect and Representative of local jurisdiction over fire prevention.
   3. Test blanks shall have red painted lugs protruding beyond flange to clearly indicate their presence and be numbered to assure their removal when testing is completed.

END OF SECTION 21 1319

END OF DIVISION 21