SECTION 13930 - WET-PIPE FIRE-SUPPRESSION SPRINKLERS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

1. PIPES, FITTINGS, AND SPECIALTIES.
2. SPRINKLERS.

1.2 SYSTEM DESCRIPTIONS

A. WET-PIPE SPRINKLER SYSTEM: AUTOMATIC SPRINKLERS ARE ATTACHED TO PIPING CONTAINING WATER AND THAT IS CONNECTED TO WATER SUPPLY THROUGH ALARM VALVE. WATER DISCHARGES IMMEDIATELY FROM SPRINKLERS WHEN THEY ARE OPENED. SPRINKLERS OPEN WHEN HEAT MELTS FUSIBLE LINK OR DESTROYS FRANGIBLE DEVICE. HOSE CONNECTIONS ARE INCLUDED IF INDICATED.

1.3 PERFORMANCE REQUIREMENTS

A. STANDARD-PRESSURE PIPING SYSTEM COMPONENT: LISTED FOR 175-PSIG MINIMUM WORKING PRESSURE.

B. DELEGATED DESIGN: DESIGN SHALL BE PREPARED UNDER THE SUPERVISION OF A NICET LEVEL IV TECHNICIAN CERTIFIED IN FIRE PROTECTION ENGINEERING TECHNOLOGY AND AUTOMATIC SPRINKLER SYSTEM LAYOUT, OR A LICENCED FIRE PROTECTION ENGINEER (FPE). SUBMITTALS, DRAWINGS, AND HYDRAULIC CALCULATIONS SHALL BEAR THE NICET TECHNICIAN’S CERTIFICATION NUMBER OR THE FPE’S SEAL. SHOP DRAWINGS, WHICH ARE NOT DESIGN DRAWINGS, WILL BE PREPARED BY THE SPRINKLER CONTRACTOR OR THE DESIGN DRAWINGS PREPARED BY THE REQUIRED NICET LEVEL IV OR FPE WILL BE ACCEPTABLE.

1. AVAILABLE FIRE-HYDRANT FLOW TEST RECORDS INDICATE THE FOLLOWING CONDITIONS:

A. DATE: SEPTEMBER 29, 2010.
B. PERFORMED BY: GULF BREEZE CONSULTING, INC.
C. LOCATION OF RESIDUAL FIRE HYDRANT R: CAMPUS EAST PARKING LOT.
D. LOCATION OF FLOW FIRE HYDRANT F: SOUTH SIDE OF CAMPUS.
E. STATIC PRESSURE AT RESIDUAL FIRE HYDRANT R: 50 PSIG.
F. MEASURED FLOW AT FLOW FIRE HYDRANT F: 919.4 GPM.
G. RESIDUAL PRESSURE AT RESIDUAL FIRE HYDRANT R: 35 PSIG.

2. FLOW DATA SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO BID. THE CONTRACTOR’S HYDRAULIC CALCULATIONS SHALL BE BASED ON THE CONTRACTOR’S FLOW TEST DATA.

C. SPRINKLER SYSTEM DESIGN SHALL BE APPROVED BY AUTHORITIES HAVING JURISDICTION. FIRE SPRINKLER SHOP DRAWINGS AND HYDRAULIC CALCULATIONS

ARE TO BE SUBMITTED TO THE SANTA ROSA COUNTY FIRE PREVENTION DEPARTMENT FOR REVIEW AND PERMITTING PRIOR TO THE COMMENCEMENT OF WORK.

1. MARGIN OF SAFETY FOR AVAILABLE WATER FLOW AND PRESSURE: 10 PERCENT, INCLUDING LOSSES THROUGH WATER-SERVICE PIPING, VALVES, AND BACKFLOW PREVENTERS.
2. SPRINKLER OCCUPANCY HAZARD CLASSIFICATIONS:

    A. BUILDING SERVICE AREAS: ORDINARY HAZARD, GROUP 1.
    B. ELECTRICAL EQUIPMENT ROOMS: **ORDINARY HAZARD, GROUP 1**.
    C. GENERAL STORAGE AREAS: **ORDINARY HAZARD, GROUP 1**.
    D. MECHANICAL EQUIPMENT ROOMS: **ORDINARY HAZARD, GROUP 1**.
    E. OFFICE AND PUBLIC AREAS: **LIGHT HAZARD**.

3. MINIMUM DENSITY FOR AUTOMATIC-SPRINKLER PIPING DESIGN:

    A. LIGHT-HAZARD OCCUPANCY: 0.10 gpm over 1500-sq. ft. AREA.
    B. ORDINARY-HAZARD, GROUP 1 OCCUPANCY: **0.15 GPM OVER 1500-SQ. FT.** AREA.

4. MAXIMUM PROTECTION AREA PER SPRINKLER: PER UL LISTING.

    A. CLASSROOMS AND PUBLIC AREAS: 225 SQ. FT..
    B. STORAGE AREAS: 130 SQ. FT..
    C. MECHANICAL EQUIPMENT ROOMS: 130 SQ. FT..
    D. ELECTRICAL EQUIPMENT ROOMS: 130 SQ. FT..
    E. OTHER AREAS: ACCORDING TO NFPA 13 RECOMMENDATIONS UNLESS OTHERWISE INDICATED.

5. TOTAL COMBINED HOSE-STREAM DEMAND REQUIREMENT: ACCORDING TO NFPA 13 UNLESS OTHERWISE INDICATED:

    A. LIGHT-HAZARD OCCUPANCIES: 100 GPM FOR 30 MINUTES.
    B. ORDINARY-HAZARD OCCUPANCIES: 250 GPM FOR 60 TO 90 MINUTES.

1.4 SUBMITTALS

A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

B. SHOP DRAWINGS: FOR WET-PIPE SPRINKLER SYSTEMS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.

C. DELEGATED-DESIGN SUBMITTAL: FOR SPRINKLER SYSTEMS INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA PREPARED UNDER THE SUPERVISION OF A NICET LEVEL IV TECHNICIAN CERTIFIED IN FIRE PROTECTION ENGINEERING TECHNOLOGY AND AUTOMATIC SPRINKLER SYSTEM LAYOUT, OR SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.

D. QUALIFICATION DATA: FOR QUALIFIED INSTALLER AND PROFESSIONAL ENGINEER.

E. APPROVED SPRINKLER PIPING DRAWINGS: WORKING PLANS, PREPARED ACCORDING TO NFPA 13, THAT HAVE BEEN APPROVED BY AUTHORITIES HAVING JURISDICTION, INCLUDING HYDRAULIC CALCULATIONS IF APPLICABLE.

F. WELDING CERTIFICATES.

G. FIRE-HYDRANT FLOW TEST REPORT.

H. FIELD TEST REPORTS AND CERTIFICATES: INDICATE AND INTERPRET TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS AND AS DESCRIBED IN NFPA 13. INCLUDE "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING."

I. FIELD QUALITY-CONTROL REPORTS.

J. OPERATION AND MAINTENANCE DATA.

1.5 PERMITS

A. IT SHOULD BE ASSUMED THAT THE SCHOOL DISTRICT WILL ISSUE THE FIRE SPRINKLER PERMIT AT NO COST TO THE CONTRACTOR. THE BUILDING DEPARTMENT IS PERFORMING ALL PLAN REVIEW UNDER AN AGREEMENT WITH THE SCHOOL SYSTEM. IN THE EVENT THAT THE BUILDING DEPARTMENT DOES REQUIRE A PERMIT FEE, PERMIT FEES WILL BE PAID DIRECTLY TO THE BUILDING DEPARTMENT BY THE SCHOOL DISTRICT. THE CONTRACTOR SHALL COORDINATE THE PAYMENT OF THESE FEES THROUGH THE ARCHITECT.

B. IT SHOULD BE ASSUMED BY THE CONTRACTOR THAT THE AUTHORITY HAVING JURISDICTION MAY EXERCISE INSPECTION REQUIREMENTS OF THE FIRE SPRINKLER WORK. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE BUILDING DEPARTMENT IN ORDER TO FULFILL THIS REQUIREMENT.

1.6 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS:

1. INSTALLER'S RESPONSIBILITIES INCLUDE DESIGNING, FABRICATING, AND INSTALLING SPRINKLER SYSTEMS AND PROVIDING PROFESSIONAL ENGINEERING SERVICES NEEDED TO ASSUME ENGINEERING RESPONSIBILITY. BASE CALCULATIONS ON RESULTS OF FIRE-HYDRANT FLOW TEST.

A. ENGINEERING RESPONSIBILITY: PREPARATION OF WORKING PLANS, CALCULATIONS, AND FIELD TEST REPORTS BY A QUALIFIED PROFESSIONAL ENGINEER.

B. WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE.

C. NFPA STANDARDS: SPRINKLER SYSTEM EQUIPMENT, SPECIALTIES, ACCESSORIES, INSTALLATION, AND TESTING SHALL COMPLY WITH THE FOLLOWING:

1. NFPA 13, "INSTALLATION OF SPRINKLER SYSTEMS."

1.7 PROJECT CONDITIONS

A. INTERRUPTION OF EXISTING SPRINKLER SERVICE: DO NOT INTERRUPT SPRINKLER SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY SPRINKLER SERVICE ACCORDING TO REQUIREMENTS INDICATED:

1. NOTIFY ARCHITECT NO FEWER THAN TWO DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF SPRINKLER SERVICE.
2. DO NOT PROCEED WITH INTERRUPTION OF SPRINKLER SERVICE WITHOUT ARCHITECT'S WRITTEN PERMISSION.
3. INTERRUPTIONS WILL NOT BE ALLOWED WHILE STUDENTS ARE PRESENT.

1.8 COORDINATION

A. COORDINATE LAYOUT AND INSTALLATION OF SPRINKLERS WITH OTHER CONSTRUCTION THAT PENETRATES CEILINGS, INCLUDING LIGHT FIXTURES, HVAC EQUIPMENT, AND PARTITION ASSEMBLIES.

1.9 EXTRA MATERIALS

A. FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.

1. SPRINKLER CABINETS: FINISHED, WALL-MOUNTED, STEEL CABINET WITH HINGED COVER, AND WITH SPACE FOR MINIMUM OF SIX SPARE SPRINKLERS PLUS SPRINKLER WRENCH. INCLUDE NUMBER OF SPRINKLERS REQUIRED BY NFPA 13 AND SPRINKLER WRENCH. INCLUDE SEPARATE CABINET WITH SPRINKLERS AND WRENCH FOR EACH TYPE OF SPRINKLER USED ON PROJECT.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. COMPLY WITH REQUIREMENTS IN "PIPING SCHEDULE" ARTICLE FOR APPLICATIONS OF PIPE, TUBE, AND FITTING MATERIALS, AND FOR JOINING METHODS FOR SPECIFIC SERVICES, SERVICE LOCATIONS, AND PIPE SIZES.

2.2 STEEL PIPE AND FITTINGS

A. STANDARD WEIGHT, GALVANIZED- AND BLACK-STEEL PIPE: ASTM A 53/A 53M, TYPE E, GRADE B. PIPE ENDS MAY BE FACTORY OR FIELD FORMED TO MATCH JOINING METHOD.

B. SCHEDULE 30, GALVANIZED- AND BLACK-STEEL PIPE: ASTM A 135; ASTM A 795/A 795M, TYPE E; OR ASME B36.10M, WROUGHT STEEL; WITH WALL THICKNESS NOT LESS THAN SCHEDULE 30 AND NOT MORE THAN SCHEDULE 40. PIPE ENDS MAY BE FACTORY OR FIELD FORMED TO MATCH JOINING METHOD.

C. THINWALL GALVANIZED- AND BLACK-STEEL PIPE: ASTM A 135 OR ASTM A 795/A 795M, THREADABLE, WITH WALL THICKNESS LESS THAN SCHEDULE 30 AND EQUAL TO OR GREATER THAN SCHEDULE 10. PIPE ENDS MAY BE FACTORY OR FIELD FORMED TO MATCH JOINING METHOD.

D. GALVANIZED- AND BLACK-STEEL PIPE NIPPLES: ASTM A 733, MADE OF ASTM A 53/A 53M, STANDARD-WEIGHT, SEAMLESS STEEL PIPE WITH THREADED ENDS.

E. GALVANIZED AND UNCOATED, STEEL COUPLINGS: ASTM A 865, THREADED.

F. GALVANIZED AND UNCOATED, GRAY-IRON THREADED FITTINGS: ASME B16.4, CLASS 125, STANDARD PATTERN.

G. MALLEABLE- OR DUCTILE-IRON UNIONS: UL 860.

H. CAST-IRON FLANGES: ASME 16.1, CLASS 125.

I. STEEL FLANGES AND FLANGED FITTINGS: ASME B16.5, CLASS 150.

J. STEEL WELDING FITTINGS: ASTM A 234/A 234M AND ASME B16.9.

K. GROOVED-JOINT, STEEL-PIPE APPURTENANCES:

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

    A. VICTAULIC COMPANY.

2. PRESSURE RATING: 175 PSIG MINIMUM.
3. GALVANIZED AND UNCOATED, GROOVED-END FITTINGS FOR STEEL PIPING: ASTM A 47/A 47M, MALLEABLE-IRON CASTING OR ASTM A 536, DUCTILE-IRON CASTING; WITH DIMENSIONS MATCHING STEEL PIPE.
4. GROOVED-END-PIPE COUPLINGS FOR STEEL PIPING: AWWA C606 AND UL 213, RIGID PATTERN, UNLESS OTHERWISE INDICATED, FOR STEEL-PIPE DIMENSIONS. INCLUDE FERROUS HOUSING SECTIONS, EPDM-RUBBER GASKET, AND BOLTS AND NUTS.

L. STEEL PRESSURE-SEAL FITTINGS: UL 213, FM-APPROVED, 175-PSIG PRESSURE RATING WITH STEEL HOUSING, RUBBER O-RINGS, AND PIPE STOP; FOR USE WITH FITTING MANUFACTURERS' PRESSURE-SEAL TOOLS.

1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

    A. VICTAULIC COMPANY.

2.3 PIPING JOINING MATERIALS

A. PIPE-FLANGE GASKET MATERIALS: AWWA C110, RUBBER, FLAT FACE, 1/8 INCH THICK OR ASME B16.21, NONMETALLIC AND ASBESTOS FREE.

1. CLASS 125, CAST-IRON FLAT-FACE FLANGES: FULL-FACE GASKETS.

B. METAL, PIPE-FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL UNLESS OTHERWISE INDICATED.

C. WELDING FILLER METALS: COMPLY WITH AWS D10.12M/D10.12 FOR WELDING MATERIALS APPROPRIATE FOR WALL THICKNESS AND CHEMICAL ANALYSIS OF STEEL PIPE BEING WELDED.

2.4 SPRINKLER SPECIALTY PIPE FITTINGS

A. BRANCH OUTLET FITTINGS:

1. STANDARD: UL 213.
2. PRESSURE RATING: 175 PSIG MINIMUM.
3. BODY MATERIAL: DUCTILE-IRON HOUSING WITH EPDM SEALS AND BOLTS AND NUTS.
4. TYPE: MECHANICAL-T AND -CROSS FITTINGS.
5. CONFIGURATIONS: SNAP-ON AND STRAPLESS, DUCTILE-IRON HOUSING WITH BRANCH OUTLETS.
6. SIZE: OF DIMENSION TO FIT ONTO SPRINKLER MAIN AND WITH OUTLET CONNECTIONS AS REQUIRED TO MATCH CONNECTED BRANCH PIPING.
7. BRANCH OUTLETS: GROOVED, PLAIN-END PIPE, OR THREADED.

B. FLOW DETECTION AND TEST ASSEMBLIES:

1. STANDARD: UL'S "FIRE PROTECTION EQUIPMENT DIRECTORY" LISTING OR "APPROVAL GUIDE," PUBLISHED BY FM GLOBAL, LISTING.
2. PRESSURE RATING: 175 PSIG MINIMUM.
3. BODY MATERIAL: CAST- OR DUCTILE-IRON HOUSING WITH ORIFICE, SIGHT GLASS, AND INTEGRAL TEST VALVE.
4. SIZE: SAME AS CONNECTED PIPING.
5. INLET AND OUTLET: THREADED.

C. BRANCH LINE TESTERS:

1. STANDARD: UL 199.
2. PRESSURE RATING: 175 PSIG MINIMUM.
3. BODY MATERIAL: BRASS.
4. SIZE: SAME AS CONNECTED PIPING.
5. INLET: THREADED.
6. DRAIN OUTLET: THREADED AND CAPPED.
7. BRANCH OUTLET: THREADED, FOR SPRINKLER.

D. SPRINKLER INSPECTOR'S TEST FITTINGS:

1. STANDARD: UL'S "FIRE PROTECTION EQUIPMENT DIRECTORY" LISTING OR "APPROVAL GUIDE," PUBLISHED BY FM GLOBAL, LISTING.
2. PRESSURE RATING: 175 PSIG MINIMUM.
3. BODY MATERIAL: CAST- OR DUCTILE-IRON HOUSING WITH SIGHT GLASS.
4. SIZE: SAME AS CONNECTED PIPING.
5. INLET AND OUTLET: THREADED.

E. ADJUSTABLE DROP NIPPLES:

1. STANDARD: UL 1474.

2. PRESSURE RATING: 250 PSIG MINIMUM.
3. BODY MATERIAL: STEEL PIPE WITH EPDM-RUBBER O-RING SEALS.
4. SIZE: SAME AS CONNECTED PIPING.
5. LENGTH: ADJUSTABLE.
6. INLET AND OUTLET: THREADED.

F. FLEXIBLE, SPRINKLER HOSE FITTINGS:

1. STANDARD: UL 1474.
2. TYPE: FLEXIBLE HOSE FOR CONNECTION TO SPRINKLER, AND WITH BRACKET FOR CONNECTION TO CEILING GRID.
3. PRESSURE RATING: 175 PSIG MINIMUM.
4. SIZE: SAME AS CONNECTED PIPING, FOR SPRINKLER.

2.5 SPRINKLERS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. TYCO FIRE & BUILDING PRODUCTS LP.
2. VICTAULIC COMPANY.
3. VIKING CORPORATION.

B. GENERAL REQUIREMENTS:

1. STANDARD: UL'S "FIRE PROTECTION EQUIPMENT DIRECTORY" LISTING OR "APPROVAL GUIDE," PUBLISHED BY FM GLOBAL, LISTING.
2. PRESSURE RATING FOR AUTOMATIC SPRINKLERS: 175 PSIG MINIMUM.

C. AUTOMATIC SPRINKLERS WITH HEAT-RESPONSIVE ELEMENT:

1. EARLY-SUPPRESSION, FAST-RESPONSE APPLICATIONS: UL 1767.
2. NONRESIDENTIAL APPLICATIONS: UL 199.
3. CHARACTERISTICS: NOMINAL 1/2-INCH ORIFICE WITH DISCHARGE COEFFICIENT K OF 5.6, AND FOR "ORDINARY" TEMPERATURE CLASSIFICATION RATING UNLESS OTHERWISE INDICATED OR REQUIRED BY APPLICATION.

D. SPRINKLER FINISHES:

1. CHROME PLATED.
2. BRONZE.
3. PAINTED.

E. SPECIAL COATINGS:

1. WAX.

F. SPRINKLER ESCUTCHEONS: MATERIALS, TYPES, AND FINISHES FOR THE FOLLOWING SPRINKLER MOUNTING APPLICATIONS. ESCUTCHEONS FOR CONCEALED, FLUSH, AND RECESSED-TYPE SPRINKLERS ARE SPECIFIED WITH SPRINKLERS.

1. CEILING MOUNTING: CHROME-PLATED STEEL, ONE PIECE, FLAT.
2. SIDEWALL MOUNTING: CHROME-PLATED STEEL, ONE PIECE, FLAT.

G. SPRINKLER GUARDS:

1. STANDARD: UL 199.
2. TYPE: WIRE CAGE WITH FASTENING DEVICE FOR ATTACHING TO SPRINKLER.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. LOCATIONS AND ARRANGEMENTS: DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING. INSTALL PIPING AS INDICATED, AS FAR AS PRACTICAL.

1. DEVIATIONS FROM APPROVED WORKING PLANS FOR PIPING REQUIRE WRITTEN APPROVAL FROM AUTHORITIES HAVING JURISDICTION. FILE WRITTEN APPROVAL WITH ARCHITECT BEFORE DEVIATING FROM APPROVED WORKING PLANS.

B. PIPING STANDARD: COMPLY WITH REQUIREMENTS FOR INSTALLATION OF SPRINKLER PIPING IN NFPA 13.

C. USE LISTED FITTINGS TO MAKE CHANGES IN DIRECTION, BRANCH TAKEOFFS FROM MAINS, AND REDUCTIONS IN PIPE SIZES.

D. INSTALL UNIONS ADJACENT TO EACH VALVE IN PIPES NPS 2 AND SMALLER.

E. INSTALL FLANGES, FLANGE ADAPTERS, OR COUPLINGS FOR GROOVED-END PIPING ON VALVES, APPARATUS, AND EQUIPMENT HAVING NPS 2-1/2 AND LARGER END CONNECTIONS.

F. INSTALL "INSPECTOR'S TEST CONNECTIONS" IN SPRINKLER SYSTEM PIPING, COMPLETE WITH SHUTOFF VALVE, AND SIZED AND LOCATED ACCORDING TO NFPA 13.

G. INSTALL SPRINKLER PIPING WITH DRAINS FOR COMPLETE SYSTEM DRAINAGE.

H. INSTALL HANGERS AND SUPPORTS FOR SPRINKLER SYSTEM PIPING ACCORDING TO NFPA 13. COMPLY WITH REQUIREMENTS FOR HANGER MATERIALS IN NFPA 13.

I. FILL SPRINKLER SYSTEM PIPING WITH WATER.

J. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. COMPLY WITH REQUIREMENTS FOR SLEEVES SPECIFIED IN SECTION 15091 "SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING."

K. INSTALL SLEEVE SEALS FOR PIPING PENETRATIONS OF CONCRETE WALLS AND SLABS. COMPLY WITH REQUIREMENTS FOR SLEEVE SEALS SPECIFIED IN SECTION 15091 "SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING."

L. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. COMPLY WITH REQUIREMENTS FOR ESCUTCHEONS SPECIFIED IN SECTION 15096 "ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING."

3.2 JOINT CONSTRUCTION

A. INSTALL COUPLINGS, FLANGES, FLANGED FITTINGS, UNIONS, NIPPLES, AND TRANSITION AND SPECIAL FITTINGS THAT HAVE FINISH AND PRESSURE RATINGS SAME AS OR HIGHER THAN SYSTEM'S PRESSURE RATING FOR ABOVEGROUND APPLICATIONS UNLESS OTHERWISE INDICATED.

B. INSTALL UNIONS ADJACENT TO EACH VALVE IN PIPES NPS 2 AND SMALLER.

C. INSTALL FLANGES, FLANGE ADAPTERS, OR COUPLINGS FOR GROOVED-END PIPING ON VALVES, APPARATUS, AND EQUIPMENT HAVING NPS 2-1/2 AND LARGER END CONNECTIONS.

D. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE.

E. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPES, TUBES, AND FITTINGS BEFORE ASSEMBLY.

F. FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL IN SIZE, TYPE, AND THICKNESS SUITABLE FOR WATER SERVICE. JOIN FLANGES WITH GASKET AND BOLTS ACCORDING TO ASME B31.9.

G. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:

1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS.
2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED.

H. TWIST-LOCKED JOINTS: INSERT PLAIN END OF STEEL PIPE INTO PLAIN-END-PIPE FITTING. ROTATE RETAINER LUGS ONE-QUARTER TURN OR TIGHTEN RETAINER PIN.

I. STEEL-PIPING, PRESSURE-SEALED JOINTS: JOIN LIGHTWALL STEEL PIPE AND STEEL PRESSURE-SEAL FITTINGS WITH TOOLS RECOMMENDED BY FITTING MANUFACTURER.

J. WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12M/D10.12, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO "QUALITY ASSURANCE" ARTICLE.

1. SHOP WELD PIPE JOINTS WHERE WELDED PIPING IS INDICATED. DO NOT USE WELDED JOINTS FOR GALVANIZED-STEEL PIPE.

K. STEEL-PIPING, CUT-GROOVED JOINTS: CUT SQUARE-EDGE GROOVE IN END OF PIPE ACCORDING TO AWWA C606. ASSEMBLE COUPLING WITH HOUSING, GASKET, LUBRICANT, AND BOLTS. JOIN STEEL PIPE AND GROOVED-END FITTINGS ACCORDING TO AWWA C606 FOR STEEL-PIPE JOINTS.

L. STEEL-PIPING, ROLL-GROOVED JOINTS: ROLL ROUNDED-EDGE GROOVE IN END OF PIPE ACCORDING TO AWWA C606. ASSEMBLE COUPLING WITH HOUSING, GASKET, LUBRICANT, AND BOLTS. JOIN STEEL PIPE AND GROOVED-END FITTINGS ACCORDING TO AWWA C606 FOR STEEL-PIPE GROOVED JOINTS.

M. STEEL-PIPING, PRESSURE-SEALED JOINTS: JOIN SCHEDULE 5 STEEL PIPE AND STEEL PRESSURE-SEAL FITTINGS WITH TOOLS RECOMMENDED BY FITTING MANUFACTURER.

N. DISSIMILAR-MATERIAL PIPING JOINTS: MAKE JOINTS USING ADAPTERS COMPATIBLE WITH MATERIALS OF BOTH PIPING SYSTEMS.

3.3 SPRINKLER INSTALLATION

A. INSTALL SPRINKLERS IN SUSPENDED CEILINGS IN CENTER OF ACOUSTICAL CEILING PANELS.

B. INSTALL SPRINKLERS INTO FLEXIBLE, SPRINKLER HOSE FITTINGS AND INSTALL HOSE INTO BRACKET ON CEILING GRID.

3.4 IDENTIFICATION

A. INSTALL LABELING AND PIPE MARKERS ON EQUIPMENT AND PIPING ACCORDING TO REQUIREMENTS IN NFPA 13.

3.5 FIELD QUALITY CONTROL

A. PERFORM TESTS AND INSPECTIONS.

B. TESTS AND INSPECTIONS:

1. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEMS AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
2. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
3. FLUSH, TEST, AND INSPECT SPRINKLER SYSTEMS ACCORDING TO NFPA 13, "SYSTEMS ACCEPTANCE" CHAPTER.
4. ENERGIZE CIRCUITS TO ELECTRICAL EQUIPMENT AND DEVICES.
5. COORDINATE WITH FIRE-ALARM TESTS. OPERATE AS REQUIRED.
6. VERIFY THAT EQUIPMENT HOSE THREADS ARE SAME AS LOCAL FIRE-DEPARTMENT EQUIPMENT.

C. SPRINKLER PIPING SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.

D. PREPARE TEST AND INSPECTION REPORTS.

3.6 CLEANING

A. CLEAN DIRT AND DEBRIS FROM SPRINKLERS.

B. REMOVE AND REPLACE SPRINKLERS WITH PAINT OTHER THAN FACTORY FINISH.

3.7 PIPING SCHEDULE

A. SPRINKLER SPECIALTY FITTINGS MAY BE USED, DOWNSTREAM OF CONTROL VALES, INSTEAD OF SPECIFIED FITTINGS.

B. WET-PIPE SPRINKLER SYSTEM, NPS 2 AND SMALLER, SHALL BE THE FOLLOWING:

1. STANDARD-WEIGHT, BLACK-STEEL PIPE WITH THREADED ENDS; UNCOATED, GRAY-IRON THREADED FITTINGS; AND THREADED JOINTS.

C. STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM, NPS 2-1/2 TO NPS 6, SHALL BE ONE OF THE FOLLOWING:

1. STANDARD-WEIGHT OR SCHEDULE 30, BLACK-STEEL PIPE WITH CUT- OR ROLL-GROOVED ENDS; UNCOATED, GROOVED-END FITTINGS FOR STEEL PIPING; GROOVED-END-PIPE COUPLINGS FOR STEEL PIPING; AND GROOVED JOINTS.
2. STANDARD-WEIGHT OR SCHEDULE 30, GALVANIZED-STEEL PIPE WITH CUT-GROOVED ENDS; GALVANIZED, GROOVED-END FITTINGS FOR STEEL PIPING; GROOVED-END-PIPE COUPLINGS FOR STEEL PIPING; AND GROOVED JOINTS.
3. STANDARD-WEIGHT OR SCHEDULE 30, BLACK-STEEL PIPE WITH PLAIN ENDS; STEEL WELDING FITTINGS; AND WELDED JOINTS.

3.8 SPRINKLER SCHEDULE

A. USE SPRINKLER TYPES IN SUBPARAGRAPHS BELOW FOR THE FOLLOWING APPLICATIONS:

1. ROOMS WITHOUT CEILINGS: UPRIGHT SPRINKLERS.
2. ROOMS WITH SUSPENDED CEILINGS: RECESSED SPRINKLERS.
3. RESTROOMS: CONCEALED SPRINKLERS.
4. WALL MOUNTING: SIDEWALL SPRINKLERS.
5. SPACES SUBJECT TO FREEZING: PENDENT, DRY SPRINKLERS.

B. PROVIDE SPRINKLER TYPES IN SUBPARAGRAPHS BELOW WITH FINISHES INDICATED.

1. CONCEALED SPRINKLERS: ROUGH BRASS, WITH FACTORY-PAINTED WHITE COVER PLATE.
2. RECESSED SPRINKLERS: BRIGHT CHROME, WITH BRIGHT CHROME ESCUTCHEON.
3. UPRIGHT AND SIDEWALL SPRINKLERS: CHROME PLATED IN FINISHED SPACES EXPOSED TO VIEW; ROUGH BRONZE IN UNFINISHED SPACES NOT EXPOSED TO VIEW; WAX COATED WHERE EXPOSED TO ACIDS, CHEMICALS, OR OTHER CORROSIVE FUMES.

END OF SECTION 13930