

FIRE PROTECTION SPECIFICATIONS

- SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
- CAST-IRON PIPE SLEEVES: CAST OR FABRICATED OF CAST OR DUCTILE IRON AND EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP COLLARS.
 - SLEEVE-SEAL SYSTEMS: MODULAR SEALING-ELEMENT UNIT, DESIGNED FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE, DESIGNED TO FORM A HYDROSTATIC SEAL OF 20 PSIG. SEALING ELEMENTS: EPDM-RUBBER INTERLOCKING LINKS SHAPED TO FIT SURFACE OF PIPE, STAINLESS STEEL PRESSURE PLATES, NUTS AND BOLTS.
 - ASTM C107/C107M, GRADE B, POST-HARDENING AND VOLUME-ADJUSTING, DRY, HYDRAULIC-CEMENT GROUT. DESIGN MIX: 5000-PSI, 28-DAY COMPRESSIVE STRENGTH.
 - INSTALL SLEEVES FOR PIPING PASSING THROUGH PENETRATIONS IN FLOORS, PARTITIONS, WALLS, AND ROOFS.
 - INSTALL SLEEVE-SEAL SYSTEM FOR PENETRATIONS THROUGH BELOW GRADE CONCRETE WALLS.

- SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING
- ONE-PIECE, STEEL TYPE: WITH POLISHED, CHROME-PLATED FINISH AND SETSCREW FASTENER.
 - INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILING, AND FINISHED FLOORS SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING
 - METAL-CASE, COMPACT-STYLE, LIQUID-IN-GLASS THERMOMETERS. ASME B40.200. CAST ALUMINUM 6 INCH NOMINAL SIZE. TUBE: GLASS WITH MAKINGNYN LENS AND BLUE ORGANIC LIQUID. ACCURACY: PLUS OR MINUS 1 PERCENT OF SCALE RANGE OR ONE SCALE DIVISION, TO A MAXIMUM OF 1.5 PERCENT OF SCALE RANGE.
 - DIRECT-MOUNTED, METAL-CASE, DIAL-TYPE PRESSURE GAGES. STANDARD: ASME B40.100. CASE: LIQUID FILLED, 4-1/2 INCH NOMINAL DIAMETER. DIAL: NON-REFLECTIVE ALUMINUM WITH PERMANENTLY ETCHED SCALE MARKINGS GRADUATED IN PSI. ACCURACY: GRADE A, PLUS OR MINUS 1 PERCENT OF FULL SCALE RANGE.
 - SNUBBERS: ASME B40.100, BRASS, WITH NPS 1/4 ASME B1.20.1 PIPE THREADS AND PISTON-TYPE SURGE-DAMPENING DEVICE. INCLUDE EXTENSION FOR USE ON INSULATED PIPING.
 - VALVES: BRASS BALL WITH NPS 1/4 ASME B1.20.1 PIPE THREADS.
 - INSTALL VALVE AND SNUBBER IN PIPING FOR EACH PRESSURE GAGE FOR FLUIDS.
 - INSTALL PRESSURE GAUGES AT BUILDING WATER SERVICE ENTRANCE, INLET AND OUTLET OF EACH PRESSURE REDUCING VALVE AND HOT WATER RECIRCULATION PUMP.
 - INSTALL THERMOMETERS AT INLET AND OUTLET OF EACH DOMESTIC HOT WATER STORAGE TANK.
 - ADJUST FACES OF METERS AND GAGES TO PROPER ANGLE FOR BEST VISIBILITY.

- SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING
- OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM SINGLE MANUFACTURER. ASME B16.18 FOR SOLDER JOINT, VALVE PRESSURE-TEMPERATURE RATINGS; NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES. VALVE SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED. HANDLE/LEVER: FOR QUARTER-TURN VALVES SMALLER THAN NPS 4, INCLUDE 2-INCH STEM EXTENSIONS FOR VALVES IN INSULATED PIPING.
 - BRASS BALL VALVES, TWO-PIECE WITH FULL PORT AND BRASS TRIM, THREADED OR SOLDERED ENDS. STANDARD: MSS SP-110 OR MSS SP-145. CWP RATING: 600 PSIG.

- SECTION 220523.14 - CHECK VALVES FOR PLUMBING PIPING
- CERTIFICATION THAT PRODUCTS COMPLY WITH NSF 61. SOURCE LIMITATIONS FOR VALVES: OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM SINGLE MANUFACTURER. ASME B16.18 FOR SOLDER JOINT, VALVE PRESSURE-TEMPERATURE RATINGS; NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES. VALVE SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED.
 - BRONZE SWING CHECK VALVES WITH BRONZE DISC, CLASS 125, STANDARD: MSS SP-80, TYPE 3, CWP RATING: 200 PSIG.

- SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- CARBON-STEEL PIPE HANGERS AND SUPPORTS. DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS. GALVANIZED METALLIC COATINGS: PRE-GALVANIZED, HOT-DIP GALVANIZED, OR ELECTRO-GALVANIZED. HANGER RODS: CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF CARBON STEEL.
 - TRAPEZIE PIPE HANGERS. DESCRIPTION: MSS SP-58, TYPE 59. SHOP-OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY, MADE FROM STRUCTURAL-CARBON-STEEL SHAPES, WITH MSS SP-58 CARBON-STEEL HANGERS RODS, NUTS, SADDLES, AND BOLTS.
 - THERMAL HANGING SHIELD INSULATION-INSERT MATERIAL FOR HOT PIPING. ASTM C592, TYPE 1. CELLULAR GLASS WITH 100-PSIG MINIMUM COMPRESSIVE STRENGTH AND VAPOR BARRIER. INSULATION-INSERT MATERIAL FOR HOT PIPING: WATER-REPELLENT-TREATED, ASTM C533, TYPE I CALCIUM SILICATE WITH 100-PSIG MINIMUM COMPRESSIVE STRENGTH. FOR TRAPEZIE OR CLAMPED SYSTEMS, INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE, FOR BAND HANGERS, INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE, INSERT LENGTH: EXTEND 2 INCHES BELOW SHEET METAL SHIELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.

- SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
- METAL LABELS FOR EQUIPMENT: MATERIAL AND THICKNESS: ALUMINUM, 0.032-INCH MINIMUM THICKNESS, AND HAVING REDRILLED OR STAMPED HOLES FOR ATTACHING STAINLESS-STEEL RIVETS OR SELF-TAPPING SCREWS.
 - PIPE LABELS: PRETENSIONED PIPE LABELS: PRECOILED, SEMIRIGID PLASTIC FORMED TO COVER FULL CIRCUMFERENCE OF PIPE AND TO ATTACH TO PIPE WITHOUT FASTENERS OR ADHESIVE. PIPE LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS INDICATED ON THE DRAWINGS AND AN ARROW INDICATING FLOW DIRECTION.
 - LOCATE PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE ACCESSIBLE CEILING IN FINISHED SPACES; MACHINE ROOMS; ACCESSIBLE MAINTENANCE SPACES SUCH AS SHAFTS, TUNNELS, AND EXTERIOR EXPOSED LOCATIONS AS FOLLOWS: NEAR EACH BRANCH CONNECTION, INCLUDING SHORT TAKEOFFS AND TERMINAL UNITS, WHERE FLOW PATTERN IS NOT OBVIOUS; FOR CLAMPED SYSTEMS, INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE, FOR BAND HANGERS, INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE, INSERT LENGTH: EXTEND 2 INCHES BELOW SHEET METAL SHIELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.
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 - LOCATE PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE ACCESSIBLE CEILING IN FINISHED SPACES; MACHINE ROOMS; ACCESSIBLE MAINTENANCE SPACES SUCH AS SHAFTS, TUNNELS, AND EXTERIOR EXPOSED LOCATIONS AS FOLLOWS: NEAR EACH BRANCH CONNECTION, INCLUDING SHORT TAKEOFFS AND TERMINAL UNITS, WHERE FLOW PATTERN IS NOT OBVIOUS; FOR CLAMPED SYSTEMS, INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE, FOR BAND HANGERS, INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE, INSERT LENGTH: EXTEND 2 INCHES BELOW SHEET METAL SHIELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.
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 - LOCATE PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE ACCESSIBLE CEILING IN FINISHED SPACES; MACHINE ROOMS; ACCESSIBLE MAINTENANCE SPACES SUCH AS SHAFTS, TUNNELS, AND EXTERIOR EXPOSED LOCATIONS AS FOLLOWS: NEAR EACH BRANCH CONNECTION, INCLUDING SHORT TAKEOFFS AND TERMINAL UNITS, WHERE FLOW PATTERN IS NOT OBVIOUS; FOR CLAMPED SYSTEMS, INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE, FOR BAND HANGERS, INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE, INSERT LENGTH: EXTEND 2 INCHES BELOW SHEET METAL SHIELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.
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 - LOCATE PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE ACCESSIBLE CEILING IN FINISHED SPACES; MACHINE ROOMS; ACCESSIBLE MAINTENANCE SPACES SUCH AS SHAFTS, TUNNELS, AND EXTERIOR EXPOSED LOCATIONS AS FOLLOWS: NEAR EACH BRANCH CONNECTION, INCLUDING SHORT TAKEOFFS AND TERMINAL UNITS, WHERE FLOW PATTERN IS NOT OBVIOUS; FOR CLAMPED SYSTEMS, INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE, FOR BAND HANGERS, INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE, INSERT LENGTH: EXTEND 2 INCHES BELOW SHEET METAL SHIELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.

- SECTION 220719 - PLUMBING PIPING INSULATION
- DOMESTIC COLD WATER: FLEXIBLE ELASTOMERIC, 1/2 INCH THICK.
 - DOMESTIC HOT AND RECIRCULATED HOT WATER: 1-1/4 AND SMALLER: MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I, 1/2 INCH THICK.
 - DOMESTIC HOT WATER: 1-1/2 AND LARGER: MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE 1, 1-1/2 INCH THICK.
 - STORMWATER AND OVERFLOW: FLEXIBLE ELASTOMERIC, 1 INCH THICK.
 - SANITARY DRAIN PIPING WITHIN 10 FEET OF DRAIN RECEIVING CONDENSATE AND EQUIPMENT DRAIN WATER BELOW 60 DEG F: FLEXIBLE ELASTOMERIC, 3/4 INCH THICK.
 - INSTALL INSULATION CONTINUOUSLY THROUGH WALL AND FLOOR PENETRATIONS.
 - FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE-OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C534/C534M, TYPE I FOR TUBULAR MATERIALS.
 - MINERAL-FIBER, PREFORMED PIPE: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C547, PREFORMED PIPE INSULATION: TYPE I, GRADE A WITH FACTORY-APPLIED ASJ.
 - FLEXIBLE ELASTOMERIC AND SOLVENT-BASED ADHESIVE. SERVICE TEMPERATURE RANGE: 40 TO 200 DEG.
 - MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.
 - VAPOR-RETARDER MASTIC: WATER BASED; SUITABLE FOR INDOOR USE ON BELOW-AMBIENT SERVICES. WATER-VAPOR PERMEANCE: COMPLY WITH ASTM E985M OR ASTM F499. APPLY TO INSULATION SEAMS ON COLD WATER PIPING.
 - ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C1136.
 - SECUREMENTS: STAPLES: OUTWARD-CLINCHING INSULATION STAPLES, NOMINAL 3/4-INCH WIDE, STAINLESS STEEL OR MONEL.

- SECTION 221116 - DOMESTIC WATER PIPING
- UNDER-BUILDING-SLAB, DOMESTIC WATER, BUILDING-SERVICE PIPING, NPS 3 AND SMALLER, SHALL BE SOFT COPPER TUBE, ASTM B88, TYPE K, WROUGHT-COPPER, SOLDER JOINT FITTINGS, SOLDER FILLER METALS: ASTM B32, LEAD-FREE ALLOYS.
 - UNDER-BUILDING-SLAB, COMBINED DOMESTIC WATER, BUILDING-SERVICE, AND FIRE-SERVICE-MAIN PIPING NPS 6 TO NPS 12, SHALL BE PLAIN-END, DUCTILE-IRON PIPE, GROOVED-JOINT, DUCTILE-IRON-PIPE APPURTENANCES; AND GROOVED JOINTS. AWWA C151/A21.51. GLANDS, GASKETS, AND BOLTS: AWWA C111/A21.11. DUCTILE OR GRAY-IRON GLANDS, RUBBER GASKETS, AND STEEL BOLTS.
 - ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 AND SMALLER SHALL BE HARD COPPER TUBE, ASTM B88, TYPE L CAST-OR WROUGHT-COPPER, SOLDER-JOINT FITTINGS, AND SOLDERED JOINTS. SOLDER FILLER METALS: ASTM B32, LEAD-FREE ALLOYS.
 - ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 1/2 TO NPS 4 SHALL BE GALVANIZED-STEEL PIPE AND NIPPLES; GALVANIZED, GRAY-IRON THREADED FITTINGS, AND THREADED JOINTS. ASTM A53A/53M.
 - ELECTRIC FITTINGS FOR NPS 2-1/2 TO NPS 4: USE DIELECTRIC FLANGE KITS.
 - ADJUST BALANCING VALVES IN HOT WATER-CIRCULATION RETURN PIPING TO PROVIDE ADEQUATE FLOW, REMOVE AND CLEAN STRAINER SCREENS. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW IT TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
 - PURGE NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING. USE PURGING AND DISINFECTING PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652.
 - POTABLE-WATER SYSTEMS AND COMPONENTS SHALL COMPLY WITH NSF 61, NSF 61, AND NSF 372.
 - WROUGHT-COPPER, SOLDER-JOINT FITTINGS: ASME B16.22, PRESSURE FITTINGS.
 - CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW IT TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS, AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 - FLUSH PIPING SYSTEM WITH CLEAN TEST WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS. FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.

- SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES
- DOMESTIC WATER PIPING SPECIALTIES INTENDED TO CONVEY OR DISPENSE WATER FOR HUMAN CONSUMPTION ARE TO COMPLY WITH THE SDWA, REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION, AND NSF 61 AND NSF 372, OR TO BE CERTIFIED IN COMPLIANCE WITH NSF 61 AND NSF 372 BY AN AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)-ACCREDITED THIRD-PARTY CERTIFICATION BODY THAT THE WEIGHTED AVERAGE LEAD CONTENT AT WETTED SURFACES IS LESS THAN OR EQUAL TO 0.25 PERCENT.
 - MINIMUM WORKING PRESSURE FOR DOMESTIC WATER PIPING SPECIALTIES: 125 PSIG UNLESS OTHERWISE INDICATED.
 - ATMOSPHERIC-TYPE VACUUM BREAKERS: STANDARD: ASSE 1001.
 - HOSE-CONNECTION VACUUM BREAKERS: STANDARD: ASSE 1001. BODY: BRONZE, NONREMOVABLE, WITH MANUAL DRAIN. OUTLET CONNECTION: GARDEN-HOSE THREADED COMPLYING WITH ASME B1.20.7.
 - WATER PRESSURE-REDUCING VALVES: STANDARD: ASSE 1003. PRESSURE RATING: INITIAL WORKING PRESSURE OF 150 PSIG. BODY: BRONZE.
 - MEMORY-STOP-BALANCING VALVES: STANDARD: MSS SP-110 FOR TWO-PIECE, COPPER-ALLOY BALL VALVES. PRESSURE RATING: 400-PSIG MINIMUM CWP.
 - WATER-TEMPERATURE LIMITING DEVICES: STANDARD: ASSE 1070. PRESSURE RATING: 125 PSIG. TYPE: THERMOSTATICALLY CONTROLLED, WATER MOVING VALVE. ACCESSORIES: CHECK STOPS ON HOT- AND COLD-WATER SUPPLIES, AND ADJUSTABLE TEMPERATURE-CONTROL HANDLE.
 - Y-PATTERN STRAINERS: PRESSURE RATING: 125 PSIG. BODY: BRONZE FOR NPS 2 AND SMALLER; CAST IRON WITH INTERIOR LINING THAT COMPLIES WITH AWWA C550 FOR NPS 2-1/2 AND LARGER. SCREEN: STAINLESS STEEL WITH ROUND 0.020 INCH PERFORATIONS FOR STRAINERS NPS 2 AND SMALLER. 0.045 INCH PERFORATIONS FOR STRAINERS NPS 2-1/2 AND SMALLER.
 - BALL-VALVE-TYPE, HOSE-END DRAIN VALVES. STANDARD: MSS SP-110 FOR STANDARD-PORT, TWO-PIECE-BALL VALVES.
 - WATER-HAMMER ARRESTERS: STANDARD: ASSE 1010 OR PDI-WH 201. PISTON OR DIAPHRAGM TYPE. SIZE: ASSE 1010, SIZES AA AND A THROUGH F, OR PDI-WH 201, SIZES A THROUGH F.

- SECTION 221316 - SANITARY WASTE AND VENT PIPING
- ABOVEGROUND SOIL, WASTE, AND VENT PIPING SHALL BE SOLID WALL PVC PIPE. PVC SOCKET FITTINGS, AND SOLVENT CEMENTED JOINTS. COMPLY WITH NSF 14 "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS," FOR PLASTIC PIPING COMPONENTS. INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING AND "NSF-SEWER" FOR PLASTIC SEWER PIPING. SOLID-WALL PVC PIPE: ASTM D 2685, DRAIN, WASTE, AND VENT. PVC SOCKET FITTINGS: ASTM D 2685, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.
 - UNDERGROUND SOIL, WASTE, AND VENT PIPING SHALL BE SOLID WALL PVC PIPE. PVC SOCKET FITTINGS, AND SOLVENT CEMENTED JOINTS. COMPLY WITH NSF 14 "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS," FOR PLASTIC PIPING COMPONENTS. INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING AND "NSF-SEWER" FOR PLASTIC SEWER PIPING. SOLID-WALL PVC PIPE: ASTM D 2685, DRAIN, WASTE, AND VENT. PVC SOCKET FITTINGS: ASTM D 2685, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.
 - TEST WASTE AND VENT PIPING EXCEPT OUTSIDE LEADERS ON COMPLETION OF ROUGH-IN:IN. CLOSE OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10-FOOT HEAD OF WATER, FROM 15 MINUTES BEFORE INSPECTION STARTS TO COMPLETION OF INSPECTION. WATER LEVEL MUST NOT DROP. INSPECT JOINTS FOR LEAKS.
 - AFTER PLUMBING FIXTURES HAVE BEEN SET AND TRAPS FILLED WITH WATER, TEST CONNECTIONS AND PROVE THEY ARE GASTIGHT AND WATERTIGHT. PLUG VENT STACK OPENINGS ON ROOF AND BUILDING DRAINS WHERE THEY LEAVE BUILDING. INTRODUCE AIR INTO PIPING SYSTEM UNTIL SYSTEM UNDER PRESSURE OF 1-INCH WG. USE U-TUBE OR MANOMETER INSERTED IN TRAP OF WATER CLOSURE TO MEASURE THIS PRESSURE. AIR PRESSURE MUST REMAIN CONSTANT WITHOUT INTRODUCING ADDITIONAL AIR THROUGHOUT PERIOD OF INSPECTION. INSPECT PLUMBING FIXTURE CONNECTIONS FOR GAS AND WATER LEAKS.
 - COMPONENTS AND INSTALLATION SHALL BE CAPABLE OF WITHSTANDING THE FOLLOWING MINIMUM WORKING PRESSURE UNLESS OTHERWISE INDICATED: SOIL, WASTE, AND VENT PIPING: 10-FOOT HEAD OF WATER.
 - PIPING MATERIALS SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.

- SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES
- CAST-IRON EXPOSED FLOOR CLEANOUTS. STANDARD: ASME A112.36.2M FOR ADJUSTABLE HOUSING, FRAME AND COVER MATERIAL AND FINISH: NICKEL-STEEL, COPPER ALLOY.

FIRE PROTECTION SCOPE OF WORK

FURNISH AND INSTALL SPRINKLER SYSTEM COMPONENTS THAT MEET THE REQUIREMENTS OF THIS DESIGN. SPRINKLER PROTECTION IS REQUIRED THROUGHOUT THE BUILDING.

STORAGE UNITS ARE CONSIDERED ORDINARY HAZARD GROUP II.

CONTRACTOR IS RESPONSIBLE FOR ALL DESIGN, SPRINKLER SYSTEM LAYOUT, HYDRAULIC CALCULATIONS AND SHOP DRAWING PREPARATION. THE CONTRACTOR SHALL OBTAIN RECENT FLOW TEST DATA AS REQUIRED BY LOCAL CODES AND STANDARDS AND SHALL BE AT A MINIMUM WITHIN 12 MONTHS OF THE DATE ON THE SHOP DRAWING PACKAGE.

ALL SPRINKLER WORK IS PART OF A DELEGATED DESIGN PROCESS. THE CONTRACTOR IS RESPONSIBLE FOR ALL SHOP DOCUMENTATION AND PERMITS.

FIRE PROTECTION GENERAL NOTES

- DESIGN AND INSTALL THE FIRE SPRINKLER SYSTEM TO MEET THE SCOPE INDICATED ON THIS SHEET. COMPLY WITH REQUIREMENTS OF ALL CODES AND STANDARDS AS APPLICABLE AND AS LISTED ON THIS SHEET.
- THE CONTRACTOR SHALL FURNISH, INSTALL, AND TEST THE BACKFLOW PREVENTER.
- CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING ALL MANUFACTURER REQUIREMENTS, WHERE A MANUFACTURER RECOMMENDS A CERTAIN ARRANGEMENT OR PRACTICE, THIS RECOMMENDATION SHALL BE CONSIDERED A REQUIREMENT OF THESE DOCUMENTS.
- BASIS OF DESIGN EQUIPMENT INDICATED IN THESE DRAWINGS IS INTENDED TO CONVEY THE MINIMUM FUNCTIONAL AND PERFORMANCE ATTRIBUTES REQUIRED FOR THIS WORK. EQUIVALENT PRODUCTS ARE ALLOWABLE WHERE APPROVED BY OWNER OR OWNER'S DESIGNATED REPRESENTATIVE.
- PROVIDE MINIMUM 24-SPARE SPRINKLER CABINET WITH SPARE SPRINKLERS AND COMPATIBLE WRENCHES FOR THE NEW SYSTEM (NFPA 662.9.5). AFFIX PERMANENT PLACARD TO INSIDE COVER LISTING QUANTITIES OF EACH COMPONENT WITHIN.
- BEFORE PROCEEDING WITH BID, OBTAIN OWNER'S WRITTEN APPROVAL IN CASE OF DISPUTE AS TO INTENT OF ANY DESIGN DOCUMENTS.
- ALL MATERIALS AND EQUIPMENT SHALL BE NEW. EACH COMPONENT SHALL BE LISTED AS A PRODUCT BY THE MANUFACTURER UNDER THE APPROPRIATE CATEGORY FOR THE INTENDED USE BY UNDERWRITERS LABORATORIES, INC. (UL) AND SHALL BEAR THE 'UL' LABEL.
- CONTRACTOR IS RESPONSIBLE FOR OBTAINING TRADE PERMIT(S). THE CONTRACTOR SHALL PREPARE AND SUBMIT PERMIT PACKAGE(S) TO THE LOCAL AHJ. THE CONTRACTOR IS RESPONSIBLE FOR ALL FEE AND SCHEDULE IMPACTS ASSOCIATED WITH PERMITTING.
- DELEGATED DESIGN: ALL PIPE SIZES SHALL BE DETERMINED VIA HYDRAULIC CALCULATIONS PERFORMED BY SPRINKLER CONTRACTOR. IN ADDITION, ALL COMPONENTS NECESSARY FOR A COMPLETE SPRINKLER SYSTEM ARE NOT SHOWN. SPRINKLER CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL EQUIPMENT NECESSARY FOR A NFPA 13 COMPLIANT SYSTEM THAT IS SATISFACTORY TO THE AHJ.
- SHOP DRAWINGS, SUPPORTING HYDRAULIC CALCULATIONS, AND PRODUCT DATA FOR EACH PLANNED SYSTEM COMPONENT SHALL BE SUBMITTED TO AND APPROVED BY THE AHJ AND/OR OWNER'S REPRESENTATIVE PRIOR TO FABRICATION AND INSTALLATION EFFORTS.
- ALL EQUIPMENT SHALL BE NEW, UNLESS OTHERWISE NOTED.
- THIS PROJECT IS NOT FM INSURED.
- SEISMIC PROTECTION IS NOT REQUIRED.
- ALL EQUIPMENT AND MATERIALS ON THIS PROJECT SHALL BE LOCATED IN AREAS MAINTAINED OVER 40 F AND WILL NOT BE SUBJECT TO FREEZING.

COMPONENTS AND HARDWARE

- EACH COMPONENT OF THE FIRE SPRINKLER SYSTEM SHALL BE LISTED FOR THE INTENDED USE BY UNDERWRITERS LABORATORIES, INC. (UL) OR OTHER NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL). EACH COMPONENT SHALL BEAR A LABEL OF THE LISTING AGENCY.
- UNLESS OTHERWISE INDICATED, ABOVEGROUND SPRINKLER PIPING SHALL BE BLACK STEEL FERROUS PIPING OR CPVC AND SHALL MEET OR EXCEED THE STANDARDS IN NFPA 13.
- ABOVEGROUND PIPE AND TUBE REQUIREMENTS: SPRINKLER PIPING 2.5-INCHES AND LARGER MAY BE SCHEDULE 10 ON WET-PIPE SYSTEMS. SPRINKLER PIPING SMALLER THAN 2.5-INCHES IS TO BE SCHEDULE 40.
- ALL FITTINGS SHALL MEET OR EXCEED THE STANDARDS IN NFPA 13. SPRINKLER PIPING 2.5-INCHES AND LARGER SHALL HAVE GROOVED FITTINGS. SPRINKLER PIPING 1.25-INCHES AND SMALLER SHALL HAVE THREADED FITTINGS. FLANGED FITTINGS ARE ONLY ACCEPTABLE UPSTREAM OF THE BACKFLOW PREVENTER OR ON PIPES 8-INCHES OR LARGER. CPVC FITTINGS AND ADHESIVES SHALL COMPLY WITH MANUFACTURER REQUIREMENTS. FIRESTOP SADDLE PENETRATIONS WITH APPROVED MATERIALS.
- ALL MECHANICAL BRANCH TEES SHALL BE THE BOLTED SADDLE TYPE. ANY MECHANICAL TEES USING U-BOLTS, GRIPPING FITTING, OR DEVICES THAT BITE INTO THE PIPE OR RELY ON FRICTION ARE NOT ALLOWED, EVEN IF THEY ARE LISTED PRODUCTS.
- FLEXIBLE SPRINKLER DROPS/CONNECTIONS ARE PERMITTED. ALL FLEXIBLE SPRINKLER DROPS SHALL USE STAINLESS STEEL, BRAIDED HOSE, CORRUGATED HOSE IS NOT PERMITTED. FLEXIBLE SPRINKLER HOSE SHALL BE INCLUDED IN THE HYDRAULIC CALCULATIONS. INSTALL PER ALL MANUFACTURER'S INSTALLATION, INCLUDING LENGTH AND BENDING REQUIREMENTS. USE VIKING/ANVIL OR VICTUALIC OR EQUIVALENT.
- GALVANIZED PIPING IS NOT PERMITTED. BRASS PIPE AND STAINLESS STEEL PIPING IS ALSO NOT PERMITTED. COPPER TUBE IS NOT PERMITTED, EXCEPT WHERE NOTED.
- PIPE, FITTINGS, VALVES, AND DEVICES TO BE JOINED WITH GROOVED COUPLINGS SHALL CONTAIN ROLLED, CUT OR CAST GROOVES THAT ARE DIMENSIONALLY COMPATIBLE WITH THE COUPLINGS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING THE GROOVES AND THEIR FINAL INSTALLATION MEET ALL MANUFACTURER REQUIREMENTS ON-SITE. AT A MINIMUM, THE CONTRACTOR SHALL ENSURE THE FOLLOWING: (1) ALL GROOVES ARE SIZED CORRECTLY WITH A PIPE TAP OR EQUIVALENT (2) ALL GASKET ARE LUBRICATED TO MANUFACTURER REQUIREMENTS. EXCESSIVE OR UNEVEN LUBRICATION IS NOT ALLOWED. (3) THE NUTS ARE TIGHTEN EVENLY/UNIFORMLY ON EACH SIDE BY ALTERNATING SIDES UNTIL PROPER ASSEMBLY IS COMPLETE. (4) THE NUT/BOLT CONNECTIONS ARE TIGHTENED/SECURED PER MANUFACTURER REQUIREMENTS. (5) FOR GROOVED COUPLINGS INSTALLED OUTSIDE OR IN EXTREME CONDITIONS, THE GROOVES SHALL BE INSTALLED TO ALLOW FOR EXPANSION AND/OR CONTRACTION.) SUBMIT CURRENT FIELD INSTALLATION INSTRUCTIONS FROM THE MANUFACTURER WITH THE PRODUCT DATA.
- PLAIN END FITTINGS ARE NOT ALLOWED.
- NO WELDING IS ALLOWED ON-SITE. ALL WELD PIPE AND FITTINGS SHALL BE SHOP WELDED PER NFPA 13.
- CONTRACTOR SHALL BE RESPONSIBLE FOR WELDING PIPE TO NFPA 13. 6.5.2. FULL PENETRATION WELDS, PARTIAL PENETRATION GROOVED WELDS, OR FILLET WELDS ARE ALLOWED. AT MINIMUM, COMPLY WITH THE FOLLOWING: (1) HOLES IN PIPING FOR OUTLETS SHALL BE CUT TO THE FULL INSIDE DIAMETER OF FITTINGS PRIOR TO WELDING IN PLACE OF THE FITTINGS (2) OPENINGS CUT INTO PIPING SHALL BE SMOOTH BORE, AND ALL INTERNAL SLAG AND WELDING RESIDUE SHALL BE REMOVED. (3) FITTINGS SHALL NOT PENETRATE THE INTERNAL DIAMETER OF THE PIPING. (4) COMPLETED WELDS SHALL BE FREE FROM CRACKS, INCOMPLETE FUSION, SURFACE POROSITY, AND DEEP UNDERCUTS. (5) COMPLETED CIRCUMFERENTIAL BUTT WELD REINFORCEMENT SHALL NOT EXCEED 3/32-INCHES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING ALL WELDING REQUIREMENTS ARE MET FOR PIPE IS INSTALLED ON-SITE.
- A WELDING PROCEDURE SHALL BE PREPARED AND QUALIFIED BY THE CONTRACTOR OR FABRICATOR BEFORE ANY WELDING IS DONE PER NFPA 13. 6.5.2. ALL WELDERS AND WELDING MACHINE OPERATORS SHALL BE CERTIFIED AND POSSESS WELDING IDENTIFICATION RECORDS SHALL BE KEPT OF ALL WELDS. WELDING CAN BE PERFORMED BY THE CONTRACTOR OR THIRD PARTY FABRICATION FACILITY. SUBMIT WELDING PROCEDURES AND ALL INDIVIDUAL WELDING IDENTIFICATIONS WITH PRODUCT DATA.
- ALL OTHER SPRINKLERS SHALL BE STANDARD COVERAGE, QUICK-RESPONSE, SPRINKLER TYPES SHALL BE AS FOLLOWS PER OWNER REQUEST: (1) CONCEALED PENDENT IN COMMON AREAS, DWELLING UNITS, AND GUARDIORS (2) SEMI-RECESSED IN ALL OTHER FINISHED (3) BRASS UPRIGHTS IN UNFINISHED SPACES.
- INSTALL SPRINKLER CONNECTIONS ON ALL SPRINKLERS INSTALLED BELOW 8-FT AFF, WHERE SUBJECT TO MECHANICAL DAMAGE, OR WHERE INDICATED.
- FURNISH AND INSTALL PERMANENTLY MARKED WEATHERPROOF METAL OR RIGID PLASTIC IDENTIFICATION SIGNS FOR ALL CONTROL, DRAIN, VENTING, AND TEST CONNECTION VALVES. SECURE WITH CORROSION-RESISTANT WIRE, CHAIN, OR OTHER APPROVED MEANS. CONTROL VALVE SIGNS SHALL IDENTIFY THE PORTION OF THE BUILDING SERVED.

INSTALLATION REQUIREMENTS

- THE FOLLOWING CLASSIFICATION OF OCCUPANCIES AND COMMODITIES ARE APPLICABLE TO THIS PROJECT:
 - LIGHT HAZARD: CIRCULATION AREAS, RESTROOMS, COMBUSTIBLE CONCEALED SPACES, ALL AREAS EXCEPT AS NOTED BELOW.
 - ORDINARY HAZARD GROUP 2: MERCANTILE, TENANT/SHELL SPACES, STORAGE ROOMS, STOCK PILES OF COMBUSTIBLES BETWEEN 8-FT AND 12-FT.
 - THE FOLLOWING WATER DEMAND REQUIREMENTS ARE APPLICABLE TO THIS PROJECTS:
 - LIGHT HAZARD: 0.10 GPM/SQFT OVER 1,500 SQFT, 100 GPM OUTSIDE HOSE
 - ORDINARY HAZARD GROUP 2: 0.20 GPM/SQFT OVER 1,500 SQFT, 250 GPM OUTSIDE HOSE
- DESIGN AREA REDUCTION FOR QUICK RESPONSE SPRINKLERS IS APPLICABLE PER NFPA 13: 11.2.3.2.3.
- PERFORM HYDRAULIC CALCULATIONS FOR THE PROPOSED SPRINKLER SYSTEM BASED ON WATER SUPPLY TEST DATA. SUBMIT CALCULATIONS IN NFPA 13 FORMAT FOR APPROVAL TO AHJ PRIOR TO SYSTEM INSTALLATION.
- GRIDDED SPRINKLER SYSTEMS ARE NOT ALLOWED, WHICH INCLUDE PARTIAL GRIDS WHERE THERE ARE MORE THAN TWO CONNECTIONS BETWEEN ANY MAINS OR ANY CONNECTIONS OF A LOOPED MAIN.
 - SUPPORT SPRINKLER PIPING IN ACCORDANCE WITH NFPA 13 - SECTION 9.1 REQUIREMENTS. COMPONENTS OF HANGER ASSEMBLIES THAT DIRECTLY ATTACH TO THE PIPE OR TO THE BUILDING SHALL BE UL LISTED.
 - DO NOT INSTALL ANY HANGERS INTO OR THROUGH THE ROOF ASSEMBLY AS THE ROOF CAN NOT SUPPORT STRUCTURAL LOADS AND ANY PENETRATIONS WILL BREAK THE WEATHER-SEAL.
 - HANGERS ON MAINS SHALL BE LOCATED AS REQUIRED BY NFPA 13, BETWEEN EACH BRANCH LINE, OR ON EACH SECTION OF PIPE, WHICHEVER IS THE LESSER DIMENSION. HANGERS ON BRANCH LINES SHALL BE LOCATED PER NFPA 13.
 - AS THE MAXIMUM PRESSURE CAN EXCEED 100 PSI, INSTALL SURGE RESTRAINTS AS REQUIRED BY NFPA 13. ALL END SPRINKLERS IN A PENDENT POSITION BELOW THE CEILING SHALL HAVE A HANGER ASSEMBLY THAT PREVENTS UPWARD MOVEMENT OF THE PIPE. THIS SURGE RESTRAINT CAN BE FURNISHED BY CLIPS OR EXTENDING THE HANGER ROD OR AS OTHERWISE APPLICABLE. THE SURGE RESTRAINT SHALL BE WITHIN 12-INCHES OF THE END SPRINKLER ON BRANCH LINES AND 24-INCHES ON ARM/ROVERS.
 - ALL HANGER ROD SHALL EXTEND ONE FULL THREAD TURN OR A MINIMUM OF A 1/8-INCH THROUGH THE HANGER RING.
 - ALL HANGERS SHALL BE INSTALLED PLUMB, BENT OR CROOKED HANGERS SHALL BE REPLACED.
 - CONCEAL ALL SPRINKLER PIPING IN FINISHED AREAS. EXPOSED SECTIONS OF PIPE SHALL NOT BE PERMITTED IN FINISHED AREAS.
 - FURNISH AND INSTALL A 1/2-INCH PRESSURE RELIEF VALVE ON EACH WET-PIPE SPRINKLER SYSTEM.
 - INSTALL A MEANS DOWNSTREAM OF ALL BACKFLOW PREVENTION VALVES FOR FORWARD FLOW TESTS AT A MINIMUM FLOW RATE OF THE SYSTEM DEMAND INCLUDING HOSE ALLOWANCE WHERE APPLICABLE PER NFPA 13: 8.17.4.5.
 - FURNISH AND INSTALL ALL SPRINKLER PRESSURE SWITCHES, WATER FLOW SWITCHES, AND VALVE TAMPER DEVICES. WIRING TO THESE DEVICES IS TO BE PERFORMED BY THE FIRE ALARM CONTRACTOR.
 - ALL EXPRESS DRAINS MUST TERMINATE 2 FEET ABOVE GRADE AND BE PROVIDED WITH CONCRETE SPLASH BLOCKS. ALTERNATIVELY, PIPE TO AN AVAILABLE OPEN SITE DRAIN.
 - CONTRACTOR SHALL SEAL ALL PENETRATIONS OF FIRE RESISTANCE-RATED CONSTRUCTION WITH MINIMUM 2-HOUR FIRESTOP SYSTEMS. ALL FIRESTOP SYSTEMS SHALL BE LISTED BY A NRTL.
 - REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF RATED CONSTRUCTION.
 - CORE DRILL ALL PENETRATIONS IN MASONRY / CONCRETE FLOORS OR WALLS. COORDINATE ALL CORE DRILLING WITH A LICENSED STATIONARY ENGINEER.

KEY SPECIFICATION REQUIREMENTS

- ENSURE A MINIMUM CLEARANCE OF 3-FEET ACCESS TO AND IN FRONT OF ALL EQUIPMENT AND 6-INCHES BEHIND THE EQUIPMENT (E.G., CONTROL VALVES, BACKFLOW PREVENTER, CHECK VALVES, FLOOR CONTROL VALVE ASSEMBLIES, WATERFLOW SWITCHES, ETC.).
- THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING ALL DOCUMENTATION REQUIRED BY NFPA 13 CHAPTER 23.
- THE CONTRACTOR SHALL PRODUCE SHOP DRAWINGS, WHICH AT A MINIMUM MUST INCLUDE A RISER, MAKE/TYPENODEL SIZE OF ALL COMPONENTS/HARDWARE, K-FACTORS OF SPRINKLERS, INFORMATION ON BACKFLOW PREVENT, TYPES/LOCATIONS OF HANGERS, WATER SUPPLY INFORMATION, HYDRAULIC REFERENCE POINTS, THE INFORMATION ON THE HYDRAULIC DATA NAMEPLATE, AND NOMINAL PIPE SIZE/CUTTING LENGTHS OF PIPE (OR CENTER-TO-CENTER DIMENSIONS).
- ALL SYMBOLS ON SHOP DRAWINGS SHALL MATCH SYMBOLS IN NFPA 170.
- THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING A PRODUCT SUBMITTAL. THE PRODUCT SUBMITTAL SHALL INCLUDE CATALOG CUT SHEETS FOR ALL COMPONENTS AND HARDWARE, WHERE MORE THAN ONE PRODUCT IS INDICATED ON A SHEET, HIGHLIGHT THE APPLICABLE PRODUCT AND STRIKE-OUT ALL OTHER PRODUCTS.
- PERFORM SYSTEM HYDROSTATIC TESTING OF NEW SYSTEM. PRESSURE SYSTEM TO 200 PSI OR HIGHEST WORKING STATIC PRESSURE PLUS 50 PSI, WHICHEVER IS HIGHER, MAINTAIN PRESSURE WITHOUT LOSSES FOR 2 HOURS. SYSTEM SHALL BE CONSIDERED DEFECTIVE IF TESTING DOES NOT MEET THIS REQUIREMENT. SUBMIT NFPA 13 "CONTRACTORS MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING" FOR APPROVAL.
- CONTRACTOR SHALL COMPLETE ALL BACKFLOW PREVENTER TESTING, WHICH SHALL INCLUDE A FORWARD FLOW TEST. THE PERSON CONDUCTING THE BACKFLOW PREVENTER TESTING SHALL POSSESS A VALID PLUMBING LICENSE. SUBMIT A COPY OF THE PLUMBING LICENSE WITH THE PRODUCT DATA.
- THE CONTRACTOR SHALL MAINTAIN ACCURATE RED-LINE CONSTRUCTION WORKING DRAWINGS ON SITE. FOLLOWING COMMISSIONING, CONTRACTOR SHALL PREPARE "AS-BUILT" DRAWINGS IN ELECTRONIC PDF AND REPRODUCIBLE DRAWING FORMAT, REFLECTING ACCURATE FIELD CONDITIONS.
- THE CONTRACTOR IS SPECIFICALLY RESPONSIBLE FOR ALL MEANS AND METHODS OF JOB SAFETY IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS.

SECTION 211313 - WET-PIPE SPRINKLER SYSTEMS

- SUMMARY
 - SYSTEM DESCRIPTION: COMBINATION COMPLETE WET-PIPE AUTOMATIC SPRINKLER.
- QUALITY ASSURANCE
 - PROVIDE COMPLETE SYSTEM FULLY COMPLIANT WITH ALL APPLICABLE CODES AND STANDARDS AS APPLICABLE AND AS LISTED ON THE COVER SHEET OF THIS DRAWING PACKAGE.
 - THE FIRE PROTECTION CONTRACTOR SHALL BE CERTIFIED BY THE STATE OF NEW JERSEY.
 - SHOP DRAWING PREPARATION QUALIFICATIONS: INDIVIDUAL IN RESPONSIBLE CHARGE OF ALL RELEVANT DESIGN ACTIVITIES SHALL:
 - HOLD A MINIMUM NICET LEVEL III CERTIFICATION IN WATER-BASED FIRE PROTECTION SYSTEMS LAYOUT, -OR-
 - BE A LICENSED PROFESSIONAL ENGINEER.
 - LEAD INSTALLER QUALIFICATIONS: INDIVIDUAL SHALL HOLD A VALID MINIMUM LEVEL III NICET CERTIFICATION IN WATER-BASED (AUTOMATIC SPRINKLER) SYSTEMS LAYOUT. THE INDIVIDUAL SHALL BE ON SITE THROUGHOUT THE PROJECT DURATION TO LEAD INSTALLATION EFFORTS, INCLUDING COORDINATION, QUALITY CONTROL, TROUBLE-SHOOTING, COMMISSIONING, AND DEMONSTRATION ACTIVITIES.
- REQUIRED SUBMITTALS

THE FOLLOWING CONTRACTOR-PREPARED SUBMITTALS REQUIRE WRITTEN APPROVAL:

- SHOP DRAWING PACKAGE. SHOP DRAWINGS WITH SUPPORTING HYDRAULIC CALCULATIONS SHALL BE SUBMITTED TO AND APPROVED BY THE AHJ PRIOR TO FABRICATION AND INSTALLATION EFFORTS. THE PACKAGE SHALL COMPLY WITH ALL REQUIREMENTS OF THE AHJ AND SHALL BE SIGNED AND SEALED BY THE INDIVIDUAL IN RESPONSIBLE CHARGE OF SHOP DRAWING PREPARATION EFFORTS.
 - AT A MINIMUM, SHOP DRAWINGS MUST INCLUDE:
 - A RISER
 - MAKE/TYPENODEL SIZE OF ALL COMPONENTS/HARDWARE
 - K-FACTORS OF SPRINKLERS
 - INFORMATION ON BACKFLOW PREVENTION
 - TYPES/LOCATIONS OF HANGERS
 - WATER SUPPLY INFORMATION
 - THE INFORMATION ON THE HYDRAULIC DATA NAMEPLATE
 - AND NOMINAL PIPE SIZE/CUTTING LENGTHS OF NEW PIPE (OR CENTER-TO-CENTER DIMENSIONS)
- PRODUCT DATA SHALL BE SUBMITTED FOR EACH PLANNED SYSTEM COMPONENT. INCLUDE ALL DESIGNER AND INSTALLER QUALIFICATION DOCUMENTATION. THE PRODUCT DATA SHALL BE ANNOTATED/RED-LINE TO INDICATE SPECIFICALLY WHICH PRODUCT IS BEING PROVIDED.
- FIELD TEST REPORTS AND CERTIFICATES. SUBMIT DOCUMENTATION IN STANDARD NFPA 13 FORMAT FOR ALL REQUIRED SYSTEMS TESTS AND CERTIFICATIONS, INCLUDING:
 - HYDROSTATIC TEST(S),
 - CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING.
- CLOSEOUT DOCUMENTS.
 - RECORD DRAWINGS. PREPARE POST-CONSTRUCTION RECORD DRAWINGS REFLECTIVE OF AS-BUILT CONDITIONS FOR ALL SYSTEM COMPONENTS. INCLUDE UPDATED HYDRAULIC CALCULATIONS WHERE SYSTEM CONFIGURATION HAS BEEN MODIFIED AND WOULD EFFECT RESULTS. DRAWINGS SHALL BE PREPARED ONLINE TO THE CONTRACTOR'S PROJECT AUTOCAD AND PDF FORMAT. EACH DRAWING SHALL BE SIGNED AND SEALED BY THE LEAD INSTALLER.
 - FIELD TESTS. COMPLETE AND SUBMIT OPERATION AND MAINTENANCE DATA FOR ALL INSTALLED SYSTEM COMPONENTS. SUBMIT THREE (3) BOUND HARD COPIES AND TWO (2) ELECTRONIC PDF COPIES (E.G., PROVIDED ON COMPACT DISCS IN AN ORGANIZED FASHION).

PIPING MATERIALS

- COMPLY WITH ALL MATERIAL STANDARDS AS ALLOWED BY NFPA 13.
- STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM, NPS 2 (DN 50) AND SMALLER:
 - STANDARD-WEIGHT, BLACK-STEEL PIPE WITH THREADED ENDS WITH CAST OR MALLEABLE IRON FITTINGS.
 - STANDARD-WEIGHT, BLACK-STEEL PIPE WITH CUT-OR ROLL-GROOVED ENDS AND UNCOATED FITTINGS.
- STANDARD-PRESSURE, WET-PIPE SPRINKLER SYSTEM, NPS 2-1/2 (DN 65) AND LARGER:
 - STANDARD-WEIGHT, BLACK-STEEL PIPE WITH CUT-OR ROLL-GROOVED ENDS AND UNCOATED FITTINGS.
 - SCHEDULE