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PART 1 - GENERAL
<p><b>SUMMARY</b></p> <p>THE WORK UNDER THIS SECTION INCLUDES ALL LABOR, MATERIALS, FEES, AND ACTIVITIES REQUIRED TO INSTALL AND/OR MODIFY, TEST, AND COMMISSION A WATER-BASED FIRE SUPPRESSION SYSTEM.</p>
<p><b>RELATED DOCUMENTS</b></p> <p>THE WORK REQUIREMENTS DESCRIBED WITHIN DIVISION 20 "COMMON MECHANICAL" ELECTRICAL REQUIREMENTS" FORM COMPLIMENTARY REQUIREMENTS TO THE SCOPE OF WORK OF THIS SECTION.</p>
<p><b>SUBMITTALS</b></p> <p>SUBMIT ACTION SUBMITTALS PRIOR TO APPLYING FOR AUTHORITY HAVING JURISDICTION INSTALLATION PERMITS (WHERE REQUIRED) AND SYSTEM INSTALLATION.</p>
<p>SUBMIT INFORMATIONAL SUBMITTALS RELATED TO TESTING AND INSPECTIONS AFTER SUCCESSFUL SYSTEM TESTING AND PRIOR TO SCHEDULING AUTHORITY HAVING JURISDICTION FINAL APPROVAL DEMONSTRATION TESTING.</p>
<p>SUBMIT CLOSEOUT SUBMITTALS AS PART OF PROJECT CLOSEOUT PROCEDURE.</p>
<p><b>ACTION SUBMITTALS</b></p> <p>PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED, INCLUDE RATED CAPACITIES, OPERATING CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, AND FURNISHED SPECIALTIES AND ACCESSORIES.</p>
<p>SHOP DRAWINGS: FOR WATER-BASED FIRE SUPPRESSION SYSTEMS, INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK. INCLUDE ALL INFORMATION REQUIRED BY THE APPLICABLE WATER-BASED FIRE SUPPRESSION STANDARD(S) FOR "WORKING PLANS". COMPLY WITH PART 3 "TECHNICAL DESIGN AND LAYOUT".</p>
<p>HYDRAULIC CALCULATIONS: PERFORM CALCULATIONS IN ACCORDANCE WITH APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION DESIGN AND INSTALLATION STANDARD(S) FOR "HYDRAULIC CALCULATIONS".</p>
<p><b>INFORMATIONAL SUBMITTALS</b></p> <p>QUALIFICATION DATA: FOR QUALIFIED INSTALLER AND CERTIFIED ENGINEERING TECHNICIAN.</p>
<p>WATER SUPPLY EVALUATION REPORT: INCLUDE WATER SUPPLY FLOW TEST REPORT AND CERTIFIED ENGINEERING TECHNICIAN EVALUATION REPORT CONFIRMING ADEQUACY OF WATER SUPPLY AND SIGNIFICANT DEVIATIONS FROM HISTORICAL DATA OR CONTRACT DOCUMENTS.</p>
<p>FIELD TEST REPORTS AND CERTIFICATES: INDICATE AND INTERPRET TEST RESULTS FOR COMPLIANCE WITH PERFORMANCE REQUIREMENTS AND AS DESCRIBED IN NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. INCLUDE "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVEGROUND PIPING" CORRESPONDING TO EACH WATER-BASED FIRE SUPPRESSION SYSTEM.</p>
<p>FIELD QUALITY-CONTROL REPORTS.</p>
<p><b>CLOSEOUT SUBMITTALS</b></p> <p>RECORD DRAWINGS: COMPLETE SHOP DRAWING RE-SUBMITTAL UPDATED TO REFLECT ACTUAL FINAL SYSTEM INSTALLATION.</p>
<p>OPERATION AND MAINTENANCE DATA: FOR WATER-BASED FIRE SUPPRESSION SYSTEM SPECIALTIES TO INCLUDE IN EMERGENCY, OPERATION, AND MAINTENANCE MANUALS.</p>
<p><b>QUALITY ASSURANCE</b></p> <p>INSTALLER QUALIFICATIONS: PERSONNEL LICENSED BY THE GOVERNING LICENSING AUTHORITY FOR THE INSTALLATION OF WATER-BASED FIRE SUPPRESSION SYSTEMS. SUCCESSFULLY INSTALLED, TESTED, OBTAINED APPROVALS FOR, AND PUT INTO SERVICE NO LESS THAN THREE (3) WATER-BASED FIRE SUPPRESSION SYSTEMS SIMILAR IN TYPE, SIZE, AND COMPLEXITY TO THAT OF THE WORK OF THIS SECTION. FOR CPVC PIPING INSTALLATIONS, PERSONNEL CERTIFIED BY THE PIPING MANUFACTURER AS AN APPROVED INSTALLER WITHIN THE LAST TWO (2) YEARS.</p>
<p>CERTIFIED ENGINEERING TECHNICIAN QUALIFICATIONS: SHOP DRAWINGS AND CALCULATIONS PREPARED BY PERSONNEL LICENSED AS A PROFESSIONAL FIRE PROTECTION ENGINEER BY THE GOVERNING LICENSING AUTHORITY OR, WHERE PERMITTED BY LOCAL AUTHORITIES HAVING JURISDICTION, NICET CERTIFIED AS A FIRE PROTECTION, WATER-BASED SYSTEMS INSTALLATION LEVEL III OR IV TECHNICIAN.</p>
<p>SOURCE LIMITATIONS: OBTAIN PRODUCTS FOR EACH PRODUCT CATEGORY FROM A SINGLE MANUFACTURER.</p>
<p>PRODUCT STANDARDS: LISTED IN THE "FIRE PROTECTION EQUIPMENT DIRECTORY" PUBLISHED BY UL OR THE "APPROVAL GUIDE" PUBLISHED BY FM GLOBAL.</p>
<p>SUBJECT TO COMPLIANCE WITH REQUIREMENTS, INDICATION OF A UL PRODUCT REQUIREMENT WITHIN PART 2 SHALL BE CONSTRUED TO BE INCLUSIVE OF A CORRESPONDING FM GLOBAL APPROVED PRODUCT, WITH OR WITHOUT UL LISTING.</p>
<p>PRODUCT STANDARDS: UL'S "FIRE PROTECTION EQUIPMENT DIRECTORY" LISTING AND "APPROVAL GUIDE," PUBLISHED BY FM GLOBAL.</p>
<p>SUBJECT TO COMPLIANCE WITH REQUIREMENTS, INDICATION OF A UL PRODUCT REQUIREMENT WITHIN PART 2 SHALL BE CONSTRUED TO REQUIRE A UL LISTED AND FM APPROVED PRODUCT.</p>
<p>ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.</p>
<p><b>COORDINATION</b></p> <p>COORDINATE CONSTRUCTION OPERATIONS WITH THOSE OF OTHER SECTIONS OF THE WORK AND OTHER ENTITIES TO ENSURE EFFICIENT AND ORDERLY INSTALLATION OF EACH PART OF THE WORK. COORDINATE OPERATIONS AND PRODUCT SELECTIONS OF THIS SECTION WITH OPERATIONS AND PRODUCT SELECTIONS INCLUDED IN DIFFERENT SECTIONS THAT DEPEND ON EACH OTHER FOR PROPER INSTALLATION, CONNECTION, AND OPERATION. SCHEDULE CONSTRUCTION OPERATIONS IN SEQUENCE REQUIRED TO OBTAIN THE BEST RESULTS WHERE INSTALLATION OF ONE PART OF THE WORK DEPENDS ON INSTALLATION OF OTHER COMPONENTS, BEFORE OR AFTER ITS OWN INSTALLATION. COORDINATE INSTALLATION OF DIFFERENT COMPONENTS WITH OTHER SECTIONS OF THE WORK TO ENSURE MAXIMUM PERFORMANCE AND ACCESSIBILITY FOR REQUIRED MAINTENANCE, SERVICE, AND REPAIR. MAKE ADEQUATE PROVISIONS TO ACCOMMODATE ITEMS SCHEDULED FOR LATER INSTALLATION.</p>
<p>COORDINATION DRAWINGS: CONTRIBUTE TO PREPARATION OF COORDINATION DRAWINGS IN THE SEQUENCE ESTABLISHED UNDER DIVISION 1 AND DIVISION 20; INDICATE WATER-BASED FIRE SUPPRESSION SYSTEM WORK COORDINATED WITH OTHER SECTIONS OF THE WORK.</p>
<p><b>MAINTENANCE MATERIALS</b></p> <p>FURNISH EXTRA MATERIALS THAT MATCH PRODUCTS INSTALLED AND THAT ARE PACKAGED WITH PROTECTIVE COVERING FOR STORAGE AND IDENTIFIED WITH LABELS DESCRIBING CONTENTS.</p>
<p>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.</p>
<p>CUSTOM-FINISH SPRINKLERS: PROVIDE A MINIMUM OF SIX SPARE COVER PLATES OR SPRINKLERS FOR EACH CUSTOM FINISH IN ADDITION TO SPARES REQUIRED BY NFPA 13.</p>

PART 2 - PRODUCTS
<p><b>PERFORMANCE REQUIREMENTS</b></p> <p>DESIGN AND INSTALLATION STANDARD(S):</p> <ul style="list-style-type: none"><li>• SPRINKLER SYSTEMS: COMPLY WITH NFPA 13.</li><li>• STANDPIPE SYSTEMS: COMPLY WITH NFPA 14.</li><li>• FM GLOBAL: COMPLY WITH FM GLOBAL DATASHEETS FOR THE DESIGN, INSTALLATION, AND TESTING OF WATER-BASED FIRE SUPPRESSION SYSTEMS.</li></ul> <p>STANDARD-PRESSURE PIPING SYSTEM COMPONENT: LISTED FOR 175 PSIG MINIMUM WORKING PRESSURE.</p>
<p>SEISMIC PERFORMANCE: WHERE REQUIRED, PIPING SYSTEMS SHALL WITHSTAND THE EFFECTS OF EARTHQUAKE MOTIONS DETERMINED ACCORDING TO NFPA 13 AND ASCE/SEI 7.</p>
<p><b>PIPING AND FITTINGS</b></p> <p>PIPE AND FITTINGS (SHALL BE ONE OF THE FOLLOWING):</p> <ul style="list-style-type: none"><li>• ASTM A 53, A795 OR A135 SCHEDULE 40 STEEL PIPE WITH CUT-GROOVED ENDS; UL 213 GROOVED-END FITTINGS; UL 213 GROOVED-END PIPE COUPLINGS; AND GROOVED JOINTS.</li><li>• ASTM A 53, A795 OR A135 SCHEDULE 40 STEEL PIPE WITH FLAM ENDS; ASTM A 234A 234M AND ASME B16.9 WELDING FITTINGS; AND WELDING JOINTS.</li></ul>
<p>STANDARD-PRESSURE WET-PIPE WATER-BASED FIRE SUPPRESSION APPLICATIONS:</p> <ul style="list-style-type: none"><li>• WET-PIPE (SPRINKLER)</li></ul> <p>PIPE AND FITTINGS (SHALL BE ONE OF THE FOLLOWING):</p> <ul style="list-style-type: none"><li>• ASTM A 53, A795 OR A135 SCHEDULE 40 STEEL PIPE WITH THREADED ENDS; UNCOATED ASME B16.4 CAST IRON THREADED FITTINGS; AND THREADED JOINTS.</li><li>• ASTM A 53, A795 OR A135 SCHEDULE 40 STEEL PIPE WITH CUT-GROOVED ENDS; UL 213 GROOVED-END FITTINGS; UL 213 GROOVED-END PIPE COUPLINGS; AND GROOVED JOINTS.</li></ul>
<p>GROOVED-JOINT FITTINGS AND COUPLINGS</p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• ANVIL INTERNATIONAL, INC.</li><li>• TYCO FIRE &amp; BUILDING PRODUCTS LP.</li><li>• VICTAULIC COMPANY.</li></ul>
<p><b>STEEL WELDED OUTLET FITTINGS</b></p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• ANVIL INTERNATIONAL, INC.</li><li>• VICTAULIC COMPANY.</li></ul>
<p><b>SPECIALTY FIRE-PROTECTION PIPE FITTINGS</b></p> <p>FLEXIBLE SPRINKLER CONNECTIONS:</p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• FLEHEAD INDUSTRIES, INC.</li><li>• VICTAULIC COMPANY.</li></ul> <p>STANDARD: UL 1474.</p>
<p>INSPECTOR'S TEST FITTINGS:</p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• AGF MANUFACTURING INC.</li><li>• RELIABLE AUTOMATIC SPRINKLER CO., INC.</li><li>• TYCO FIRE &amp; BUILDING PRODUCTS LP.</li><li>• VICTAULIC COMPANY.</li></ul> <p>STANDARD: UL'S "FIRE PROTECTION EQUIPMENT DIRECTORY", CATEGORY VEHZ.</p>
<p><b>SPRINKLERS</b></p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• RELIABLE AUTOMATIC SPRINKLER CO., INC.</li><li>• TYCO FIRE &amp; BUILDING PRODUCTS LP.</li><li>• VICTAULIC COMPANY.</li><li>• WIKING CORPORATION.</li></ul> <p>UNLESS OTHERWISE INDICATED OR REQUIRED BY APPLICATION, SPRINKLER PRESSURE RATING SHALL BE 175 PSIG.</p> <p>UNLESS OTHERWISE INDICATED OR REQUIRED BY APPLICATION, SPRINKLER K-FACTOR AND THERMAL SENSITIVITY SHALL COMPLY WITH THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• LIGHT HAZARD: QUICK RESPONSE, MINIMUM 5.6 K-FACTOR.</li><li>• ORDINARY HAZARD: QUICK RESPONSE, MINIMUM 8.0.</li><li>• EXTRA HAZARD: STANDARD RESPONSE, MINIMUM 8.0.</li></ul> <p>UNLESS OTHERWISE INDICATED OR REQUIRED BY APPLICATION, SPRINKLERS SHALL BE NFPA 13 ORDINARY TEMPERATURE CLASSIFICATION.</p>
<p>SPRINKLERS SHALL BE HIGHER TEMPERATURE CLASSIFICATION IN ACCORDANCE WITH NFPA 13 FOR SPECIFIC LOCATIONS INCLUDING, BUT NOT LIMITED TO:</p> <ul style="list-style-type: none"><li>• STEAM EQUIPMENT AND HEATING DUCTS.</li><li>• SKYLIGHTS AND DISPLAY WINDOWS.</li><li>• CONCEALED BUILDING SPACES, ATTICS, PEAKED ROOFS, AND METAL ROOFS.</li><li>• COMMERCIAL COOKING EQUIPMENT.</li><li>• RESIDENTIAL AREAS.</li></ul> <p>SPRINKLERS SHALL BE HIGH TEMPERATURE CLASSIFICATION FOR EXTRA HAZARD OR HIGH-PILE/RACK STORAGE OCCUPANCIES WHERE CORRESPONDING NFPA 13 HIGH TEMPERATURE SPRINKLER DESIGN CRITERIA IS UTILIZED FOR HYDRAULIC CALCULATIONS.</p>
<p>CONCEALED SPRINKLER COVER-PLATES: FLAT, NON-PERFORATED, FOR CEILING- AND WALL-MOUNT. FINISHES: POLISHED CHROME-PLATED, PAINTED, AND SPECIAL APPLICATION, SEISMIC APPLICATIONS; OVERSIZED TO CONCEAL SPRINKLER CEILING PENETRATION INCLUDING REQUIRED 1 INCH ANNUAL CLEARANCE AROUND PENETRATING SPRINKLER ASSEMBLY.</p>
<p><b>SPRINKLER GUARDS:</b></p> <p>STANDARD: LISTED FOR USE WITH ATTACHED SPRINKLER.</p> <p>TYPE: SINGLE-PIECE, WIRE CAGE WITH FASTENING DEVICE FOR ATTACHMENT TO SPRINKLER.</p>
<p>FINISH INDICATIONS SHALL APPLY UNIFORMLY TO SPRINKLER ASSEMBLY COMPONENTS EXPOSED TO VIEW INCLUDING FRAME, ESCUTCHEON, AND COVER PLATE.</p>
<p>SPRINKLERS INSTALLED IN CEILINGS SHALL BE: UL 199, STANDARD SPRAY, CONCEALED-PENDENT, WHITE FINISH.</p>

PART 2 - PRODUCTS
<p>SPRINKLERS IN OPEN CEILING AREAS SHALL BE: UL 199, STANDARD SPRAY, UPRIGHT, BRONZE FINISH.</p>
<p><b>PIPE HANGERS AND FASTENERS</b></p> <p>PIPE HANGERS:</p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• TOLCO</li><li>• COOPER B-LINE</li></ul> <p>ANVIL INTERNATIONAL</p> <p>GENERAL: STEEL, GALVANIZED ADJUSTABLE BAND TYPE AND CLEVIS. BAND TYPE HANGERS USED ON CPVC PIPING SHALL HAVE FLARED OR BEVELED EDGES.</p>
<p>HANGER ROD: CARBON STEEL, GALVANIZED.</p>
<p><b>ATTACHMENTS TO STEEL:</b></p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• TOLCO</li><li>• COOPER B-LINE</li></ul> <p>ANVIL INTERNATIONAL</p> <p>GENERAL: CARBON OR MALLEABLE STEEL, GALVANIZED BEAM CLAMP.</p>
<p><b>DROP IN ANCHORS:</b></p> <p>MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:</p> <ul style="list-style-type: none"><li>• HILTI CORP.</li><li>• ITW RED HEAD</li></ul> <p>ANVIL INTERNATIONAL</p> <p>GENERAL: UL 203, MILD STEEL WITH ZINC PLATING.</p>

PART 3 - EXECUTION
<p><b>PREPARATION</b></p> <p>SCHEDULE AND CONDUCT WATER SUPPLY FLOW TESTS PROMPTLY TO ESTABLISH AVAILABLE WATER SUPPLY FLOW AND PRESSURE CHARACTERISTICS.</p> <p>SCHEDULE AND SEQUENCE WATER SUPPLY FLOW TESTS AND SHOP DRAWING PREPARATION SUCH THAT THE FLOW TEST DATE IS NO MORE THAN TWELVE (12) MONTHS PRIOR TO THE SHOP DRAWING SUBMITTAL DATE.</p>
<p>TESTS SHALL BE CONDUCTED DURING TIME OF SEASONAL AND DAILY PEAK DEMAND BASED UPON REVIEW WITH LOCAL WATER AUTHORITY.</p> <p>WHERE TESTING DURING TIME OF PEAK DEMAND IS NOT PERMITTED OR FEASIBLE, OBTAIN HISTORICAL DATA REGARDING SEASONAL AND DAILY SYSTEM PRESSURE VARIATIONS FROM LOCAL WATER AUTHORITY.</p>
<p><b>TECHNICAL DESIGN AND LAYOUT</b></p> <p>GENERAL:</p> <p>ROLES AND RESPONSIBILITIES SHALL BE AS SET FORTH IN NSPE POSITION STATEMENT NO. 1740 "SPRINKLER JOINT POSITION OF THE ENGINEER AND THE ENGINEERING TECHNICIAN DESIGNING THE FIRE PROTECTION SYSTEM," AVAILABLE AT NSPE.ORG, AS APPLIED TO THE WORK. THE CONTRACT DOCUMENTS HAVE BEEN PREPARED BY THE "ENGINEER" AND SHOP DRAWINGS REQUIRED BY THIS SECTION OF THE WORK ARE PREPARED BY THE "CERTIFIED ENGINEERING TECHNICIAN."</p> <p>AS THE CERTIFIED ENGINEERING TECHNICIAN, PREPARE SHOP DRAWINGS INDICATING SYSTEM LAYOUT AND SIZING IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO:</p> <ul style="list-style-type: none"><li>• EVALUATION OF WATER SUPPLY ADEQUACY</li><li>• DETAILED SIZING AND LAYOUT OF PIPING AND APPURTENANCES INCLUDING FEED-MAINS, RISERS, CROSS MAINS, BRANCH LINES, VALVES, DRAINAGE PROVISIONS, HANGERS, RESTRAINTS, SUPPORTS, AND SIMILAR.</li><li>• DETAILED SPRINKLER LAYOUTS.</li><li>• HYDRAULIC CALCULATIONS.</li><li>• INSTALLATION DETAILS FOR THE SPECIFIC EQUIPMENT BEING FURNISHED.</li></ul>
<p>DESIGN AND INSTALLATION STANDARD(S): COMPLY WITH PART 2 ARTICLE "PERFORMANCE REQUIREMENTS".</p> <p>COMPLY WITH THE PERFORMANCE REQUIREMENTS INDICATED BY THE CONTRACT DOCUMENTS WHERE SUCH REQUIREMENTS ARE MORE STRINGENT THAN THOSE OF THE DESIGN AND INSTALLATION STANDARD(S); OTHERWISE, COMPLY WITH THE PERFORMANCE REQUIREMENTS OF THE DESIGN AND INSTALLATION STANDARD(S).</p>
<p><b>WATER SUPPLY EVALUATION:</b></p> <p>EVALUATE WATER SUPPLY FLOW TEST DATA OBTAINED AS PART OF THE WORK OF THIS SECTION AGAINST HISTORICAL DATA OBTAINED FROM THE WATER AUTHORITY AND, WHERE INCLUDED, WATER SUPPLY FLOW TEST DATA INDICATED BY THE CONTRACT DOCUMENTS.</p> <p>PROMPTLY REPORT IN WRITING SIGNIFICANT DEVIATIONS BETWEEN WATER SUPPLY TEST RESULTS OBTAINED AS PART OF THE WORK OF THIS SECTION AND THOSE INDICATED BY THE CONTRACT DOCUMENTS OR HISTORICAL DATA; AND ANTICIPATED SYSTEM DESIGN IMPACTS.</p>
<p>COMPLETE THE EVALUATION OF WATER SUPPLY FLOW TEST DATA PRIOR TO PREPARING SHOP DRAWINGS AND ASSOCIATED HYDRAULIC CALCULATIONS.</p>
<p>DESIGN AND LAYOUT FIRE SUPPRESSION PIPING TO SATISFY PERFORMANCE REQUIREMENTS:</p> <p>RECTILINEAR FIRE SUPPRESSION PIPING ARRANGEMENT WITH RESPECT TO BUILDING PARTITIONS AND STRUCTURAL ELEMENTS.</p> <p>CONCEALED FIRE SUPPRESSION PIPING INSTALLATION THROUGHOUT FINISHED SPACES AND MAXIMUM HEADROOM BENEATH EXPOSED FIRE SUPPRESSION PIPING IN AREAS EXPOSED TO STRUCTURE ABOVE.</p>
<p>NO FIRE SUPPRESSION PIPING WITHIN ELECTRICAL, INFORMATION TECHNOLOGY, OR SIMILAR SPACES OTHER THAN BRANCH PIPING SERVING SPRINKLERS PROTECTING SUCH ELECTRICAL, INFORMATION TECHNOLOGY, OR SIMILAR SPACE SPACES.</p>
<p>NO FIRE SUPPRESSION PIPING DIRECTLY ABOVE ELECTRICAL EQUIPMENT, ELECTRICAL PANELS, INFORMATION TECHNOLOGY EQUIPMENT, OR SIMILAR ENERGIZED EQUIPMENT.</p>
<p>NO FIRE SUPPRESSION PIPING WITHIN EXIT ENCLOSURES EXCEPT STANDPIPES SUPPLYING HOSE VALVES WITHIN THE EXIT ENCLOSURE, SPRINKLER ZONE CONTROL ASSEMBLIES AND PIPING IMMEDIATELY DOWNSTREAM, BRANCH PIPING SUPPLYING SPRINKLERS WITHIN THE EXIT ENCLOSURE, AND ASSOCIATED DRAIN CONNECTIONS AND RISERS.</p>
<p>NO FIRE SUPPRESSION PIPING WITHIN OR IN PROXIMITY TO HAZARDOUS MATERIALS STORAGE OR PROCESSING OPERATIONS OTHER THAN BRANCH PIPING SERVING SPRINKLERS PROTECTING SUCH HAZARDOUS MATERIALS STORAGE OR PROCESSING OPERATIONS.</p>
<p>FIRE SUPPRESSION PIPING SUPPORTED FROM PRIMARY BUILDING STRUCTURAL ELEMENTS OR APPROVED SUPPLEMENTAL SUPPORTS CAPABLE OF SUPPORTING THE ATTACHED LOAD.</p>
<p>FIRE SUPPRESSION PIPING CROSSING BUILDING EXPANSION JOINTS PROVIDED WITH EXPANSION FITTINGS APPROPRIATE TO THE JOINT DESIGN DEFLECTION VALUE.</p>
<p>FIRE SUPPRESSION PIPING PROTECTED AGAINST DAMAGE WHERE SUBJECT TO EARTHQUAKES.</p>
<p>FIRE SUPPRESSION PIPING PROTECTED AGAINST DAMAGE WHERE SUBJECT TO FREEZING WITHOUT THE USE OF HEAT-TRACE CABLES UNLESS INDICATED OTHERWISE.</p>
<p>FIRE SUPPRESSION PIPING ARRANGED SUCH THAT PIPING DRAINS BACK TO MAIN DRAINS AND DRAIN RISERS WITHOUT THE USE OF AUXILIARY DRAINS.</p>

PART 3 - EXECUTION
<p>HYDRAULICALLY DESIGN WATER-BASED FIRE SUPPRESSION SYSTEM PIPING USING THE HAZEN-WILLIAMS OR DARCY-WEISBACH FORMULAS IN ACCORDANCE WITH THE DESIGN AND INSTALLATION STANDARD(S).</p> <ul style="list-style-type: none"><li>• SPRINKLER SYSTEM OCCUPANCY HAZARD AND DISCHARGE CRITERIA: COMPLY WITH CRITERIA INDICATED BY DRAWINGS AS APPROVED BY AUTHORITIES HAVING JURISDICTION.</li><li>• CALCULATION AREAS SHALL NOT BE REDUCED FOR QUICK RESPONSE SPRINKLER APPLICATIONS.</li><li>• STANDPIPE SYSTEM FLOW AND PRESSURE CRITERIA: COMPLY WITH CRITERIA INDICATED BY DRAWINGS AS APPROVED BY AUTHORITIES HAVING JURISDICTION.</li><li>• MARGIN OF SAFETY BETWEEN AVAILABLE AND REQUIRED PRESSURE AT DESIGN FLOW RATE: 10 PSI MINIMUM, INCLUDING LOSSES THROUGH WATER SERVICE WELDED VALVES, AND BACKFLOW PREVENTERS.</li><li>• FOR FIRE PUMP APPLICATIONS, SUBMIT FIRE PUMP PRODUCT DATA INCLUDING MANUFACTURER'S CHARACTERISTIC PUMP CURVE PRIOR TO PREPARING HYDRAULIC CALCULATIONS.</li><li>• USE FLOW AND PRESSURE DATA POINTS FROM THE SUBMITTED MANUFACTURER'S CHARACTERISTIC FIRE PUMP CURVE WHEN PREPARING HYDRAULIC CALCULATIONS.</li><li>• FOR DIRECT-ACTING PRESSURE REGULATING VALVE APPLICATIONS, INCLUDE MANUFACTURER'S PRESSURE LOSS CHART AND INDICATE THE CALCULATED FLOW THROUGH THE VALVE AND RESULTING PRESSURE LOSS.</li><li>• FOR APPLICATIONS WITH SYSTEM PRESSURES GREATER THAN 175 PSIG, PREPARE A CALCULATION AT MAXIMUM STATIC PRESSURE TO IDENTIFY BUILDING FLOOR ELEVATIONS REQUIRING PRESSURE REGULATING VALVES.</li><li>• RISER DIAGRAM: INDICATE MAXIMUM STATIC PRESSURE AT EACH FLOOR ELEVATION INCLUDING INLET AND OUTLET PRESSURE AT PRESSURE REGULATING VALVES WHERE PROVIDED.</li><li>• INCLUDE PRESSURE LOSSES ASSOCIATED WITH SPECIALTY FITTINGS AND ASSEMBLIES SUCH AS SEISMIC SEPARATION ASSEMBLIES AND FLEXIBLE SPRINKLER CONNECTIONS.</li></ul>
<p><b>HYDRAULIC CALCULATIONS FOR SPRINKLER PIPING:</b></p> <ul style="list-style-type: none"><li>• SPRINKLER MAINS INCLUDING ZONE CONTROL AND RISER VALVE ASSEMBLIES SHALL BE NO SMALLER THAN AS INDICATED BY THE DRAWINGS.</li><li>• HYDRAULICALLY DETERMINE PIPE SIZES FOR SPRINKLER BRANCH PIPING.</li><li>• SPRINKLER ZONE CONTROL AND RISER VALVE ASSEMBLIES SHALL BE NO SMALLER THAN AS INDICATED BY THE DRAWINGS.</li><li>• HYDRAULICALLY DETERMINE PIPE SIZES FOR SPRINKLER PIPING DOWNSTREAM OF ZONE CONTROL ASSEMBLIES.</li><li>• WHERE SPRINKLER SYSTEMS ARE SUPPLIED BY TWO (2) RISERS, PIPE SIZING SHALL BE BASED UPON SUPPLY FROM THE HYDRAULICALLY MOST REMOTE RISER ONLY.</li><li>• INCLUDE ADDITIONAL HYDRAULIC CALCULATIONS AS REQUIRED WHEN THE HYDRAULICALLY MOST REMOTE AREA IS NOT CLEAR (NOT THE GEOMETRICALLY MOST REMOTE).</li><li>• INCLUDE A MINIMUM OF THREE (3) CALCULATION AREAS FOR SUCH THAT THE SYSTEM DESIGN THAT THE HYDRAULICALLY MOST DEMANDING AREA IS IDENTIFIED.</li><li>• DO NOT UTILIZE NFPA 13 AREA REDUCTION FOR QUICK RESPONSE SPRINKLERS UNLESS OTHERWISE INDICATED.</li></ul>
<p><b>FLEXIBLE SPRINKLER CONNECTIONS:</b></p> <p>HYDRAULIC CALCULATIONS INCLUDE PRESSURE LOSSES THROUGH FLEXIBLE SPRINKLER CONNECTIONS. INDICATE INSTALLATION PARAMETERS FOR MAXIMUM HOSE LENGTH, MAXIMUM BEND RADIUS, MAXIMUM QUANTITY OF BENDS, AND FITTING PATTERNS ASSOCIATED WITH THE CALCULATED PRESSURE LOSS.</p> <p>SHOP DRAWINGS: INCLUDE LOCATIONS OF FLEXIBLE SPRINKLER CONNECTIONS WITH LIMITING INSTALLATION PARAMETERS AS DETERMINED VIA HYDRAULIC CALCULATIONS CLEARLY INDICATED.</p>
<p><b>ON-SITE AS-BUILT DRAWINGS</b></p> <p>AS WORK PROGRESSES AND FOR THE DURATION OF THE CONSTRUCTION OPERATIONS, MAINTAIN COMPLETE AND SEPARATE SET OF PRINTS OF SHOP DRAWINGS (WORKING PLANS) AT PROJECT SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL DEVIATIONS FROM REVIEWED SHOP DRAWINGS (WORKING PLANS) CLEARLY AND ACCURATELY. INCLUDE ACTUAL LOCATIONS OF EXISTING UTILITIES IF THEY DIFFER FROM DESIGN DOCUMENTS. RECORD VALVE TAG DESIGNATIONS AS INSTALLED.</p>
<p><b>EXAMINATION</b></p> <p>EXAMINE SLEEVED PENETRATIONS THROUGH CONCRETE AND STRUCTURAL PENETRATIONS THROUGH STEEL AND VERIFY THAT THEY ARE SUITABLE FOR INTENDED PIPING INSTALLATION.</p> <p>EXAMINE WALLS AND PARTITIONS AND VERIFY THAT THEY ARE SUITABLE FOR INSTALLATION OF PIPING, CABINETS, INLET CONNECTIONS AND SIMILAR PRODUCTS.</p> <p>EXAMINE AREAS TO CONTAIN STANDPIPE HOSE OUTLETS INCLUDING STAIRWELLS AND VESTIBULES AND VERIFY THAT DOOR SWINGS OR OTHER OBSTRUCTIONS WILL NOT INTERFERE WITH THE INSTALLATION OR FUTURE OPERATION OF HOSE VALVES.</p>
<p>REPORT CONFLICTS WITH PROPOSED SOLUTIONS. PROCEED WITH INSTALLATION AFTER CONFLICTS HAVE BEEN RESOLVED.</p>
<p>FURNISH DRAIN HOSE ASSEMBLY FOR CONDUCTING SPRINKLER DRAIN OUTLET DISCHARGE-TO-GRADE AWAY FROM BUILDING FAÇADE AND ADJACENT HARD-SCAPE SUBJECT TO STAIRWELL, INCLUDING:</p> <ul style="list-style-type: none"><li>• BRASS HEX NIPPLE FITTING, FURNISH ONE FITTING FOR EACH DRAIN OUTLET FITTING INCLUDING:</li><li>• BRASS SWIVEL HOSE ADAPTER FITTINGS FOR CONNECTION TO 2 1/2 IN HOSE COUPLING; FURNISH ONE ADAPTER FITTING FOR EACH HEX NIPPLE OUTLET SIZE USED.</li><li>• INDUSTRIAL DOUBLE-JACKET EPDM RUBBER-LINED INTERIOR / EXTERIOR FIRE HOSE WITH HOSE-COUPLING ENDS: 2 1/2 IN, 75 FT.</li><li>• GALVANIZED-STEEL, WALL-MOUNT, HOSE AND COUPLING STORAGE RACK, MOUNT ADJACENT TO MAIN SYSTEM RISER.</li></ul>
<p><b>PIPING INSTALLATION</b></p> <p>LOCATIONS AND ARRANGEMENTS: DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING, INSTALL PIPING AS INDICATED.</p> <p>DEVIATIONS FROM APPROVED SHOP DRAWINGS REQUIRE WRITTEN APPROVAL FROM AUTHORITIES HAVING JURISDICTION, FILE WRITTEN APPROVAL WITH ARCHITECT BEFORE DEVIATING FROM APPROVED WORKING PLANS.</p>
<p>INSTALL HANGERS, FASTENERS, AND STRUCTURAL ATTACHMENTS:</p> <ul style="list-style-type: none"><li>• NPS 6 AND LARGER: USE CLEVIS TYPE HANGERS ONLY.</li><li>• NPS 4 AND SMALLER: USE CLEVIS OR ADJUSTABLE BAND TYPE HANGERS.</li><li>• INSTALL BEAM CLAMPS WITH RETAINING STRAPS REGARDLESS OF SEISMIC CLASSIFICATION.</li><li>• POWDER-DRIVEN OR PRE-EXPANDED INSERTS SHALL NOT BE USED.</li><li>• THREADED CONNECTIONS SHALL NOT BE USED FOR ATTACHMENTS TO CONCRETE.</li></ul>
<p>WHERE APPLICABLE INSTALL SEISMIC RESTRAINTS AND FLEXIBLE COUPLINGS IN ACCORDANCE WITH NFPA 13.</p>
<p>INSTALL PROVISIONS TO ACCOMMODATE BUILDING EXPANSION JOINTS. PROVIDE FOR EXPANSION AT BUILDING EXPANSION JOINTS WITH ASSEMBLIES LISTED FOR THAT PURPOSE. COORDINATE THE MAXIMUM VALUE OF BUILDING DEFLECTION WITH THE APPROPRIATE STRUCTURAL SECTION OF THE WORK.</p>
<p>INSTALL SLEEVES, SLEEVE-SEALS, FIRE-STOPPING, AND PIPE ESCUTCHEONS. HOLE-CUT FITTINGS: WHERE USED, USE TWO-PIECE CAST TYPE FITTINGS UTILIZING STRAPS, U-BOLTS, OR SIMILAR ARE NOT PERMITTED.</p>
<p>INSTALL WATER-BASED FIRE SUPPRESSION PIPING WITH DRAINS FOR COMPLETE SYSTEM DRAINAGE.</p>
<p>INSTALL WATER-BASED FIRE SUPPRESSION PIPING SUCH THAT PIPING DRAINS BACK TO MAIN DRAINS AND DRAIN RISERS WITHOUT THE USE OF AUXILIARY DRAINS.</p>
<p>INSTALL "INSPECTOR'S TEST CONNECTIONS" IN SPRINKLER SYSTEM PIPING, COMPLETE WITH SHUTOFF VALVE, AND SIZED AND LOCATED ACCORDING TO NFPA 13.</p>
<p>INSTALL AUTOMATIC AIR RELEASE VENTS.</p>

PART 3 - EXECUTION
<p><b>SPRINKLER INSTALLATION</b></p> <p>INSTALL SPRINKLERS IN SUSPENDED CEILINGS IN CENTER OF ACOUSTICAL CEILING PANELS WITH NO VISIBLE DEVIATION.</p> <p>DO NOT INSTALL PENDENT OR SIDEWALL, WET-TYPE SPRINKLERS IN AREAS SUBJECT TO FREEZING. INSTALL DRY-TYPE SPRINKLERS WITH WATER SUPPLY FROM HEATED SPACE.</p> <p>WHERE PENDENT SPRINKLERS ARE INDICATED FOR DRY-PIPE OR PREACTION SPRINKLER SYSTEMS, USE DRY-TYPE SPRINKLERS.</p> <p>PIPING USED FOR SPRINKLER CONNECTION RETURN-BENDS, DROP-NIPPLES, AND RISER-SPRINGS SHALL BE NO SMALLER THAN NPS 1.</p> <p>SUPPLY PENDENT SPRINKLERS USING A RETURN-BEND PIPING ARRANGEMENT WITH CONNECTION AT THE TOP OF THE BRANCH PIPE TO PREVENT THE ACCUMULATION OF PIPING CORROSION, SCALE, AND SEDIMENT AT THE SPRINKLER.</p> <p>INSTALL SPRINKLERS SUCH THAT COVER PLATE OR ESCUTCHEON IS FLUSH AND UNIFORM WITH RESPECT TO PENETRATED CEILING OR WALL FINISH AND PIPING, LIGHTING, CABLE TRAYS, AND FLOATING ORIMENTAL CEILINGS. ADJUST SPRINKLER LOCATIONS AND/OR ADD SPRINKLERS AS A UNIT-COST ALLOWANCE WHERE INSTALLATIONS ARE NOT COORDINATED AND OBSTRUCTIONS CANNOT BE RELOCATED TO ACCOMMODATE SPRINKLERS AS INSTALLED.</p> <p>ADJUSTABLE SPRINKLER DROP NIPPLES ARE NOT PERMITTED.</p> <p>ADJUSTABLE SPRINKLER DROP NIPPLES ARE NOT PERMITTED.</p> <p>INSTALL SPRINKLERS IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 13 (AND FM GLOBAL) REGARDING OBSTRUCTIONS TO SPRINKLER DISCHARGE. CONSIDER ALL OBSTRUCTIONS SUCH AS STRUCTURAL ELEMENTS, DUCTWORK, PIPING, LIGHTING, CABLE TRAYS, AND FLOATING ORIMENTAL CEILINGS. ADJUST SPRINKLER LOCATIONS AND/OR ADD SPRINKLERS AS A UNIT-COST ALLOWANCE WHERE INSTALLATIONS ARE NOT COORDINATED AND OBSTRUCTIONS CANNOT BE RELOCATED TO ACCOMMODATE SPRINKLERS AS INSTALLED.</p> <p>COORDINATE THE INSTALLATION OF SOLID BARRIERS BENEATH "NON FLAT," "NON SOLID," OR "NON CONTINUOUS" OBSTRUCTIONS REQUIRED BY FM GLOBAL WITH THE CONSTRUCTION MANAGER.</p>
<p>PROVIDE AND INSTALL GUARDS ON SPRINKLERS SUSCEPTIBLE TO MECHANICAL DAMAGE AT A MINIMUM PROVIDE GUARDS FOR PENDENT AND UPRIGHT SPRINKLERS LOCATED IN THE FOLLOWING LOCATIONS: ELECTRICAL ROOMS AND CLOSETS, NEAR ADJACENT TO CEILING MOUNTED EQUIPMENT REQUIRING MAINTENANCE, BENEATH OBSTRUCTIONS SUCH AS DUCTWORK OR CATWALKS, WALK-IN FREEZERS OR COLD ROOMS, AND BENEATH STAIR LANDINGS.</p> <p>WHERE NOT PROVIDED UNDER OTHER SECTIONS OF THE WORK, PROVIDE AND INSTALL NON-COMBUSTIBLE Baffles BETWEEN SPRINKLERS LESS THAN 6 FEET APART TO PREVENT COLD-SOLDERING.</p>
<p>INSTALL FLEXIBLE SPRINKLER CONNECTIONS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.</p>
<p>INSTALL EACH FLEXIBLE SPRINKLER CONNECTION ACCORDING TO THE CRITERIA AND LIMITATIONS ESTABLISHED BY THE SUBMITTED PRODUCT DATA. SHOP DRAWINGS AND HYDRAULIC CALCULATIONS WITH RESPECT TO QUANTITY AND TYPE OF FITTING CONNECTIONS, MAXIMUM HOSE LENGTH, MAXIMUM QUANTITY OF BENDS, AND MINIMUM BEND RADIUS.</p>
<p>BRANCH CONNECTIONS SHALL BE MADE A MINIMUM 45 DEGREES FROM HORIZONTAL, WHERE CONNECTIONS FROM THE SIDE OR BOTTOM OF BRANCH ARE REQUIRED DUE TO COORDINATION, LOCATIONS SHALL BE CLEARLY INDICATED OR SHOP DRAWINGS AND APPROVED BY THE ENGINEER.</p>
<p><b>IDENTIFICATION</b></p> <p>INSTALL LABELING AND PIPE MARKERS ON EQUIPMENT AND PIPING ACCORDING TO NFPA 13 FOR IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT.</p>
<p><b>FIELD QUALITY CONTROL</b></p> <p>FLUSH, TEST, AND INSPECT SPRINKLER SYSTEMS ACCORDING TO APPLICABLE NFPA "SYSTEMS ACCEPTANCE" CHAPTER.</p> <p>HYDROSTATICALLY TEST SYSTEM PIPING IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.</p> <p>INSPECT SYSTEM COMPONENTS IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. ADJUST SETTINGS OR REPLACE DAMAGED OR MALFUNCTIONING COMPONENTS AND RETEST UNTIL PROPER OPERATION IS ACHIEVED.</p> <p>INSPECT AND ADJUST ALARM AND DELAY SETTINGS OF ALARM DEVICES.</p> <p>FUNCTIONALLY TEST WATER-BASED FIRE SUPPRESSION SYSTEMS, INCLUDING REQUIRED FULL-FLOW TESTS, IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. COMBINE TESTS TO CONSERVE WATER. CORRECT DEFICIENCIES AND RETEST SATISFACTORY RESULTS ARE ACHIEVED.</p>
<p>WATER-BASED FIRE SUPPRESSION SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.</p>
<p>PREPARE TEST AND INSPECTION REPORTS. USE NFPA "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE" FORMAT.</p>
<p><b>CLEANING</b></p> <p>CLEAN DIRT AND DEBRIS FROM SYSTEM COMPONENTS. REMOVE AND REPLACE SPRINKLERS WITH PAINT OTHER THAN FACTORY FINISH OR SIMILAR.</p>
<p><b>DEMONSTRATION</b></p> <p>TRAIN OWNER'S MAINTENANCE PERSONAL TO ADJUST, OPERATE, AND MAINTAIN WATER-BASED FIRE SUPPRESSION SYSTEMS.</p>

# CROCKFORDS - RESORTS WORLD CATSKILLS

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INSTALL FLEXIBLE SPRINKLER CONNECTIONS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

INSTALL EACH FLEXIBLE SPRINKLER CONNECTION ACCORDING TO THE CRITERIA AND LIMITATIONS ESTABLISHED BY THE SUBMITTED PRODUCT DATA. SHOP DRAWINGS AND HYDRAULIC CALCULATIONS WITH RESPECT TO QUANTITY AND TYPE OF FITTING CONNECTIONS, MAXIMUM HOSE LENGTH, MAXIMUM QUANTITY OF BENDS, AND MINIMUM BEND RADIUS.

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### IDENTIFICATION

INSTALL LABELING AND PIPE MARKERS ON EQUIPMENT AND PIPING ACCORDING TO NFPA 13 FOR IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT.

### FIELD QUALITY CONTROL

FLUSH, TEST, AND INSPECT SPRINKLER SYSTEMS ACCORDING TO APPLICABLE NFPA "SYSTEMS ACCEPTANCE" CHAPTER.

HYDROSTATICALLY TEST SYSTEM PIPING IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.

INSPECT SYSTEM COMPONENTS IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. ADJUST SETTINGS OR REPLACE DAMAGED OR MALFUNCTIONING COMPONENTS AND RETEST UNTIL PROPER OPERATION IS ACHIEVED.

INSPECT AND ADJUST ALARM AND DELAY SETTINGS OF ALARM DEVICES.

FUNCTIONALLY TEST WATER-BASED FIRE SUPPRESSION SYSTEMS, INCLUDING REQUIRED FULL-FLOW TESTS, IN ACCORDANCE WITH THE APPLICABLE NFPA WATER-BASED FIRE SUPPRESSION SYSTEM DESIGN AND INSTALLATION STANDARDS. COMBINE TESTS TO CONSERVE WATER. CORRECT DEFICIENCIES AND RETEST SATISFACTORY RESULTS ARE ACHIEVED.

WATER-BASED FIRE SUPPRESSION SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.

PREPARE TEST AND INSPECTION REPORTS. USE NFPA "CONTRACTOR'S MATERIAL AND TEST CERTIFICATE" FORMAT.

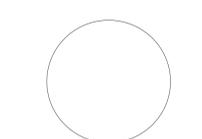
### CLEANING

CLEAN DIRT AND DEBRIS FROM SYSTEM COMPONENTS. REMOVE AND REPLACE SPRINKLERS WITH PAINT OTHER THAN FACTORY FINISH OR SIMILAR.

### DEMONSTRATION

TRAIN OWNER'S MAINTENANCE PERSONAL TO ADJUST, OPERATE, AND MAINTAIN WATER-BASED FIRE SUPPRESSION SYSTEMS.

## BIDDING & CONSTRUCTION 07/06/2022



ISSUE	07/06/2022
JOB	30860.00
DRAWN	Author
SCALE	NONE
REVISIONS	

## FIRE PROTECTION SPECIFICATIONS

# FP-3