SECTION 13900 - FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Automatic sprinkler systems.
2. Fire protection sprinkler piping work with feed and cross main piping, branch line piping, test valves, test connections, and sprinklers.
3. Flow indicators, valves, gauges, alarms, drain piping, and supervisory switches.
4. System design, installation and certification.

B. Related Requirements:
1. Appendix A – Products and Work By Owner or Separate Contractor.
   a. General procedures related to Owner furnished products and transport, handle, store and protect products.

1.2 REFERENCES

A. ASTM International (ASTM):
1. ASTM A 47 - Ferritic Malleable Iron Castings
2. ASTM A 53 - Pipe, Steel, Black And Hot-Dipped, Zinc-Coated, Welded And Seamless
3. ASTM A 135 - Electric-Resistance-Welded Steel Pipe
4. ASTM A 234 - Piping Fittings Of Wrought Carbon Steel and Alloy Steel For Moderate And High Temperature Service
5. ASTM A 536 - Ductile Iron Castings
6. ASTM A 795 - Black And Hot-Dipped Zinc-Coated (Galvanized) Welded And Seamless Steel Pipe For Fire Protection Use
7. ASTM A 865 - Threaded Couplings, Steel, Black Or Zinc-Coated (Galvanized) Welded Or Seamless, For Use In Steel Pipe joints

B. American Society of Mechanical Engineers (ASME):
1. ASME B 16.1 - Cast Iron Pipe Flanges And Flanged Fittings
2. ASME B 16.3 - Malleable Iron Threaded Fittings
3. ASME B 16.4 - Gray Iron Threaded Fittings
4. ASME B 16.5 - Pipe Flanges And Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
5. ASME B 16.9 - Factory-Made Wrought Buttwelding Fittings
6. ASME B 16.11 - Forged Fittings, Socket-Welding And Threaded

C. Factory Mutual System (FM):
1. Approval Guide, Latest edition.

D. National Fire Protection Association (NFPA):
1. NFPA 13, 2013 Edition - Installation of Sprinkler Systems; Or, as shown on the Fire Protection drawings and as required by the AHJ.

E. Underwriters Laboratory (UL):
1. UL Fire Protection Directory – Latest Edition.

1.3 SUBMITTALS

A. Authorities Having Jurisdiction (AHJ)
1. Provide Deferred Submittals to AHJ per requirements of 01330. Drawings and calculations have not been

submitted to the AHJ for code compliance by Owner's Fire Protection Consultant.

a. Submit the following:
   1) Product data.
   2) Shop drawings.
   3) Additional data as may be required by NFPA 13 and Walmart's Fire Protection Consultant.

B. Submittal Procedure:
1. Reference Section 01330 for general submittal procedures. Conform to provisions of Section 01330 unless otherwise specified herein.
2. Within 21 days after award of prime contract, send submittals by email in PDF format to Walmart's Fire Protection Consultant as specified Section 01330. Allow 15 day turn-around on submittals sent to Walmart's Fire Protection Consultant.
   a. Fire Protection Consultant's electronic drawing files (i.e., DWG, DWF, PDF, etc.) will not be provided to the Contractor for the purpose of submittals nor will the Fire Protection Consultant assist with production of submittal information including shop drawings and material data.
   b. If the Contractor fails to submit a complete Fire Suppression submittal package within 21 days after award of contract, the Contractor shall pay the Owner $250.00 per day as liquidated damages and not as a penalty, until the fully completed Fire Suppression submittal package is received by Walmart's Fire Protection Consultant.
   c. Send a copy of the Letter of Transmittal sent with the submittals to the Architect indicating date of and content of transmittal.
3. Walmart's Fire Protection Consultant will review the electronic file submittal as an alternate to requirements of Section 01330. Obtain the electronic submittal procedure from Walmart's Fire Protection Consultant during the Pre-Construction Conference Call.
4. Within 21 days after Award of Contract by Walmart to Contractor, submit two copies of complete submittals to Authorities Having Jurisdiction if required by Walmart's Fire Protection Consultant. Coordinate submittal with Walmart's Fire Protection Consultant. Submit additional copies if required
5. Submittals shall be complete, accurate, and in full compliance with contract requirements for proper and timely approval.
6. Note: Material Data Sheets must only include the exact products and materials necessary to complete the scope of work shown on the contract documents. The contractor shall highlight or mark the specific items used for the product submitted. A cover sheet must also be provided on the material data submittals. Failure to follow this process will result in a rejected submittal.
7. Contractor shall respond to shop drawing review comments within 7 days of receipt.
8. Maintain two copies of approved documents on site.

C. Submittal Rejection:
1. Walmart's Fire Protection Consultant will reject submittals which do not comply with Contract Documents. If submittal is rejected by Walmart's Fire Protection Consultant for any reason, Walmart Stores, Inc., will back-charge the Contractor $200.00 via Change Order, to cover the processing costs of each subsequent review until submittal is approved. Submittal rejections include, but are not limited to, the following reasons:
   a. Design Issues: Incorrect densities, design areas, equipment sprinkler spacing, hose station missing, incomplete system design, etc. No changes in design area, number of sprinklers operating, pipe sizes, number of branch lines, and number of mains or deviation of water supply from that shown on the Contract Documents shall be approved by Walmart's Fire Protection Consultant. This is not intended to limit the Contractor from making minor modifications to system design for coordination purposes.
   b. Incorrect Water Flow Test Information: Failure to use the Walmart water test found on the Fire Protection Construction Documents. No other water flow test data is permitted for system design submittals to Walmart's Fire Protection Consultant.
   c. Incorrect Material: Do not propose pipe, sprinklers or backflow preventers not indicated in Contract Documents. Products not specified in contract documents are cause for rejection.
   d. Incorrect Valves: Do not propose OS&Y valves when wall PIV's are indicated in the Contract Documents.
2. Rejected submittals shall be revised and resubmitted until approved. Extension of time will not be allowed

for rejected submittals.

a. The Fire Suppression subcontractor shall revise and resubmit rejected submittals within 7 days of receipt of rejected submittals.
b. The Contractor shall verify that the Fire Sprinkler subcontractor has addressed all required revisions in the resubmittal.

1.4 Contract Closeout Submittals:

A. Submit the following under provisions of Section 01770.
1. Maintenance Data: Include components of system, servicing requirements, inspection data, and owner's manuals.
2. Training Requirements: Provide operational training to Walmart. Include system control operation, Fire Pump, (if provided), manual and abort functions, trouble procedures, auxiliary functions and emergency procedures.
3. Contractors Material Test Certificates: Provide Copies of all completed Underground, Overhead, and Fire Pump (if applicable) Contractor's Material Test Certificates. Note: All Material Test Certificates must be signed by both the Fire Sprinkler Contractor, the General Contractor and the Authority Having Jurisdiction. As-Built shop drawings indicating installed location of components, including all piping, sprinklers, hangers, valving, inspector's test stations, auxiliary drains, and hose stations (if required).
4. No later than 2-weeks after all Fire Protection scope of work items have been completed, The General Contractor shall issue a "Letter of Completion" on their letter head stating to the affect that "all fire sprinkler work as shown on the contract documents has been completed and that all sprinkler systems have been returned to service."

B. At Project completion, present to the Store Manager the As built Drawings enclosed in a plastic pipe tube (fixed cap at one end and a threaded-cap on the other end) for storage in the Riser Room.

C. In addition to the copies of Documents delivered to the Store Manager, distribute additional copies of documents as indicated below:
a. Contractor shall deliver copies of the As-Built shop drawings for Fire Suppression and Contractor's Material Test Certificates (Underground, Overhead, and Fire Pump) in both hard copy and electronic form (*.pdf) to Walmart's Fire Protection Consultant.

1.5 SYSTEM DESCRIPTION

A. System shall provide coverage for all existing and new building and expansion areas including, but not limited to, areas scheduled in this Section. Contract Documents have been prepared in accordance with NFPA 13 (working plans) except for fabrication information. The Contract Documents are prepared to a level consistent with that level required by the Authorities Having Jurisdiction to gain plan check approval. No changes in design area, number of sprinklers operating, pipe sizes, number of branch lines, and number of mains or deviation of water supply from that shown on the drawings shall be approved by Fire Protection Consultant. This is not intended to limit the Contractor from making minor modifications to system design for coordination purposes. The Contractor shall review the Contract Documents for completeness and to ensure that the Construction Documents meet all Authorities Having Jurisdiction requirements. Discrepancies with NFPA or Authorities Having Jurisdiction requirements shall be brought to the attention of the Fire Protection Consultant prior to bid. The Contractor shall complete the fire protection Contract Documents to provide all final required detail such as fabrication details, final pipe cuts, hanger cuts, and other miscellaneous details not required by the Authority Having Jurisdiction for approval. Contractor is responsible to coordinate design with all trades and disciplines.
1. Fire Protection Consultant has submitted Contract Documents to Authorities Having Jurisdiction for review and approval. Contractor shall provide all other documents, qualifications, submittals and coordination necessary to obtain approval by Authorities Having Jurisdiction. All changes made to the Contract Documents by the Contractor shall be submitted to the Fire Protection Consultant for approval prior to fabrication or installation. Refer to Section 01330 for submittal requirements.

B. Limit each system to 52,000 square feet.

C. Provide a 5-psi safety factor between supply curve and demand point, including hose stream allowance, OR, as

required by the Authority Having Jurisdiction.

D. Provide hangers, supports and earthquake bracing per Contract Documents, NFPA 13, and Authorities Having Jurisdiction.

E. Interface sprinkler system with fire protection supervisory system.

F. If required by Authority Having Jurisdiction, provide Fire Department lock-box; quantity, size, type and location as directed

1.6 QUALITY ASSURANCE

A. Guarantee system for a period of one year after completion of work and acceptance by Owner.

B. Qualifications (Installer): Company specializing in performing work of this Section with minimum three years' experience and a minimum of a NICET Certified Engineering Technician (Level III) Fire Sprinkler Designer on staff responsible for project.

C. Company shall have a sprinkler contractor license issued by the Authorities Having Jurisdiction.

D. Regulatory Requirements: Provide certificate of compliance from Authorities Having Jurisdiction indicating approval of field acceptance tests.

1.7 EXTRA MATERIALS

A. Provide extra sprinklers under the provisions of NFPA 13. Provide suitable wrenches for each sprinkler type. Provide sprinklers as needed to meet the requirements listed below. Provide a minimum of 2 spare sprinklers for new sprinklers being added that do not match existing:
1. 12 Sales Floor Type
2. 4 Dry Pendent
3. 2 each of other type present for a total of 24.

B. If needed, provide sprinkler and sprinkler wrench cabinet per NFPA 13, adjacent to sprinkler risers.

C. Provide hydraulic calculation placard attached to each riser on systems that are modified or added.

1.8 DELIVERY, STORAGE, AND HANDLING

PART 2 - PRODUCTS

2.1 FIRE PROTECTION PIPING - ABOVE GROUND

A. Pipe: Steel pipe, conforming to the applicable requirements of NFPA 13, and ASTM A 53, ASTM A 135, or ASTM A 795, as applicable.
1. Wet Pipe Systems, Utilizing Threaded Pipe:
   a. Schedule 40 black steel pipe.
   b. Threadable lightwall sprinkler pipe with corrosion resistance ratio of 1.0 or greater after threading.
   c. Use galvanized pipe, zinc coated internally and externally, outdoors, inside coolers and freezers, or in non-conditioned spaces.
2. Wet Pipe Systems, Utilizing Roll Grooved Pipe.
   a. Schedule 10 black steel pipe.
   b. Lightwall sprinkler pipe with corrosion resistance ratio of 1.0 or greater.
   c. Use galvanized pipe, zinc coated internally and externally, outdoors, inside coolers and freezers, or in non-conditioned spaces.
3. Dry Pipe Systems: Same as wet pipe systems except pipe shall be galvanized, zinc coated internally and externally.

4. Fitting type shall match pipe. Galvanized fittings shall be used for dry pipe systems and wet pipe systems located outdoors, inside coolers & freezers, or in non-conditioned spaces
5. Crimp-type couplings shall not be used.
6. Plain end fittings (socket, FIT, roustabouts, etc.) shall not be used.

B. Flexible Piping Systems: At Contractor's option, UL Listed **and** FM Approved flexible piping connections to sprinklers may be used for both acoustical panel and gypsum board ceilings when suitable for their intended use.
1. Description: Connections shall include a fully welded (non-mechanical fittings), leak-tested sprinkler drop with a minimum internal corrugated hose diameter of 1 inch.
2. Flexible piping lengths shall not exceed 6 feet.
3. Installation shall not exceed the minimum bend radius and maximum allowable bends as specified by the manufacturer.
4. Change in direction shall be gradual enough to allow flexible piping to bend without crimping, distorting or reducing internal diameter.

2.2 SPRINKLERS

A. Replace any existing sprinkler that has signs of leakage, paint applied (other than by the sprinkler manufacturer), corrosion, damage, or loading; or is installed in the improper orientation. Provide new sprinkler with identical K-Factor, temperature rating, and response type as the existing.

B. Subject to compliance with requirements, provide UL Listed or FM Approved automatic sprinklers. Provide sprinklers with nominal K-factor as indicated on Contract Documents. Sidewall sprinklers are not acceptable, unless noted otherwise. Provide the following sprinkler types:
1. Areas with Exposed Structure Above: Upright or pendent sprinkler, brass.
2. Areas with Gypsum Board Ceilings: Pendent sprinkler, white, with two-piece white escutcheon plate.
3. Areas with Lay-in Ceilings: Pendent sprinkler, white, with two-piece semi-recessed white escutcheon plate.

C. Standard Sprinklers: Glass bulb sprinklers are acceptable. Sprinklers with o-rings not permitted.

D. Dry Pendent Sprinklers shall be Concealed type Globe Model GL5689, Tyco Model TY3555, or Victaulic V3301.
1. Substitutions: Not permitted.

E. Dry Horizontal Sidewall Sprinklers shall be Tyco Model TY3355, TY5339, or Reliable R5734.
1. Tyco Model TY5339 for extended coverage ordinary hazard (ECOH) installations.
2. Substitutions: Not permitted.

F. Wire Cage Sprinkler Guards:
1. Provide guards on pendent sprinklers located within 7'-6" of finished floor, except for semi-recessed and concealed sprinklers.
2. Provide guards on sprinklers located beneath overhead doors.

G. Substitutions: Not permitted.

2.3 FIRE PUMP

A. Fire Pump not permitted.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Install system and equipment in accordance with NFPA 13 and manufacturer's instructions.

B. Replace with an identical K-Factor, temperature rating, and response-type any sprinkler that has signs of leakage, paint applied other than by the sprinkler manufacturer, corrosion, damage, or loading; or is installed in the

improper orientation.

C. Provide piping to conserve building space. Do not interfere with use of building space and other work.

D. Group piping whenever practical at common elevations.

E. 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. Protect sprinkler to ensure sprinklers do not receive field paint. Remove protective covering after painting. Replace sprinklers having paint other than factory finish with new sprinklers. Cleaning and reuse of painted sprinklers is prohibited.

F. Examine other work indicated on the Drawings and conditions at job site. Coordinate routing of work with other construction trades to avoid interference with other installations. Do not cut building structural members, beams, joists, etc. for routing of sprinkler piping.

G. Seal pipe penetrations through fire rated walls or floors to achieve fire resistance equivalent to fire separation required.

H. Provide wall plates at all penetrations. Provide zinc coated (galvanized) wall plates at exterior penetrations.

I. Provide zinc coated (galvanized) all-thread rod for hanging dry system piping.

J. Provide valves with stems upright or horizontal.

K. Route piping and locate sprinklers as required to avoid building structure, equipment, plumbing piping, heating and air conditioning piping, ductwork, lighting fixtures, electrical conduits and bus ducts, and similar work. Locate center of sprinkler a minimum of 6 inches off ceiling grid.
1. Final location of lighting and exposed ductwork shall have priority over pipe routing and final sprinkler locations.
2. Sprinkler piping in sales area without a ceiling and stockroom shall be located above bottom of joists. Minimum height of sprinkler piping in areas with ceilings shall be 1’-0” above ceiling.

3.2. INSTALLATION - ABOVE GROUND PIPING

A. Provide piping in accordance with NFPA 13.

B. Locate top beam clamp or thru bolt connection near joist panel points per pipe support detail.

C. Space pipe hangers at maximum distances shown in the following schedule.

	4" and Smaller Pipe	6" Pipe	8" Pipe
Parallel to Joist	12 feet Not Trapezed	10 feet Trapezed	6 feet Trapezed
Perpendicular to Joist	12 feet Not Trapezed Hanger at every other joist	6 feet Not Trapezed Hanger at every joist	6 feet Trapezed Hanger at every joist

D. Hangers must be bolted through the top chord of joists within 6 in of joist panel point.
Parallel to Joist Installation: A 2” x 2”x ¼” in. square washer and nut is required above top chord of joist; fender washers are not allowed. Piping routed parallel to joists must not be closer than 1-ft to the joist centerline. Do not locate two or more pipes 4 inch or larger between the same joists.

E. Provide piping to conserve building space. Do not interfere with use of building space and other work.

F. Group piping whenever practical at common elevations.

G. 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. Protect sprinkler to ensure sprinklers do not receive field paint. Remove protective covering after painting. Replace sprinklers having paint other than factory finish with new sprinklers. Cleaning and reuse of painted sprinklers is prohibited.

H. Examine other work indicated on the Drawings and conditions at job site. Coordinate routing of work with other construction trades to avoid interference with other installations. Do not cut building structural members, beams, joists, etc. for routing of sprinkler piping.

I. Seal pipe penetrations through fire rated walls or floors to achieve fire resistance equivalent to fire separation required.

J. Provide wall plates at all penetrations. Provide zinc coated (galvanized) wall plates at exterior penetrations.

K. Provide zinc coated (galvanized) all-thread rod for hanging dry system piping.

L. Provide valves with stems upright or horizontal.

M. Route piping and locate sprinklers as required to avoid building structure, equipment, plumbing piping, heating and air conditioning piping, ductwork, lighting fixtures, electrical conduits and bus ducts, and similar work. Locate center of sprinkler a minimum of 6 inches off ceiling grid.

N. Final location of lighting and exposed ductwork shall have priority over pipe routing and final sprinkler locations.

O. Sprinkler piping in sales area without a ceiling and stockroom shall be located above bottom of joists. Minimum height of sprinkler piping in areas with ceilings shall be 1’-0” above ceiling.

3.2 FIELD QUALITY CONTROL

A. General: Contractor shall schedule, coordinate and conduct all tests required by Authorities Having Jurisdiction and Walmart’s Fire Protection Consultant. Contractor shall modify, replace or retest as required by Authorities Having Jurisdiction and / or Walmart’s Fire Protection Consultant.

B. Flush, test, and inspect sprinkler system according to NFPA 13 "Systems Acceptance" Chapter. Test the systems, including the underground water mains, and the aboveground piping and components to assure that equipment and components function as intended. Pressure test the systems in accordance with NFPA 13 and NFPA 24. The Contractor shall have available copies of as-built drawings.
   1. Above Ground Fire Protection Piping:
      a. Test per NFPA 13.
      b. Inspect welds and verify welder's qualifications per Authorities Having Jurisdiction.
      c. Perform Hydrostatic tests per NFPA 13.
   2. Backflow Prevention Assembly Forward Flow Test.
   3. Operation of control valves and flowing of inspector's test connections to verify operation of alarm devices including alarm switches. After operation of control valves has been completed, assure that control valves are in the open position.
   4. Main Drain flow test.

C. Fire Sprinkler System Construction Follow Up: Walmart’s Fire Protection Consultant (as specified in Section 01330) will conduct a Pre-Construction Conference Call. The purpose of the Pre-Construction Conference call is to review status of project, notify contractor of status of approvals, and review project expectations.
   1. Pre-Construction Conference Call: The General Contractor shall contact Walmart’s Fire Protection Consultant within 2 days after Contract Award to schedule the Pre-Construction Conference Call with the Fire Sprinkler Contractor). The conference call will be held within 7 days after Award. The Fire Protection Consultant for this project is as follows:

Cyntergy AEC
Attn: Matt Roberts
mroberts@cyntergyaec.com
Phone: (918) 877-6000

a. Contractors Materials and Test Certificate for Above Ground Piping (By System). As a minimum, the form shall contain information indicated in sample form shown in NFPA 13 (i.e. Figure 16.1 of 2002 edition). The certificate shall be complete and verify that all information except Dry pipe test section and hydrostatic test section. Dry pipe section may be completed during Acceptance Test. Hydrostatic test may be completed in the future and a copy forwarded to Walmart's Fire Protection Consultant at a later date.
b. Sprinkler Zone Map.
c. Approved Shop Drawings.
d. Fire Pump Factory Test Curve (if applicable).

2. After these documents have been reviewed, Acceptance Test shall be initiated by Contractor/Sprinkler Contractor in the order determined by Walmart's Fire Protection Consultant. Each of these tests shall be interfaced with the fire alarm system. Contractor shall arrange for system to be put in test and arrange to be able to silence local alarms during Acceptance Test. Contractor shall coordinate with Alarm Central. The Contractor shall provide all personnel, material, equipment, lifts, air and water pumps, hand tools, and apparatus necessary to complete the above required testing. The Contractor shall notify the store management that the above tests are scheduled.
3. The following tests shall be conducted by the Contractor / Sprinkler Contractor and witnessed by Walmart's Fire Protection Consultant. Generally this is the order the tests shall be conducted, but the Walmart's Fire Protection Consultant may require tests be conducted in any order deemed appropriate. Determination of order will be made while on site.
   a. Fire Pump Systems (if applicable): Sprinkler Contractor shall conduct a full NFPA 20 acceptance test, including (but not limited to) flow (churn, 100%, and 150%), manual and automatic starts, etc. Sprinkler Contractor shall provide all equipment and personnel necessary to conduct test. Verify flushing and pre-start preparation prior to test. Typically, this is the first test in the Acceptance Test.
   b. Water Storage Tank (if applicable): Sprinkler Contractor shall drop water level, overflow tank, and operate tank heaters. Typically, this is the second test in the Acceptance Test.
   c. Dry Pipe systems: Sprinkler Contractor shall operate dry system to verify High, and Low air pressure settings as well as water delivery time. This test typically follows the Fire Pump/Tank test depending on site conditions.
   d. Inspector's Test: Sprinkler Contractor shall operate each Inspector's Test to verify flow switch operates within 90 seconds (preferred time is 45 seconds, minimum time is 30 seconds). This test typically follows the Dry pipe system Acceptance Test.
   e. System Control Valves: Sprinkler Contractor shall operate each system control valve to verify functionality. This test typically follows the Inspector's Test Acceptance Test.
   f. Antifreeze Systems (if applicable): Sprinkler Contractor shall test antifreeze mixture to verify proper solution ratio. This test typically follows the System Control Valve Acceptance Test.
   g. Hydrostatic Test: Sprinkler Contractor shall hydrostatically test all systems simultaneously. Typically this will be the last test initiated, and depending on schedule may not be fully witnessed by Walmart's Fire Protection Consultant. Contractor/Sprinkler Contractor shall certify and provide signed off copies of test certificates proving successful completion of Hydrostatic tests prior to full acceptance.
4. After installation of all components, provide a Letter of Completion to Walmart's Fire Protection Consultant. The Letter must state the date that the installation is in substantial conformance with Contract Documents and be signed by representatives from the Fire Sprinkler Contractor and Contractor. Additional documentation must be provided to the Fire Protection Consultant upon request, including photographs or Certificate of Occupancy.

D. Prior to interior store finishing, test existing and new above ground pressure piping for leakage in presence of Authority Having Jurisdiction and Owner's representative. Maintain test pressure at the high end for two hours. Test pressure: 200 psi or 50 psi over normal operating pressure, whichever is greater. Conduct test in accordance with NFPA 13, Hydrostatic Tests. Submit documentation per Contract Closeout Submittals of this section and

01770.

END OF SECTION