SECTION 15600

AUTOMATIC FIRE SPRINKLERS

DIVISION I REQUIREMENTS ARE A PART OF THIS SECTION.

PART 1 GENERAL

General Provisions of the Contract Documents to be included but not necessarily limited to General Conditions, Supplementary Conditions and sections of Division One of this project manual.

1.01 SCOPE

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the proper and satisfactory installation of the automatic fire protection systems as specified herein.

B. This specification is intended to establish the required performance and quality of the work necessary to provide for a complete automatic sprinkler systems to serve all of the buildings on the site. The point of connection for sprinkler system shall be at the riser flange approximately 6 inches above finish floor within the building.

C. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided by this contractor and incorporated under this Section of the work at no additional cost to the County.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Plumbing

B. Electrical Work

C. Painting

1.03 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to applicable ordinances of the City of Orange including the City of Orange Fire Department, the latest requirements of the National Fire Protection Association 2002 Edition, NFPA 13. The design shall conform to Uniform Fire Code with California Amendments and CBC Chapter 9 Fire Protection Systems. 2007 California Fire Code, Part 9, Five Protection Systems, Title 24, 2007 California Code of Regulations (CCR).

B. UL and FM Compliance: Fire protection system materials and components shall be Underwriter's Laboratories listed and labeled, and Factory Mutual approved for the application anticipated.

C. Permits and Inspections: The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by all legally constituted authorities and shall deliver all certificates to the County.

1.04 GENERAL REQUIREMENTS

A. It shall be the Contractor's responsibility to provide a complete automatic fire sprinkler system in complete conformance with the governing agencies mentioned herein. The contract drawings indicate only the main fire line riser location and suggested routing for mains and branches. It shall be this Contractor's complete responsibility to prepare drawings indicating the entire automatic fire sprinkler system.

B. Arrangement, size, location and quantity of service, riser and appurtenances indicated on the drawings is suggested as a minimum requirement only. It shall be this Contractor's responsibility to verify the exact requirements of the governing agencies and include these items in the bid. Piping sizes indicated are to be considered as a minimum and where sizes are not indicated the Contractor shall provide the sizes as necessary to meet the code requirements. Any variation from the drawings and specifications and/or piping or equipment relocation shall be approved by the Architect prior to bid.

C. Prior to installation of any work, the Contractor shall carefully prepare complete working drawings of the automatic fire sprinkler system. The Contractor shall examine the Structural, Architectural, Mechanical, Plumbing and Electrical Drawings for the construction of the building in order to fully inform himself as to the scope and detail for the work which will be required of him before proceeding with the design and preparation of the final working drawings. Submit for approval to the City of Orange Fire Department completed working drawings. All sprinkler head locations shall be carefully coordinated with the lighting and diffuser systems to provide a symmetrical appearance.

1.05 PERMITS, LICENSES AND INSPECTIONS

A. Permits and Inspections: This Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by all legally constituted authorities and shall deliver all certificates to the County.

B. Installing Contractor shall have a California C-16 license.

1.06 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work under this section of the specifications, the Contractor shall be deemed to have made such study and examination and that he is familiar with and accepts all conditions of the site.

1.07 COORDINATION

A. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid confliction and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

B. Piping runs found to be in conflict with work of other trades, as a result of neglected coordination, shall be removed and reinstalled in new locations designated by the Architect at no additional expense to the County.

C. To achieve coordination, Contractor shall contact the Architect and obtain necessary information to design his system to fit into allotted spaces without interfering with work by other trades.

1.08 SUBMITTAL DATA

A. Furnish all at one time, within the time noted below, six (6) bound copies of valid submittal data on all material, equipment and devices. The Contractor shall make all presentations and clarifications although he may bring suppliers representatives for technical assistance to meetings called by the architect. Each submitted item shall be indexed and referenced to these specifications and to put identification numbers on fixtures and equipment schedules. Submittals not complying with this paragraph shall be rejected.

B. Submittals are required on all items to insure the latest and most complete manufacturer's data is available for review. Manufacturer's submittal literature and shop drawings often contain information not available in design literature; requirements of the submittals and engineer's submittal notes are a part of the work of this Division except that engineer's notes may not be used as a means of increasing the scope of work of this Division.

C. Submittals will be checked for general conformance with the design concept of the project, but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

D. A list of names is not a valid submittal. To be valid, all submittals must be delivered to the Architect's office per the requirements of Section 01350 - Submittals. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.

1.09 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall repair all damage caused either directly or indirectly by his own work persons. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 UNINSPECTED WORK

A. Contractor shall not allow or cause any of his work to be covered up before it has been duly inspected, tested and approved by the authorized inspectors having legal jurisdiction over his work. Should he fail to observe the above, he shall uncover his work and, after it has been inspected, tested and approved, recover it at his own expense.

1.11 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations of all shut-off valves, etc. On completion of the work, this set of prints shall be delivered to the Architect.

1.12 FINAL APPROVAL

A. Prior to final acceptance of the installation, the Contractor shall furnish to the County, local fire official and Architect "NFPA Certificates of Approval" signed by the fire marshal having jurisdiction, stating that the systems, as installed, have been inspected and tested and meet all governing code requirements.

1.13 GUARANTEES

A. Contractor shall guarantee the automatic fire sprinkler systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, Contractor shall make good the defects promptly and without any expense to the County.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT (Provide all materials and equipment as specified or required in the work)

A. All material installed shall be approved and/or listed for fire protection use by referenced authorities, codes and standards. All material shall be new, without field modifications, and be the best possible grade of its kind.

B. Fire Sprinkler Pipes: (within the Building):
   1. Fire Sprinklers system shall be a minimum of schedule 40 pipe. No exceptions.
   2. Fire sprinkler pipe – 1" thru 8" schedule 40 black and / or galvanized steel meeting ASTM Standards A 53, A135, and / or A795 as manufactured by Allied Tube, Bull Moose Tube and Wheatland Tube Company. Pipe Corrosion Resistance Ratio (CRR) shall be 1.00 or greater. Pipe may be threaded or grooved.
      a. Piping 2 inches and smaller shall have threaded joints and fittings in all concealed, non- accessible locations. Groove coupler connections (Victaulic or equal) on pipe sizes 1 inch through 2 inches are acceptable in all accessible areas with all required seismic bracing provided. Plain end connections such as "Plain lock" and "FIT" are prohibited.
      b. For pipe sizes 1-1/2 inches and larger, grooved type (Victaulic or equal), welded, threaded and flanged connections may be used. Any connection that does not utilize a threaded, welded or grooved connection is prohibited.
      c. Submit Verification from manufacturer stating that piping material furnished meets above criteria; (i.e.: threadable pipe has UL assigned CRR of 1.00 minimum, that it meets ASTM A53, A135 or A795, and it is UL listed, FM approved, and/or NFPA approved.)
   3. Mechanical Tee bolted branch outlet fittings are prohibited.
   4. One-piece reducing fittings shall be used whenever a change is made in pipe size. Reducing couplings are prohibited.
   5. Plain end couplings are prohibited.

C. Threaded Fittings:
   1. Ductile iron, 300 psi rated, UL listed, FM approved and/or NFPA approved conforming to ANSI A21.10.
   2. Cast iron fittings, 175 psi rated, UL listed, FM approved, and/or NFPA approved conforming to ANSI B16.4. "ANVIL", "WARD" or equal
   3. Mallable Iron, threaded fittings, 300 psi rated, UL, listed, FM approved and/or NFPA approved conforming to ANSI B16.3.
   4. Galvanized fittings, 175 psi rated, UL listed, FM approved, and/or NFPA approved.

5. Cast iron flanged fitting, Class 250. UL Liaised, FM approved and/or NFPA approved conforming to ANSI b16.1.

D. Drain and Test Piping:
   1. Pipe: Schedule 40, galvanized steel, ASTM A-53.
   2. Fittings: Cast iron, drainage pattern, standard weight, screwed.

E. Sprinkler Heads:
   1. Interior Finished Ceilings and Exterior Soffits:
      a. Heads located in drop ceilings and hard lid ceilings shall be concealed flush to ceiling Reliable Model G4A Quick Response type. Cover plates with white painted finish. Equivalent products of Grinnell, star, Viking are acceptable. Corrosion-resistant finish shall be installed at exterior areas; finish shall be Polyester or Teflon coating. Color and finish of all corrosion-resistant sprinklers shall be as approved by Architect.
      b. Heads located above ceilings and in attic spacers shall be Reliable Model F1FR Quick Response Glass Bulb Heads. Pendent or upright with bronze finish equivalent products of Grinnell, Star or Viking are acceptable.
      c. Heads located within skylights exposed to the direct rays of the sun shall be Reliable Model FIFR Quick Response Intermediate Classification (200 degrees) Horizontal Sidewall with Bronze Finish equivalent products of Grinnell, Star or Viking are acceptable.
      d. All areas without Suspended Ceilings, Concealed Areas, Unfinished Ceilings and Storage Areas: Heads shall be Reliable, model GFR Quick Response, Upright/pendent with rough brass finish. Equivalent product of Grinnell, Star or Viking are acceptable. Reliable Model D-1 sprinkler guard with chrome finish shall be furnished in Gymnasium at storage, mechanical, and electrical room ceilings.
      e. Sidewall Sprinklers: Sidewall sprinklers, may be installed for interior and exterior applications, subject to prior approval be Architect, Heads shall be Reliable, model Grinnell, Star or Viking are acceptable.
      f. Upright and Pendent type glass bulb type sprinklers heads are not acceptable except in concealed spaces above ceilings and in attic.
      g. Temperature Rating; Heads below finished ceilings and in all other occupied areas shall have a temperature rating of Ordinary (155-165 degrees). Heads in unventilated, concealed and void spaces shall have a temperature rating of intermediate (200-212 degrees), unless otherwise required by code.
      h. Provide metal cabinet for a reserve supply of sprinklers heads as required by N.F.P.A. 13. Include suitable head wrenches for each type of sprinkler installed.

F. Escutcheons: Furnish and install steel chrome plated set screw type escutcheons on all exposed pipes passing through walls, floors, partitions, and white escutcheons at ceilings.

G. Provide U.L. listed guards for sprinkler heads, which are located in areas where they are susceptible to mechanical damage.

H. Valves: All valves shall be UL & FM compliance approved as manufactured by Mueller, Clow, Stockham or Kennedy and shall have valve body marked UL/FM approved.
   1. General Duty Valves:
      a. Gate Valves - 2 Inch and Smaller: Body and bonnet of cast bronze, 175 pound cold water working pressure - non-shock, threaded ends, solid wedge, outside screw and yoke, rising stem, screw-in-bonnet, and

malleable iron hand wheel. Valves shall be capable of being repacked under pressure, with valve wide open.

b. Gate Valves - 2-1/2 Inch and Larger: Iron body; bronze mounted, 175 pound cold water working pressure - non-shock. Valves shall have solid taper wedge; outside screw and yoke, rising stem, flanged bonnet, with body and bonnet conforming to ASTM A126 Class B; replaceable bronze wedge facing rings; flanged ends; and a packing assembly consisting of a cast iron gland flange, brass gland, packing, bonnet, and bronze bonnet bushing.

c. Interior drain and test valves shall be brass, rubber disc, angle or globe pattern, with screwed ends, rated 200psi WOG. United Brass Works, Model 125 or 126, or equivalent, is acceptable.

2. Specialties Valves: (State Fire Marshal approved)

a. Alarm Valve: Provide Reliable Model G "Right-Check" or approved equal alarm valve, 250 psig working pressure, designed for vertical installation, with grooved end connections. Provide trim kit with water flow detector pressure, gauges, Voltage to suit building electrical system. One N.O. and one N.C. contact. Alarm bell Underwriter's approved, weather-proof electric bell.

I. Sprinkler System Supervision Alarms:

1. All valves controlling the water supply for automatic sprinkler systems and water flow switches on all sprinkler systems shall be electrically supervised in accordance with Section 904.3 of the 2007 California Building Code.
2. All required alarm devices and remote control supervising stations, conduit and wiring shall be provided under Section 16000 and it shall be this contractor's responsibility to coordinate with the electrical contractor regarding the points of connection for electrical services.

J. Alarm Devices:

1. General: Types and sizes shall mate and match piping and equipment connections.
2. Water Flow Indicators: Vane type water flow detector, rated to 250 psig; designed for horizontal or vertical installation; have 2-SPDT circuit switches to provide isolate alarm and auxiliary contacts, 7 ampere 125 volts AC and 0.25 ampere 24 volts DC; complete with factory-set, field adjustable retard element to prevent false signals, and tamper proof cover which sends a signal when cover is removed.

K. Local Alarm:

1. Electrical alarm bell shall be Wheelock, Model MBS-G10 or U.L. listed equivalent, 10" diameter combination horn/strobe, 12 or 24 vdc, with standard mounting hardware. Bell shall be located as required by authorities having jurisdiction, and as acceptable to Architect.
2. Supervisory & Sentry Switches: SPST, normally closed contacts, designed to signal valve in other than full open position.

L. Sleeves:

1. 22 gauge galvanized sheet metal sleeves shall be provided for all pipes passing through walls, floors, plaster partitions and ceilings. For concrete, construction, sleeves shall be set in forms before concrete is poured. Provide one inch (1") clearance between sleeves and pipe. Where installed in fire walls, caulk space between pipe and sleeves with ceramic fire rope and D.O.W. Corning Fire Stop Sealant U.L. No. 827U.
2. In wall construction below grade, provide Schedule 40 galvanized steel pipe. Seal between pipe and sleeve as described here-in-above.

M. Pressure Gauges: Install as required by Code. Underwriters' approved four and one-half inch (4-1/2") dial type, and shall have a maximum limit of not less than twice the normal working pressure at the point where installed.

N. Identification Signs: Control valves, test valves, chain valves, and water flow indicators shall be fitted with approved enameled sign indicating their use.

O. Identification of Piping (Per NFPA-13 and NFPA-24): Provide as required.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. Supervision: The Contractor shall furnish the services of an experienced Superintendent who shall be qualified in all phases of the work of this Section and who shall constantly be in charge of the work of this Section.

1. All installations shall be per referenced standards. Follow manufacturer's directions and recommendations in all cases as required for all approvals and warranty enforcement.
2. Any cutting of structure shall be subject to approval by the Architect. Beams, decks and other structural components shall not be cut or altered in any way unless previously approved.
3. Provide flexible couplings where required to provide extension capability, and for earthquake protection per N.F.P.A. 13. Provide sway bracing as required by coupling locations.
4. Entire sprinkler system shall be installed in such a manner so that it can be drained in accordance with N.F.P.A. 13. Drains shall be located at suitable points as approved by Architect. No primary or auxiliary drain shall be located in any public area or electrical room. All drains shall discharge into dedicated receptors.
5. No work shall be covered or enclosed until inspected, tested, and approved by Architect and authority having jurisdiction. Should any work be concealed before inspection, the Contractor shall, at his own expense, uncover such work and after it has been inspected, tested and approved, provide for all repairs as may be necessary to restore any other affected work to its original and proper condition.
6. Sprinkler heads at finished ceilings, and in exposed locations shall form a symmetrical pattern, carefully integrated into the ceiling layout as shown on approved drawings. Heads shall be located at the centerline of ceiling tiles.
7. All piping shall be concealed in areas having ceilings. Use best of workmanship in the installation of all piping and in particular all piping exposed in areas having no suspended ceilings. Install all piping as high as possible and where possible, install branch piping between structural framing and run main piping only below beams.
8. Sprinkler head layout must accommodate ceiling-mounted HVAC register and lighting locations. Coordination with work of these trades is the responsibility of Contractor.
9. Without exception, no piping shall be run under or through any skylight or skylight well. Any additional upright or pendent sprinklers, which may be required by skylight locations, shall be the responsibility of this Contractor.
10. All penetrations of wall and/or floor assemblies shall be suitably sleeved, patched and/or sealed in order to preserve fire rating, where applicable.
11. Location of control valves, fire department connection, and inspector's test shall be as indicated and as required by authorities having jurisdiction, and as approved by Architect.
12. Local alarm bell shall be located so that it can be easily heard and seen by passersby and fire department personnel. Locate on exterior wall, approximately 10'-0" above finished grade, as approved by Architect.

3.02 CUTTING & PATCHING (See Division I)

A. The cutting and patching of existing construction shall be coordinated in advance of the work.

B. Where required to remove, cut or core drill existing building walls, partitions, floors, ceilings and roof and outdoor paved and landscaped areas in order to install the work as indicated, the Contractor shall cut and patch existing construction to match adjacent areas in a manner that will not result in visual evidence of any cutting or patching. The materials, finishes and methods of installation shall match the existing adjacent surfaces and shall be in accordance with the requirements of other applicable sections of these specifications.

C. Unless specified on structural drawings, any alterations or modifications to a structural element by cutting, drilling, boring, bracing, welding, etc., shall have written approval by Structural Engineer of record prior to start of work.

3.03 FABRICATION

A. General:

1. All pipe, fittings, etc. shall be prepared by qualified and trained personnel, experienced with the products involved, and the recommended methods of preparation. All cuts, threads and grooves shall be made according to applicable codes, standards and accepted good practices. Pipe shall be free of damage, flaws and burrs. Threads and grooves shall not be excessively shallow or deep. Fittings shall be made onto pipe no tighter than necessary. Cracked or broken fittings shall be replaced by the Contractor without exception. Excess dope and oils shall be removed before shipment to job site.

B. Welding:

1. Welding methods shall comply with NFPA #13 "Installation for Fire Sprinklers", NFPA #51B "Standard for Fire Prevention in use of Cutting Welding Process" and AWS D10.9, Level AR-3 and ANSI B31.1. Contractor shall be responsible for all welded joints and any qualifying procedures or certification required for welders and related personnel.
2. Joining Materials: Section II, Part C, ASME BOILER & pressure vessel code for welding materials appropriate for the wall thickness and chemical analysis of the pipe being welded.
3. Holes in pipe for welded outlets shall be cut to full inside diameter of fitting, prior to welding in place. Holes shall be free of slag and welding residue, and of smooth, continuous bore. Fittings shall not penetrate internal diameter of run piping. Holes shall be cut by hole saw or other rotary bit. Torch-cutting of holes is strictly prohibited.
4. All welded pipe shall be subject to inspection by serving Fire Department before it is installed. All welded pipe shall be stamped with welders I.D. Provide documentation of acceptance, as required, at time of project close-out.

C. Hangers and Supports:

1. Provide U.L./F.M. approved hangers as required by N.F.P.A. 13. Shop-fabricated supports shall be designed to meet requirements of N.F.P.A. 13.
2. Provide U.L./F.M. approved earthquake bracing as required by N.F.P.A. 13. Locations of all bracing shall be clearly shown on shop drawings.
3. Size all anchors and fasteners per N.F.P.A. 13. All lag screws, bolts and drive screws shall be installed as required by codes and accepted good practices. Pilot holes shall be drilled in all wood framing members as required by structural

engineer. Under no circumstances shall lag screws or bolts be hammered or pounded into framing.

D. Service Connections: Co-ordinate exact location with contractor installing underground fire service main.

E. Cleaning Equipment:
   1. Thoroughly clean all parts of apparatus and equipment. Exposed parts to be painted shall be thoroughly cleaned of cement, plaster and other materials, and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.
   2. Exposed metal work shall be carefully brushed down with steel brushes to remove the rust and other spots and left smooth and clean.

3.04 TESTING

A. Upon completion of the system, the Contractor shall subject same to a hydrostatic pressure of 200 pounds per square inch for a two (2) hour continuous period. Any leaks or defects due to materials or workmanship occurring during this test shall be immediately and properly corrected.

B. Provide the NFPA Material and Test Certificates to the County, local fire official, and Architect.

3.05 MAINTENANCE MANUAL

A. Submit maintenance manual fully describing all equipment maintenance schedules and replacement parts as required by Section 01730.

3.06 CLEAN-UP

A. Upon completion of the work specified, and at other times during the progress of the work when required, the Contractor shall remove all surplus materials, rubbish and debris resulting from this work, and shall leave the entire building and involved portions of the site, insofar as the work of these Sections are concerned, in a neat, clean and acceptable condition.

B. Closeout:
   1. Upon completion and final approval of system, and prior to occupancy, provide instruction to the County, or his authorized representative, in all details of operation and maintenance. Submit maintenance and operation manuals.
   2. Provide three (3) copies of final inspection and certification as required by County's Insurance Underwriter, and/or authorities having jurisdiction.
   3. Submit two (2) copies of guarantee.

END OF SECTION