DESIGN AND SUBMITTAL REQUIREMENTS

All new and existing fire sprinkler systems within the jurisdiction of the City Fire Department shall meet all of the applicable sections of the Municipal Code and NFPA 13, 2016 Edition.

The intent of this document is to facilitate the process of design and installation of a fire sprinkler system. Consult the applicable code sections for any unmentioned detail information.

All fire sprinkler systems shall be designed and installed by a California licensed Fire Protection Contractor (C-16); Registered Fire Protection or Mechanical Engineer for design.

*For one and two family dwellings, consult NFPA 13D design guideline for one and two family dwellings residential fire sprinkler system.

1. **Submittal Requirements**

   All fire sprinkler systems submittal shall include:

   1.1 Four (sets) of plans that comply with the design and plan requirements of these standards.

   1.2 Four (sets) of hydraulic calculations that comply with hydraulic calculation requirements of this standard.

   1.3 Four (sets) of manufacturers’ material information sheets (complete materials submittal) for sprinkler head, piping, fitting, hanger, earthquake bracing, horn & strobe, valve, fire pump components, fire department connection and any other device being used. Consult your water purveyor for back flow preventer requirement and underground water main connection.

   1.4 A completed Permit Application. (A detailed description of scope of work is required)

   1.5 Payment of fees. A plan check and inspection fees will be charged for each submittal. Please remit payment at the time of submittal. Call (650) 522-7940 for current fee schedule.

**NOTE:** Failure to provide all of the requested information will result in unnecessary delays in the plan review process.

2. **Approval of Plans**
2.1 The approval permit application entitles the applicant to one (1) hydrostatic/overhead piping inspection and one (1) final inspection. Additional fees will be charged for additional inspections.

2.2 It is the installer’s responsibility to perform sufficient pre-inspection testing to ensure operational integrity and reliability of the system in order to avoid any delays at the time of inspection. Additional fees will be charged for additional inspections.

2.3 Any equipment or piping shall not be installed prior to the approval of plans and issuance of permits.

2.4 Any installation without permit is subject to double permit and inspection fees.

3. Plans

3.1 The plans shall be wet stamped and signed by the designer of record (installing contractor or Fire Protection or Mechanical Engineer). The designer’s name shall be clearly printed on the plans. The designer of record shall be responsible for the entire project design.

3.2 A key plan of the building and/or complex indicating the street location and the area of work within the building shall be provided.

3.3 Plans and all revisions to the plans shall be dated. If utilizing an existing drawing or a portion of a drawing, the area of work shall be highlighted and clouded with the appropriate revision symbol (delta). Provide a revision list with a symbol, date description and initials.

3.4 Plans shall be drawn to limit one building per page, one floor per page, or one system per page.

The minimum scale for fire sprinkler plans shall be 3/32" = 1'-0". Floor plans shall be fully dimensioned and described (room or area). Sketches will not be accepted. Match lines shall be clearly identified with the corresponding drawing number.

3.5 A legend shall be provided and symbols used shall match the legend. Strike out any "typical" symbols and/or details, which do not pertain.

3.6 All equipment and devices shall be indicated on the plan and shall be listed by a nationally recognized testing agency.

Note: San Mateo Fire Department reserves the right to disallow any listed product due to past performance.

3.7 Roof structural members, full height wall (to bottom of roof structural member), light fixture, mechanical duct wider than four feet or any obstruction that interferes with the sprinkler head discharge pattern shall be shown on plan.

3.8 Sprinkler head deflector distance from roof/floor structural member shall be indicated on plan.

4. Design (for new construction)

4.1 Speculative buildings are defined as any building or portion of a building that is built for lease. It is
advisable that the overhead system design and distribution of plugged outlets is considered for future tenant space use. It shall be the responsibility of the owner and/or occupant to meet the minimum requirement of applicable codes.

4.2 Obstructed/Unobstructed Construction
4.2.1 The definition of obstructed and unobstructed construction shall be as provided in NFPA 13 section 3.7.1 and 3.7.2.

4.3 Sprinklers
4.3.1 Indicate the type, size, temperature rating and manufacturer of the proposed sprinkler head(s). Submit the manufacturer specification for every head to be used. Only new and nationally recognized testing agency sprinkler heads shall be used.

4.3.2 Sprinkler heads may be omitted from the following areas:

a) In skylights or other similar ceiling opening where the length is 8 feet or less, the width is 5 feet or less and the depth is 1 feet or less.

b) Non-combustible interstitial spaces where no potential storage and no heat source is present. Any mechanical or electrical installation in this space shall be rated for non-combustible.

4.3.3 Sprinklers shall be installed under roofs or canopies exceeding four feet in width.

4.3.4 A list of sprinklers installed in the property shall be posted in the sprinkler cabinet. List to include sprinkler identification number, general description, and quantity to be in cabinet, issued or revision date of list.

4.3.5 Elevators shall have a sidewall sprinkler head installed in the elevator pit, not more than 24” above the floor as per NFPA 13.

4.3.6 All new buildings, upgrades and renovations to existing building between 35 and 75 feet in height will be considered high-rise for the purpose of elevator function and emergency power. Sprinkler requirements will be as per California Building Code.

There will be no fire sprinkler head in the shaft or elevator equipment room and existing heads will be removed to comply with the requirement of the California Building Code. No power shunt trip will be provided and the elevator will function in the case of an emergency.

4.3.7 Elevator emergency power will be provided for firefighter use for a minimum duration of 2 hours.

4.4 Piping

4.4.1 Welding inspection is required prior to installing pipe. A welder certificate presented to fire inspector during the field inspection is required and it shall be kept at the job site at all time. The imprint of the welder’s stamp shall be visible on the pipe during the inspection.
4.4.2 On-site welding is not permitted unless a welding permit is obtained from the San Mateo Fire Department.

4.4.3 Where mechanical tees are used, the hole disc (cutout) shall be permanently wired to the mechanical tee.

4.4.4 When using CPVC products, the pipe, fittings and adhesive cement shall be compatible and the installation shall be per manufacturer's specification and procedure.

4.4.5 All fire sprinkler main pipe shall be indicated as "FIRE" and flow direction in red with permanent red markings. The imprint shall be visible from an accessible standing position.

4.4.6 All metal piping shall be of approved type (i.e. Schedule 40, Schedule 10, galvanized copper).

4.5 Corrosion Protection

4.5.1 Where corrosive conditions are known to exist due to moisture or fumes from corrosive chemicals or both, special types of fittings, pipes, hangers that resist corrosion shall be used or a protective coating shall be applied to all unprotected exposed surface of the sprinkler system.

4.5.2 Any portion of piping exposed to outdoor weather condition shall be galvanized.

4.5.3 Corrosion-resistant (i.e., wax coated, stainless steel, etc.) sprinkler heads shall be installed in corrosive environments such as those specified above. All corrosion-resistant sprinkler heads shall be thermo-sensitive glass bulb type.

4.6 Protection of Piping Against Damage from Earthquakes

4.6.1 The fire sprinkler system shall be designed and installed to resist the seismic load per NFPA 13 protection of piping against damage where subject to earthquake.

4.6.2 Provide complete details of seismic bracing with attachment components and fasteners verified by load calculations. Include the following:

a) The seismic load: use NFPA 13, or use the actual weight of pipes plus water to be braced (area of influence).

b) Type, length and vertical angle of brace.

c) Orientation of connecting surface.

d) Method of attachment to building structure: include size of the structural member.

e) The type and size of fastener.

f) Lateral sway bracing shall be provided on all feed and cross mains regardless of size and all branch lines and other piping with a diameter of 2 ½ in. and larger.
4.6.3 The earthquake bracing method and its components shall be listed by a nationally recognized agency.

4.6.4 When hangers with short rods are used in lieu of seismic bracing, the distance between top of pipe and the fastening point at the building structural member shall be less than 6", otherwise lateral earthquake braces are required.

4.6.5 Sprig-ups 4' or longer shall be restrained against lateral movement.

4.7 Hangers

4.7.1 All hanging methods and components shall be listed by the nationally recognized agency and per NFPA 13 for fire sprinkler system.

4.7.2 Submit an arm over detail (if applicable) for new systems and alteration to existing systems. Starting from the connection point of main or branchline, any arm over that has a total horizontal length 24” or longer require hanger(s).

4.7.3 A branchline which has a row of short armovers (less than 24”) positioned at the same side of the branchline hangers.

4.7.4 C-type clamps used to attach hangers to the building structure shall be equipped with a restraining strap.

4.7.5 Power-driven studs shall not be used.

4.7.6 When hangers are used to attach a pre-manufactured trusses (i.e. TJI, TJL......), the hanging methods shall be strictly per manufacturer's specifications and recommendations.

4.8 Fire Pump

4.8.1 Design and installation of fire pump system shall be in compliance with NFPA 20 (2016 Edition) and manufacturer's specifications.

Prior to the submittal of plans to the Fire Department, the applicant must first obtain approval from Water Purveyor first, if the system pumping capacity is over 500 gpm.

4.8.2 All components of the fire pump assembly shall be provided with permanently marked signs indicating the function of each one as well as the water flow direction.

4.8.3 Per NFPA 20, power shall be supplied to the electric motor-driven fire pump by a reliable source of two or more approved independent sources. Due to past experience, the power provided by the public utility company is not considered a reliable source, therefore a reliable secondary power supply is required.

4.9 Control Valves

4.9.1 A backflow preventer is required for all wet fire sprinkler system. The backflow preventer assembly specification and listing is per Water Purveyor.
4.9.2 When the sprinkler control valve(s) is/are located inside the building, the room housing the 
control valve(s) shall be a minimum one-hour construction with labeled exterior as “Fire 
Sprinkler Control Valve”. The Fire Department shall first approve the riser location within the 
building.

4.9.3 Any building having more than two levels shall be provided with a floor sectional control valve 
with tamper switch on each level.

4.9.4 When located within multi-story buildings, control valves shall be installed in rated stairwells 
having exterior ground floor access.

4.9.5 All control valves shall be provided with tamper switch.

4.9.6 Any auxiliary system shall be provided with its own control valve (i.e., spray booth, under floor 
system, etc.).

4.9.7 All control valves shall be provided with a permanent signage stating clearly the area which it 
is controlling.

4.9.8 Control valves shall be locked in the “open” position.

4.11 Drains

4.11.1 Drains shall be discharged to sanitary sewage drain.

4.11.2 Main drain and inspector's test valves shall be operable from 7'-0" or less above finished floor.

4.12 Signs

4.12.1 Hydraulic design information shall be provided per Section 25.5, on a permanently marked 
weatherproof metal or rigid plastic sign secured with corrosion-resistant wire chain or other 
approved means. 
This sign shall be located on the main riser.

4.13 Hydraulic Calculations

4.13.1 A minimum of a 10% safety margin below the available city main water supply is required.

4.13.2 Water flow information can be obtain from Water Purveyor. A fax confirmation sheet from 
Water Purveyor. is required as part of submittal package.

4.13.2 In accordance with the suggestion of the NFPA 13, a maximum flow velocity of 20 feet/second 
shall not be exceeded when providing calculation based on the Hazen-Williams formula.

4.13.4 All hydraulic reference nodes shall be shown on plan including the underground portion with 
pipe size, length and control devices.
4.14 Alarms

4.14.2 An all-weather strobe & horn shall be provided above the Fire Department Connection (FDC) and shall be visible from both street directions.

4.15 Fire Department Connection

4.15.1 Department Connection (FDC) shall be located on the address side of the building. The location of FDC shall be visible from both street directions and free from any obstruction (36” clearance minimum) including landscaping. In the downtown area, the FDC shall be a flush wall mounted types to reduce the projection into the right-of-way.

4.16 System Monitoring

4.16.1 Fire sprinkler system with 100 heads or more shall be monitored by a fire alarm monitoring system.

5. Design (for existing construction)

5.1 Splitting the existing outlet to accommodate additional heads is not permitted, unless hydraulically proving this practice.

5.2 All existing piping layouts with pipe size and head locations in the tenant improvement area shall be indicated on the plan for reference.

5.3 All new full height walls (from finished floor to deck) shall be shown on the plan and proper sprinkler head coverage shall be provided.

5.4 All new fire sprinkler head types shall match the existing.

5.5 If a change of occupancy is more hazardous than the existing design, a hydraulic calculation with new design criteria shall be accompanied. The plan shall show all hydraulic reference points including the underground portion.

5.6 The plan must clearly reflect the tenant improvement area and the scope of work.

5.7 New area description (room name) shall be indicated on plan.

5.8 A key-map shall be shown on the plan indicating the tenant improvement area.

5.9 Additional outlets may be obtained from the main(s) only.
6. Field Inspection

The sprinkler system installed in accordance with NFPA 13 shall be properly inspected, tested, and maintained in accordance with NFPA 25, Standard for the Inspection, testing, and Maintenance of Water-Based Fire Protection System, to provide at least the same level of performance and protection as designed. Any inspection not included in the permit (including before and after hours inspections) shall be paid for prior to the inspection.

6.1 Field inspections can be scheduled only after a permit has been issued. The permit and Fire Department approved stamped set of plans and all specifications must be on site during the scheduled inspection. Please call (650) 522-7940 for inspection.

6.2 Two inspections are provided as covered by the permit fees. These two inspections are always the first two inspections performed. Additional inspections shall be billed by the amount of time required in one hour increments. Depending the complexity of the project, exception may be granted by the inspectors.

6.3 Overtime inspections may be available depending on each inspector’s daily workload and an additional fee will be accessed per the required time. The additional fee must be paid prior to the scheduled inspection.

6.4 Missed inspection or inspections cancelled within 24 hours shall be billed as an inspection for the amount of time booked.

6.5 A hydrostatic test is required for all new systems or any modification or addition work involving new mains or new branchlines or 20 heads or more.

A 200 psi hydrostatic pressure for two hours is required for all new installation however if the new work cannot be isolated from the existing portion, the entire system shall be tested for two hours at 150 psi minimum or 50 psi above static pressure, whichever is greater.

6.6 It is the responsibility of the installing contractor to ensure and provide the accessibility for the inspector to conduct the visual inspection. No exception will be made.

6.7 Hydraulic design information shall be provided as following:

1) Location of the design area or areas.
2) Discharge densities over the design area or areas.
3) Required flow and residual pressure demand at the base of the riser.
4) Occupancy classification or commodity classification and maximum permitted storage height and configuration.
5) Hose stream demand included in addition to the sprinkler demand, on a permanently marked weatherproof metal or rigid plastic sign secured with corrosion-resistant wire chain or other approved means.
   This sign shall be located on the main riser.

6.8 A permanently marked sign shall be posted for test valves, main drain, auxiliary drain, control valves (which area), main riser room or any other special function.

6.9 If any component of the system is not accessible for verification, the installing contractor shall provide
a sample per the inspector's request.

6.10 The installing contractor shall provide an adequate amount of spare sprinkler heads, wrench(s) and box(s), in the order of preference, at the location of main riser, fire alarm control panel room, and electrical room.

6.11 As-built drawings are to be submitted and approved prior to the final inspection when there are deviations from the first approved plan(s).

The approved set of plans does not represent the entire spectrum of installation; Fire Department reserves the right of rejecting any portion if it is not code compliance.

Approved by:

Ray Iverson
Deputy Fire Chief