AUTOMATIC FIRE SPRINKLER SYSTEM STANDARDS
Development Standard #4.2 (Commercial Installation) (Rev 7/18)

This standard applies to the design and installation of automatic fire sprinkler systems in conjunction with 2016 ed. NFPA 13, California Building Code 2016, California Fire Code 2016 and local amendments, and other applicable codes.

I. RESPONSIBILITY
A. All individuals and companies who intend to engage in the installation or alteration of sprinkler systems are subject to the requirements of this standard.
B. Installer: The sprinkler system shall be installed by an individual who holds a State of California C-16 (sprinklers) license.
C. Designer: Plans shall be designed by a C-16 licensed contractor or by a Registered Professional Engineer (Civil, Mechanical, or Fire Protection), licensed by the State of California (Board of Professional Engineers). All copies of the plans shall be stamped and signed by the licensed individuals.
D. C-16 contractors may only design systems that the firm has a contract to install.
E. Installers shall be certified by State Fire Marshalls Office as of July 1, 2018 – Certification card required for fitters; requires at least one certified fitter per job site.

II. PURPOSE
The purpose of this standard is to provide minimum requirements for the design and installation of fire sprinkler systems in commercial and industrial use buildings, in order to aid in the detection and control of fires and thus provide improved protection against injury, life loss, and property damage.

DISCLAIMER: These standards may change without notice. Whenever applicable statutes, regulations and standards are updated and adopted, the latest shall apply. Please contact the (805) 566-2451 to determine if these standards have changed. These requirements do not exempt any individual from complying with other applicable state, county, or city codes and standards.

III. PLANS SUBMITTAL PROCEDURE

SUBMITTALS: The following shall be submitted to the Fire Department for approval and permit prior to performing any work on any fire sprinkler system.
1) A completed Carpinteria/Summerland Fire District permit application.
2) Submit a minimum of two (2) sets of detailed plans, hydraulic calculations submitted (For information on what must be included on plans, see sections below in this Standard and the CSFD Plan Submittal Checklist) to the Fire Prevention Bureau located at 1140 Eugenia Pl, Carpinteria, CA 93013.

3) Manufacturer’s specifications sheets (cut sheets) for all proposed materials and equipment.

4) Any other important details and information as required by this Standard.

6) A copy of the State Fire Marshal Installer Certification card.

7) Plans will be checked and if approved, will be stamped “Approved”, signed and dated. The Fire District will retain one set. Plans are automatically returned via U.S. Mail. If you wish to pick up the plans, please specify, “Call for Pick Up” on your transmittal.

8) All fees shall be paid prior to issuance of approved plans.

9) One copy of the Fire District stamped plans shall be maintained on the job site.

10) All modifications/changes to existing systems require a plan check and inspection by the Fire District.

11) Plan check fees include the original plan check and one re-check. Please ensure that all corrections are made prior to re-submission to avoid additional fees.

12) Excessive field changes may require re-submittal of plans along with additional plan check fees.

IV. PLANS

1. Submittal Information: To speed up the plan check process and to avoid the possibility of having the plans returned for corrections, please use the following checklist, to ensure that the appropriate information is included on the working sprinkler drawings prior to submittal.

a) Name of owner and/or occupant

b) Location of project, including street, number, and city.

c) Name of sprinkler installer, address, phone number, type of license and license number.
d) Total number of square feet.
e) Point of compass. Date of drawing.
f) All plans must be to scale or dimension.
g) The scale shall be no smaller than 1/8 inch=1 foot.
h) Plot plan showing, water source, tank, pump, structures, underground pipe size and type, point of supply connections, depth of bury, type and size of any valves or meters.
i) Piping plan showing tank, pump, and structure elevations as they relate to each other.
j) Full height cross-section showing building construction types, vaulted, and beamed ceiling locations.
k) Riser detail showing system split, pressure gage, check valve, main control valve, relief valve (where applicable), main drain, and domestic shut-off valve.
l) Water tank details including size and type of construction (where applicable).
m) Indicate the manufacturer, model, type, and pump curve of the booster pump (where applicable).

o) Sprinkler head spacing.
p) Show clearly all unsprinklered areas.
q) Indicate manufacturer, style, model, orifice size, and “K” factor of each sprinkler used.
r) The main drain shall be a minimum ½ inch.
s) Type of pipe.
t) Hanger detail.
u) Inspectors test at most remote location.
v) Size of each pipe.
w) The main control valve shall be located above grade and readily accessible.
x) Use of each room.
y) Location of heat sources.
z) Water flow information including:
• Flow location
• Static pressure, psi
• Residual pressure, psi
• Flow, gpm at base of riser
• Date / Time
• Test conducted by or information supplied by ______________.

V. SYSTEM DESIGN

GENERAL

A) All automatic fire sprinkler systems for commercial/industrial projects shall be designed to the requirements of the latest edition of NFPA 13 and other recognized standards as they apply to the hazard being protected. No deviations from these recognized standards will be made without approval from the Fire Code Official.

B) Plans submitted for plan check must show complete hanger and sway bracing details. When the attachment method of hangers and sway braces is different than those shown in NFPA 13, the design must be certified by a registered Professional Structural Engineer.

C) Systems shall be designed not to exceed 90% demand of available water supply or at least ten (10) p.s.i. below the available water supply, whichever is greater. This demand is to include the sprinkler system flow and the combined inside and outside hose allowance requirements but shall not be required to include fire-flow per Appendix B of the California Fire Code.
D) Hydraulic calculations shall be designed using data either from official flow tests performed by the water purveyor or performed by a licensed contractor and witnessed by the Carpinteria/Summerland Fire Department. All water flow tests used in design of sprinkler systems shall be less than one (1) year old.

E) When fire sprinkler systems are required in buildings of undetermined use with ceiling height of 20 feet or less, they shall be designed and installed to have a sprinkler density of no less than that required for an Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet. For buildings of undetermined use with ceiling height of over 20 feet, the system shall be designed as Extra Hazard Group 1, with a density of 0.33 square feet and a minimum design area of 3,000 square feet.

VI. UNDERGROUND PIPING

A. General
1) The underground fire protection line between the backflow device and the first joint above grade shall be designed by:
   a) General Engineering Contractors (A)
   b) Fire Protection Contractors (C-16)
   c) Plumbing Contractors (C-36)
   d) Pipeline Contractors (C-34)
   e) Professional Engineer holding a license as:
      • Civil Engineer
      • Mechanical Engineer
      • Fire Protection Engineer

2) Prior to installation, submit a minimum of three sets of underground plans with the contractor’s or engineer’s name, address, type of license, and license number to the Fire Prevention Bureau.

3) The following notes shall be completed and placed verbatim on the working underground plans.
a) Thrust blocks to be designed, located, and installed per 2016 NFPA 24, and Fire District requirements.

b) Underground supply piping to be minimum PVC C900, Class 150, or lined ductile iron with a minimum bury of 36 inches, 48 inches for driveways and roads.

c) All bolted joint accessories shall be cleaned and thoroughly coated with asphalt or other corrosion retarding material, and then wrapped in plastic after installation and prior to backfill. Backfill to be rock and debris free.

d) Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler, standpipe, or other fire protection piping to remove foreign materials. Flushing shall be in the presence of a Fire Prevention representative and in accordance with 2016 NFPA 24.

e) All new private fire service mains shall be pressurized to 200 psi, or 50 psi above the maximum static pressure, when the maximum static pressure is in excess of 150 psi. The pressure shall be provided for at least 2 hours prior to the scheduled inspection time.

f) The trench shall be backfilled between joints before testing to prevent movement of pipe.

gh) Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection. Tests shall be made by the contractor in the presence of a Fire Prevention representative.

h) All control valves shall be listed and indicating, with a tamper switch.

i) Fire department connection (FDC):
   • Shall be accessible and visible.
   • Shall be facing the public street and set back a maximum of 2 feet from the curb face or rear of the sidewalk, and at a height of 2 to 3 feet above the finished grade.
   • Maintain a 3-foot clear radius around FDC’s.
• Where subject to mechanical injury, protection shall be provided.
• Shall have an identification sign to indicate building address and what it controls.
• Shall be of all brass construction with two inlets, each with a clapper and protective metal or plastic cover or plug.
• Shall be within 150 feet of a fire hydrant.

4) Inspection of underground piping will not be conducted until underground plans are approved.

5) All underground fire lines shall be pressurized to 200 psi, or 50 psi above the maximum static pressure. The pressure shall be provided for at least 2 hours prior to the scheduled inspection time.

6) Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection.

7) Buried joints shall be of an approved type. Steel pipe joints shall be field-coated and wrapped after assembly.

8) Buried fittings shall be an approved type with joints and pressure class ratings compatible with the pipe used. Steel pipe fittings shall be coated, wrapped and lined.

9) All private fire service mains shall be flushed prior to connection to the overhead piping.

10) Any pipe located under foundation shall have no mechanical joints.

11) An annular space shall be provided for pipes passing through walls or slabs. Means to waterproof shall be applied for inspection.

B. Drains and Valves

1) Backflow devices are not a requirement of the Fire District. Please check with the appropriate water company for information.

2) Indicating valves on backflow devices are acceptable for the system shut-off valves on installations with only one riser and with no system side hydrants.

3) Indicating valves on backflow devices shall be chained and locked in the open position prior to final inspection as well as monitored by local alarm company.

4) When one fire service line serves multiple buildings and/or hydrants, post indicator valves (PIV) or outside screw and yoke (OS&Y) valves are required for every connection from a private service main to a building.

5) Sectional control valves shall be PIV type.
6) All drains and test valves shall be piped to the exterior of the building. Outlets of test valves and drains shall discharge preferably into landscaped areas, such as planters or basins, but in no case shall the installation allow water to flow into the public street or storm drain system.

7) As an alternate to exterior outlets, test valves and drains may have outlets that discharge into interior floor drains connected to the sewer system, or another suitable location approved by the Fire Code Official. Floor drains are to be adequately sized for the flow and pressure of the water being drained from the system.

8) All control valves, including sectional control valves, shall have a permanent metal identification sign to indicate their functions and what they serve.

9) Each sprinkler system shall have an Inspectors Test Valve.

10) Floor control valves (indicating type) are required on each floor when the building has three floor levels or more. The valves shall be readily accessible to Fire Department personnel and shut off the entire floor without affecting other floors. Floor control valves shall be locked in the open position. Each floor shall be provided with an auxiliary drain valve and an inspector’s test valve.

C. Fire Department Connections (FDC)

1) FDC shall be accessible and visible.

2) FDC shall be facing the public street and shall be set back a maximum of 2 feet from the face of the curb or the rear of the sidewalk, and at a height of 2 to 3 feet above the finished grade.

3) A public fire hydrant must be within 150 feet of FDC.

4) Maintain 3 feet clear radius around FDC.

5) Where subject to mechanical injury, protection shall be provided. The means of approved protection shall be arranged in a manner that will not interfere with the connection to the inlets.
6) FDC shall have a permanent identification sign to indicate building address, and what it controls. A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections.

7) FDC connections shall be of all brass construction.

8) All FDC’s shall have two inlets, each with a clapper.

9) Protective metal covers or plugs shall be provided on the inlets. (No plastic)

10) When system side (yard) hydrants are connected to the underground fire sprinkler piping, a UL listed 6-inch FDC with four 2½ inch inlets shall be provided. Each inlet shall be equipped with its own clapper.

D. Fire Hydrants
   1) Prior to construction, fire hydrant type, location, and required fire flow are determined by this district for each building, in accordance with the California Fire Code (CFC). See Fire District Standard 2.
   2) Fire hydrants shall be provided with shut-off valves located in the street or driveway, within 4 to 10 feet of the hydrant.
   3) 3 feet shall be maintained around all hydrants.
   4) Blue location reflectors shall be installed off center to side of street hydrant is installed.
   5) Protection of hydrants by bollards or alternate method approved by fire official shall be provided.

E. System Side Hydrants
   Definition of system side (yard) hydrants: Connected to underground piping between the FDC and the sprinkler riser of a fire sprinkler system.

   1) Requires Fire Department approval and is only allowed when design constraints provide no other alternative.
2) If system side hydrants are used, the mains must be sized to meet the fire flow determined by this District. Hydraulic calculations shall be submitted to verify that the pipe size will provide the required gpm at 20 psi residual pressure.
3) Requires a UL listed 6-inch FDC with four 2 ½ inch inlets. Each inlet shall be equipped with its own clapper.
4) System side hydrants shall be painted yellow.
5) System side hydrants shall be provided with shut-off valves located in the street or driveway, within 4 to 10 feet of the hydrant.

VII. INSPECTIONS

A. GENERAL:
1) Inspection of overhead piping will not be conducted until plans are approved.
2) All pipes shall be exposed for rough inspection.
4) Required 200 psi Pressure test per NFPA 13 Required at Rough Inspection.
5) For maintenance and repair purposes, a clearance of 3 feet shall be provided around all risers. If a riser is to be concealed by a wall or closet, access to the riser shall be provided by a door with minimum dimensions of 2 feet by 6 feet 8 inches. The door shall have a “Sprinkler Riser” identification sign posted on the outside.
6) A hydrostatic test is required on all tenant improvement projects involving pipe sizes 2 ½ inches or larger over 20 heads.
7) Hydraulic calculation plates required on risers shall be made of metal, unpainted, and the information permanently stamped or engraved, and attached to the riser with a metal “U-bolt” or chain.
8) All doors or other building materials enclosing or concealing sprinkler risers shall have a durable metal sign with a minimum of three inch (3”) red block letters on a contrasting background stating “FIRE RISER INSIDE.” Signs shall be installed at five feet (5”) above finished floor on the outside of fire sprinkler riser access doors.
B. CALLED INSPECTIONS:

1. “WELD INSPECTION”
   a) All welded pipe shall be visible on the ground and inspected for quality and consistency of welds. A certificate from a licensed welder shall be provided when requested, and all pipes shall have the matching stamp visible to the inspector.

2) “OVERHEAD ROUGH INSPECTION”
   a) All piping and components are required to be in place and shall be exposed and visible, including fire department connection, sprinkler heads, valves, gauges, and flow switches. Installation shall be per the approved plans.
   b) All seismic bracing, hangers and other restraints shall be in place and installed per the approved plans.

3) “OVERHEAD HYDRO INSPECTION”
   a) The system piping and all components shall be tested in accordance with current edition of NFPA 13.

4) “FINAL INSPECTION”
   a) All fees to be paid prior to final inspection.
   b) All sprinkler heads and escutcheons shall be in place. All sprinkler heads shall be free of protective caps, paint, texturing, or any other obstruction. Protective guards shall be installed on all heads in garage and storage areas. Any other protective coatings and plastic bags shall be in place on sprinkler heads installed in locations susceptible to corrosion or overspray.
   b) All required Signage to be complete permanently affixed. All Exterior Signs to be of metal type.
c) A flow test shall be performed using the approved Inspectors Test Valve. If electrically operated, the water-flow alarm bell shall be connected an energized source. Flow of water shall result in an audible alarm on the premises within 5 minutes after such flow begins and until such flow stops. Monitoring company shall be ready to test dispatch.

**VIII. SCHEDULING INSPECTIONS**

A. Inspection fees paid with plan submittals will provide you with (3) three inspections to complete the project. For projects that exceed this limit, inspection requests will not be accepted unless additional fees are paid prior to scheduling an inspection.

B. It is the responsibility of the installing contractor/owner to schedule and be on the job site during inspection with approved plans. Failure to do so will result in the cancellation of the inspection. Cancelled inspections will be counted as one inspection.

C. Call (805) 566-2453 three business days prior to inspection for scheduling an inspection.

D. When scheduling an inspection by phone, be sure to leave a return call telephone number, so the inspector can call you back to verify our inspection time.

E. Inspection times are approximate and may vary because of delays at previous inspections or emergency response by Fire District personnel. Please allow time on either side of the inspection time for the inspector to arrive.

F. At the time of system acceptance, a Title 19 installation tag shall be affixed to the riser with the installers name and date of installation per NFPA 25. A copy of these standards shall be provided to owners.