



# Santa Barbara County Fire Department

## Fire Prevention Division

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### Development Standard - #4c

## COMMERCIAL SPRINKLER SYSTEM STANDARD

*The information contained in this standard is provided solely for the convenience of the reader in complying with the Santa Barbara County Fire Department (SBCFD) requirements. It should be used as a schematic reference only. The SBCFD reserves the right to make changes and improvements to this standard as and when required by law, or otherwise, at any time. The Department's current standards will be posted and made available for downloading by the public at the following web site: [www.sbcfire.com](http://www.sbcfire.com)*

*Please note that the SBCFD assumes no liability for any damages incurred directly or indirectly as a result of any errors, omissions, or discrepancies between this standard and any applicable law. It is the sole responsibility of the person or persons conducting any work pursuant to this standard to ensure their work complies with any and all applicable codes, ordinances, and regulations.*

### CHAPTER 1 ADMINISTRATION

**1.1 PURPOSE.** This standard is prepared for the use and guidance of those charged with designing, installing, inspecting, approving, or maintaining commercial fire sprinklers systems.

**1.2 SCOPE.** This standard applies to the design and installation of automatic fire sprinkler systems in commercial structures within the jurisdiction of the Santa Barbara County Fire District (SBCFD). This standard shall be used in conjunction with the current adopted editions of the Santa Barbara County Fire Code, the National Fire Protection Association (NFPA) Standard 13 and any other applicable standards.

**1.3 APPLICABILITY.** This standard shall apply to all automatic fire sprinkler systems installed in commercial structures within the jurisdictional boundaries of the Santa Barbara County Fire District.

**1.4 FEES.** A plan check fee is required for the installation of or modification to a fire sprinkler system as required by the current SBCFD fee schedule.

### CHAPTER 2 DEFINITIONS

**WATER PURVEYOR:** A public utility, a mutual water company, a government body or other entity, owning and operating a water system and holding a valid permit from the state or county health department to purvey water.

### CHAPTER 3 DESIGN AND PLAN SUBMITTAL

**3.1 DESIGN AND INSTALLATION.** Only the following classifications of contractors and professionally licensed individuals shall be allowed to design and install commercial fire sprinklers:

**3.1.1 Underground Design.** Underground fire protection plans shall be designed by a licensed contractor (A, C-16, C-36 or C-34) 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.

**3.1.2 Underground Installation.** The underground fire protection system shall be installed by an individual or firm that holds a State of California Contractors License (A, C-16, C-36 or C-34).

**3.1.3 Overhead Design.** Overhead sprinkler 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.

**3.1.4 Overhead Installation.** The overhead sprinkler system shall be installed by an individual or firm that holds a State of California Contractors License (C-16).

**3.1.4.1** 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.

**3.1.5 Installing Contractor.** Contractors may only design systems that the firm has a contract to install.

**3.2 PLAN SUBMITTAL.** At the time of building permit application for new structures designed to accommodate automatic fire sprinklers, or for any installation of or modification to an automatic fire sprinkler system, plans and specifications shall be submitted for review and approval. Plans shall be drawn to an indicated scale of not less than 1/8 inch = 1 foot for overhead plans and 1 inch = 20 feet for underground plans and digitally submitted to Planning and Engineering by emailing digital copies of all documents to [pe.submittals@countyofsb.org](mailto:pe.submittals@countyofsb.org). In addition to the information required by the applicable standard, the submittal shall include the information specified herein. Once approved, a copy of the approved plan shall be maintained on the premises.

- 1) Scope of work of the project.
- 2) Name of owner and/or occupant.
- 3) Location of project, including parcel #, street, number, and city.
- 4) Name of sprinkler installer, address, phone number, type of license and license number.
- 5) Plot plan showing structures, roads and driveways, underground pipe size and type, point of supply connections, depth of bury, type and size of any valves.
- 6) Piping plan showing point of supply, pipe, and structure elevations as they relate to each other.
- 7) Full height cross-section showing building construction types.
- 8) Riser detail showing main drain, pressure gauge, flow switch, and relief valve (where applicable).
- 9) Detailed calculations.
- 10) Sprinkler head spacing.
- 11) Show clearly all non-sprinklered areas.
- 12) Indicate manufacturer, style, model, orifice size, and "K" factor of each sprinkler used.

- 13) Type and size of each pipe.
- 14) Hanger detail.
- 15) Sway brace detail.
- 16) Indicate type of fitting used.
- 17) Water flow information including: Flow location, static pressure (psi), residual pressure (psi), flow (gpm), date, time and the name of the person and company who conducted the test or supplied the information.

**3.2.2 Hydraulic calculations.** The following information shall be contained in the hydraulic calculations:

- 1) Calculations must conform to manufacturer's specifications.
- 2) "K" factors for all sprinklers.
- 3) "C" values for the type of pipe used.
- 4) A pump curve or city supply curve, where the total demand point is clearly plotted.

**3.2.3 Field Changes.** Field changes may require re-submittal of plans along with additional plan check fees.

**3.3 VERBATIM NOTES.** The following notes shall be completed and placed verbatim on the working sprinkler plans:

1. A current 5-year inspection certification tag shall be affixed to the system riser(s) and a copy of the inspection report shall be on file with this Santa Barbara County Fire Department per NFPA 25-2013 California Edition.
2. Underground Notes. The following notes shall be completed and placed verbatim on the working underground plans.
3. Thrust blocks to be designed, located, and installed per NFPA 13-2022, and Santa Barbara County Fire Department requirements.
4. Underground supply piping four (4) inches or greater shall be PVC C900, Class 150, or lined and sleeved ductile iron with a minimum bury of thirty-six (36) inches.
5. Underground supply piping less than four (4) inches shall be CPVC or Type-L copper with a minimum bury of thirty-six (36) inches.
6. 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.
7. Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler, standpipe, or other fire protection system piping to remove foreign materials. Flushing shall be in the presence of a Fire Prevention representative and in accordance with NFPA 13- 2022.
8. All new private fire service mains shall be pressurized to two hundred (200) psi, or fifty (50) psi above the maximum static pressure, when the maximum static pressure is in excess of one hundred fifty (150) psi. The pressure shall be provided for at least two (2) hours prior to the scheduled inspection time.
9. The trench shall be backfilled between joints before testing to prevent movement of pipe.
10. Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection.

11. Tests shall be made by the contractor in the presence of a Fire Prevention representative.
12. All control valves shall be indicating, with a tamper switch.
13. Fire department connection (FDC):
  - a. Shall be accessible and visible.
  - b. Shall be facing the public street and set back a maximum of two (2) feet from the curb face or rear of the sidewalk, and at a height of 1.5 to 4 feet above the finished grade.
  - c. Maintain a three (3) foot clear radius around FDC's.
  - d. Provide a minimum three foot by three foot (3'x3') square concrete pad.
  - e. Where subject to mechanical injury, protection shall be provided.
  - f. Shall have an identification sign to indicate the building address and what it controls.
  - g. Shall be of all brass construction with two inlets, each with a clapper and protective metal cover or plug (no plastic).
  - h. Shall be painted red.
  - i. Shall be within one hundred fifty (150) feet of a fire hydrant.

**3.4 ALTERNATIVE METHODS.** The Fire Chief or their designee is authorized to approve alternate materials or methods provided that the Chief finds that the proposed design, use or operation satisfactorily complies with the intent of the Fire Code.

## CHAPTER 4 UNDERGROUND

**4.1 GENERAL.** Underground piping shall be installed in accordance with NFPA 24, NFPA 22 (when applicable), NFPA 1142 (when applicable) and the approved plans prepared by a civil engineer or piping installation contractor as approved by the Santa Barbara County Fire District.

**4.1.1** All sprinkler systems shall have a single supply main serving as a dedicated fire line to the automatic sprinkler system.

**4.1.2** Backflow Prevention Devices. Backflow devices are not a requirement of the Fire Department. Please check with the appropriate water company for information.

**4.2 TRENCH MATERIALS.** All piping shall be laid in a six-inch (6") bed of sand or natural gravel not over one inch (1") in diameter and have a twelve inch (12") fill of sand or natural gravel not over one inch in diameter.

**4.3 DIG PROTECTION.** A strand of three inch (3") wide plastic blue tape marked "Water" shall be placed twelve inches (12") above all piping.

**4.4 PLASTIC PIPING.** Plastic piping approved for underground installations shall be PVC, C900, Class 150 or greater, and be listed for such use.

**4.4.1** All runs of non-metallic water pipe shall have a No. 10 gauge solid soft drawn copper locator wire taped on top of the pipe to facilitate locating the pipe at a later date. The wire shall be stubbed up inside each valve box. Continuity test shall be conducted on each splice at all locations.

**4.4.2** Non-metallic pipe shall not be used within five feet of a building.

**4.5 GALVANIZED PIPING.** Galvanized pipe is not approved for underground supply piping.

**4.6 DUCTILE IRON.** Ductile iron pipe installed at or below grade shall be continuously sleeved to inhibit corrosion in either 8-mil linear low density (LLD) or 4-mil high-density, cross laminated (HDCL) polyethylene sheets or tubes in accordance with American Water Works Association Standard C105/A21.5-05, Polyethylene Encasement for Ductile-Iron Pipe Systems. Any fasteners shall be made of low-alloy steel.

**4.7 FERROUS METAL PIPE.** All ferrous metal pipe shall be lined and additionally, steel pipe shall be coated and wrapped. For buried pipe, galvanizing, internally or externally, does not meet the requirements of this section. Exception: Internal galvanizing shall be permitted as the lining for the pipe between the check valve and the FDC.

**4.8 PIPE JOINTS.** Buried joints and fittings shall be of an approved type and compatible with the pipe being used. Steel pipe fittings shall be coated, wrapped and lined.

**4.8.1** Pipe joints shall not be located under foundation footings. The pipe under the building or building foundation shall not contain mechanical joints.

**4.8.2** Concrete thrust blocks or other approved retaining shall be installed at all locations where piping changes direction.

**4.9 RISER CLEARANCE.** Clearance shall be provided for pipes passing through walls or slabs in accordance with NFPA 13.

**4.10 FLANGE BOLTS.** All exposed flange bolts shall be coated in a bituminous material to protect the bolts from corrosion.

## **CHAPTER 5 FIRE DEPARTMENT CONNECTION (FDC)**

**5.1 GENERAL.** Each building shall be provided with a dedicated Fire Department Connection (FDC) in accordance with this chapter unless approved by the fire code official.

**5.2 ACCESS.** FDC shall be accessible.

**5.2.1** FDC's shall be facing the public street and shall be set back a maximum of two (2) feet from the face of the curb or the rear of the sidewalk, and at a height of one and a half (1.5) to four (4) feet above the finished grade.

**5.2.2** Maintain three (3) feet clear radius around fire department connections.

**5.2.3** When installed in planters FDC's shall be provided with a minimum three foot by three foot (3'x3' square) concrete pad.

**5.2.4** Where subject to mechanical damage, 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.

**5.3 VISIBILITY.** FDC's shall be visible.

**5.3.1** FDC shall have a permanent identification sign to indicate building address and what it controls with reflective red lettering on white background and lettering one inch (1") tall.

**5.3.2** FDC heads shall be painted red.

**5.4 PROXIMITY TO HYDRANT.** FDC's shall be located within one hundred fifty (150) feet of a hydrant.**5.5 CONSTRUCTION.** FDC connections shall be of all brass construction.

**5.5.1** All FDC's shall have two inlets, each with a clapper.

Exceptions:

- 1) Systems that have been hydraulically designed with a two and a half (2 ½) inch backflow assembly.
- 2) 13R systems are permitted to be provided with a single two and a half (2 ½) inch inlet.

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

**5.6 STANDPIPE CONNECTION.** When standpipes are connected to the fire sprinkler piping, a UL listed six (6) inch FDC with four (4) two and a half (2 ½) inch inlets shall be provided. Each inlet shall be equipped with its own clapper.**5.7 SYSTEM SIDE HYDRANTS.** When system side (yard) hydrants are connected to the underground fire sprinkler piping, a UL listed six (6) inch FDC with four (4) two and a half (2 ½) inch inlets shall be provided. Each inlet shall be equipped with its own clapper.**CHAPTER 6 SPRINKLER RISER****6.1 GENERAL.** Sprinkler risers shall be installed in accordance with this Chapter.**6.2 LOCATION.** System riser shall be inside the fire control room in accordance with the following.

**6.2.1** For maintenance and repair purposes, a clearance of three (3) feet shall be provided around all risers.

**6.2.2** Fire control rooms shall be located within the building on an outside wall at a location approved by the AHJ and shall be provided with a means to access the room directly from the exterior with an approved door of minimum dimensions of 36"X80".

**6.2.3** Fire control room shall contain all fire sprinkler system risers, fire alarm control panels, spare sprinklers and wrench, and other fire equipment as required by the AHJ.

**6.2.4** Durable signage shall be provided on the exterior side of the access door to identify the fire control room. The sign shall indicate "FIRE CONTROL ROOM" with three-inch (3") tall by half inch (½") stroke letters that contrast with their background.

**6.2.5** There shall be a key for access to the Fire Control Room in the Knox key vault. The key vault location to be determined by the AHJ.

**6.2.6** Fire control rooms shall have a minimum dimension of five feet (5') and not be less than thirty-five (35) square feet in usable area.

**6.2.7** The fire sprinkler riser shall be located between twelve and eighteen inches (12" and 18") from that outside wall and at least twelve inches (12") from any other wall.

**6.2.8** The fire control room may contain other building service equipment. This other equipment shall not be within three feet (3') in front of any fire equipment in the room.

**6.2.9** There shall be a minimum of a two-inch (2") clearance between the fire riser pipe and the concrete/pipe sleeve floor structure. The two-inch (2") space shall be filled with a compressible material that allows movement

**Exception:** 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 two feet (2') by six feet eight inches (6' 8"). The door shall have a "Sprinkler Riser" identification sign posted on the outside.

**6.3 ALARM BELL.** An alarm bell shall be located on the building in an approved, readily visible location. Approved signs shall be legible and indicate, "SPRINKLER FIRE ALARM - CALL 911 IF RINGING" in accordance with NFPA 13.

**6.3.1** Alarm bells shall provide a sound pressure level of a minimum fifteen decibels (15db) above ambient noise.

## CHAPTER 7 VALVES

**7.1 GENERAL.** Valves on Fire Sprinkler Systems including underground piping shall comply with this section.

**7.1.1** All sprinkler system control valves shall be supervised with tamper switches that report to a central station alarm company and shall be locked in the fully open position with a non-hardened lock and chain assembly.

**7.2 CONTROL VALVES.** All automatic fire-sprinkler systems shall be provided with a dedicated indicating exterior control valve.

**7.2.1** All sprinkler control valves and sectional valves shall be painted red.

**7.2.2** All control valves, including sectional control valves, shall have a permanent identification sign to indicate their function prior to final.

**7.3 MULTISTORY CONTROL VALVES.** 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, flow switch, and an inspector's test valve.

**7.3.1** Floor control valves shall have a permanent sign identifying areas or systems controlled in half inch ( $\frac{1}{2}$ ") letters that contrast with their background and shall be permanently banded to the valve or permanently affixed to a wall adjacent to the valve.

**7.4 INSPECTORS TEST VALVE.** Inspectors test valves shall be installed on all automatic fire-sprinkler systems.

**7.4.1** Inspectors test valves shall be located in an approved remote area.

**7.4.2** Inspectors test valves shall be located inside the building in a readily accessible location.

**7.4.3** Test valves located within a wall shall be protected by a wall panel door with a simple turn knob. Panel doors kept closed by screws or locks may be acceptable. The panel door shall have an "Inspector Test Valve" identification sign posted on the outside.

**7.5 SYSTEM CONTROL VALVES.** System control valves shall be an indicating type valve assembly. To comply with water quality requirements, back flow protection shall be provided in accordance with local Water Purveyor standards. All sprinkler systems shall have an OS&Y valve incorporated into the above ground double detector check valve as approved by the local water purveyor.

**7.5.1** 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.

**7.5.1.1** Indicating valves on backflow devices shall be chained and locked in the open position prior to final inspection.

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

**7.5.3** Vehicle protection shall be provided for above ground control valves subject to vehicular damage by approved bollards or a minimum of a six-inch (6") curb.

**7.6 SPECIAL HAZARD SYSTEM VALVES.** Sprinkler systems located in special hazard areas (i.e. spray booths, trash chutes, flammable liquid storage, etc.) shall have a separate locked and monitored indicating control valve

## CHAPTER 8 INSTALLATION REQUIREMENTS

**8.1 GENERAL.** Installation of Fire Sprinkler systems shall be in accordance with this chapter.

**8.2 PIPE PROTECTION.** All pipe and materials delivered to the job site shall be protected from the elements and physical damage.

**8.3 MONITORING.** Fire sprinkler systems shall be monitored in accordance with SBCFD Standard 5.

**8.4 PENETRATIONS.** All penetrations of fire separation walls by sprinkler piping shall be sealed with a suitable sealant prior to final inspection.

**8.5 TRASH ENCLOSURES.** All trash areas designed for storage in excess of one and a half (1.5) cubic yards (ie 40.5 cubic feet) that are located within five (5) feet of combustible walls, openings or combustible roof eave lines, shall be protected by an automatic sprinkler system.



**8.6 SWAY BRACING.** Plans submitted for plan check must show complete hanger and sway bracing details.

**8.6.1** Lag screws or power-driven fasteners shall not be used to attach braces to the building structure.

**8.6.2** Fastening methods other than those identified in NFPA 13 shall be acceptable for use if certified by a registered Professional Structural Engineer to support the loads determined and submitted to VCFPD.

**8.7 END OF LINE RESTRAINTS.** Branch lines that exceed thirty (30) feet shall require end of line restraints.

**8.8 SPRINKLER OMISSIONS.** Subject to the approval of the building official and with the concurrence of the fire code official, sprinklers may be omitted.

**8.8.1** When sprinklers are considered undesirable because of the nature of the contents or in rooms/areas which are of noncombustible construction or contains electrical equipment.

**8.8.2** Sprinklers shall not be installed when the application of water, or flame and water, to the contents may constitute a serious life or fire hazard, as in the manufacture or storage of quantities of aluminum powder, calcium carbide, calcium phosphate, metallic sodium and potassium, quicklime, magnesium powder, and sodium peroxide.

**8.8.3** Safe deposit or other vaults of fire-resistive construction, when used for the storage of records, files, and other documents, and the files are stored in metal cabinets.

**8.8.4** Communication equipment areas under the exclusive control of a public communication utility agency, provided all of the following requirements:

- 1) The equipment areas are separated from the remainder of the building by one-hour fire resistive occupancy separation.
- 2) Such areas are used exclusively for such equipment.
- 3) An approved automatic smoke detection system is installed in such areas and is supervised by an approved central, proprietary or remote station service, or a local alarm which will give an audible signal at a constantly attended location.
- 4) Other approved fire protection equipment such as portable fire extinguishers or Class II standpipes are installed in such areas.

**8.8.5** Other approved automatic fire extinguishing systems may be installed to protect special hazards or occupancies in lieu of automatic sprinklers.

**8.8.6** The top of elevator shafts and elevator equipment rooms when machine rooms, shafts, and passenger cars meet ASME A17.1 requirements for fire resistive construction.

## **CHAPTER 9 LIMITED AREA SYSTEMS**

**9.1 GENERAL.** Limited area systems shall comply with the requirements of the 2022 California Fire Code section 903.3.8

**9.2 DOMESTIC SERVICE.** Limited area systems are permitted to be connected to the domestic service and shall require a control valve on the common main water supply line above grade at the structure and a control valve on the supply to the fixtures. There shall not be a valve on the sprinkler supply. Consult the water purveyor for alternative piping arrangements.

**9.3 DESIGN AREA.** Design shall be by the room design method as described in NFPA 13. Attic spaces shall be considered rooms.

## CHAPTER 10 INSPECTIONS

**10.1 INSPECTIONS.** The requirements for inspections and types of inspections that are to be conducted are listed in this chapter and shall comply with the following.

**10.2 COVERING WORK.** No work shall be covered or otherwise rendered inaccessible or unviewable prior to fire department inspection.

**10.3 SCHEDULING WINDOW.** Inspections shall be scheduled at least two business days prior to the desired inspection time via the inspection request webpage found at <https://sbcfire.com/inspection-requests/>

**10.4 UNDERGROUND ROUGH AND HYDRO INSPECTION.** All underground fire lines shall be pressurized to two hundred (200) psi, or fifty (50) psi above the maximum static pressure, when the maximum static pressure is in excess of one hundred fifty (150) psi. The pressure shall be provided for at least two (2) hours prior to the scheduled inspection time. Underground pipe joints, thrust blocks, and other anchors shall be left exposed for inspection.

**10.5 UNDERGROUND FLUSH INSPECTION.** All private fire service mains shall be flushed prior to connection to the overhead piping.

**10.6 UNDERGROUND FINAL INSPECTION.** All sectional control valves shall be verified to be in the open position in the presence of a Fire Prevention representative at final inspection.

**10.7 WELD INSPECTION.** When overhead piping arrives to the job site, it shall be inspected for welds, slag, or any materials left in the pipe. Welder certification shall be provided.

**10.8 OVERHEAD ROUGH AND HYDRO INSPECTION.** The sprinkler system shall be field tested and inspected at the rough plumbing stage (i.e. exposed pipe and fitting stage) by the Fire Prevention Bureau. All overhead fire lines shall be pressurized to two hundred (200) psi, or fifty (50) psi above the maximum static pressure, when the maximum static pressure is in excess of one hundred fifty (150) psi. The pressure shall be provided for at least two (2) hours prior to the scheduled inspection time.

**Exception:** A hydrostatic test is required only on tenant improvement projects involving pipe sizes two and a half (2 ½) inches or larger.

**10.9 FINAL INSPECTION.** The sprinkler system and all related components shall be tested and inspected by the Fire Prevention Bureau at the final inspection stage, prior to occupancy being granted. At the time of new system acceptance, an installation tag shall be affixed to the riser as prescribed by Title 19, California Code of Regulations, Chapter 5.