

**City Of Clovis
Fire Department
Fire Sprinkler and Plan Review Minimum Submittal Requirements**

1. Provide Fire Sprinkler Plans and Hydraulic Calculations to the City of Clovis Fire Department for their Review/Approval. For the first submittal, provide a set of Fire Sprinkler Plans and Hydraulic Calculations as a separate package (to be routed to the Fire Department for their Review/Approval). Add the sheets to the Index on the Cover Sheet. Once the Fire Department has approved the Fire Sprinkler Plans and Hydraulic Calculations, the approved plan sheets shall be inserted into the final plan sets being resubmitted.
2. Provide the approved Fire Sprinkler Plans, and Hydraulic Calculations as part of the plan set resubmitted for back-check. Add the sheets to the Index on the Cover Sheet, and insert the approved Fire Sprinkler sheets into the final plan sets being resubmitted. Coordinate with the Fire Department to ensure the plans and calculations comply with all the following items.

RESIDENTIAL SPRINKLER PLAN REVIEW

Hydraulic Calculations

1. For hydraulic design purposes, indicate 45 psi static, 35 psi residual, and a flow of 1800 gallons per minute in hydraulic calculations.
2. All standard plans, include a minimum of 40' of 1" type K copper pipe (C factor of 150) with an interior diameter of .995 from the city main to the meter.
3. Include an additional 10'6" of pipe lengths for the fittings for the meter in the underground in the hydraulic calculations for standard plans and custom homes. This should be added to the 40' of 1" type K copper pipe for a total of 50'6".
4. For all standard plans, indicate a minimum of 70' of pipe from the meter to the riser and specify the pipe's type and size. For cottage homes, indicate a minimum of 250' of 1 ½" from the meter to the riser.
5. Include an equivalent length chart with calculations. (note for plan checker-some designers add tee runs into the pipe lengths because the software they use does not allow them to enter it as a fitting)
6. All calculations for custom homes must indicate the actual length of pipe from the city main to the meter using 1" type K copper pipe (C factor of 150) with an interior diameter of .995 and the type and length of the pipe after the meter.
7. Indicate a minimum 3-pound friction loss for the meter.
8. Include a 5-gallon domestic water demand in all hydraulic calculations for 13D systems.

Flow (Q), K factor (K), Pressure (P)

- a. $Q = K\sqrt{P}$
- b. $P = \left(\frac{Q}{K}\right)^2$
- c. $K = Q \div \sqrt{P}$

9. Hazen Williams Formula

a. $P = \frac{4.52Q^{1.85}}{C^{1.85}D^{4.87}}$

Installation Requirements

1. Provide a full flow quarter turn shut off valve.
2. All piping in the attic is required to be covered by insulation.
3. The garage must have fire sprinklers installed. For garages with finished ceilings, 175-degree residential sprinklers shall be used. Overhead door position may be ignored relative to sprinkler placement.
4. Note that all uninsulated attic areas, such as the garage attic, require that the sprinkler piping be insulated.
5. Provide a domestic water line drop from the sprinkler piping to a remote toilet fixture.
6. Steel pipe used in the system riser shall be galvanized.
7. Ceiling sprinklers shall be located a minimum of 36" from the centerline of all electrical boxes.
8. In bedrooms, sprinklers shall be installed a minimum of 36" from the center of the room to accommodate the future installation of ceiling fans or light fixtures.
9. Shadow areas are permitted in the protection area of a sprinkler as long as the cumulative dry area does not exceed 15 square feet.
10. The small closet rule NFPA#13D section 8.3. does not apply to closets containing laundry or other appliances. Closets 24 square feet or less are not required to be fire sprinklered. The provision to sprinkler closets where the least dimension exceeds 3' has been removed from the 2016 Edition of NFPA 13D.
11. Provide a spare fire sprinkler headbox that includes at least one sprinkler head of each type used in this residence (normally two spare sprinkler heads). The spare headbox is to be located in the laundry room or in the garage adjacent to the door leading into the house. A wrench is not required in the spare head kit.

Standard Notes

1. Provide a legend on the cover sheet of the fire sprinkler plan that includes each of the different head types for this residence.

2. A complete & separate sprinkler plan is required for each floor plan option. 2019 CRC R106.1.1
3. Indicate maximum head spacing on plans.
4. Note on the fire sprinkler plan that the system used must comply with NFPA 13D, or R313.3, which is considered to be equivalent. 2019 CRC R313
5. Note on the residential Fire Sprinkler Plan that, effective 1/1/10, all piping, fixtures, fittings, and sprinkler heads must comply with the lead-free requirements of AB1953. Note that all of the above-noted items are not permitted to exceed 0.25% lead content.
3. Provide table R313.3.2.2 regarding the location of intermediate sprinkler heads on the fire sprinkler plan. 2019 CRC R106.1.1
6. Note on the fire sprinkler plan that modifications are prohibited. Sprinklers that have been painted, caulked, modified, or damaged must be replaced. 2019 CRC R313.3.2.6
7. Note on the fire sprinkler plan that a separate shut off valve is not permitted for the fire sprinkler system. 2019 CRC R313.3.3.2
8. Note on the fire sprinkler plan that an owner's manual must be provided to the homeowner. 2019 CRC R313.3.7
9. Note on the fire sprinkler plan at the main shut-off valve, a tag or a sign stating the following is required; "Warning, the water system for this home supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtration systems, and automatic shut-off valves, SHALL NOT be added to this system without a review of the fire sprinkler system by a fire protection specialist. DO NOT REMOVE THIS SIGN" 2019 CRC R313.3.7
10. Show an alternate point of connection for the water service on the opposite side of the residence. 2019 CRC R106.1.1
11. Note the ceiling height of all rooms in the residence that require fire sprinklers, including the garage on the fire sprinkler plan.
12. Provide the designer's signature on the plans and the calculations.

Pipe Diameters to be used in Calculations

Pipe Diameters: The City of Clovis Water Division specifies Type K copper tubing for single-family home domestic water services to the meter from the public water main. The interior diameter of Type K copper tubing for hydraulic calculations purposes is:

<u>Nominal Size</u>	<u>Actual Internal Diameter</u>
1"	.995"

1-1/4" 1.24" (only for greater than 40' of pipe between the city main and meter)

Fittings in the City Service: There are two valves between the city water main and the water meter that must be included in hydraulic calculations. The total equivalent pipe lengths for the corp. stop and angle meter stop are as follows:

1" = 10.6 feet

1-1/4" = 13.8 feet

Water meter friction loss: A meter loss must be included, even if an existing house does not currently have a water meter. Water meters will be added to all existing house domestic services in the near future. Neptune T-10 friction loss charts for 1", 1-1/2", and 2" services are attached.

Water meter transition: Two elbows must be added to the calculations for the transition from the meter to the PVC underground piping run to the house.

PVC tubing inside diameter:

1 inch = 1.049"

1 ¼ inch = 1.38"

1 ½ inch = 1.61"

2" inch = 2.067"

CPVC tubing inside diameter:

¾ inch = .874"

1 inch = 1.101"

1 ¼ inch = 1.394"

1 ½ inch = 1.598"

2 inch = 2.003"

Type K Copper tubing inside diameter:

1 inch = .995"

1 ¼ inch = 1.245"

1 ½ inch = 1.481"

2" inch = 1.959"

PEX tubing inside diameter:

¾ inch = 0.68"

1 inch = 0.88"

1 ¼ inch = 1.07"

1 ½ inch = 1.26"

2" inch = 1.65"

Galvanized tubing inside diameter:

1 inch = 1.049"

1 ¼ inch = 1.38"

1 ½ inch = 1.661"

2" inch = 2.067"

**Table G1
Allowance for Friction Loss in Fittings*****

Fitting Size ANSI Inches	3/4	1	1-1/4	1-1/2	2	2-1/2	3
Tee Branch- ft.	3	5	6	8	10	12	15
Elbow 90°*- ft.	4	5	6	7	9	12	13
Elbow 45°- ft.	1	1	2	2	2	3	4
Coupling- ft.	1	1	1	1	1	2	2
Tee Run**- ft.	1	1	1	1	1	2	2