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FIRE DEPARTMENT
INFORMATION BULLETIN

SUBJECT: **STANDARD FOR DESIGN, INSTALLATION AND TESTING OF SELF-CONTAINED WATER SUPPLY SYSTEMS**

Bulletin Number: 038
Date of Issue: February 20, 1997

Code Reference:
Santa Rosa City Code, Chapter 18-44
1994 City Code (UFC) Section 1003

NOTE: This bulletin is a summary of Fire Department interpretations of City and State Codes and information contained herein applies to typical instances and may not address all circumstances.

The National Fire Protection Association's Standard 13D (NFPA 13D) is the standard to which most one- and two-family residential sprinkler systems are designed and installed.

The 1994 Edition of NFPA 13D, Chapter 2, Section 2-1 requires that, "Every automatic sprinkler system shall have at least one automatic water supply. Where stored water is used as the sole source of supply, the minimum quantity shall equal the water demand rate times 10 minutes." NFPA further states in its 1994 "Automatic Sprinkler Systems Handbook" that "Any sprinkler system is only as good as its water supply; therefore, this supply must be automatic and reliable."

When water supply mains are not available for these water supply needs, several "non-traditional" water supply methods may be utilized to provide the necessary pressure and flow to meet the design demand of the fire sprinkler system. These water supply methods range from simply connecting to the domestic supply (e.g., well water, gravity tanks, spring/creek/lake supply) to utilizing "self-contained" water supply systems (e.g., pressure tanks, tank/pump systems).

PURPOSE

The purpose of this Standard is to improve the reliability of self-contained water supply systems by providing minimum requirements for the installation and acceptance testing of self-contained automatic water supply methods.

DEFINITIONS:

SELF-CONTAINED WATER SUPPLY

An assembly of components, which, when filled with water, forms a water supply system that has been designed and installed to provide the demand flow and pressure solely for the automatic fire sprinkler system. Examples are, but not limited to, wells, gravity tanks, pump/tank systems, and pressure tank systems.

INSTALLATION/APPROVAL

Performance Test: All self-contained water supply systems shall be flow tested prior to final acceptance by the Fire Department.

During the flow test, all self-contained water supply systems shall flow the design flow for at least ten (10) minutes at NO LESS THAN the pressure required by the sprinkler manufacturer for the spacing of heads approved by the Fire Department.

Where provided, the manufacturer's recommended testing guidelines shall be utilized for the performance test. Otherwise, two (2) acceptable methods of testing are:

A. INTERIOR METHOD

1. Connect to each of the "required design sprinkler" drops, the test hose arrangement shown in Figure 1-1. The test hose on the hydraulically most remote sprinkler must have a reliable water pressure gauge attached to determine minimum residual water pressure.

   This test hose arrangement is intended to allow flowing the system by discharging the sprinklers (anchored for water reaction) outside the structure.

2. When ready, turn all test hose valves on simultaneously and begin timing the test.
3. Watching the residual pressure gauge connected to the

hydraulically most remote sprinkler drop, flow the system for at least ten (10) minutes or until the gauge falls below the required pressure, whichever comes first. (In order to provide a reasonable margin of safety, an operating pressure of at least 1-2 pounds ABOVE the sprinkler manufacturer's required minimum pressure must be maintained throughout most of the 10 minute test.)

4. If the pressure drops below the required minimum, the system has failed.

B. **REMOTE METHOD**

If the sprinkler system has been approved by the Fire Department to allow design and installation by performance testing from a location remote from the design heads, follow the approved method of testing.

Whichever method of testing is used, any system not flowing the required pressure for at least ten (10) minutes shall not be approved until it can successfully do so.

RELIABILITY

Water supply methods and systems shall be relied upon, with very little maintenance, to provide system demand for at least 50 years or longer without replacement. Reliability is an abstract term when applied to the many methods and systems which supply water to a fire sprinkler system. Residential automatic fire sprinkler systems are intended for, and are providing, reasonable property and life safety protection. It is critical that reliability is a primary consideration when reviewing water supply methods and systems submitted for connection to the fire sprinkler system. Concerns about reliability that should be satisfactorily mitigated by the contractor or manufacturer are presented in this Standard. The Fire Department will work closely with the contractor, installer, manufacturer and the California State Fire Marshal's Office whenever necessary to satisfactorily address these concerns.

AREAS OF CONCERN:

To ensure greater reliability, the following recommendations shall be considered:

A. **FOR GRAVITY SYSTEMS**

The elevation of the source shall remain constant for the expected life of

the sprinkler system.

If a water source is natural water (e.g., river/stream/lake) the history of, or potential for, drought in the area shall be evaluated.

If static stored water is used, the source shall be protected from sediment buildup and corrosion.

Provision shall be made to replenish water lost due to evaporation or leakage.

The water supply shall be dedicated to fire protection only, and not depleted by domestic/agricultural uses.

Seismic concerns shall be addressed.

Water shall be protected from freezing if applicable.

The manufacturer or contractor shall provide guidelines for acceptance tests and inspections and for homeowner's periodic maintenance inspections.

B. **FOR ELECTRICALLY OPERATED PUMP/TANK SYSTEMS**

Verify with the local power utility that power is reliable, 24 hours per day for at least 50 years or longer.

If constant power supply is questionable, backup power may be necessary.

If pump is battery powered, battery charging/maintenance shall be acceptable to the Fire Department.

Pump maintenance shall be ensured.

History of underground water table shall be verified.

If the pump's source is static stored water, the source shall be protected from sediment buildup and corrosion.

Provision shall be made to replenish water lost due to evaporation or leakage.

Pressure relief shall be provided for the pump if system operating pressures exceed 175 psi.

Pump/tank components shall be expected to remain in proper working order for at least 50 years.

Components shall be listed, either as a complete system or separately by a nationally recognized listing service.

Components shall be provided with protection from environmental elements as necessary.

Water shall be protected from freezing as applicable.

Seismic concerns shall be addressed.

C. **PRESSURE TANK SYSTEMS**

The pressure tank shall be designed to ASME Standards.

The source of pressure in the tank shall be described and evaluated.

Volume of pressure (air/gas) shall be managed to ensure full capacity.

Maintenance of air compressor/receiver system shall be verified.

Air compressor power supply shall be reliable, available 24 hours per day for at least 50 years or longer. If constant power supply is questionable, backup power supply may be required.

The system shall be leak tested after separate sprinkler hydrostatic testing and before final approval of the entire system.

Leak resistant components (e.g., hose, gauges and piping connectors) shall be used.

Pressure relief shall be provided if system operating pressures exceed 175 psi.

System components shall be provided with adequate protection from environmental elements as necessary.

Water shall be protected from freezing if applicable.

Pump/tank components shall be expected to remain in proper working order for at least 50 years.

Components shall be listed, either as a complete system or as separate components by a nationally recognized listing service.

Seismic concerns shall be addressed.

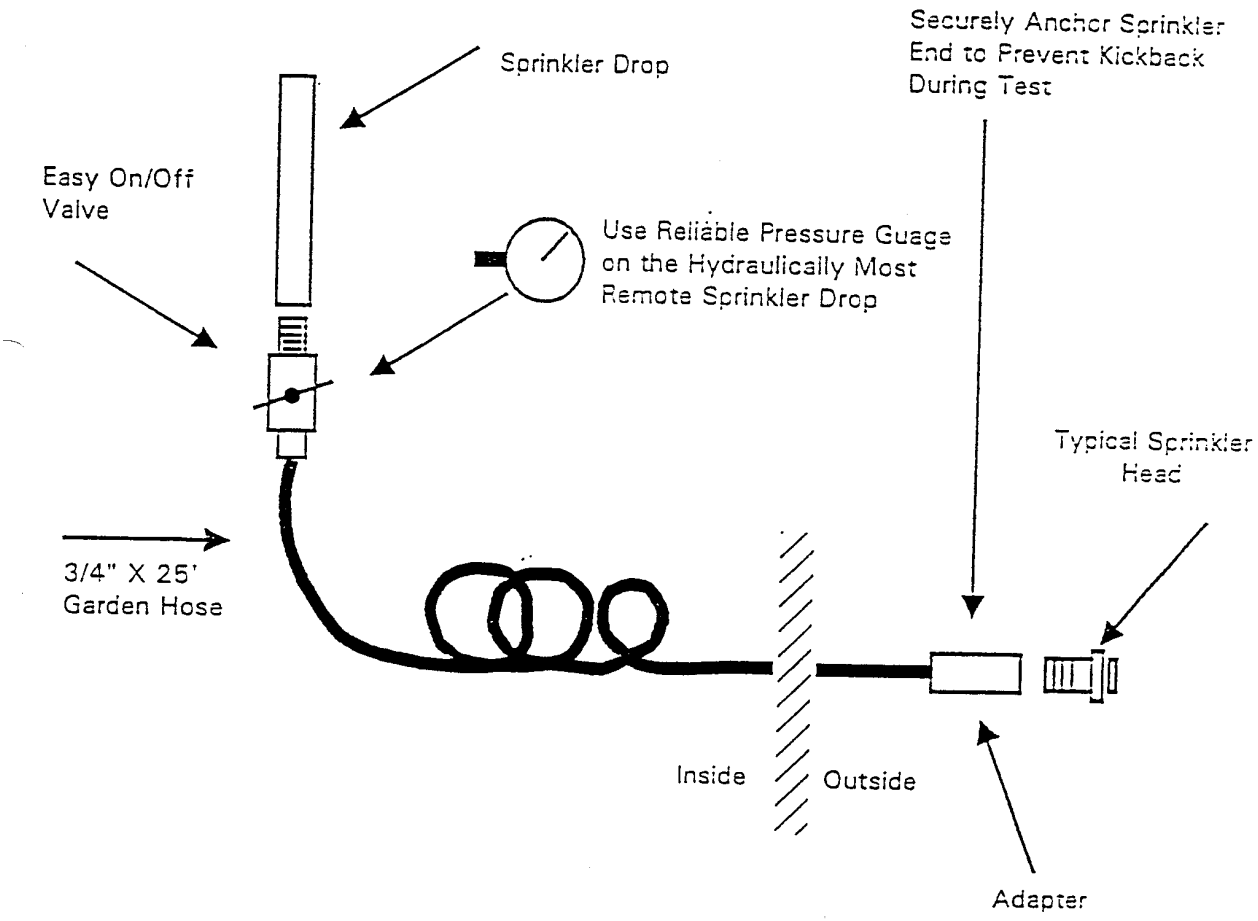
The manufacturer or contractor shall provide guidelines for acceptance tests, inspections and the homeowner's periodic maintenance inspections.

D. **INSPECTION/TESTING/MAINTENANCE**

Manufactured self-contained water supply systems shall be inspected, tested and maintained in accordance with the manufacturer's maintenance instructions when provided.

For other types of water supply methods the Fire Department will assist contractors with the development of specific maintenance standards for the type of method utilized. Local homeowners of sprinklered homes should utilize the standards so developed in maintaining their sprinkler systems.

Figure 1-1


Securely Anchor Sprinkler End to Prevent Kickback During Test
Sprinkler Drop
Easy On/Off Valve
Use Reliable Pressure Guage on the Hydraulically Most Remote Sprinkler Drop
Typical Sprinkler Head
3/4" X 25' Garden Hose
Inside
Outside
Adapter