



# NORTHSTAR FIRE DEPARTMENT



## Fire Sprinkler (NFPA 13D) – Guidelines & Specifications

### Fire Prevention Guideline P-03

#### PURPOSE

To ensure that the design, installation, and maintenance of automatic sprinkler systems in one-and two-family dwellings, and manufactured homes, is appropriate for the protection of the building occupants against fire hazards. Sprinkler systems designed to these guidelines are expected to [1] prevent flashover within the compartment of origin in the building, and [2] provide occupants with improved protection against injury and loss of life.

#### SCOPE

This guideline applies to the design and installation of automatic fire sprinkler systems in one-and two-family dwellings and manufactured homes within the Northstar jurisdiction. This standard shall be used in conjunction with the latest California adopted versions of National Fire Protection Association (NFPA) Standard No. 13D Installation of Sprinkler Systems in One- and Two- Family Dwellings and Manufactured Homes, California Residential Code (CRC), California Fire Code (CFC), as well as any local amendments adopted by the Northstar Community Services District (NCS D) or Northstar Fire Department (NFD). Other applicable national and manufacturer standards may apply. When a design, installation or maintenance provision exists in more than one of the codes, the most restrictive provision shall apply unless otherwise approved by the Fire Code Official.

#### FIRE SPRINKLER REQUIREMENTS

##### 1. PLAN SUBMITTAL REQUIREMENTS

- 1.1 All fire sprinkler plans submittals to the fire department shall be sent as electronic copies in .pdf format and include:
  - 1 sets of plans.
  - 1 set of hydraulic calculations that comply with the calculation procedure and format of the CRC or NFPA 13D.
  - Water flow data from NCS D Utilities, NFD or other approved water supply source.
  - 1 set of manufacturers material information sheets for the fire sprinkler heads, piping, bell and horn/strobe device, flow switch and hangars.
- 1.2 Any plan review fees will be determined after the plan review/check is complete. All fees must be paid before fire department sign-off.

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### 1.3 Specific fire sprinkler plan submittal requirements:

- Location of project including street address and Assessor Parcel Number (APN).
- Name of sprinkler installer, address, phone number, type of license and license number.
- All plan sheets shall be to scale, dimensioned and numbered. The scale shall be no less than 1/8" = 1-foot.
- A site plan drawn to scale with the following items shown on the plan:
  - All property lines, the outline of all buildings on the parcel, roads adjacent to the parcel, the driveway, a north arrow and the scale the plan is drawn to note.
  - The point of connection to public or private water system and size of any public water main.
  - Any alternate water supply components such as a well, pump or storage tank.
  - The point of entry of the water service to the dwelling.
  - The size and type of all pipe and fittings, with the length of each segment of the underground supply line.
  - The location, size and arrangement of all devices on the water supply line, such as a meter, valves and backflow prevention devices.
  - The location of the bell (10") or horn/strobe.
  - Elevation reference points corresponding to matching locations in the hydraulic calculations.
- A floor plan / fire sprinkler plan drawn to scale with the following items shown on the plan:
  - Label all rooms and indicate the use of any room where sprinkler protection is not being provided.
  - The location of the fire sprinkler riser.
  - All sprinkler locations and spacing dimensioned on the floor plan, including the garage.
  - Size and type of all pipe and fittings, with length of each segment.
  - The location and type of all pipe hangers and other means of support.
  - The location of all heat producing devices with their heat zones noted on the plan.
  - The location of all ceiling electrical fixtures. Indicate the size and depth of all fixtures not flush with the ceiling.
  - Note any exposed beams, lighting fixtures or other ceiling obstructions to the sprinkler heads.
  - The location, size, depth and spacing of exposed beams.
  - Provide ceiling elevations, or cross sections, to indicate any sloped, beamed or special shaped ceilings.
  - Specify the method of freeze protection for the piping system.
  - Elevation reference points corresponding to matching locations in the hydraulic calculations.
  - Provide the square footage of the bathrooms on the plans.
  - Provide the square footage for all clothes and linen closets and pantries.
  - Show the attic access door.
  - Show any attic or crawl space areas that are designed for storage.

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### 2. DESIGN REQUIREMENTS

- 2.1 All fire sprinkler plan submittals shall be designed to meet the requirements of NFPA 13D, CRC, CFC, NCSO Ordinances and any additional requirements as outlined within this document.
- 2.2 Per NCSO 39-22, fire sprinkler systems are required throughout for:
- All new buildings regardless of occupancy type or square footage.
  - When there is a change in use in all, or a portion, of an existing structure which would cause occupancy classification to change.
  - Additions to be made to an existing structure so as to increase the Total Fire Area of the original structure to greater than twenty percent (20%).
  - Remodels, alterations and/or repairs to an existing building involving demolition, removal or repair of more than 50% of the gross square footage of the building, the building, the building shall meet the requirements for a newly constructed building. For the purpose of this section, a 50% threshold shall be applied if the project involves any of the following:
    - The removal, demolition or repair of more than 50% of the exterior weight bearing walls; or
    - The removal, demolition or repair of more than 50% of the interior floor square footage.
  - Exceptions:
    - Low life safety hazard structures, such as stand-alone public restrooms and ski lift operator structures that are less than **500 square feet** shall be evaluated by the Fire Chief on a case-by-case basis.
    - Whenever there are practical difficulties involved, the Fire Chief shall have the authority to grant modifications in individual cases provided the modifications do not lessen the health, life and fire safety requirements as permitted in Section 104.8 of the California Fire Code.
- 2.3 The fire sprinkler systems shall be designed by either a California licensed Fire Protection Engineer, Mechanical Engineer, Registered Professional Engineer or a California licensed Fire Protection Contractor (C-16). A C-16 contractor may not install a design by another C-16 contractor.
- 2.4 A stand-alone fire sprinkler system (shall be separate and independent within the building from the water distribution system) and shall include a water flow switch. (Placer County)
- 2.5 Provide as a local audible alarm either an all-weather rated bell or horn/strobe (producing an audible notification sound of no less than 110 dB). Such local audible alarms shall be installed on the street front and visible from the street from two different directions. Provide the manufacturer's information sheets indicating the device chosen. (NCSO 39-22)

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- 2.6 Fire sprinkler water flow switches shall be interconnected to the dwelling smoke detectors. Activation of the fire sprinkler water flow switch shall activate and sound the audible smoke alarms at each detector within the dwelling. (Placer County)
  - 2.7 Fire sprinkler water flow switches shall be monitored by a local audible alarm. (NCSD 39-22)
  - 2.8 Fire sprinkler water flow switches shall be a retarding type with a delay set between 30-45 seconds. (Placer County)
  - 2.9 Fire sprinkler water flow switches shall be connected to each automatic sprinkler system. (NCSD 39-22)
  - 2.10 Fire sprinkler water-flow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. (NCSD 39-22)
  - 2.11 Provide tamper switches for backflow preventer control valves so that if the control valves are closed a local audible alarm will activate/sound. (NCSD 39-22)
- Exceptions:
1. Backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position. In occupancies required to be equipped with a fire alarm system, the *backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFP A 72 and separately annunciated.*
  2. *Central station monitoring is not required in one- and two-family dwellings and townhouses with less than 100 sprinklers.*
- 2.12 All risers shall be designed and constructed per the Northstar's Standard Riser Detail (See Attachment A), some exceptions apply. All risers shall be within a conditioned space. Northstar's Standard Detail must be placed on the plans submittal. (NCSD 39-22)
  - 2.13 The underground fire riser must be two (2) inch continuous polyethylene pipe (200 psi minimum) with enough remaining to be run into the conditioned space for the fire riser. (NCSD 39-22)
  - 2.14 A Cherne well-plug must be installed at the underground fire line riser at the main/street for lock-out/tag-out. (AHJ). See attachment B.
  - 2.15 Devices and materials used in sprinkler system shall be listed except as permitted. (NFPA 13D)
  - 2.16 Sprinklers shall be classified as ordinary temperature rated with a temperature rating of 135 to 170 degrees F or intermediate temperature rated with a temperature rating of 175 to 225 degrees F. (NFPA 13D) Provide the manufacturers listed rating and indicate the classification rating on the plans.

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- 2.17 Each fire riser shall have a minimum ½” drain on the system side of the control valve. Indicate on the plans a ½” minimum drain on the system side of the control valve. (NFPA 13D)

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- 2.18 Sprinklers are required in all areas of the structure including:
- Attached garage
  - Attic Spaces (as described below)
  - Crawl Spaces (as described below)
  - Closets (as described below)
  - Accessible openings under stairwells
- 2.19 Sprinklers are required in bathrooms that are greater 55ft<sup>2</sup>. (NFPA 13D)
- 2.20 Sprinklers are not required in clothes closets, linen closets, and pantries that meet all of the following conditions (NFPA 13D):
- The area of the space does not exceed 24ft<sup>2</sup>.
  - The walls and ceilings are surfaced with noncombustible or limited-combustible materials as defined in NFPA 220.
- 2.21 Garages shall be provided with automatic fire sprinkler protection. (NFPA 13D)
- 2.22 All small enclosures containing heat producing devices (i.e. furnace, hot water heater, etc.) are required to be sprinklered. These may be protected by standard type sprinklers with intermediate temperature rating.
- 2.23 A sprinkler shall be installed above heat producing equipment or at the wall separating the space with the heat producing equipment from the occupied space. If the sprinkler is placed on the wall, it must be placed on the same side of the heat producing equipment. (NFPA 13D).
- 2.24 Piping or tubing in sprinkler systems shall be of the proper materials. (NFPA 13D) CPVC fire sprinkler pipe may be used. All materials shall be installed per their listing requirements. CPVC piping is acceptable for use in a garage when it is installed in the following manner:
- The piping is installed above a smooth flat horizontal ceiling.
  - The entire ceiling all of the walls are covered with a minimum of ½" plywood or 3/8" gypsum board.
- 2.25 Pendant sprinklers shall be located at least 3 ft. away from obstructions such as ceiling fans and light fixtures unless the spacing requirements are met. (NFPA 13D)
- 2.26 All valves controlling the flow to the fire sprinkler system shall be monitored by a local audible alarm so that the valves stay in the open position. Not required in Automatic sprinkler systems protecting one- and two-family dwellings and townhouses with less than 100 sprinklers. Install additional audible devices central to all sleeping rooms on each floor to be activated by the flow and tamper switches and audible throughout the sleeping rooms with a minimum 70 dB. (NCSD 39-22)

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- 2.27 Fire sprinkler flow switch, horn/strobe and audible devices shall be on a shared circuit breaker such as the garage door opener, refrigerator, furnace, etc. (AHJ)
- 2.28 A cabinet with at least one spare sprinkler head of each type and temperature with the corresponding sprinkler head wrenches shall be required and located adjacent to the sprinkler riser.
- 2.29 The fire sprinkler riser shall be designed and constructed in accordance with the District's Residential Riser Detail.
- 2.30 The fire sprinkler riser and control valves shall be installed in an approved location and provided with approved access to operable devices.
- 2.31 An informational nameplate shall be attached to the riser as required in Section 29 of NFPA 13.

### **3. HYDRAULIC CALCULATION REQUIREMENTS**

- 3.1 Calculations are required for the two most hydraulically demanding heads. (NFPA 13D) NFD may require additional flowing heads if certain benchmarks are exceeded.
- 3.2 Provide a 10% safety margin in all calculations.
- 3.3 The two (2) inch continuous polyethylene pipe (200 psi minimum) must be calculated using an internal diameter (ID) of 1.625

### **4. INSPECTIONS & TESTING REQUIREMENTS**

- 4.1 An underground trench inspection of the two (2) inch continuous polyethylene fire riser pipe is required prior to burial. (NCSD 39-22)
- 4.2 Underground fire riser pipe shall be tested at 150 psi for two (2) hours with a visual system flush. (NCSD 39-22)
- 4.3 Visual inspection of the two (2) inch continuous polyethylene fire riser pipe with the compression fitting above ground within the conditioned space is required. (NCSD 39-22)
- 4.4 Above ground fire sprinkler piping shall be visually inspected prior to any sheetrock or insulation.
- 4.5 The above ground piping shall be hydrostatically tested at 150 psi for two (2) hours with a visual flush of the system. (NCSD 39-22)
- 4.6 Prior to final sign-off of the fire sprinkler system a backflow certification certificate needs to be provided by a fire sprinkler contractor. (NCSD 39-22)

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- 4.7 Inspection and manipulation of the flow and tamper switches is required. Activation of the switches must – at a minimum – sound an exterior audible device. If such exterior audible device is not readily heard in the interior of the structure, notification devices shall be added. (NCSD 39-22)



## NORTHSTAR FIRE DEPARTMENT NOTES

### Fire Sprinkler Systems 13D

#### PLACE THE FOLLOWING NOTES VERBTIM ON THE PLAN:

1. The system shall be designed and installed in accordance with the most recently adopted edition of NFPA 13D and amendments as adopted by the local jurisdiction.
2. System design basis. Hydraulically most demanding 2 sprinklers.
3. All pipe shall be U.O.N.: Underground = Copper/Poly, Riser = Copper, Overhead = Blazemaster CPVC.
4. Only 2" continuous polyethylene pipe to be used for underground fire line. (NCSD 39-22)
5. Underground mains and lead-in connections (i.e. underground fire line) shall be hydrostatically pressure tested (150 psi for 2 hours) and flushed before connection is made to fire riser/sprinkler piping. (NCSD 39-22)
6. A Cherne well-plug must be placed on the fire sprinkler riser at the main/street for lock-out/tag-out. (AHJ)
7. The water meter shall be installed prior to final. (AHJ)
8. If chosen over strobes, an exterior bell shall be of 10-inch minimum size. (NCSD 39-22)
9. Fire riser must be installed or placed within conditioned space. (NCSD 39-22)
10. Fire riser must be installed or constructed per NCSD Detail. Fire Riser Detail must be placed on plans. (NCSD 39-22)
11. All valves controlling fire system flows shall be monitored by a local audible alarm so that all valves stay in the opened position. (NCSD 39-22)
12. Exposed exterior fire riser valves shall be painted OSHA safety red. Fire sprinkler or supply pipe exposed or susceptible to wet conditions shall be painted (any color) or otherwise coated to inhibit corrosion. Stainless steel assemblies and piping may be left unpainted provided that any hose connections, valves, or other components operated by the fire department are painted red.
13. A 10% safety factor deduction from the existing static pressure shall be included in the hydraulic calculations
14. The distance between sprinklers and sprinklers to walls shall be measured along the slope of the ceiling. (NFPA 13D)
15. Pendent sprinklers shall be a minimum of 36" away from the center of any obstructions such as ceiling fans and light fixtures unless requirements of NFPA 13D 8.2.5.3 are met.
16. Sidewall sprinklers shall be a minimum of 60" away from the center of any obstructions such as ceiling fans and light fixtures unless the requirements of NFPA 13D 8.2.5.4 are met.
17. NFPA 13D provides information regarding spacing of the sprinklers with respect to heat producing devices (fireplaces, ranges, ovens, heating vents, water heaters, furnaces, etc.) whether or not all heat producing devices are shown on the plan proper minimum distances must be maintained.
18. Sprinklers shall be required in all attached garages. Sprinklers located in garages shall be listed residential sprinklers or quick response sprinklers having the same orifice size as the sprinklers in the dwelling unit.
19. Sprinklers may be omitted from attics and crawl spaces which are not used or intended for living purposes or storage.
20. Sprinklers in spaces subject to temperatures in excess of 100°F (including garages and exterior closets) must be intermediate temperature rated (175°F or more).
21. Where the fuel-fire equipment is above all of the occupied areas of the dwelling unit, no sprinkler protection shall be required in the concealed space. (NFPA 13D 8.3.5.1.1)
22. Where fuel-fired equipment is below or on the same level as occupied areas of the dwelling unit, at least one quick response intermediate temperature sprinkler shall be installed above the equipment or at the wall separating the space with the fuel fired equipment from the occupied space. (NFPA 13D 8.3.5.1.2)
23. Above ground fire sprinkler piping shall be hydrostatically tested (150 psi for 2 hours).

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24. Installation of all residential sprinklers shall be in strict compliance with manufacturer's installation guide.
25. Prior to drilling joists, contact structural engineer for recommended drilling guidelines.
26. All required signage shall be installed prior to final approval.
27. Call NFD at (530) 562-1212 ext.1 to schedule all inspections at least 48 hours in advance.
28. An underground fire line inspection is required during the open trench inspection.
29. A pressure gauge shall be provided on the riser at the time of final inspection to verify the minimum required pressure is present.
30. An approved method of demonstrating the system is pressurized at the time of rough inspection will be provided.
31. All sprinkler piping shall remain uncovered until inspected by NFD.
32. An inspection required at both rough and final prior to occupancy being granted.
33. At final inspection, all ceilings shall have all patches, repairs, and final finishes completed.

### FIRE SPRINKLER SPACING

The system has been designed to allow all compartments with:

- 1 residential head to be spaced at \_\_\_\_\_x \_\_\_\_\_max. The sprinkler shall not exceed \_\_\_\_\_feet from the wall.
- 2 or more residential heads to be spaced at \_\_\_\_\_x \_\_\_\_\_max. Sprinklers shall exceed \_\_\_\_\_feet from the wall.

The minimum distance between any 2 residential sprinklers shall not be less than \_\_\_\_\_feet.

The minimum distance a sprinkler can be located from a wall is \_\_\_\_\_inches.

### HYDRAULIC INFORMATION

The minimum static pressure required at the riser gauge is calculated by adding the minimum required street (source) pressure +/- elevation gain/loss.

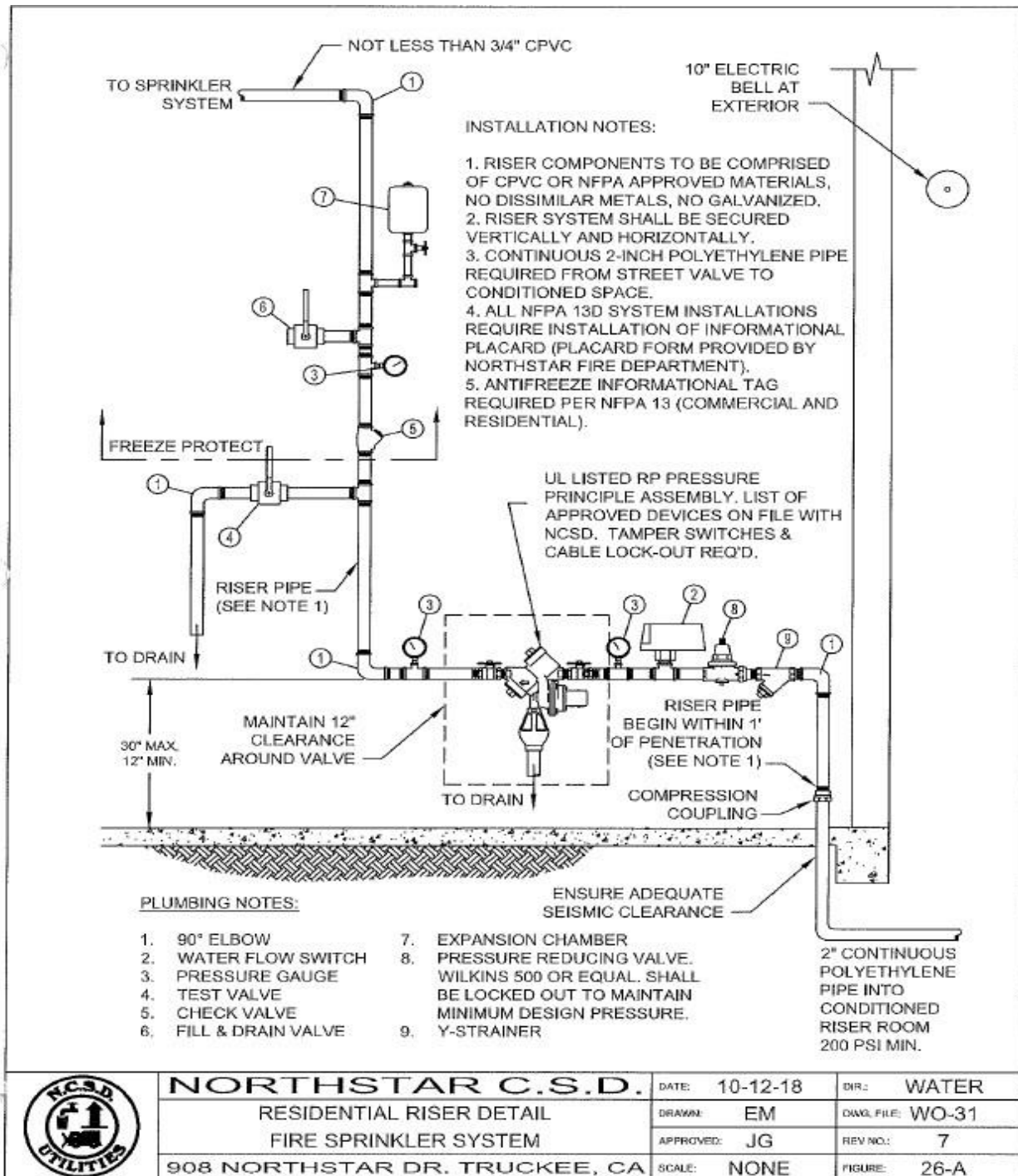
Water supply/Source: Static \_\_\_\_\_PSI

Minimum static pressure (psi) required at riser gauge: \_\_\_\_\_PSI

## Attachment A

### Northstar's Fire Riser Detail

\*\*\*Riser detail must be placed on the fire sprinkler plans.\*\*\*



## Attachment B

### Cherne Well Plug

\*\*\*Must be placed at underground fire line riser at the main/street.\*\*\*

	<h3>Monitor Well</h3> 	
<p><b>Pneumatic Plugs</b> <b>Mechanical Plugs</b></p> <p>Original Gripper® Hub-Fit Gripper® Clean-Out Gripper® T-Handle Gripper® Iron Grip® Econ-O-Grip® Petro Econ-O-Grip® Kwik 'N Sure® Sure-Grip® Monitor Well Test Caps - Test Kap</p>	<p><b>Monitor-Well Locking Plug Features:</b></p> <ul style="list-style-type: none"><li>• Designed to seal monitor wells</li><li>• Meets all EPA requirements for locking plugs</li><li>• Sized to seal Schedule 40 piping</li><li>• 2" and 4" sizes can also seal Schedule 5 pipe</li><li>• Works with Cherne's solid brass padlock</li></ul> <p><b>Equipped with:</b></p> <ul style="list-style-type: none"><li>• Chemical and petroleum-resistant Estaloc™ plastic top and bottom plates</li><li>• Petroleum resistant nitrile o-ring</li><li>• Stainless steel carriage bolt</li><li>• Yellow chromate-coated locking latch</li></ul>	
<p><b>Deflection Gauges</b> <b>Testing Equipment</b> <b>Tools &amp; Accessories</b> <b>Technical Data</b> <b>Contact Us</b> <b>Used Inventory</b> <b>Search</b></p>	<p><b>Monitor-Well Plug Installed</b></p>  <p>Monitor Well Plug</p> <p>Underground storage tank</p>	