



St Charles Fire Department
Fire Prevention Bureau
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Underground Flush & Hydrotest Contractors Guide

Procedure- Underground Flush

1. The contractor shall provide all the equipment necessary to perform the flush test. Flushing apparatus shall be secured to reduce the potential for an unsafe condition. The fire code official and/or the water department representatives reserve the right to stop the test if an unsafe condition is noted.
2. A full diameter flush is preferred with the flushing apparatus attached directly to the lead-in, stub-up. Alternatively, on 4" or larger OS&Y valves only, the first incoming sprinkler valve shall be utilized for the flush. Butterfly valves or any control valve less than 4" in size shall NOT be attached and used as a discharge for the flush.
3. If the first sprinkler valve is not installed for the flush test and the permanent apparatus is on-site (fire valve, tee, domestic valving) they are to be installed immediately after the completion of the flush and the installation is to be witnessed by the fire code official. This is to ensure that no debris will be introduced into the underground piping. If the permanent apparatus is not on-site or cannot be installed, a blind flange shall be installed in the presence of the fire code official to cover the opening and shall not be removed until the installation of permanent valves.
4. The contractor shall provide a means to measure the flow GPM to confirm achievement of the required flow velocity.
5. Once the flushing apparatus and water discharge location is approved by city officials, the water department personnel shall operate the municipal water supply valve. The Fire Code Official, in conjunction with the water department personnel and upon confirmation of achieving the required flow velocity, shall determine when the test can be concluded. The fire code official shall signal to the water department official to close the municipal water valve to conclude the test.

6. Upon successful completion of the underground flush, the contractor shall furnish the required NFPA 13 Contractor Material Test & Data Certificate. If no CMT&DC is provided, the test is marked failed until it is received by the Fire Code Official.

Flow required to produce velocity requirement:

Nominal Pipe Size	Non-Fire Pump Flushing Velocity. 10ft/sec (GPM)	Fire Pumped Flushing Velocity. 15ft/sec (GPM)
4"	390 GPM	590 GPM
6"	880 GPM	1320 GPM
8"	1560 GPM	2350 GPM
10"	2440 GPM	3670 GPM
12"	3520 GPM	5290 GPM

Where the flow rates established are not attainable, the maximum flow rate available to the system shall be acceptable.

NFPA 13, 2019 ed. 6.10.2.1.2 requires the flushing operation to continue until water flow is verified to be clear of debris.

This procedure may be modified in the field by city officials to accommodate for actual field conditions. A minimum of 48-hour notice is required for scheduling a flush test in order to comply with public notice requirements. Any flush test scheduled after 3pm may be subject to overtime charges billed to the permit holder.

Reference

NFPA 13, 2019 ed.

NFPA 20, 2019 ed.

NFPA 24, 2019 ed.

ANSI/ AWWA Requirements

PROCEEDING WITHOUT REQUIRED INSPECTIONS & PROPER APPROVALS OR EXCAVATION OF ANY UNAPPROVED AREA, MAY RESULT IN A STOP WORK ORDER BEING ISSUED AND FINES ISSUED BY THE BUILDING AND CODE ENFORCEMENT DIVISION OF THE CITY OF ST CHARLES.

Procedure- Underground Hydrostatic Testing

1. The underground flush is required to be completed prior to scheduling the underground hydrostatic test.
2. The contractor shall provide all the equipment necessary to perform the underground hydrostatic test including but not limited to the following:
 - A 250 psi, calibrated, liquid filled pressure gauge with 2 psi increments maximum.
 - A reliable pressure pump and water supply
 - A means to isolate the pressure gauge in order to zero the gauge without affecting the pressure in the main prior to the start of test and again upon completion of the 2-hour test.
 - Fittings for connecting the testing equipment to the water main. Consult with the City of St Charles Water Department for approved connection methods.
3. The first sprinkler system valve on the inside of the building must be in place for hydrostatic testing, disinfection and sampling. Hydrostatic testing against blind flanges is not allowed.
4. After filling the main with water, air shall be expelled from the main by flushing water out of the main via the first sprinkler system valve at the highest point.
5. Once a test pressure of 200 psi is achieved, the fire code official will record the pressure, take a digital picture of the pressure gauge and begin timing the test. The pressure gauge will be checked periodically by the fire code official, if the pressure varies more than +/- 5 psi from the starting pressure, the test will be considered failed. The contractor shall conduct a leak investigation and repair any leaks. The test can be rescheduled when the cause for the pressure variance is addressed. Additionally, the Fire Code Official and/or the Water Department representative reserve the right to stop the test at any time if an unsafe condition is identified.
6. If a pressure variance of less than +/- 5 psi is noted, a hydrostatic testing allowance (recovery) is allowed and will be performed by the Water Department personnel on site.
7. Immediately upon completion of a successful test, the water pressure gauge shall be reduced to zero in the presence of the fire code official to ensure that the gauge is not faulty or defective.
8. The main is not to be placed in-service until after disinfection and approval by the Water Department.

9. Upon successful completion of the underground hydrostatic test, the contractor shall furnish the required NFPA 13 Contractor Material Test & Data Certificate. If no CMT&DC is provided, the test is marked failed until it is received by the Fire Code Official.

This guide may be modified in the field by city officials to accommodate for actual field conditions. A minimum of 48-hour notice is required for scheduling an underground hydrostatic test. Any underground hydrostatic test scheduled after 3pm or during holidays and weekends may be subject to overtime charges billed to the permit holder.

Reference

NFPA 24, 2019 ed.

AWWA C600 Standard

City of St Charles Engineering Design and Inspection Policy Manual

PROCEEDING WITHOUT INSPECTIONS & PROPER APPROVALS OR EXCAVATION OF ANY UNAPPROVED AREA, MAY RESULT IN A STOP WORK ORDER BEING ISSUED & FINES CITED BY THE BUILDING AND CODE ENFORCEMENT DIVISION OF THE CITY OF ST CHARLES.