Winston-Dillard Fire District

Fire Hydrant

Installation and Location Manual

(revised 2010)

Winston-Dillard Fire District
Fire Hydrant Manual

Note!

Oregon Fire Code 2010 Chapter 5, Fire Service Features 501.4 Timing of installation. When fire apparatus access roads or a water supply for fire protection is required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except when ***approved*** alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles in accordance with Section 505.2

Attention!

The Winston-Dillard Water District shall be notified and permission received prior to any work being performed on any water main, fire hydrant, or fire hydrant installation. There shall be no exceptions.

Fire Hydrant Specifications

1. General Classification

A. Fire Hydrant shall be Mueller Super Centurion 200.
B. Fire hydrants shall be dry barrel, fast type, with compression main valve closing with the pressure.
C. Fire hydrants shall have a replaceable safety stem coupling and a replaceable safety flange at the ground line to prevent or minimize traffic damage.
D. Fire hydrants shall comply with AWWA Standard C502.

2. Selective Specifications

A. Fire Hydrants:
    1. Size of fire hydrant: 5.25 inch fire hydrant to be sized by seat ring internal diameters (valve opening).
    2. Size and type of inlet connections: 6 inch Flange Spool or M.J. with ductile iron – minimum of Class 50 – polyethylene sock shall be required. Joint restraints are to be used.
    3. Fire hydrant operating nut and nozzle cap nut shall be 1.5 inch pentagon.
    4. Fire hydrant opening direction shall be counter clockwise.
    5. Nozzle arrangement:
        a. Three way style with 1 pumper and 2 hose nozzles, 180 degrees apart.
        b. Hose nozzle threads, 2.5 inch National Standard Hose Thread.
        c. Pumper nozzle threads, 4.5 inch National Standard Hose Thread.
    6. Fire hydrant shall have a flanged shoe.

B. Gate valve (auxiliary valve) shall be:
    1. Resilient seat type.
    2. Epoxy coated interior.
    3. Flange to flange or flange to M.J. as needed for installation.
    4. Non-rising stem type.
    5. 2 inch square, wrench operating nut.
    6. Connected directly to the hydrant shoe not more than 2 feet From the fire hydrant.

7. All spools and tees between the fire hydrant and main shall be ductile iron.

3. Design Features:

A. Dry top, factory lubricated bonnet assembly.
B. Upper operating stem bronze encased for “O” ring seal surface contact.
C. Nozzles, interchangeable, threaded and locked in place with stainless steel screw or bayonet lugs secured by a stainless steel allen screw and appropriate caps, or mechanically locked into barrel and have O-ring pressure seals.
D. Bonnet and lower barrel flanges concealed types for improved appearance.
E. Safety flange, to break cleanly upon impact, yet strong enough for normal handling, shipping and use. Permits full 360 degree rotation of upper barrel to position nozzles in any desired direction. Extension sections or upper barrel with different nozzle size or arrangement can easily be added. Full size un-notched steel bolts used to retain safety flange to connect the upper and lower barrels.

Installation

1. Fire hydrants shall be installed as plumb as possible.

2. Locate fire hydrants in accordance with the Winston-Dillard Fire District or local code.

3. The pumper outlet nozzle shall face the street in order to provide a quick connection for the fire pumper.

4. Auxiliary valve shall be flanged and bolted directly to the flanged hydrant shoe to permit isolation of the fire hydrant for maintenance purposes. The distance from the fire hydrant shall not be more than two (2) feet. The valve shall be the non-raising type, 2 inch square wrench operation nut.

5. Provide thrust restraint for the auxiliary valve so that the fire hydrant may be removed without shutting down the main.

6. Bottom of hydrant bolts shall be a minimum of 2 inches above ground level.

7. Remove foreign matter from the hydrant lead before installing the auxiliary valve and fire hydrant.

8. In setting a fire hydrant use a firm footing, such as stone slabs or a concrete base on firm ground, to prevent settling and strain on the hydrant lead joints.

9. Provide for thrust restraint of the fire hydrant by strapping, blocking, or using a restraining type joint. (see figure 4-3 for examples of restraints).

10. A concrete collar shall be installed around the fire hydrant lower barrel at or near ground level to avoid transmitting shock to the fire hydrant's lower barrel and hydrant inlet. The collar will be about 6 inches thick, with a diameter of 2 feet. Collar may be either square or round or part of an installed sidewalk. When installing fire hydrants on a PVC main, the concrete collar is of extra importance. In areas of substantial frost penetration, expansion-joint material should be placed between the fire hydrant and the collar. (see figure 4-1 for example)

11. Provide for drainage from dry-barrel fire hydrants. The drain field shall consist of 1.5 or 2 inch washed rock and shall cover the hydrant drains by a minimum of 6 inches. The drain field shall cover the entire thrust block pad unit in a level plane toward the water main to a point 6 inches beyond the gate valve and shall surround the gate valve case. Cover the rock with plastic to prevent soil from clogging the drain area.

12. Do not connect fire hydrant drains to a sanitary sewer or storm sewer.

13. In rural areas where no curb exists, use large setbacks or other means to protect fire hydrants from traffic, always being sure that the fire hydrant is accessible to firefighting equipment.

14. No device shall be installed in the line that supplies the fire hydrant that shall in anyway restrict the flow of the water supply from the main to the fire hydrant. This shall include but not be limited to screens, filters, pressure regulators, meters, etc.

15. Whenever possible fire sprinkler system mains and fire hydrant mains shall utilize separate water mains from separate water main grids. This will help to alleviate tripping the fire alarm and water flow detector during annual fire hydrant flow testing as well as providing additional water for fire flow.

Thrust Block

The thrust block pad unit shall be one of concrete poured around the hydrant valve casing in such a manner that it begins 2 inches below the drain ports and proceeds downward from that point for 2 feet. Likewise, the thrust block pad shall be poured so that it will not interfere with or cover any flange bolts or drain ports.

The overall dimensions of the thrust block pad unit shall be:

a. A minimum of 2 feet deep measured from 2 inches below the drain ports downward.
b. A minimum of 2 feet wide, with the fire hydrant centered therein.
c. A minimum of 2 feet long beginning 2 inches to the hydrant side of the hydrant case-gate valve flange.

A concrete collar shall be installed around the hydrant lower barrel at or near ground level to avoid transmitting shock to the hydrant's lower barrel and hydrant inlet. The collar will be 6 inches thick, with a diameter of 2 feet. Collar may be either square or round or part of a finished sidewalk. In areas of substantial frost penetration, expansion-joint material should be placed between the hydrant and the collar. (see figure 4-1).

The gate valve and gate valve box shall be installed in a truly vertical position, with the operating nut upward. An extendible valve box shall be used and will be seated securely on the gate valve casing and shall extend to the surface of the ground at the bury line of the hydrant. The valve box shall be metal, tight fitting and free from all obstructions. The proper valve box cover shall be positioned to prevent debris from entering the valve box, and said cover shall be painted in such a manner as to distinguish it from its surroundings.

The drain field shall consist of 1.5 or 2 inch washed rock and shall cover the hydrant drains by a minimum of 6 inches. The drain field shall cover the entire thrust block pad unit in a level plane toward the water main to a point 6 inches beyond the gate valve and shall surround the gate valve case. The drain field rock shall be covered with plastic to prevent soil from clogging the drain area.

Mains Supplying Fire Hydrants

All water mains used to supply water to fire hydrants shall provide a minimum flow of 500 gallons per minute (GPM) and shall not be less than 6 inch inside diameter. These water mains and apertures shall be installed to the specifications of the *WINSTON-DILLARD WATER DISTRICT* and the manufactures specifications. Extra precautions shall be taken when main crosses highways, parking lots, etc.

The size of water mains serving fire hydrants shall be determined using fire flow calculations to ensure that adequate water pressure and flow is provided at the fire hydrant to deliver the calculated fire flow.

A locater wire shall be 14 gauge solid copper wire with blue insulation designed for burial. All locator wire will be continuous. All splices will be done with a 3M direct burial kit. Locating wire shall be installed directly over center of all mains and services to the meters not to exceed 6 inches above pipe. Locator wire must be extended up each valve box so a direct hook-up can be made.

Fire hydrants when required shall be located along the streets or public ways, readily accessible by fire department apparatus to use and located within 500 feet or less of all homes and buildings. (see exception in locations of fire hydrants)

No device shall be installed in the main that supplies water to the fire hydrant that shall in any way restrict the flow of the water supply from the main to the hydrant. This shall include but not be limited to screens, filters, pressure regulators, meters, etc.

Whenever possible fire sprinkler system mains and fire hydrant mains shall utilize separate water mains from separate water main grids. This will help to alleviate tripping the fire alarm and water flow detector during annual fire hydrant flow testing as well as providing additional water for fire flow.

A single source main for both fire hydrants and sprinkler systems shall be avoided whenever possible. If necessary utilize 2 mains leading to a single supply main.

Locations of Fire Hydrants

When a calculated fire flow of 500 Gallons per Minute (GPM) or less will be encountered fire hydrants shall be located such that no structure shall be further than 500 feet from a fire hydrant.

When a calculated fire flow in excess of 500 GPM but less than 2000 GPM will be encountered fire hydrants shall be located such that no structure shall be further than 250 feet from a fire hydrant.

When a calculated fire flow in excess of 2000 GPM will be encountered for a structure or complex of structures, water mains shall be sized to provide adequate pressure and GPM to provide the calculated fire flow. Where structures are required to be equipped with a fire sprinkler system, fire hydrants shall be located so that the sprinkler system can be readily supported at the Fire Department Connection (FDC) and still be outside the potential collapse zone. Whenever possible fire sprinkler system mains and fire hydrant mains shall utilize separate water mains from separate water main grids.

The Fire District shall approve all fire hydrant locations prior to any installation work taking place.

The Fire District will assist contractors with determining the proper location of all fire hydrants.

Exception: A minor variance may be granted to the 500 and 250 foot rule if a tactical advantage will be gained by the Fire District with locating fire hydrants at intersections or mid block.

Fire Flow Calculation: L x W x H divided by 100 = GPM (Iowa State University method)

Collapse Zone = Twice the height of the building from the parameter wall or any overhangs.

Fire Hydrant Inspections

Each new fire hydrant and existing fire hydrant relocation shall have three inspections. Each inspection shall be signed by the Fire District inspector.

1. Proper site location.

2. After the fire hydrant has been installed in the thrust block, and prior to the drain field being installed. This inspection will check for the following items.
    a. Size and proportions of thrust block.
    b. Position of hydrant valve housing.
    c. Hydrant gate valve positioning.
    d. Proper clearance for drain ports.
    e. Clearance of hydrant valve housing bolts and flanges.
    f. Type of fill material for drain field.
    g. Locater wire is properly installed.

3. Final inspection shall check:
    a. Hydrant and valve are at grade level.
    b. Hydrant is in a true vertical position.
    c. Flow test to check hydrant parts and to determine GPM flow.

No deviation from any of these specifications will be made without ***written*** approval from the Fire District inspector.

Winston-Dillard Fire District
Fire Hydrant Inspection Form

Installation Manual Issued To: _____

Inspection # 1

Site Location:_____

Date:_____ Inspector:_____

Inspection # 2

____ 1. Size and proportions of thrust block
____ 2. Position of hydrant valve housing
____ 3. Hydrant gate valve position
____ 4. Proper clearances of drain ports
____ 5. Clearances of hydrant, valve housing bolts and flanges
____ 6. Type of fill material for drain field
____ 7. Locater wire is properly installed

Date:_____ Inspector:_____

Inspection # 3

Final Inspection

____ 1. Hydrant and valve box cover are at finished grade level
____ 2. Fire hydrant is in a true vertical position
____ 3. Flow test to check hydrant parts and to determine GPM flow

Static: _____ Residual: _____ GPM: _____

Date:_____ Inspector: _____

Note!
Fire District signature of approval on all three inspections for fire hydrant installation is required before payment or compliance with the International Fire Code.

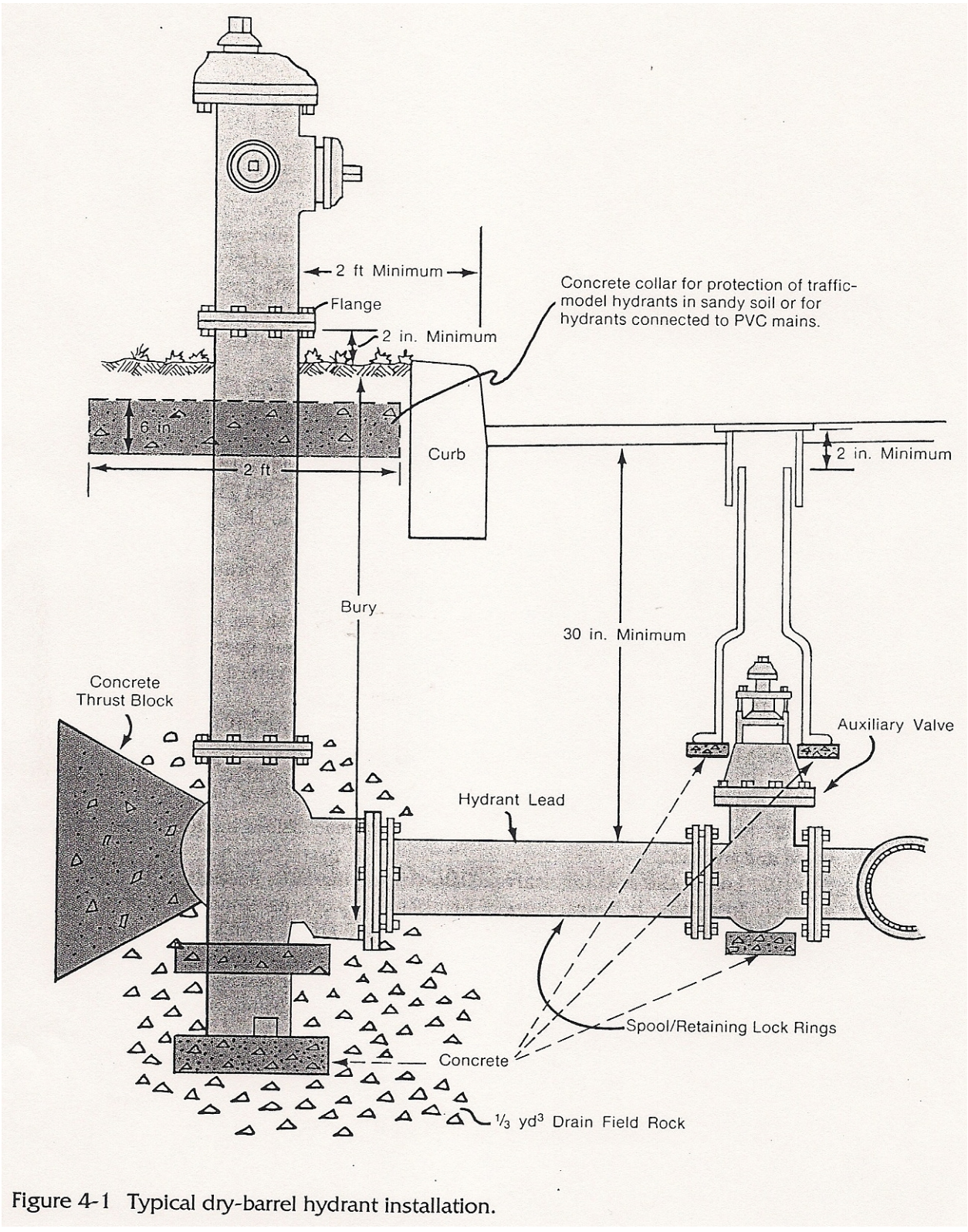

Figure 4-1 Typical dry-barrel hydrant installation.

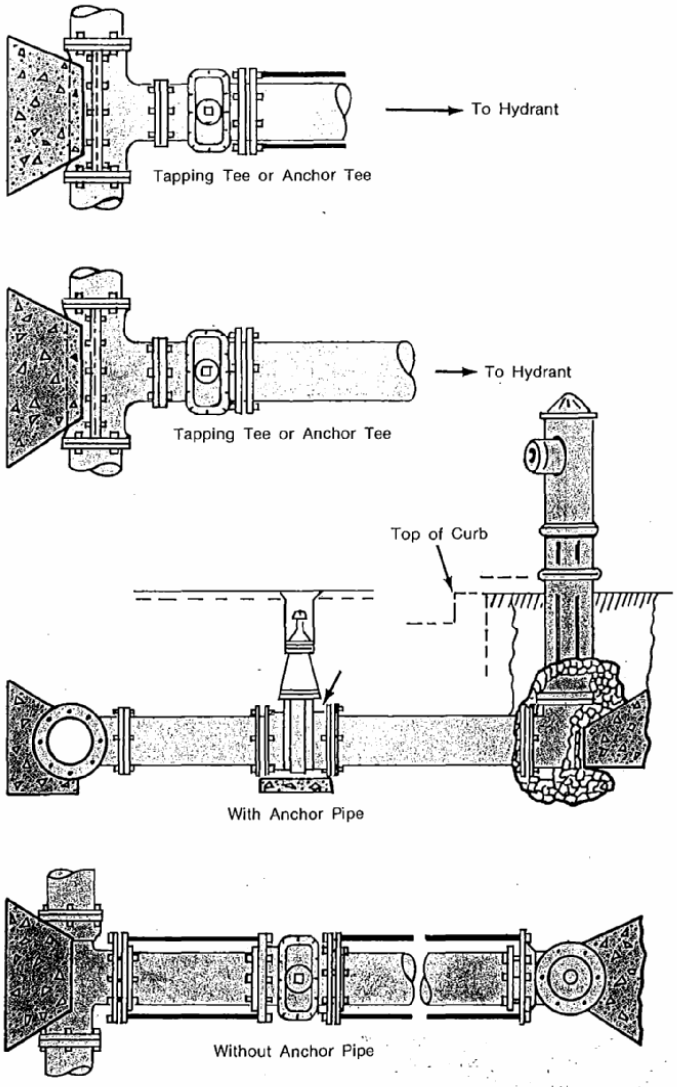

Figure 4-3 Examples of hydrant restraints.