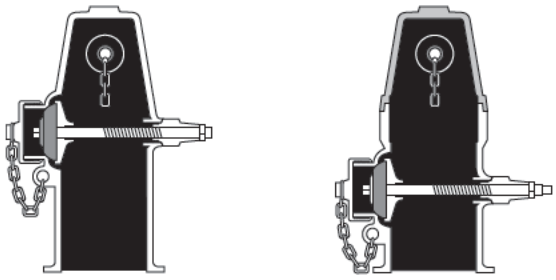
Component Terminology

Nomenclature for Wet Barrel Hydrants

Two types of Wet Barrel Hydrants

There are two types of wet barrel fire hydrants: one-piece and two-piece. These terms refer to the portion of the hydrant that extends above the ground.



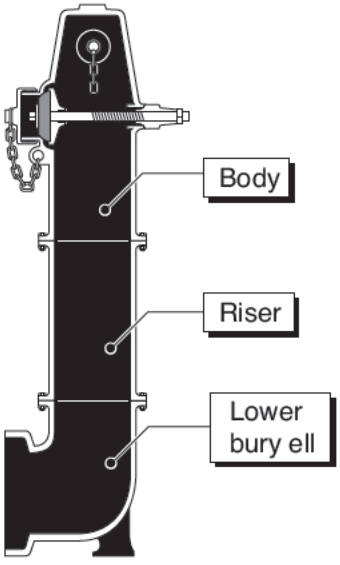
One Piece Two Piece

Wet Barrel Hydrant Components

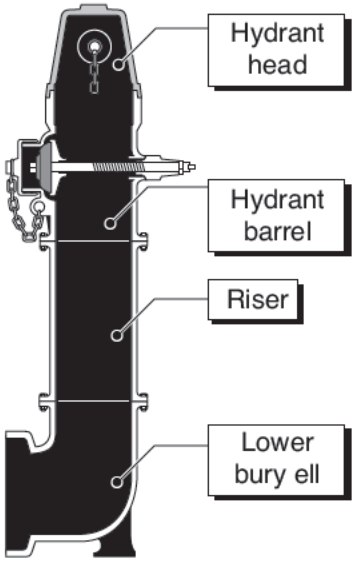
Examining the hydrant from the top down, the major components of a wet barrel hydrant are identified as follows:

Top Section

The **top section**[22] of a one-piece hydrant is called the body. The top section of a two-piece hydrant is divided into two components: the **hydrant head**[23], located at the top of the hydrant, and the **hydrant barrel**[24].



One-Piece Hydrant

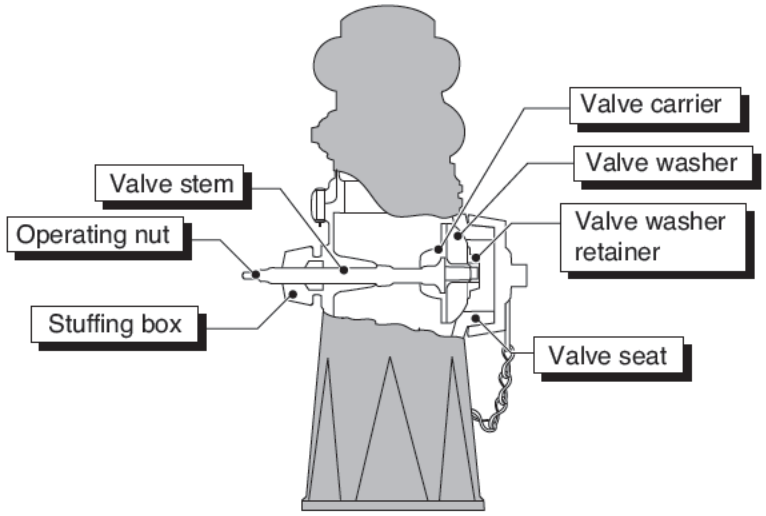


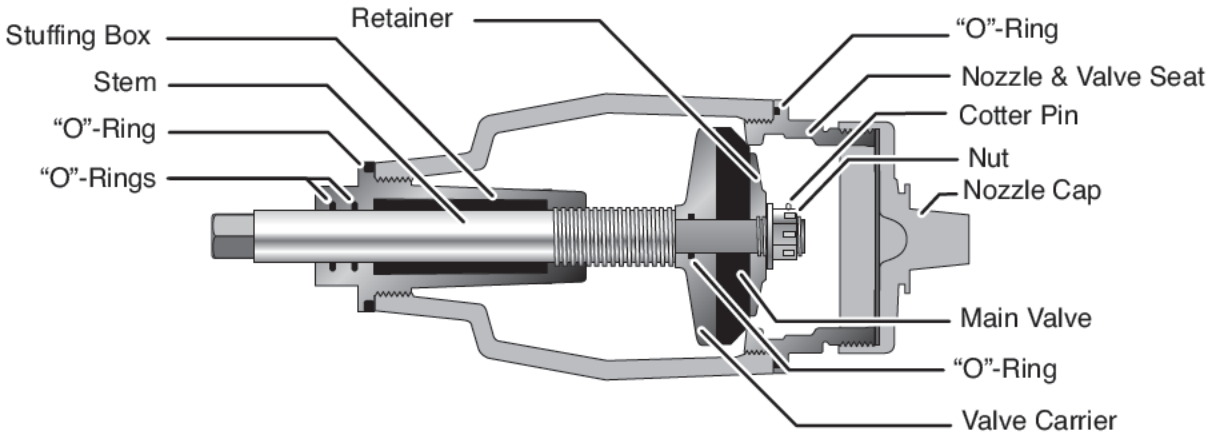
Two-Piece Hydrant

[22] **Top Section** - The above ground portion of the hydrant.
[23] **Hydrant Head** - The upper portion of the top section of a two-piece hydrant. This portion contains outlet valves.
[24] **Hydrant Barrel** - The lower portion of the top section of a two-piece hydrant. This portion may contain outlet valves.

Outlet Valves

The outlet valves are located in the above ground portion of the hydrant. With the two-piece hydrants, the valves may all be located in the hydrant head or divided between the head and the barrel sections. The outlet valves are positioned behind the nozzle connections, which serve as valve seats.





Main Valves

The main valves are composed of a stem and the operating nut used to open and close the valve. The valve face, made of a resilient material, is called a **washer**[25]. Support is given to the washer by a metal disk called the valve **carrier**[26]. The valve closes against a brass seat which is a machined face on the back side of the hydrant nozzles.

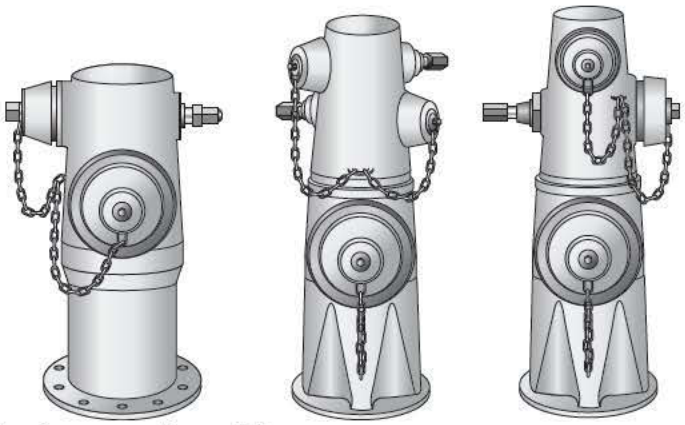
Outlet nozzle

There are two types of outlet nozzles. The most common outlet nozzles are the hose outlet nozzles. These nozzles are designed to connect fire hoses up to 3 inches in diameter. The most common hose outlet nozzles are 2½ inches with National Standard Threads. However, many

[25] **Washer** - A part made of resilient material that is forced against the valve seat to form a watertight seal when the valve is closed.

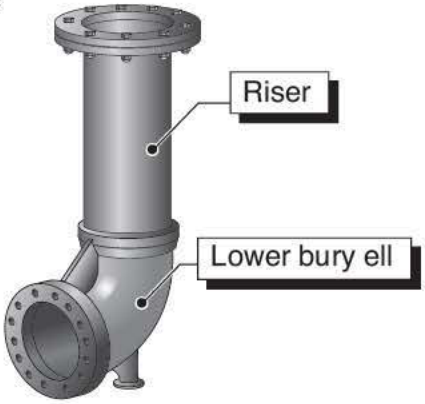
[26] **Carrier** - A part mounted onto the stem that supports the valve washer from the pressure side.

specific fire departments have requirements for special threads that are only used in that fire jurisdiction. The other common outlet nozzle is the pumper nozzle outlet. The pumper nozzle is 3½ inches or larger. There are three common outlet nozzle combinations used with wet barrel hydrants: 1) One 2-½" hose connection and a pump connection. 2) Two 2-½" hose connections and a pump connection. 3) One 2-½" hose connection and two pump connections.



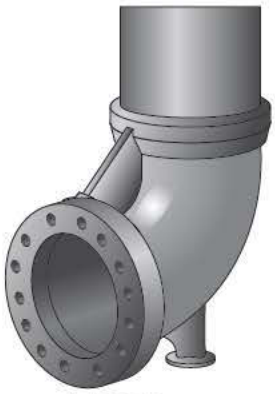
Lower Section

The lower section of the hydrant is called the **bury section**[27]. The bottom of the bury section is the **lower bury ell**[28]. The inlet to the lower bury ell may be flange, M.J., or hub fitting used to connect the hydrant to the lateral line.



Two Pieces

With some hydrants the bury section is composed of two pieces, the lower bury ell and a



Flange

Mechanical Joint

Hub for PVC, AC, Cast Iron

[27] **Bury Section** - The below-ground section of the hydrant. May be constructed of one or two pieces.
[28] **Lower Bury Ell** - A part that connects the top section or riser of a wet-barrel hydrant to the hydrant lead.

riser[29]. The riser is typically a flange by flange section used to adjust the height of the hydrant.

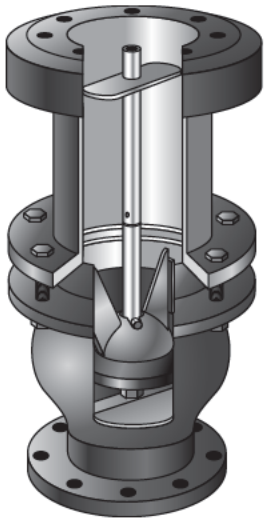
Alternate Method

Some utilities prefer to purchase only the top section of the hydrant, and use a M.J. x M.J., a flange by flange, or M.J. by flange ductile cast iron ell and a ductile cast iron riser made on-site.

Traffic Problems

One of the main disadvantages to the wet barrel hydrant is the major loss of water that occurs when a hydrant is struck and broken off. This could occur from a vehicle accident, vandalism, or natural disaster when a heavy object strikes the hydrant as from a falling building during an earthquake. There are at least two different devices that have been developed to reduce the possibility that water will be lost when a hydrant is broken.

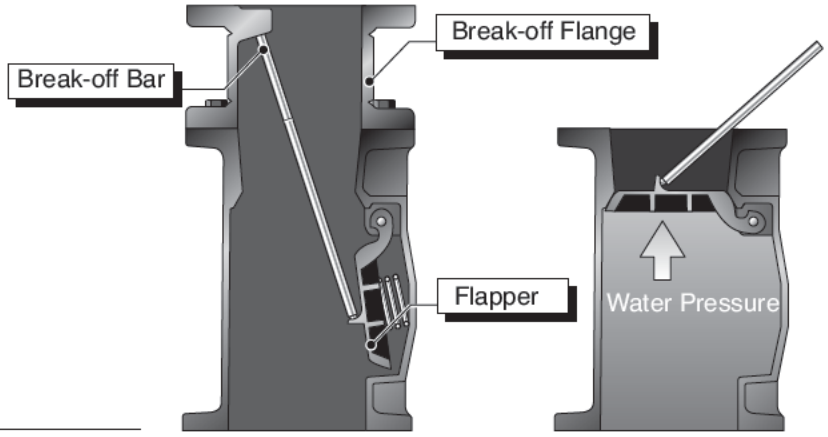
Tell-Tail™



The James Jones Company manufactures a device called Tell-Tail™ Break-off. The device is installed in the riser and looks similar to a dry barrel hydrant main valve. Excessive flow that would occur when the top of the hydrant is broken off causes a valve to be pushed up against a seat, sealing the hydrant and stopping the flow.

Clow

The Clow Valve Company makes a device that acts like a check valve. It is also installed in the riser. The hydrant body or barrel (on a two-piece hydrant) is set against a rod that holds the valve open. When the body or barrel is broken off of the riser, the rod is released and a spring pushes the valve into the flow, which moves it against a seat, cutting off the flow of water.



[29] **Riser** - A section of pipe used to vertically extend the lower bury ell.

Nomenclature for Dry Barrel Hydrants

Reference to AWWA

Each manufacturer of fire hydrants incorporates some unique features not available on other hydrants. These features and related components must be named. It is because of the uniqueness of each brand of hydrant that there are so many names for some of the common components. In order to bring some order to this situation, the AWWA Fire Hydrant Standards Committee, in its 1988 publishing of the M-17 manual, offered a listing of "preferred terms" for the most common hydrant components. The descriptions offered here are consistent with those found in M-17. The descriptions that follow trace the water flow through the hydrant from the main to the top of the hydrant.

Auxiliary Valve

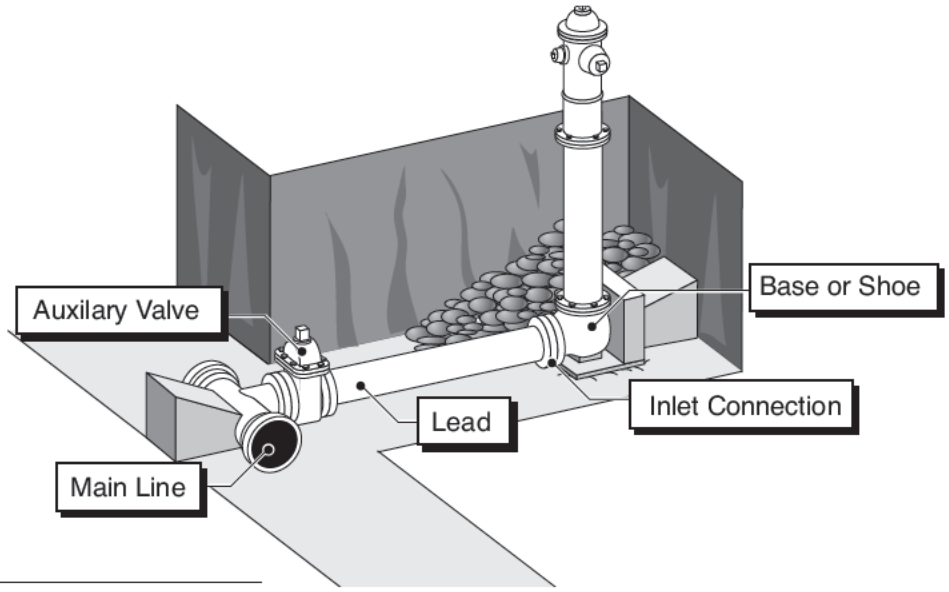
The **auxiliary valve**[30] is the valve placed in the lateral. This valve is normally a non-rising stem gate valve. The valve's primary function is to allow the operator to shut down the hydrant for repair without any portion of the main being shut down. It is common practice to place this valve as close to the main line as possible. By doing so, the valve can be used to shut down the lateral should it be broken or develop a leak.

Lateral Line

The line leading from the main to the hydrant is referred to as the lateral line. It has also been referred to as the hydrant **lead**[31], auxiliary line, and hydrant branch. This line is typically 6 inches and is made of the same material as the main line.

Base

The lateral connects to the hydrant at the hydrant shoe (base). The shoe houses the **inlet connection**[32]

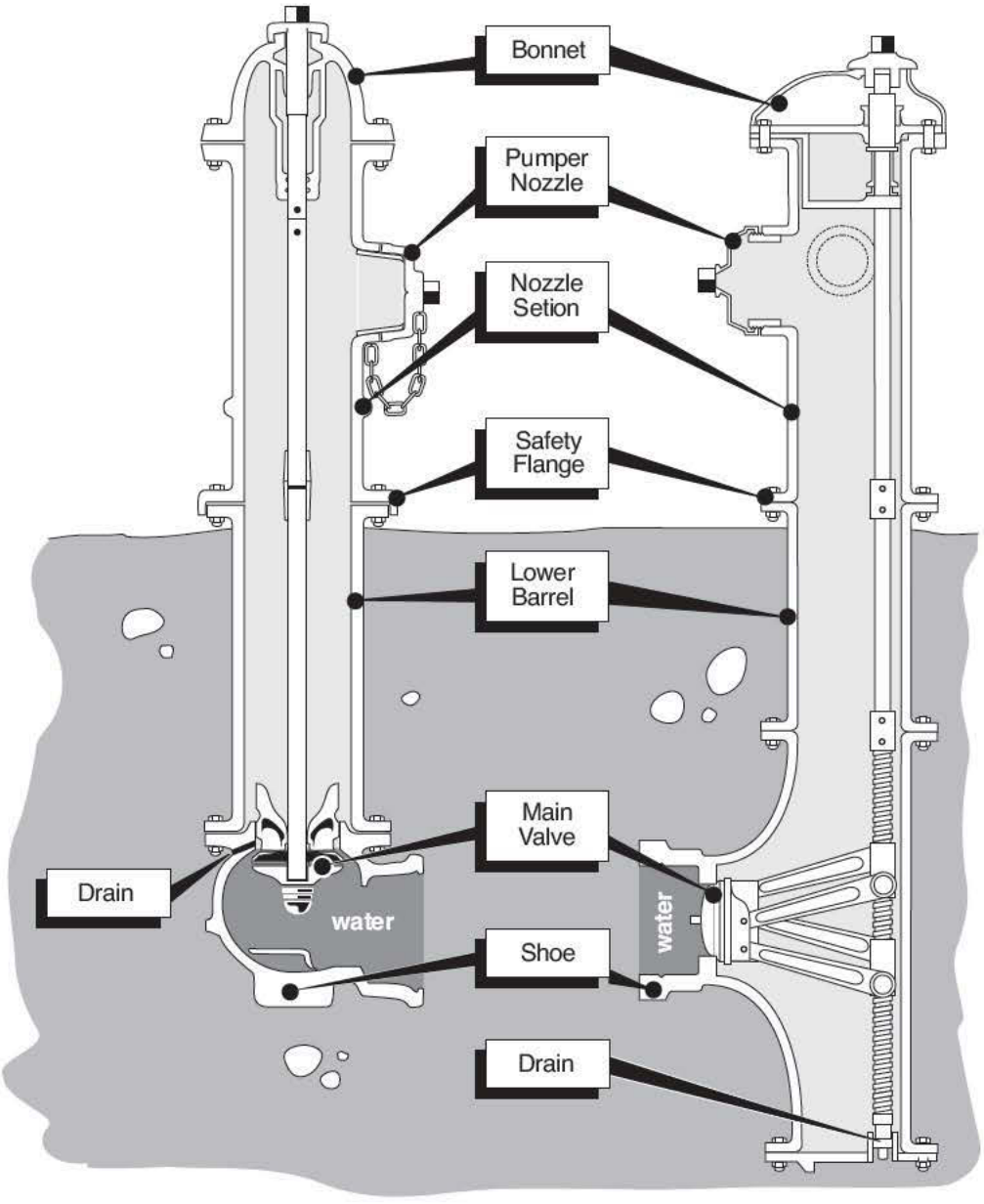


[30] **Auxiliary valve** - The valve placed in the line leading between the hydrant and the main; the lateral line.
[31] **Lead Line** - The line leading between the main and the hydrant. Also called the lateral, branch or auxiliary line.
[32] **Inlet Connection** - The connection to the lateral line; usually a 6-inch MJ, rubber ring push on, or flange connection.

Hub for PVC, AC, Cast Iron

Mechanical Joint

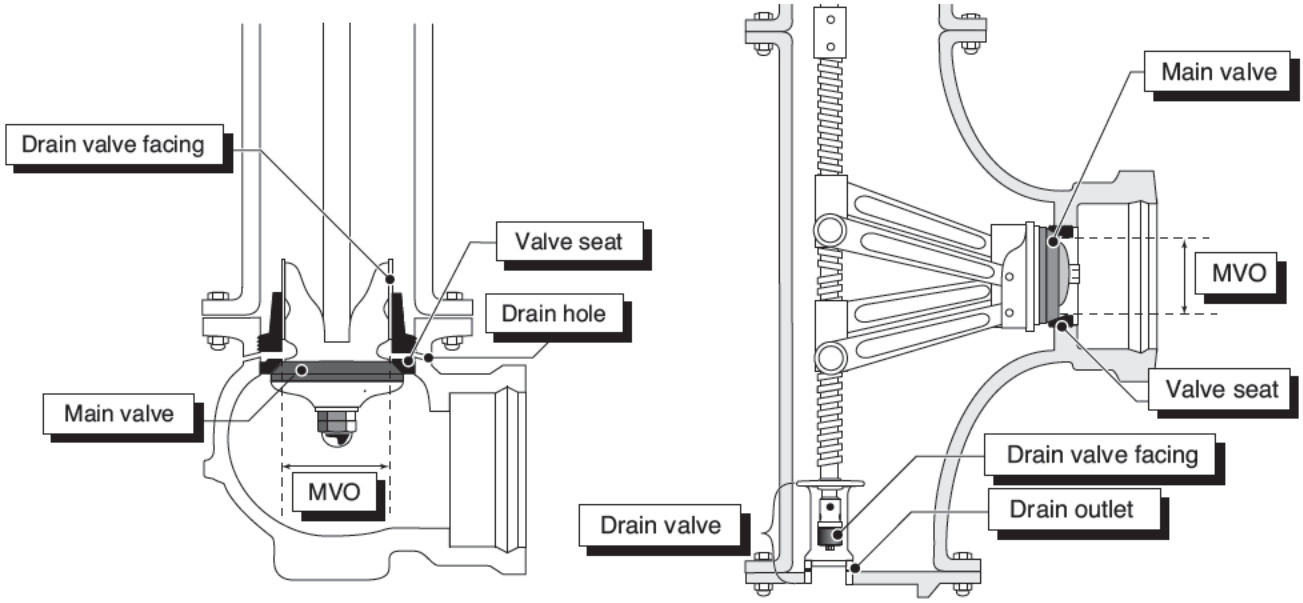
Flange



and the main valve *seat* which is threaded into or otherwise secured to the base. The inlet connection is commonly 6 inches and may be a Mechanical Joint, rubber ring push-on for PVC, cast iron or AC, or it may be a flange joint.

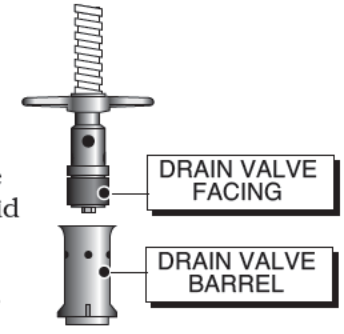
Main Valve & Seat

The main valve is commonly some resilient material such as neoprene or leather. A common replacement material for main valves is polyurethane. The size of a hydrant is judged by the inside diameter of the main valve seat. This size is referred to as the MVO, **main valve opening**[33], and normally ranges from 4¼ inches to 6½ inches. The size of the inlet connection does not dictate the MVO size. For instance a 6-inch inlet connection may be purchased with MVO sizes ranging from 4¼ inches to 6½ inches. The main valve sits against a brass seat called the main valve seat.



Drain Valve

The drain valve is also located in the base. On compression hydrants, it is located just above and alongside of the main valve. The drain valve is connected through a channel to one or more holes in the side of the base. The drain valve on most compression hydrants consists of one or more flat pieces of rubber-like material or leather that are slid over an opening to close the drain. The Waterous hydrant uses a short section of copper tubing. With toggle, slide gate, and compression hydrants that open with the flow (Eddy) hydrants, the drain valve is in the bottom of



[33] **Main Valve Opening** - The inside diameter of the main valve seat.

the hydrant. The valve consists of a leather or rubber-like material that is operated against a brass valve seat. (Drain valves are not allowed on hydrants sold or installed in the State of Maine.)

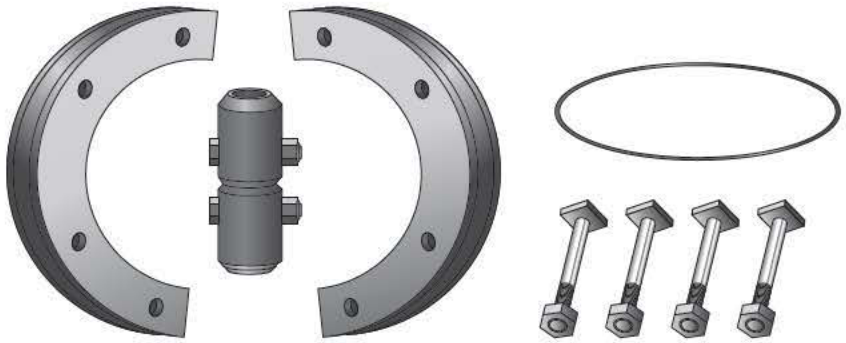
Lower Barrel

The **lower barrel**[34] is the section of the hydrant that extends from the base to the ground line. This is usually made of cast iron or ductile cast iron.

Safety Flange

Most traffic model hydrants are designed to break on impact at a point between the lower barrel and the nozzle section. This breaking device may be a flange or special bolts. A breakable coupling is placed on the shaft that connects the main valve with the operating nut. This coupling, like the safety flange, is designed to break when the hydrant is struck, without damage to the hydrant.

Examples of breaking bolts, coupling and flange



Nozzle Section

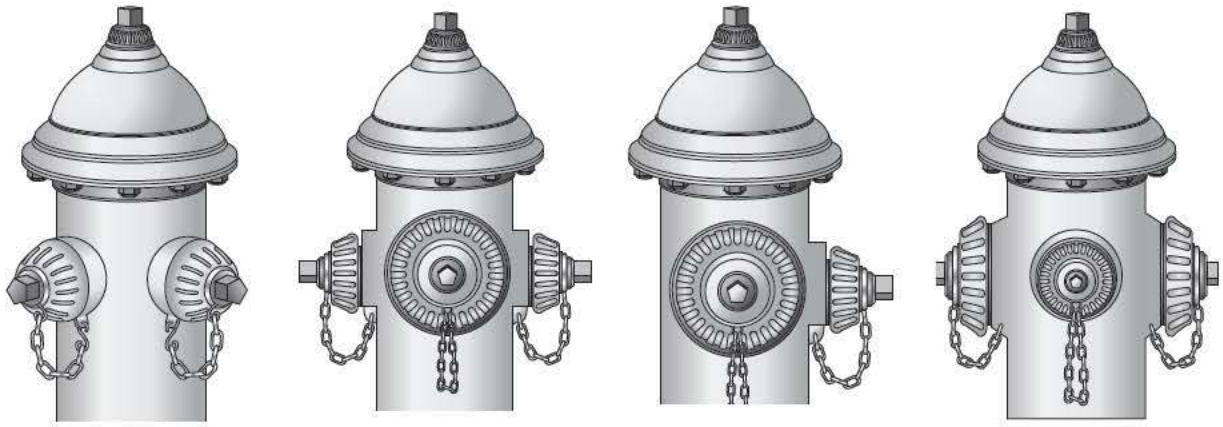
The section that extends above the ground may be one or two components. When it is one component, it is referred to as the **nozzle section**[35] because it houses the outlet nozzles. When this section is a two-piece section, the top section is referred to as the nozzle section and the section between the lower barrel and the nozzle section is called the **upper barrel**[36].

Outlet Nozzles

There are two types of outlet nozzles. The most common outlet nozzles are the hose nozzle outlets. These nozzles are designed to connect fire hoses up to 3 inches in diameter. The most common hose outlet nozzles are 2½ inches with National Standard Threads. However, many specific fire departments have requirements for special threads that are only used in that fire jurisdiction. The other common outlet nozzle is the pumper nozzle outlet. The pumper nozzle is 3½ inches or larger. Most hydrants with a pumper

[34] **Lower Barrel** - A part that extends from the base to the ground line, enclosing the operating mechanism, and conducts water from the base to the upper portion of the hydrant.
[35] **Nozzle Section** - A part that extends upward from the barrel and contains the outlet nozzles. It may be integral with the upper barrel.
[36] **Upper Barrel** - The part that extends from the lower barrel to the nozzle section, enclosing the operating mechanism. It may be integral with the nozzle section.

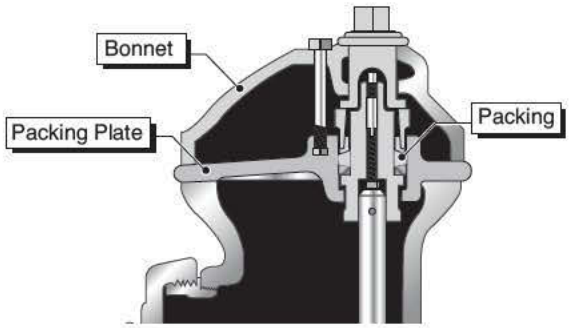
nozzle have only one pumper nozzle and two hose nozzles. However, hydrants can be purchased with just two 2½-inch hose nozzles, two pumper nozzles, three 2½-inch hose nozzles, two pumper nozzles and one 2½-inch hose nozzle.



Two 2 1/2" **Two 2 1/2" One pumper** **One 2 1/2" One pumper** **Two Pumpers one 2-1/2"**

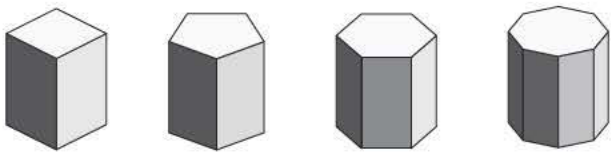
Bonnet & Packing Plate

The **bonnet**[37] sits on top of the nozzle section and houses the operating nut and, if present, the packing plate.



Operating Nut

Operating nuts come in a variety of sizes and shapes. The common shapes are pentagon, square and octagon. The hydrant wrench connection on the outlet nozzle is the same size and shape as the operating nut on the hydrant. From an operations standpoint, it would be desirable to standardize the size and shape of all operating nuts on all the hydrants in the system.



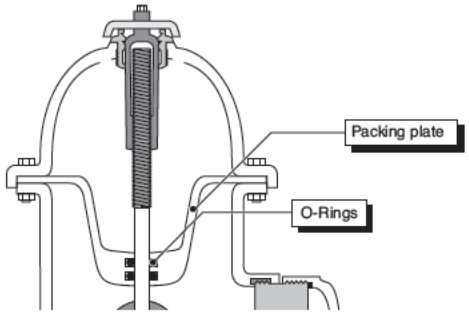
SQUARE (4- Sided) PENTAGON (5- Sided) OCTAGON (6- Sided) HEXAGON (8- Sided)

[37] **Bonnet** - A part that attaches to the top of the nozzle section and encloses the support portions of the operating mechanism. It may be integral with the nozzle section.

These nuts can be changed with relative ease so that if they are not standard they can be changed to a single size and shape at relatively little cost.

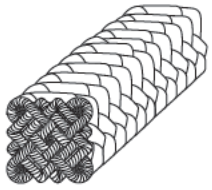
Packing Plate and O-rings

The packing plate is only found on dry top hydrants. The packing plate forms a physical barrier between the nozzle section and the bonnet. It protects the threads on the operating stem and operating nut from the water in the nozzle section. The operating stem passes through the packing plate. To prevent water from traveling upward around the operating stem, packing or "O" rings are placed around the stem.



Packing Material

Until very recently, the packing material used in fire hydrants was made from a combination of long fibrous asbestos and graphite. Due to the health hazards in the manufacture of asbestos-based packing, it is no longer available. Fire hydrant manufacturers recommend that existing packing be replaced with non-asbestos material. Check with the manufacturer for a recommendation of type of packing material. We recommend Teflon-based packing. Jute, flax, and cotton-based packing should be replaced every three to five years. Teflon packing should have a life expectancy of 10 years or more. The packing is held in place and the leakage controlled with a packing gland. This gland is drawn down against the packing with two bolts.

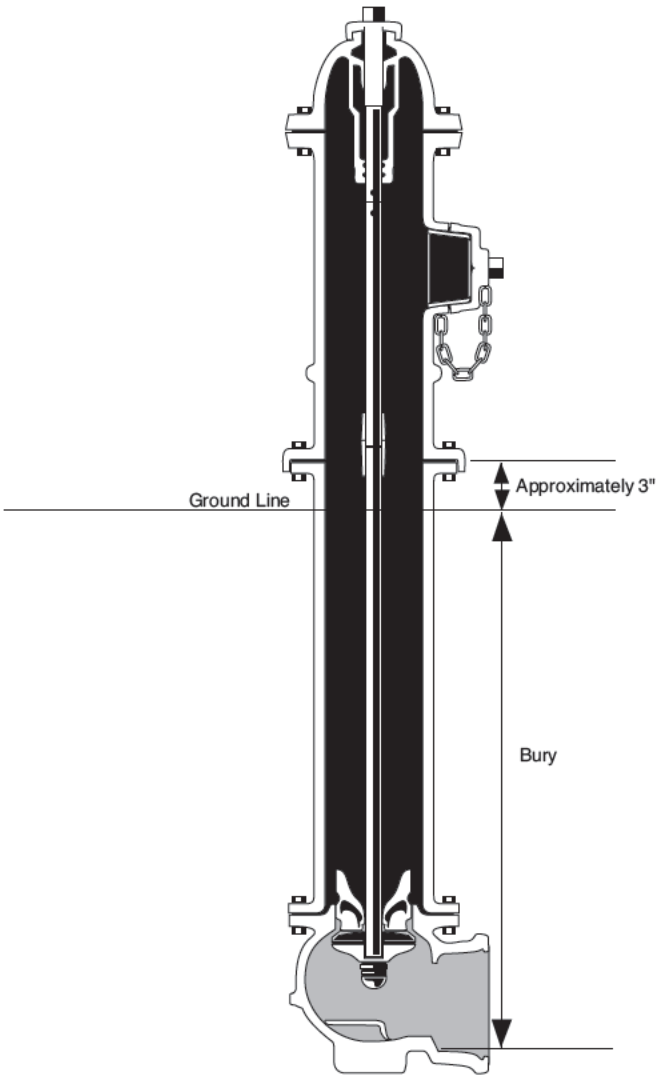


BRAIDED FABRIC PACKING MATERIAL

Bury

The **bury**[38] is not a hydrant component, but a description. Bury is the distance from the bottom of the trench to some predetermined point on the lower barrel of the hydrant. The point is usually 2 to 3 inches below the flange that connects the lower barrel to the nozzle section.

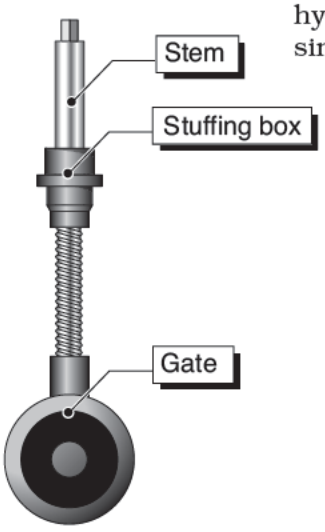
[38] **Bury** - The nominal vertical distance between the ground line and the bottom of the pipe connected to the hydrant inlet, measured to the nearest six-inch increment.

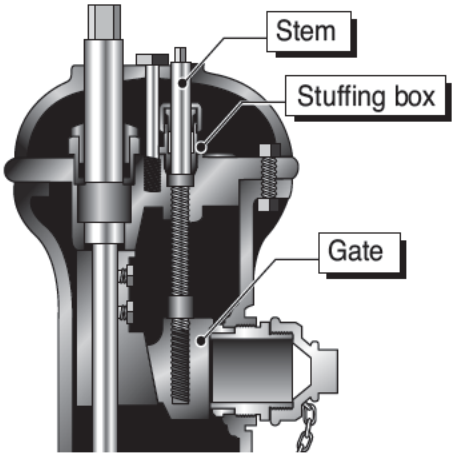


Special Components

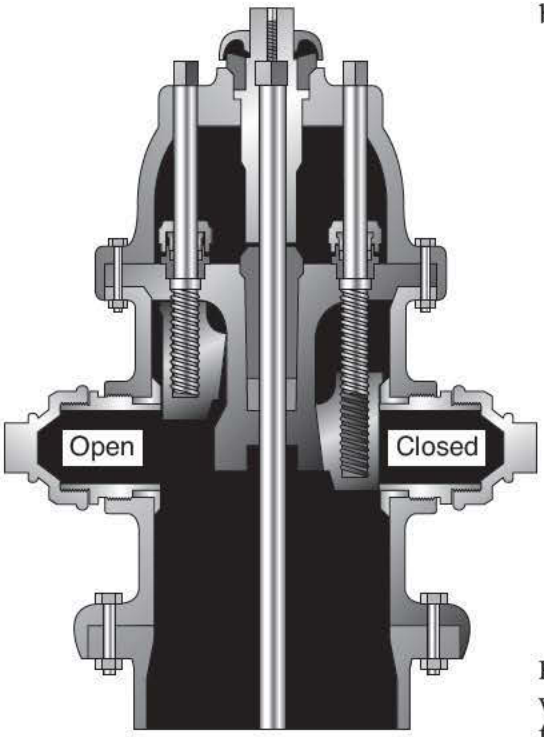
In order to meet the advantages the wet barrel hydrant has in connecting the second fire truck to the hydrant, several manufacturers built into hydrants a single-disc gate valve on each discharge nozzle called

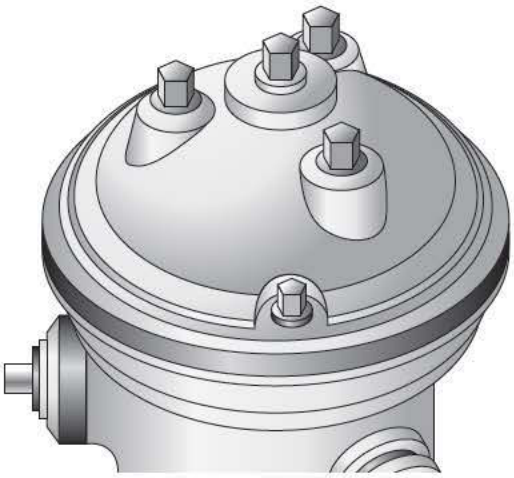
Slide Gate





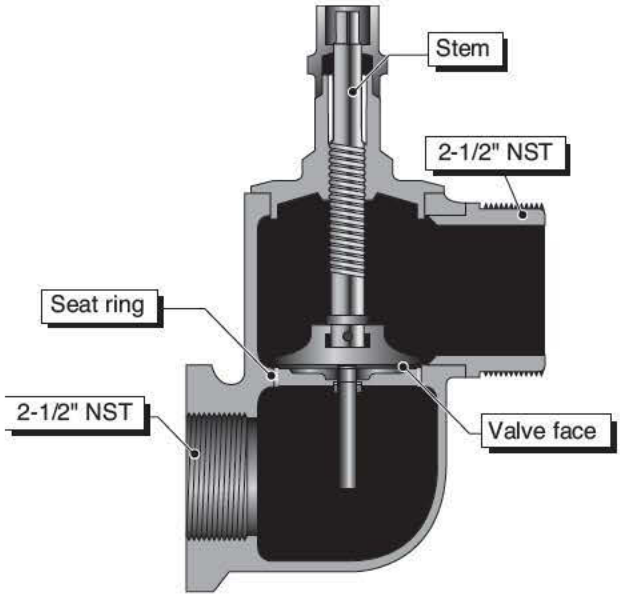
outlet valves. While still in use in some locations, the added maintenance on these devices proved them to be more trouble than they were worth.



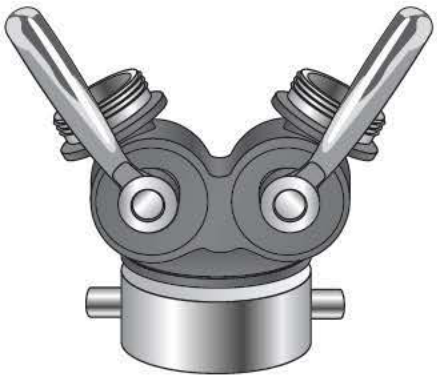


Independent Gate Nozzle Hydrant
Market St., San Francisco., CA

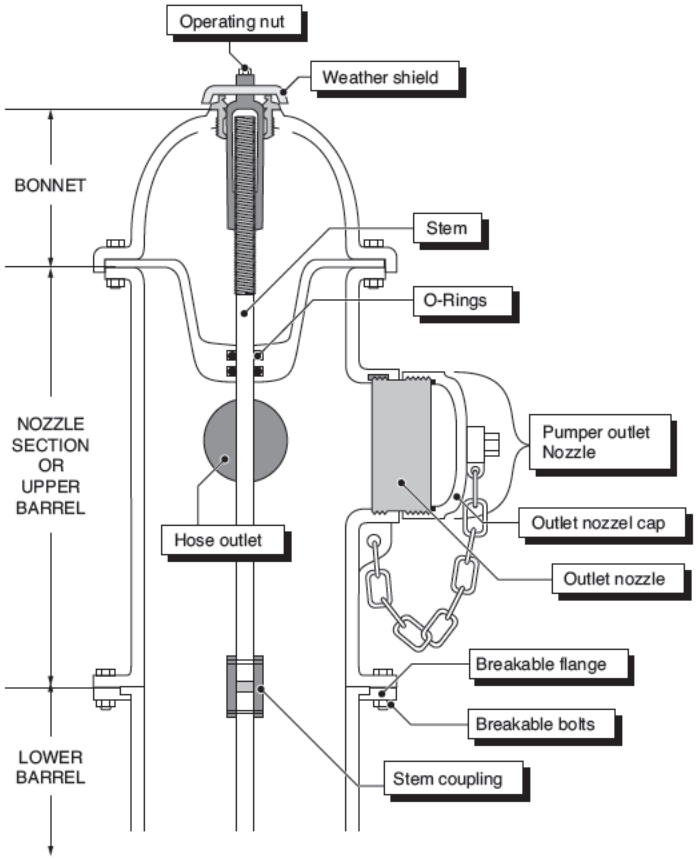
Presently no hydrant manufacturer offers this variation. There are two methods fire departments use to provide the same function. One is to carry a heavy-bodied globe valve on the truck. This globe valve is connected to the second hose nozzle outlet, making it easy to make the second connection. The second method is to install on the discharge nozzle a wye with two ball valves.



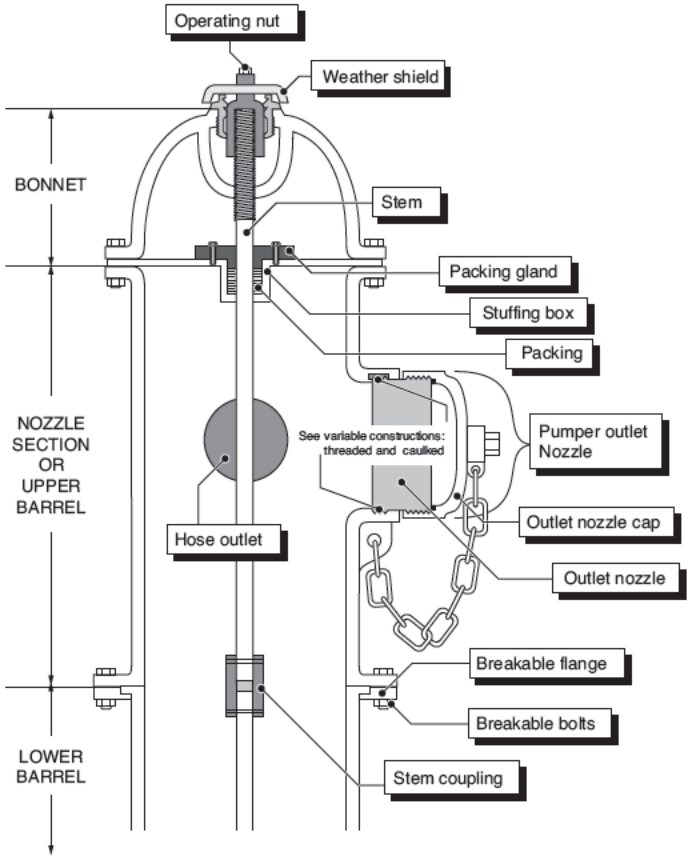
Heavy-Bodied Globe Valve



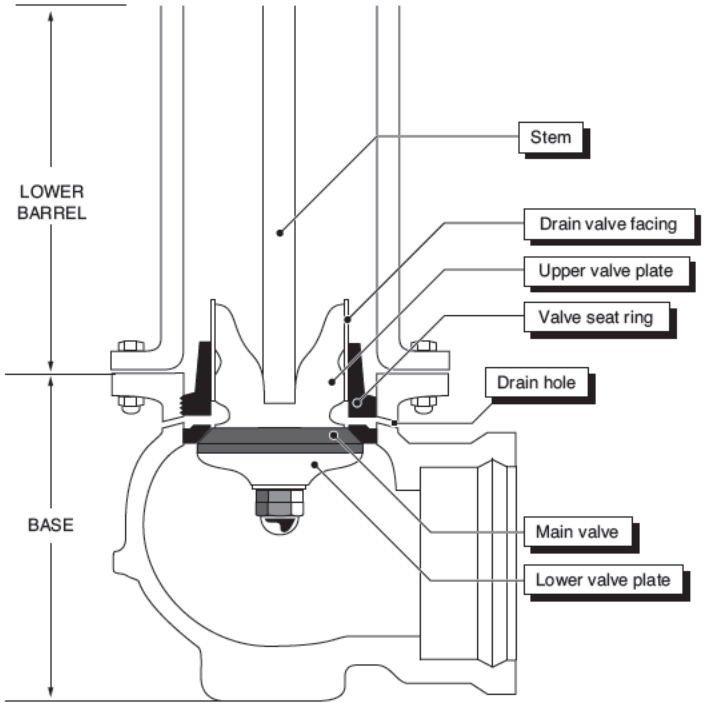
Dry Barrel hydrant with "O"ring stuffing box.



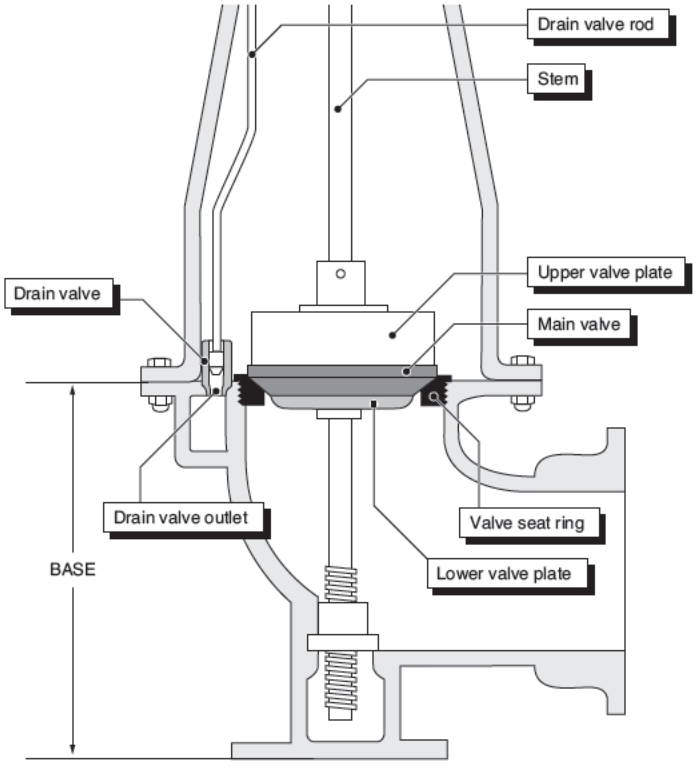
Dry Barrel hydrant with packing stuffing box.



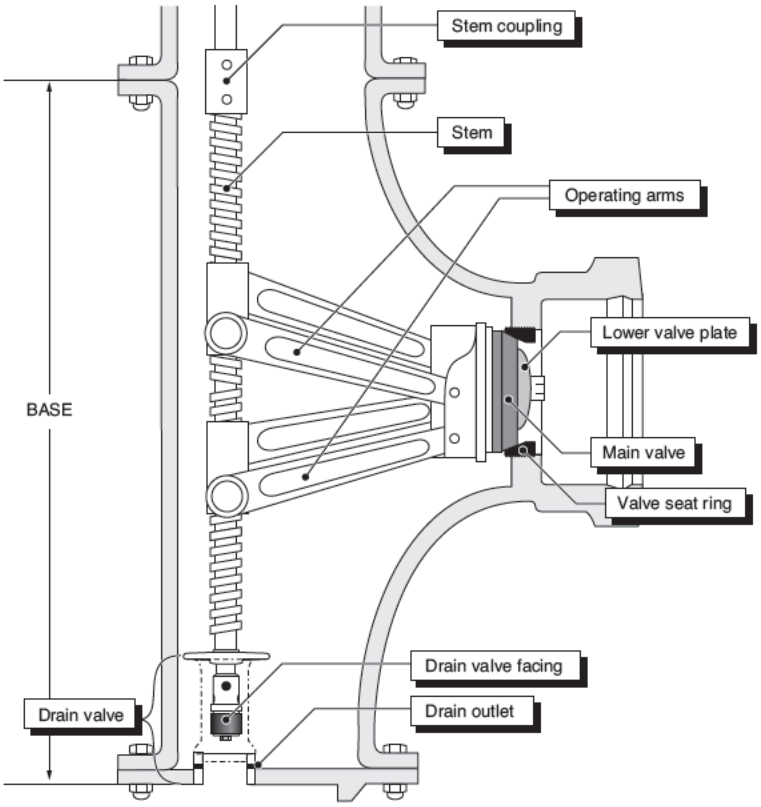
Compression Hydrant
Opens against Flow



Compression Hydrant
Opens with Flow



Toggle Hydrant



Slide Gate Hydrant