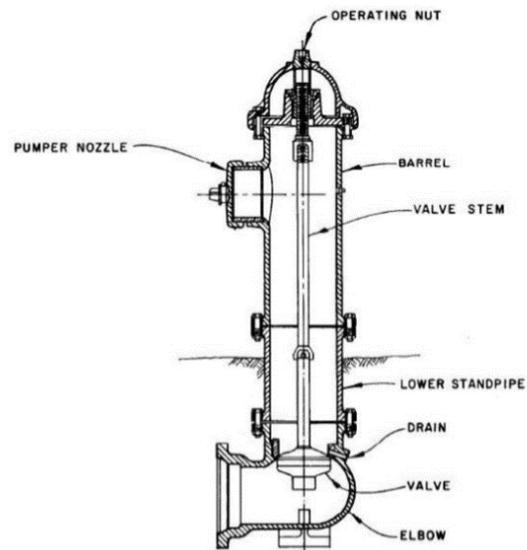


## Anatomy of a Typical Dry Hydrant

All hydrants in this part of the country are dry hydrants because of the freezing weather conditions we experience. This means that the barrel of the hydrant stays dry until the hydrant is opened at the Operating nut. This drives the stem to open the valve at the bottom of the barrel.

Notice in the detail to that the stem is split into two parts with a safety coupling which acts as a breakaway valve in case the hydrant is run over. As can be seen, a hydrant is an intricate water delivery mechanism with many moving parts.

In addition to the stem and valve that bring water into the barrel, other important moving parts are the 2½ and 4½ inch nozzle caps (identified as hose and pumper nozzle respectively) which keep the nozzles protected from dirt and the elements. The caps can easily lock up due to corrosion, neglect, and sloppy painting.



SCHEMATIC OF TYPICAL  
DRY-BARREL FIRE HYDRANT

## Dynamics of Water

When performing any sort of flow test or exercising of hydrants, there are several important concepts that must be understood to avoid causing damage to the hydrants and to the water system in general.

### Water Hammer

Water hammer is caused by an abrupt change in the velocity of flowing water. It is most often the result of shutting down a valve too quickly. Imagine driving into a brick wall at 60 mph. The energy of your momentum has to be transferred somewhere. In this case it is shared, though unequally, by you, the car, and the brick wall. Water is incompressible. It will not absorb ANY of the energy it gives off by being forced to suddenly decelerate. Therefore, the system, pipes, hydrants, ground have to absorb all of the energy. If a valve is shut down too quickly, the weak link in the system will go first. The weak links are almost always at the flanges.

### Brown Water

Brown water is the basic complaint the Water Resources Department receives when people turn on their faucet and see less than clear water coming out. This may be caused by several things. One thing that will almost always cause brown water is a large amount of flow in a water main. During normal conditions only the center portion of a water main actually flows water. That's because of the friction that the wall of the pipe is exerting on the water. It's less trouble for the center portion to flow than the outer portion.

As the average velocity increases, so will the velocity of the fluid close to the wall of the pipe. As this water moves faster, it begins to kick up all the sediment that usually stays at the bottom of the pipe. This sediment gets stirred up and does not settle back down until the velocity slows down. However, once the sediment has been kicked up into the center portion of the pipe, it is now in the main stream of flow.

### Flushing a Hydrant

Flushing a hydrant removes any accumulated sediment in the barrel and on the valve. Flushing must be performed annually along with the regular inspection and maintenance items described above. Circumstances will sometimes not permit flushing; at a minimum, perform the regular inspection and maintenance.

## To flush a hydrant:

Contact the appropriate Water Department to inform them that a hydrant flush is about to take place.

Often, when a large volume of water is moved through an orifice such as a hydrant, sediment in the line will be stirred up and the Water Department may receive complaints about brown water.

Prepare to flow water from the hydrant by attaching hoses to direct the discharging water to acceptable locations. The following are acceptable discharge locations for the water:

- Sanitary Sewer
- Storm Sewer if water has been de-chlorinated
- Other locations must receive prior approval

Next steps:

1. Open the hydrant **very slowly** until it is fully open (this prevents water hammer).
2. Let water flow for a minimum of 3 minutes or until water is clear.
3. Do not open more than one hydrant at a time - this will minimize the amount of flow created in the main.
4. Shut the hydrant down, again very slowly (this prevents water hammer), until the valve is completely shut.
5. Remove hose and replace cap.