By Greg Metz, KRWA Circuit Rider

Orange ring under cap indicating a flow of 500 to 999 GPM.

Fire Hydrant Maintenance Best Practices

In the November 2022 issue of *The Kansas Lifeline*, I wrote about fire hydrants and hydrant maintenance. It's an important topic. The operation of hydrants by local fire departments can also be troublesome. One of KRWA's staff members spent time in early October helping repair a municipal water line that it is assumed, was broken when local firefighters were in too much of a hurry closing it.

The issue of adequate maintenance of fire hydrants cannot be overstated. So, what will your community do when it has an emergency and a critical fire hydrant is found to be inoperable?

There are numerous essential tasks for good maintenance of fire hydrants. Hydrants require the attention of water system staff – and fire officials. Regular testing and inspection of hydrants help ensure good operability of hydrants. That helps maintain a favorable rating from the fire department and insurance providers and adds to the community's perception of good preparedness.

Colors – what do they signify?

I have seen all sorts of different paint jobs on fire hydrants. (PIC 4) Although there is no law concerning colors, hydrants should have a marking to indicate the flow rate.

NFPA code 291 is designed so that any firefighter can go anywhere in the United States and know how much water should be expected from a particular fire hydrant based on its color.

Unfortunately, this code is only a guideline and not the law. It is estimated that only half of all hydrants are colored according to the code. Any inoperable hydrant should be covered and or marked properly. Purple is the color for non-potable but I would also make sure it is signed.

Painted puppy dog hydrant with Red top indicating less than 500 GPM flow.

Flow tests allow communities to accurately color-code their fire hydrants, providing firefighters with the water-flow capabilities of each individual fire hydrant. Here is a list of what each fire hydrant color represents:

- **Red** indicates a water-flow capacity of less than 500 gpm
- **Orange** indicates a water-flow capacity of 500 to 999 gpm
- **Green** indicates a water-flow capacity of 1,000 to 1,499 gpm
- **Blue** indicates a water-flow capacity of 1,500 or greater gpm

The NFPA Standard . . .

The National Fire Prevention Association (NFPA) is a global, non-profit organization that promotes safety standards, education, training, and advocacy on fire and electrical-related hazards. Established in 1896 as a way to standardize the use of fire sprinkler systems, the NFPA's scope grew to include building design, rescue response, electrical codes, and other safety concerns.

The Fire Extinguisher Guide recommends that "fire hydrants shall be provided for detached one- and two-family dwellings in accordance with both of the following: (1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 600 feet; and, 2) the maximum distance between fire hydrants shall not exceed 800 feet.

NFPA 291 Guidance (2022 edition) recommends that fire hydrant flow tests be performed every five (5) years and fire hydrant inspections be performed annually.

There are presently eight major fire hydrant manufacturers that are most commonly used in the U.S.

There are two types of hydrants: 1) wet barrel; and, 2) dry barrel. The dry barrel is what is used in Kansas. It has the main valve below ground. The drain holes drain the water from the barrel to prevent freezing. Wet barrels are commonly used in warmer climates where freezing is not a problem.

Proper maintenance is necessary for any waterworks device buried in the ground for long periods such as fifty or more years. But unlike many of other appurtenances, a fire hydrant that does not work when required can have grave consequences. Too often, due to the lack of staff, fire hydrant maintenance is neglected in smaller communities.

The best way to keep a fire hydrant in working order is to have a minimum annual testing and maintenance program. A good fire hydrant maintenance program should include the following.

Exercising, lubrication and flushing

Exercising a fire hydrant will help ensure the hydrant will work properly when needed. It is a good practice to exercise the main valve on the feed line at the same time if it has one. The caps and outlet nozzles should be inspected. Over time, corrosion can make nozzle caps difficult to remove. Remove caps during each inspection and clean them. Adding food-grade lubrication or anti-seize to the nozzle and cap threads can help because of less effort in the future. I have seen nozzle caps stuck so badly that they would not have been able to be used in an emergency. After exercising the hydrant, check it to ensure it is properly draining. This is especially important in cold climates. A high-water table or clogged drain holes can cause water to accumulate in the fire hydrant. This accumulated water can freeze, causing damage to the hydrant. After flushing, this inspection can be done by holding your hand over the exposed nozzle to feel for small amounts of suction. This signals that the fire hydrant is draining correctly. Some fire hydrants in areas with a higher water table may have plugged drains. These need to be pumped after use. A plumb bob can be lowered down the nozzle outlet to see if the water level drains adequately. A well-sounder will also serve this purpose.


Line flushing using a diffuser.

The lubrication of the fire hydrant differs with the brand. Fire hydrants are typically greased or oil-filled. Without proper lubrication, corrosion can occur, making the hydrant difficult or, in some cases, impossible to operate. Follow the manufacturer's instructions.

It is a good practice to flush the hydrant to clear any debris in the feed line. KRWA staff members have seen many issues with large objects in the lines and obstructing the flow of

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hydrants. Hydrants should be flow tested at least every five (5) years. There is always a concern about having discolored water during hydrant flushing; that's the purpose of flushing. In other words, flush until the water clears Always be aware of flow direction when flushing and use a diffuser when necessary not to cause unnecessary damage to yards or landscaping.

Pressure testing; checking for leaks

A fire hydrant can be pressurized to inspect for leaks. This is achieved by removing a hydrant cap and operating the hydrant for a few turns. Another way I like to do it is to install a cap with a small valve to let the air escape with a pressure gauge.

Allow the hydrant barrel to fill until a small amount of water comes out of the nozzle. This allows for as much air to escape as possible. Replace the cap and fully open the hydrant. With the hydrant pressurized all visible joints can be inspected for leaks. During the inspection, double-check that the breakaway devices are not damaged. Depending on the age and type of the fire hydrant, this feature could be breakaway flanges or breakaway bolts. Some fire hydrant models do not have a breakaway design. It is also important to inspect the fire hydrant surroundings. Make sure there are no obstructions hiding the fire hydrant, like bushes or debris. Homeowners sometimes landscape around the hydrants to hide it from their view or with the best intentions of beautifying, but with no maintenance, it can quickly become difficult to find.

Bury depth of the fire hydrant

Most fire hydrants have a bury-depth marked on them. This is very important to monitor. A fire hydrant that has the incorrect height above the groundline can result in serious consequences if hit by a vehicle. A hydrant buried too low can result in the hydrant not breaking as designed, and minimize damage to the water system and to what collided with the hydrant. Most hydrants are designed to break at a specific point and then can be repaired at a minimal cost. A hydrant that is set too high may allow for a vehicle to impact the lower barrel. Improper fire hydrant height can cause not only more damage to the vehicle during a collision but also damage the water piping systems. A fire hydrant should be buried so the breakaway flange is just above the ground, allowing room to get a wrench on the bottom bolts. The hydrant shown in the nearby photo would have to be dug out around the flange to work on it.

Pressure testing fire hydrant with bleed valve.

Photo of a hydrant buried too high and hit by a truck; it shifted the lower barrel. It did not break away because it hit the flange.

Hydrant buried too low.

Maintain good records!

Record keeping can impact the Insurance Service Organization (ISO) rating in your city. A good rating can help reduce fire insurance costs. A municipality must know which hydrants have been repaired/inspected or need to be repaired/inspected or replaced. This is an essential part of any maintenance and inspection program. It is also imperative that any issue discovered during an inspection be repaired promptly.

No shortcuts to safety

Firefighters need to access fire hydrants quickly. The delay can be catastrophic if their wrenches and hoses do not fit. Municipalities also need to ensure that new hydrants have

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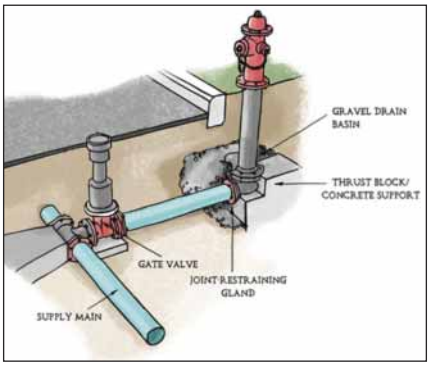
Hydrant would probably break away but it would be difficult to repair without digging it out.

similar threads and operating nut size as other hydrants in the area. Hydrants with stainless steel components will last longer and are better protected against corrosive soil (hot soil). Proper thrust blocking and installation of a drain field will also help with the performance and longevity of the hydrant.

No shortcuts should be taken when it comes to maintaining fire hydrants because they have a critical function



Common proper fire hydrant installation graphic.

and need to perform at a moment's notice. Still, the most common cause of failure is the lack of a proactive preventative maintenance program. Municipal crews with solid maintenance programs will have fewer repairs and more reliable hydrants.

Generally speaking, the mechanics of fire hydrants have not changed that much, so once an operator has a good grasp of the basics, the operator will be set for a long time. Most manufacturers have a step-by-step document that walks operators through their model's fire hydrant maintenance and inspection. Also, the "AWWA M17:

Bury depth marking on a fire hydrant.

Installation, Field Testing, and Maintenance of Fire Hydrants" is an excellent resource. It can be found on their website www.awwa.org.

Greg Metz joined KRWA as a Technical Assistant in July 2009. He previously worked at the city of Washington for 13 years where he was involved in city utilities including the power plant, streets, water and wastewater. Greg holds a Class II Water Operator and a Class I Wastewater Operator Certification.