



Hydrant Security

Taking that first step

A White Paper Published by

Mueller Co.

Chattanooga, TN 37450

Hydrant Security – Taking that First Step

Until 9/11, fire hydrant security had more to do with “hindrance” than “prevention.” It was the theft of hydrant parts, vandalism and unauthorized operation of hydrants for water that utilities tried to thwart, and that hydrant locking devices were intended to address. Since the perceived problem was more one of monetary loss than being a threat to health and welfare, available locking devices were often considered effective if they merely discouraged or delayed a would be vandal or thief long enough to abandon the hydrant.

Times have changed. Since 9/11 there has been a heightened awareness that the ubiquitous fire hydrant, with its need to remain highly visible and immediately accessible in emergencies, could become the target for a determined agent bent on introducing contaminants into the public water supply. Today theft and vandalism remain important concerns, but add to that the threat of contamination of the water supply, and fire hydrant security becomes more of an imperative for 24/7 prevention that can be depended upon to work reliably.

Security has come a long way

At first, typical hydrant locks were aftermarket ad-on items that sought to block anyone from removing a nozzle cap or hydrant part, or operating the hydrant valve to flow water unless they possessed a specialized tool. The effectiveness of these “active” devices [active – visible and standing in the way of anyone trying to access the hydrant, and having to be removed or unlocked to operate the hydrant] was about as varied as the number of designs being sold. Use of such locks was often limited to hydrants in areas where the utility had experienced the highest incidents of vandalism or theft, rather than using them preemptively over broader areas of their distribution system. As a result, anyone with determination could find a vulnerable hydrant relatively easily. What’s more, most locking devices left no tell-tail sign if they had been circumvented and any breach might easily go undetected.

Today some of the focus has shifted from protecting the hardware of fire hydrants and theft of water, to protecting the purity of the water supply itself by blocking the backflow of potentially contaminated water from a hydrant back into the public water main. Typically, this involves a “passive” device [passive – invisible and providing protection without affecting normal hydrant operation, and without needing any special action or tool to access the hydrant] such as a check valve installed somewhere in the fire hydrant or the pipe that connects it to the main. There are types that are add-ons installed in the hydrant upper barrel or the hydrant connector line, and others that are purchased from the hydrant manufacturer as an integral part of a new hydrant’s shoe connection. The Mueller® Super Centurion® 250/HS High Security Fire Hydrant is an example of the type fire hydrant with a check valve built into the shoe.

Check valve equipped hydrants offer the advantage of providing protection without interfering with emergency personnel connecting to them and accessing water, since there is no need to first disengage or remove a locking device. Check valves are typically buried or inside the hydrant out of sight, and not so easily tampered with as would be an exposed locking device. In addition, no special tools or keys are involved. The hydrant manufacturer should be consulted to determine if adding a check valve inside the hydrant will affect the hydrant warranty.

With check valves located in the hydrant shoe or connector line, maintenance procedures are the same as for a regular, unprotected hydrant. However, if the check valve is the type that is mounted inside the hydrant upper barrel or standpipe, it may be necessary to do more disassembly of the hydrant than normal to complete some maintenance procedures, especially those performed on the inside of the hydrant, such as work on the main valve.

Assessing which security method to use

One of the first and most important steps before selecting a specific fire hydrant security device is to evaluate the risk level for the various hydrant locations in the distribution system. The risk associated with a fire hydrant varies with its location. One on a street corner in a busy central city location surrounded most times of the day with passing crowds would certainly be at a much lower risk than one in an isolated area of deserted buildings or where there's little development. A quiet suburban neighborhood might rate somewhere in between. While the busy street corner might need only a simple operating nut shield or perhaps nothing at all, and the quiet neighborhood may get by with a simple add-on locking device to slow a would be agent long enough to increase the chances of being discovered, the isolated hydrant likely will require something that blocks a potential contaminant as would the check valve approach. In the latter location, a simple lock might not be enough since a determined person would have the advantages of obscurity and time to overcome the lock to perpetrate the intended deed.

Another consideration is how the security method might affect emergency personnel and even utility maintenance crews. Most shields and locks require some type of special tool to disengage or remove the locking device before operating the hydrant. These tools must be purchased and distributed to everyone authorized to access hydrants, including fire stations. Even then, they have to be safeguarded to keep the tools from falling into the wrong hands. In addition, they require periodic training to assure thorough awareness of how to work the locking device as quickly as possible in time-critical emergency situations. And while most hydrant locks might not add significantly to maintenance time, some can, especially if they block normal access to the hydrant's internal parts. Consideration should be given to the additional time and equipment needed for hydrant disassembly that might not be needed if some other device were to be used.

Clearly, when it comes to hydrant security "one size" does not necessary "fit all." It is helpful to construct a matrix with levels of threat for the various hydrant locations in your system on one axis, and the types of security devices you intend to use on the other. Then for each combination of device and location, rate the effectiveness of the device for that location's threat level. This can help you select the types of device to use and help quantify the number of devices involved and their cost. Don't overlook the time and cost for training and making changes to maintenance procedures that might be needed. Although much of this evaluation will be subjective, the process will result in a better understanding of what's involved to protect your system.

The trade offs

Once you have a better picture of what it will take to protect your system, you can consider some of the trade-offs using one style of protection over another. For instance, the special tool needed for one style of lock might also be usable on a standard unprotected hydrant, reducing the numbers and types of tools emergency and maintenance crews will need to carry. One locking device might provide an easily recognized tell-tail sign of tampering while another might not. The former might be better suited for higher threat areas under frequent surveillance where the "tell-tail" will likely be seen. The latter might be better suited for areas where there's less a threat to safety and more a problem with vandalism, since the lack of a "tell-tail" might be less important.

Even isolated hydrants might present different levels of threat. For example, one on a dead-end area of the distribution system in a predominantly agricultural area might have less potential for affecting a broad area of the distribution system than one in a remote area of an industrial park, but located on the grid.

Advice from maintenance crews should also be sought and factored into the assessment. Their experience with the various types and ages of the hydrants in your system might reveal a higher incidence of repair for certain models. If for example those repairs tend to involve the main valve, it would be advantageous to

install a device that doesn't block access to the lower barrel and main valve of the hydrant. Or if they report certain parts on a particular model are frequently stolen, a locking device that also helps to shield that part would be a good one to consider.

It is hard to provide comprehensive rules, let alone general guidelines sufficient for making hydrant security decisions that will work in every situation. Hydrant security itself is changing as more technically sophisticated products and contamination detection systems are being developed. Tomorrow's choices may be quite different from what they are today. But this doesn't justify the ultimate trade-off of sticking with the status quo and ignoring what could quite possibly be a critically needed upgrade for your situation. By knowing your distribution system, its vulnerabilities and by spending time to learn about the security options available to you now to address them, you can arrive at a workable plan to protect the purity of water you take great pride in providing to your customers.

Mueller® - an integrated approach to hydrant security

Mueller is unique among the companies that manufacture fire hydrants in that Mueller is the only manufacturer to make both the fire hydrants and the security devices to protect them. A significant advantage for the hydrant owner is Mueller's product warranty backs both the Mueller-made hydrant and security device used to protect it. Mueller stands behind both products with one of the most trusted warranties in the market.

Mueller® Security Solutions	Active	Passive	Deters Theft	Deters Contamination	Deters Operation
250/HS™		X		X	
Hydrant Defender™	X		X	X	X
Tamper-proof Operating Nut	X		X		X
Tamper-resistant Hold-down Nut	X		X		X

Mueller makes hydrant security devices for several levels of protection. Devices range from a simple, one-piece cast shield that inhibits access to the operating nut, to the Hydrant Defender lock that covers the operating nut and nozzle caps and "tattles" if it has been disturbed, to the ultimate passive protection 24/7: the 250/HS™ "high security" hydrant.



All types of Mueller brand locks, shields and check valves used for hydrant security are easily removed to perform maintenance, and once removed all allow normal access to the hydrant internal parts. The unique advantage of the 250/HS style hydrant, with its shoe mounted check valve, is the valve's location has no effect whatsoever on normal maintenance procedures involving the upper and lower barrels and main valve of the hydrant.

◀ Ultimate Protection:

Mueller Super Centurion® 250/HS™ "High Security" Fire Hydrant – the highest level of protect we offer as a standard option on any Centurion hydrant. A flexible check valve is built into the shoe where it provides constant and reliable prevention of backflow of fluids from the hydrant to the public water main, but allows normal operation and maintenance of the hydrant. Features a steel and fabric reinforced elastomeric flapper valve that provides reliable service without periodic maintenance, and resists water hammer. Available as an option on any Mueller® Centurion® hydrant.



◀ **Excellent Protection:**

Hydrant Defender™ Security Device – a rugged stainless steel lock that shields and covers the operating nut and nozzle caps. Guards against theft of parts and water, operation of the hydrant, or removal of nozzle caps. The recommended barrel lock comes from its manufacturer and is controlled to avoid easy access to the key. Easily removed by emergency personnel – view a video demonstration on the Mueller web site at <http://tinyurl.com/hydrantdefender>. Heavy gauge stainless steel resists cutting, but evidence of unauthorized removal is easily seen. Available as a retrofit kit for Mueller® and other brands of hydrants.

Good Protection: ▶

Tamper-Proof Operating Nut Shield – completely covers and hides the operating nut to protect it from any type of access. It protects from both unauthorized operation of the hydrant and theft of parts. Requires a special wrench which also removes nozzle caps and can be used on other hydrants with standard pentagon operating nuts and nozzle caps. Available on new Mueller hydrants or as a retrofit kit.



◀ **Economical Protection:**

Tamper-Resistant Hold Down Nut – simple one-piece cast iron shield easily installed in place of the standard hold down nut on any Mueller® Centurion® or Improved fire hydrant. The shield's cup surrounds the operating nut to prevent it from being turned by common wrenches. Inexpensive and easily retrofits existing hydrants. Uses a specially designed wrench that will also operate other hydrants with a standard pentagon operating nut. Available on new Mueller hydrants or as a retrofit kit.



Check valves for retrofit of existing Mueller or other brand fire hydrants:



◀ **SA-Series Check Valve** – with integral 6” male mechanical joint ends to connect directly to any standard 6” MJ hydrant shoe connection without additional pipe. Convenient means to add protection with a minimum of additional joints. Similar to 250/HS check valve function and features.



◀ **Flexible Disc Check Valve** – with flanged ends to fit flanged hydrant shoe connections. Similar to 250/HS check valve function and features.

