

Mueller Co.

Reliable Connections™

10 Considerations For Better Gate Valve Operation

Reliable gate valve operation isn't dependent solely on the product itself. In fact, it's more accurate to say that reliability is the product of sound utility operations.

Valves are arguably the most critical components of a water system. They are necessary for supplying water for residential and commercial use, allowing operators to control flow, isolate sections of pipeline systems for maintenance and repair, or to isolate pressure zones. They may seem simple, but valves come in all shapes and sizes, containing complex components tailored for different uses.

Of all the various types, gate valves are the most common within water distribution systems — and perhaps the most important. Certainly, they must work when called upon. AWWA describes their basic operation, which utilities know well:

“The gate, disc, or wedge of the valve is raised and lowered by a threaded operating stem, which is operated by a handwheel or valve key. When fully open, gate valves provide almost unrestricted flow because the gates are pulled fully up into the bonnet.”

Utilities also know that gate valves improperly selected, installed, or maintained are prone to failure, which can have significant health, cost, and convenience repercussions for both the utility and the public.

Fortunately, future issues can be avoided

if the following considerations are made during the decision-making/specification process and in the course of installing and maintaining your gate valves. The tips were provided by a trio of valve experts — John Petito, PE and associate VP with AECOM, along with Virgil Diaz and Mark Snyder, district engineers with Mueller Co.

These considerations are applicable for metal-seated gate valves adhering to AWWA Standard C500, as well resilient wedge (RW) gate valves adhering to C509 (cast iron/ductile iron) or C515 (ductile iron). They are classified in linear fashion to denote tasks recommended before, during, and after installation.

Before Installation

1. Create A Robust Spec

Start by having a robust specification (or “performance spec”) that covers epoxy linings and coatings, stainless steel fasteners, grade of rubber, type of seals (e.g., flat gaskets or O-rings), torque requirements, gear ratio, etc. Be specific not just on AWWA Standards, but also on NSF/FM/UL certifications and approvals to ensure quality materials in accordance with your specific application and unique



conditions such as corrosive soil or high-temperature water. This will make sure that you don't end up with an inferior product, which Diaz warns “will come back to bite you.”

“The only thing you can really do is invest up front by putting together a solid specification. If you can't shut down your system with minimal interference to your customer base because you have a poor product in the ground, then you probably didn't invest the appropriate amount of time on your spec,” he said. “If you've got a four-page spec, chances are you spent some time developing that. The guy who has half a paragraph is going to get a bottom-of-the-line product and will probably see that once buried valve again in the very near future.”



2. Guard Against Corrosion

Defend your gate valve against corrosion and debris by specifying not only an NSF-approved epoxy system, but thickness as well. Whether via liquid or fusion-bonded epoxy (FBE), the interior coating should conform to AWWA C550, while the industry standard for exterior coating (not governed by C550) is 8 to 12 mils.

Quality components should also be specified to keep out debris. Debris leads to corrosion, which ultimately leads to galling or binding — when you can barely move the valve, or even not at all.

“Providing proper stem covers, dirt seals [also known as wiper rings], O-rings, and gaskets are the most important issues to help keep out debris,” said AECOM’s Petito.

3. Verify That Manufacturer Documentation Matches Your Spec

Having worked to make the perfect spec, be sure that the documentation for the gate valve matches your specifications prior to its installation. It is often overlooked or taken for

granted that the right product is actually on-site.

“Your inspection team is really your last line of defense. If you have no one there to receive it, the contractor could be installing something that’s not even of the required specifications, quality, or brand,” Diaz warned. “The

inspectors need to be very educated and know what they’re looking at.”

During Installation

4. Favor Vertical Installation Over Horizontal

“Gate valve installation in the vertical





[stem] position is always preferred,” advised Petito. “Provision for efficient and easy manual operation of the valves is also critical.” [See #6].

Installing on a horizontal line with the stem and wedge vertical, especially for larger valves, allows gravity to do some of the work. That being said, Mueller Co.’s Snyder acknowledged, “You cannot always do that, if you don’t have the clearance due to the depth of the water main. You’ve got to lay them over [horizontally] sometimes.”

5. Avoid Internal Pipeline Debris

Sediment and debris can be naturally occurring within a pipeline, but the advice here is to ensure that no outside debris is allowed into the pipeline during installation or repair of the valve by municipal staff or contractors. There are even instances, conveyed by the Mueller Co. district engineers, where kids might throw rocks into an open pipeline. Proper oversight and careful execution are the

keys to keeping foreign debris — rocks, dirt, etc. — from getting into the pipeline.

There is often natural sediment in the pipeline, however, that is unavoidable. If the debris accumulates in the bottom and solidifies, it will create an obstruction in the travel of the wedge of the valve and make it harder to operate, requiring more torque and causing the actuators to break. To make sure the debris doesn’t solidify, exercise your valves on a regular cycle. [see #8].

6. Consider A Larger Size Valve Box, Valve Can Riser, Or Concrete Vault

It’s very simple upon installation, but using a larger size valve box concrete vault for access to the stem — 9” instead of 6”, for example — can save considerable time, effort, and money later by allowing you to do stem changeouts without excavation.

“Especially if you’re in the middle of some street with heavy traffic, the last thing you want to do is have a backhoe, traffic

control, and shutdowns to fix a problem. But if you can do it through the valve box, it’s a much faster fix if you just think ahead,” explained Diaz.

7. Open Left/Open Right?

Some gate valves open left and some open right. Ideally, all the gate valves in a distribution system will open the same way, but at minimum you want to know which ones might be backward (i.e., opposite the majority). During installation, note the color of the operating nut; a red nut indicates that the valve opens to the right, while a black nut indicates that it opens to the left.

After Installation

8. Cycle Once Per Year (At Minimum)

Valve cycling is exercise for your valves — the practice of opening and closing each valve to not only verify operation, but to ensure that they remain running smoothly by clearing out debris. Once



per year is acceptable, and twice per year even better, but short-staffed operations may find any cycling program difficult to schedule. Some utilities may, therefore, outsource the task to contractors. AWWA M44 Distribution Valves is the go-to field manual, offering “updated information on valve selection and installation, as well as the importance of location, condition, and frequency of operation” per AWWA’s description.

9. Document All Issues

If you’ve been burned by a bad valve or a bad spec, make sure it ends there by documenting issues discovered during cycling, then updating the current spec to meet the new standard needed for success. If a valve fails, note the year of the valve, the manufacturer, the type of failure, etc.

“If you’ve fixed a similar problem 6 times out of 30 [valves], that’s a pretty good indication that the standards need changed,” Diaz related hypothetically.

At specification review, leverage that knowledge and consult your documentation to uncover the

underlying issues and create a better spec; don’t just “kick the can” down the road.

10. Make Valve Box Adjustments As Necessary

Oftentimes the fault of paving crews, but something municipalities should venture to avoid and correct, is a situation where the water utility is forced to break through blacktop to reach the valve box because it was paved over.

The valve box needs to be raised to grade for continued accessibility — typically a contractor requirement per the repaving contract. However, oversights (or attempts to save money) by the contractor do happen, and it behooves the utility and municipality to have an inspector on-site to ensure that valve boxes don’t get buried in asphalt.

With continuous diligence — before, during, and after installation, aided by these 10 recommendations — utilities can all but guarantee reliable gate valve operations when called upon. ■

