Establishing a Level of Quality That Elevates Industry Standards

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There are many variations of shut-off valves used in the water works industry. The Resilient Seated Gate Valve in compliance with the AWWA (American Water Works Association) Standards is one of the most utilized shut-off valves because of its long-term reliability and its full unobstructed flow path.

There are currently many manufacturers of water works gate valves. In an effort to establish consistency among water works products, volunteer members work together on AWWA Standards Committees. These committees work to establish the minimum requirements for design, installation, performance and manufacturing of valves used in the water works industry.

The AWWA Committee Members go to great lengths to establish a level of quality that ensure the products installed in water works systems comply with at least the established minimum determined by the standards. On the market today, many water works gate valve manufacturers closely engineer and design their valves to meet the minimum AWWA Standards. Over the years, the AWWA Committee for Gate Valves has written the following three Gate Valve Standards: C500 for Metal Seated Gate Valves, C509 for Resilient Seated Gate Valves and C515 for Reduced Wall Resilient-Seated Gate Valves. As stated in Sec 1.2 of each of these standards, "The purpose of this standard is to provide purchasers, manufacturers and suppliers with the minimum requirement for gate valves for water supply service, including materials, application, inspection, handling and shipping:"

Since the AWWA C509 and C515 Standards set the minimum

design requirements for Resilient Seated Gate Valves, some gate valve manufacturers strive to construct their valves as close to the minimum requirements as possible and still stay in compliance with the standards. Valve manufacturers who provide the level of quality closest to the minimum improve their company's profitability, but offer limited benefit to the end-user.

What can the end-user do to get a higher quality product? They can demand materials of construction above the minimum set forth by the AWWA Standards. Some manufacturers offer higher quality materials at competitive prices. The end-user simply has to educate themselves on the options available and request they be specified.

Some examples of superior materials include the types of metals and rubber components as well as the thickness of the cast parts. The AWWA C509 Standard (the Standard for Resilient Gate Valves for Water Supply Service) states the minimum thickness of the body and bonnet and states that the valve can be made of cast gray iron or ductile iron. End-users and designers can improve this standard by meeting or exceeding the minimum thickness stated in C509 and require all cast ferrous valve components be of ductile iron — including the body, bonnet, wedge, seal plate and operating nut or handwheel. The tensile strength of cast ductile iron (commonly known as ductile iron) is 65,000 psi with a 12 percent elongation property. The tensile strength of most cast gray iron (commonly known as simply cast iron) is 30,000 psi with less than 1 percent elongation.

The AWWA C515 Standard (the AWWA Standard for Reduced Wall Resilient Seated Gate Valves) states the valve body and bonnet to be made of ductile iron; however, it allows for reducing the

AWWA C509 Section 4.4.1.2, Table 2

Table 2 Minimum thickness of body and bonnet

Nominal Valve Size or NPS		Minimum Thickness*		
in.	*(mm)*	*in.*	*(in., fractions)*	*(mm)*
3	(75)	0.37	(3/8)	(9.4)
4	(100)	0.40	(13/32)	(10.2)
6	(150)	0.43	(7/16)	(10.9)
8	(200)	0.50	(1/2)	(12.7)
10	(250)	0.63	(5/8)	(16.0)
12	(300)	0.68	(11/16)	(17.3)
14	(350)	0.75	(3/4)	(19.1)
16	(400)	0.85	(27/32)	(21.6)
18	(450)	0.94	(15/16)	(23.9)
20	(500)	0.97	(31/32)	(24.6)
24	(600)	1.08	(1 3/16)	(27.4)
30	(750)	1.39	(1 13/32)	(35.3)
36	(900)	1.54	(1 17/32)	(39.1)

* The decimal value should be used when the two expressions are not exactly equivalent.

wall thickness. The reduction in thickness of the wall is close to 50 percent in some sizes in comparison to the same size iron valve manufactured to the AWWA C509 Standard. While manufacturers of the C515 valve are using a strong material (ductile iron) they are reducing the wall thickness, which is of little significant benefit to the end-user over a thicker wall cast gray iron valve. It does provide additional profit the manufacturer of C515 valves, versus the manufacturer of thick wall ductile iron valves that comply with C509.

To elevate the industry standards, end-users and designers can specify all iron parts be cast ductile iron meet or exceeding the thickness called for by the AWWA C509 Standard by not allowing the Gate Valves that only comply with AWWA C515 by specifying the valve stem be made of 304 stainless steel, requiring an aluminum bronze stem nut, specifying 12 mils of fusion bonded epoxy inside and out leaving no cast surface uncoated, and use EPDM rubber for all seals and seats throughout the valve. By demanding improved quality the end-user can get improved quality at no added cost because some gate valve manufacturers already offer these improvements and they are competitive with the other manufacturers who are not offering the same design features.

Why does the industry need a stronger, higher-quality gate valve? Often the associated costs of replacing a valve can be more expensive that the valve itself. When factors such as excavation costs, labor costs, system down time costs and inconvenience to water and wastewater users are incurred when a valve has to be replaced or repaired, the costs incurred graphically illustrates the reason to use the most robust valve design possible.

The improved design features described in this article will

AWWA C515 Section 4.4.1.2, Table 2

Table 2 Minimum thickness of body and bonnet

Nominal Valve Diameter Size or NPS		Minimum Metal Thickness	
in.	(mm)	in.	(mm)
3	(75)	0.30	(7.6)
4	(100)	0.31	(7.9)
6	(150)	0.32	(8.1)
8	(200)	0.34	(8.6)
10	(250)	0.36	(9.1)
12	(300)	0.38	(9.7)
14	(350)	0.45	(11.4)
16	(400)	0.50	(12.7)
18	(450)	0.56	(14.2)
20	(500)	0.56	(14.2)
24	(600)	0.62	(15.7)
30	(750)	1.06	(26.9)
36	(900)	1.31	(33.3)
42	(1,050)	1.42	(36.0)
48	(1,200)	1.44	(39.6)

better resist unexpected surges, pipe line settling and freeze damage. The added strength will withstand excessive operator torque and construction mishaps such as dropping the valve or accidentally hitting the valve with machinery. When spending time, effort and money to construct projects as important as waterworks projects, it is important to provide the best quality products for the money on each project after all the volunteers on the AWWA Standard Committees go to great lengths to establish a level of quality to which manufacturers must use to be AWWA compliant, and exceeding these minimums without incurring extra costs assure our nation's waterworks projects will be able to be maintained economically for many generations to come.

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