



Mud Valve Torque Requirements:

How much effort should it take to operate a mud valve?

When writing a specification on torque requirements for mud valves, where should one look for guidance? You don't want to set the bar too low and have users thinking they have issues when they don't. Conversely, you don't want to draft a spec that sets the bar so high that it asks the valve to perform at unsafe levels. Luckily, AWWA already did the work for us.

AWWA specifies that rim pull for operators on gate valves should not exceed 40 lbs. of effort to operate the valve. Furthermore, AWWA steps up to 80 lbs. of rim pull on butterfly valve operators. These valves, especially gate valves, are often tasked with working in the same environments as mud valves, so we can assume the same requirements should apply. But first, what is rim pull, and how does it relate to torque?

Torque

Torque is defined as the force applied to rotate a body about an axis. A good example of torque would be the force applied to a hand wheel to rotate a stem.

Rim Pull

Rim pull is defined as the operating torque that is applied by pulling on the rim of the hand wheel. Pretty straight forward.


Deciding on Requirements

Previously, I stated that AWWA has set fourth requirements for rim pull regarding butterfly valves as well as gate valves. These requirements serve as a textbook guideline for almost any type of valve.

The most important question to ask is “how much torque is required for my valve to operate and to seal?” I think one would find that these numbers are generally quite low. And when they’re higher (for larger diameter valves), the valves will come with gearing to lower this number substantially.

Now let’s assume you have decided to write your mud valve specification to require that valves should be able to withstand 450 lbs. of torque without damaging the valve. Let’s look at what this looks like when these valves are operated by hand wheels (which they often are) in relation to the guidelines that AWWA has set forth.

AWWA has stated that rim pull should not exceed 40 lbs. of effort to operate the valve. To stay within that specification, one would need a hand wheel that is approximately 22 feet in diameter and would need to use all 40 lbs. of rim pull to even reach the 450 ft. lbs. of torque specified. Furthermore, when it comes to butterfly valves, AWWA raises the rim pull limit to 80 lbs. This would require a hand wheel with a diameter of almost 11 feet, and you would need all 80 lbs. of rim pull. I wouldn’t know where to get a hand wheel remotely close to those sizes, as the largest I’ve seen is 36 inches diameter, so I don’t see anyone coming close to applying enough rim pull to reach 450 ft. lbs. And that’s a good thing.



You might be thinking, “Great! I don’t want anyone reaching torques high enough to break my valves.” But, practically speaking, if something goes wrong with the valve, the person operating it will just turn the wheel as hard as he or she can or grab something to provide greater leverage. However, this likely will cause harm to the valve, the operator, connection points, accessories, and potentially the person operating the valve.

The ideal thing would be to recognize there is an issue and investigate and address that issue instead of trying harder to close the valve. When manufacturers are forced to over-design something such as valve stem sizes, the stems grow in diameter, and this creates more surface area, causing the stems to wear faster. This also shifts the stress of the high torque to other parts of the valve, like the seat. Even at torques much lower than 450 ft. lbs., the seats on mud valves will become damaged to the point of failure, and the down time and repairs you were hoping to avoid just became real issues.

Mud valves should not require high torques to operate the seal. Difficulty operating the valve is a great indicator that there is an issue that needs to be addressed to avoid lengthy down time in the near future.

Troy Valve mud valves are so well designed that they require just 1 ft. lb. of torque to achieve a water-tight seal. Troy Valve does not recommend using a mud valve that is designed with an acceptable leakage rate or one that requires a torque of 450 ft. lbs.

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