

Correct installation of meters is critical to accuracy

In the past few months I have tested many master meters. There are many other meters that I would like to test but it's impossible to do so. Why? Because there are no plumbing or test ports available - and none can be installed. I consider these to be poor installation and nothing short of being oversights by designers and lack of understanding of the owners. The unforgiving thing is that some of these situations are very recent installations.

Doug Guenther
Tech Assistant



It is very frustrating to see a brand new, expensive pump house with a large propeller meter installed with a reducer, such as an 8-inch to 6-inch, immediately abutting the inlet side of the water meter. In some

cases, add an elbow immediately on the outlet side. Every meter manufacturer's specifications clearly advise to have 5 diameters of the pipeline size of straight pipe upstream and 1 diameter pipeline size of straight pipe downstream. Add the suggestion that there should be a clean interior, meaning no intrusion into the stream flow.

Controlling production impacts accuracy

Many wells operated by public water systems in Kansas are showing the effects of prolonged drought. Water well

drawdown has increased in many wells. In such cases, the only prudent response by systems is to reduce pumping by throttling back production by partially closing an adjacent valve. If the valve is located on the inlet side of the meter, a jetting effect can be created in the pipeline and through the meter, especially if



The above installation was made in 2003. This new meter is butted directly to reducers on either side.

displacement, turbine or propeller types. Others are single and multi-jet types. All types do a fair job of metering water if

It is very frustrating to see a brand new, expensive pump house with a large propeller meter installed with a reducer, such as an 8-inch to 6-inch, immediately abutting the inlet side of the water meter. In some cases, add a 90-degree elbow on the outlet side.

there is not the ten diameters of straight pipe between the valve and meter. The same holds true for devices like pressure reducers and injection ports. In testing meters in such configurations, I don't know which is worse or more inaccurate: pumping air or jetting the meter. Both conditions affect the meter's performance.

The main meter types I have been working with are positive

installed properly and sized for the application.

Proper installation

An example of parameters for mounting turbine meters is taken from the literature for the Invensys W-Series Turbo Meters. It reads as follows:

1. When installing a Turbo meter with a strainer, a minimum of 5 pipe diameters of straight run of pipe or equivalent full open components is required

Now and then, even improperly installed meters can really throw a curve ball; they sometimes will test accurate.

upstream of meter strainer inlet flange. A minimum distance 10 pipe diameters of unobstructed pipeline should be available upstream of meter's inlet flange when installed without strainer. Fully open components may consist of: straight pipe, full open gate valves, bypass tees and concentric reducers with only one nominal reduction.

2. Do not install elbows, bends, nonconcentric reducers, check valves, back flow preventers and/or pressure reducing devices within 10 pipe diameters upstream and 5 pipe diameters downstream of meter.

3. Do not install butterfly valves within 5 diameters of the pipeline upstream and 3 diameters downstream of the meter.

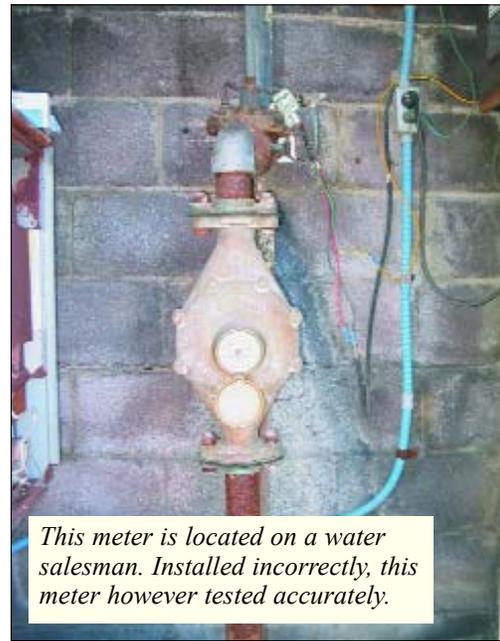
4. Gate valves located immediately upstream of the meter setting are acceptable,

provided they are fully open during meter service and are not used to THROTTLE flow rates through the meter.

I would like to add that another manufacturer suggests that the meter should not be located within 10 pipe diameters down stream of a pump, such as a booster pump. This is because of the concern for turbulence created in the pipeline by the pump.

Check the installation guidelines for your particular brand of turbine meter. You will find these parameters to be very consistent among manufacturers. Some meters are more adaptable than others and can be installed vertically, horizontally or at any angle between.

On multi-jet and positive displacement meters, the installation guidelines are very similar. When installed in straight pipe, the suggestion is to have 5 to 10 pipe diameters upstream, providing full and unobstructed flow and 2 to 5



This meter is located on a water salesman. Installed incorrectly, this meter however tested accurately.

pipe diameters full and clean flow down stream. This includes the same restriction on devices installed in conjunction with the meter setting valves, pressure reducers, check valves, elbows and reducers. The positive displacement meters usually need to be installed horizontally with the register in an upright position. There are some variations with these types; my suggestion is to verify the



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Correct installation of meters is critical

installation parameters by brand and model.

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Get the basics right

KRWA conducts testing of master and residential meters. KRWA has 4 test meters which are certified for accuracy at least annually. Presently, KRWA does not charge for meter testing. The testing unit I use has a capacity of about 400 gpm. But to test master meters, we need to have test ports in place. Make sure your consultant considers this need to ensure that you will be able to ensure accuracy of your master meters. When used for sale or purchase of water from another system, inaccurate meters have major financial impacts. Again, just make sure that the piping configuration

accommodates future testing.

Every meter has some limitations; installation parameters should be checked before making the installation. Meters need to be properly sized for the job. Good meter installation requires that the environment also be correct.

If care is not given to these basics, there's likelihood that the meter will only provide inaccurate information.

In closing, it is very sad to see master metering as what appears to often be an after thought on new installations.



While it's difficult to try to retrofit an old well house with the proper size meter it is even more of a challenge to tackle a project to correct conditions in near new facilities. Many future problems can be eliminated if everyone involved, from designers, plan reviewers, owners, funding agencies and technical assistance providers all work in concert to make sure that future operation and maintenance of master meters be shown higher consideration.

I encourage you to attend the pre-conference session "Water Meters and Water Meter Technology" beginning at 10 a.m., Tuesday, March 23 in Hyatt Ballroom D and another session, "Water Meters, Today and Tomorrow" presented by Jim Plahn of Badger Meter. That session is Thursday, March 25 at 9:30 a.m., also in Hyatt Ballroom D. That session will provide a quick review of the history of water metering and will include a discussion of how to evaluate whether the labor-saving benefits of Automated Meter Reading equipment make sense for your water utility. I hope someone from your system will be able to attend both of these very worthwhile sessions.

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