

How to Avoid Common Flowmeter Installation Mistakes

Learn to optimize performance through proper installation and maintenance.

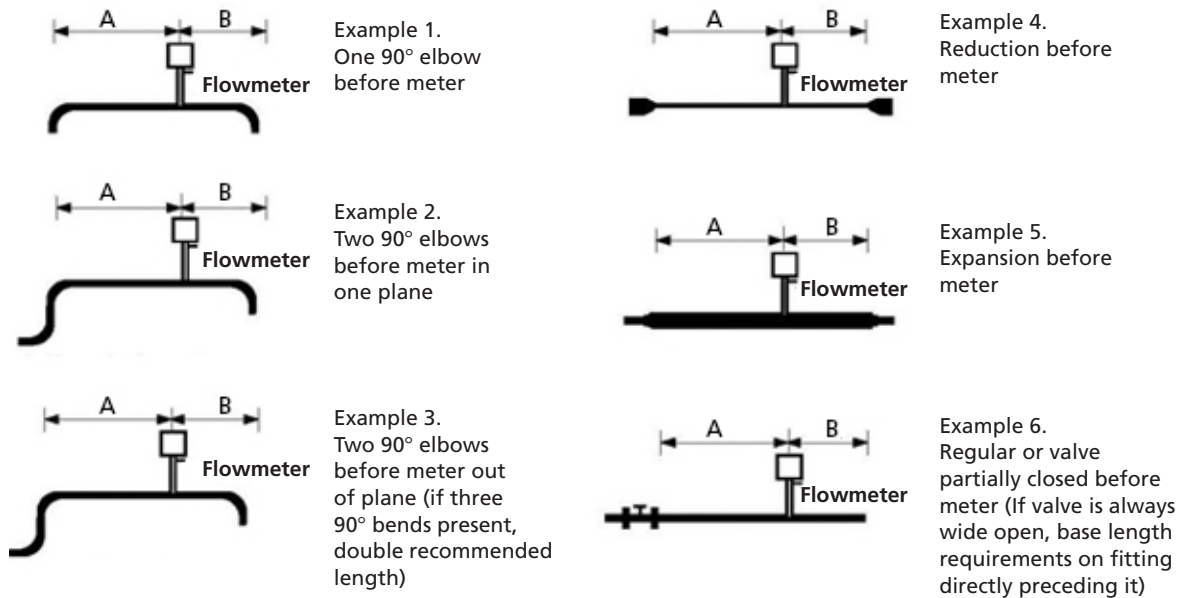
By Scott Rouse, Sierra Instruments

Plant and operation managers are constantly searching for ways to manage the flow energy in their facility to cut costs and increase their process efficiency. After the flowmeter purchase decision is made, correct installation and calibration are the next steps to maintaining the equipment over the lifetime of the product and reducing the cost of ownership to increase the cost savings of the overall facility. Let's look at some common installation mistakes and some other ways to lower costs and optimize your flowmeters' performance.

Once you have identified the right flowmeter for each type of fluid and [application](#), properly installing your flowmeter is critical for successful flow readings. Many times, if you think your flowmeter "doesn't work," it could just be that the meter was not installed properly. Here are some installation tips for thermal mass, vortex, and ultrasonic flowmeters.

To achieve accurate and repeatable performance for thermal mass flowmeters, the first tip is to install the flowmeter using the recommended number of straight-run pipe diameters upstream and downstream of the sensor. The chart below shows basic good plumbing practice for common upstream obstructions and meter locations.

Another solution for insertion flowmeters is to install flow conditioning plates in the flanges somewhere in the straight section, requiring 3 diameters of pipe run (two before, one after). This installation will totally disrupt the flow, creating a “flat” profile.



Straight Pipe Length Requirements at 1 ATM			
Piping Condition	Flow Conditioning		Orifice Plate (3)
	Upstream	Downstream	
Single 90° Elbow or T-Piece	1D	OD	28D
Reduction (4:1)	3D	OD	14D
Expansion (4:1)	3D	OD	30D
After Control Valve	3D	OD	32D
Two 90° Elbows (In Same Plane)	3D	OD	36D
Two 90° Elbows (Different Plane)	5D	OD	62D

Avoid common mistakes

The second tip is to avoid the following mistakes when installing vortex flowmeters:

- Not having the proper upstream and downstream diameter. Unlike thermal flowmeters, vortex meters do not work with flow condition plates, so they must have a straight run of pipe to function at optimal levels. In most installations, you need a straight run of at least 10 diameters upstream and 5 diameters downstream.

- Installing the vortex meter backward. When installing a vortex flowmeter, make sure the orientation of your meter is in the direction of the flow, so your meter's flow sensor can measure your fluid accurately. Most vortex flowmeters have some type of flow direction indicator to help you point downstream.
- Measuring the incorrect fluid type in the pipe. In some situations, end users might be measuring steam flow and think they are producing saturated steam, but in fact, they have a 50 percent overheat and are measuring superheated steam.
- Do not shut down your steam flow to install a vortex flowmeter. Many insertion vortex flowmeters have a retractor to make hot tap installation much easier. This means you can install the insertion vortex flowmeter in large steam pipes with no process shutdown.

For ultrasonic flowmeters, consider clamp-on sensors for field flexibility and easy setup. With a portable ultrasonic flowmeter, you can use one in several locations throughout your flow process. Fieldwork calls for flexibility in your equipment. Look for liquid flowmeter clamp-on sensors with a high-powered ultrasonic pulse and digital signal processing that requires just one set of transducers for a wide range of pipe sizes and materials like metal, plastic, and concrete.

In-situ calibration

The last tip is to remember that the measurement accuracy of your device is critical in determining efficiency, performance, and cost savings. So the more accurate your flowmeter is, the better data you have to make cost-saving decisions. Thermal mass flowmeters with in-the-field in-situ calibration validate the meter's accuracy without shutting down the facility.



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Scott Rouse is product line director for [Sierra Instruments](#), a member of the TASI Group and makers of flow instruments, including all types of [flow controllers](#) for gas, liquid, and steam applications. This article first appeared in October 2020 in the official blog of Sierra, [Let's Talk Flow](#).

For More Information

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