TECHNICAL BULLETIN
AG2000-Series Installation Variances

Introduction. Due to the significant number of flow meter applications with adverse installation conditions, Seametrics, Inc. contracted to have a series of tests performed to determine the effects of adverse installation configurations on the accuracy of the AG2000-Series flow meter. After reviewing the results of field and lab tests, including tests performed by the Irrigation Training and Research Center (IRTC) at California Polytechnic State University (Cal Poly), we have concluded that traditional straight pipe requirements can be reduced or even eliminated without causing significant deterioration in this meter's accuracy.

90˚ Elbow Test (Figure 1). In the first test, performed in the Seametrics lab, an AG2000-Series flow meter was connected to a 90˚ elbow with no straight pipe on either the upstream or downstream sides. Testing demonstrated approximately 1% deviation in the meter's accuracy.

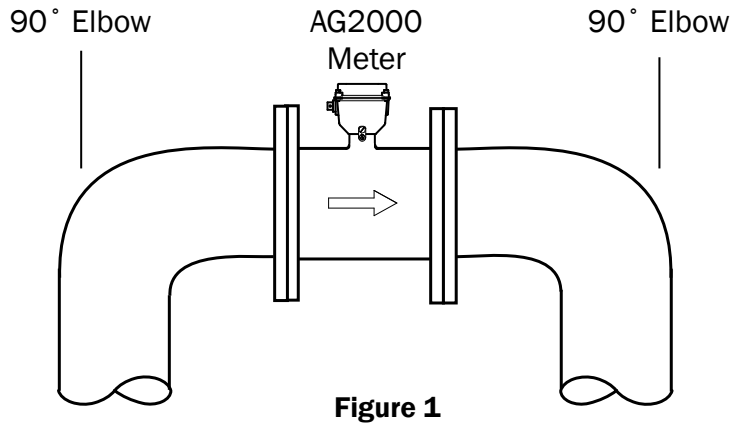

Figure 1

Reduced Pipe and Butterfly Valve (Figure 2). In the second test, performed at Cal Poly, a 10" AG2000 was mounted on a turbine pump, downstream of an 8"x10" cast-iron concentric adapter, and immediately downstream of a butterfly valve.

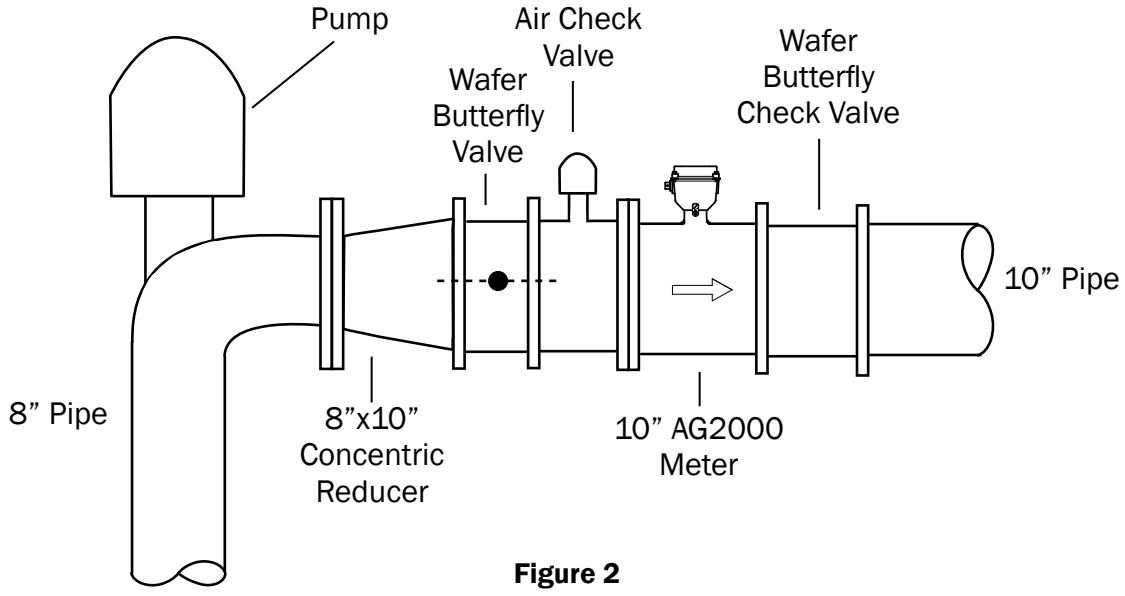

Figure 2

This configuration introduces spiral action caused by the pump, velocity distortion caused by the 90˚ elbow in the pump discharge head, jetting caused by the 8"x 10" concentric adapter, and turbulence caused by the throttled butterfly valve. There was also a wafer butterfly check valve connected directly to the downstream side of the meter. This test configuration was designed to represent the worst possible conditions in an irrigation application. Until the butterfly valve was closed more than 50%, the accuracy of the meter deviated less than 1.5% from the control meter.

Close Coupled Butterfly Valve (Figure 3). In the third test, also performed by the IRTC at Cal Poly, a 4" AG2000 was mounted with less than two pipe diameters of straight pipe on the upstream side of a butterfly valve and zero pipe diameters from a diaphragm pressure regulating valve on the downstream side.

Two reference full bore meters were installed over 20 pipe diameters downstream of the AG2000, with at least 20 diameters of straight pipe both upstream and downstream on each meter. A series of flow tests were performed on all three meters. With the butterfly valve wide open, all the meters read 401 GPM. The butterfly valve was progressively closed, and at each step, all three meters read the same down to 12 GPM, the low flow cutoff for the AG2000-400 (4") meter. This configuration showed no deterioration in the accuracy of the meter.

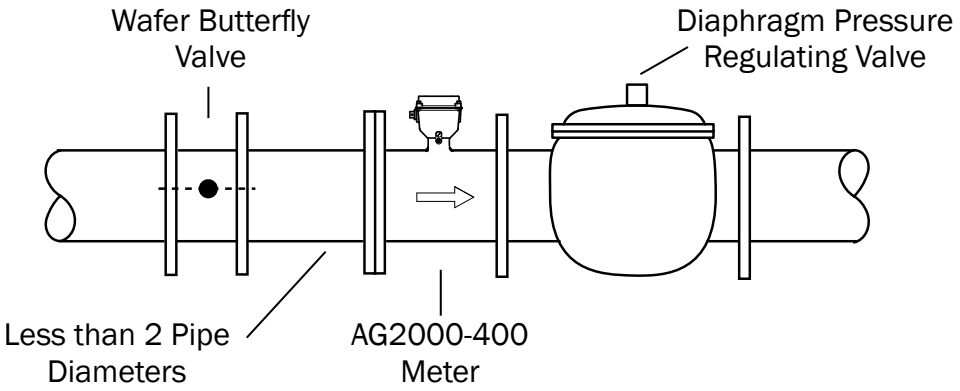

Figure 3

Pump Discharge Flange and Check Valve (Figures 4a and 4b). In the fourth test, performed in the field in Nebraska, an AG2000-Series meter was mounted in two different configurations. In the first, the AG2000 was mounted directly to the pump discharge head, with a spring-loaded swing check valve directly downstream.

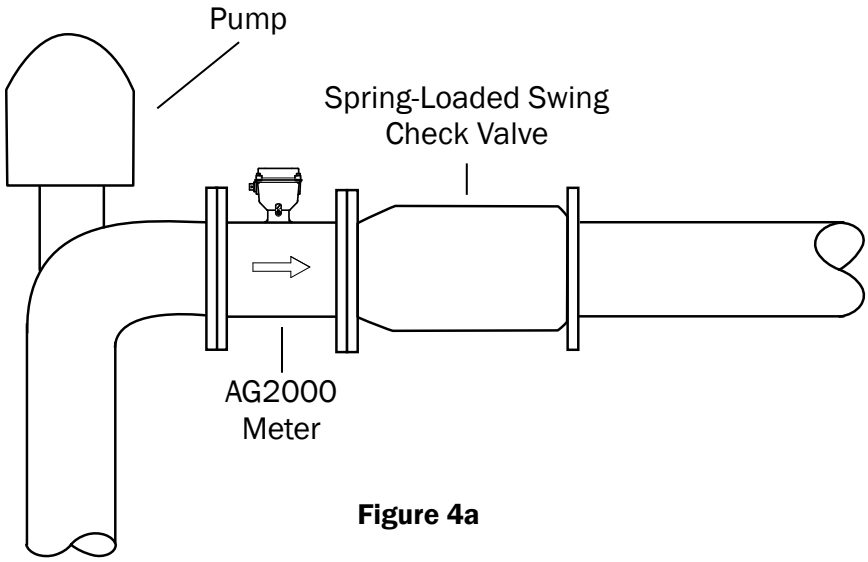

Figure 4a

In the second configuration, a spring-loaded swing check valve was mounted directly to the pump discharge with the AG2000 mounted directly to the check valve.

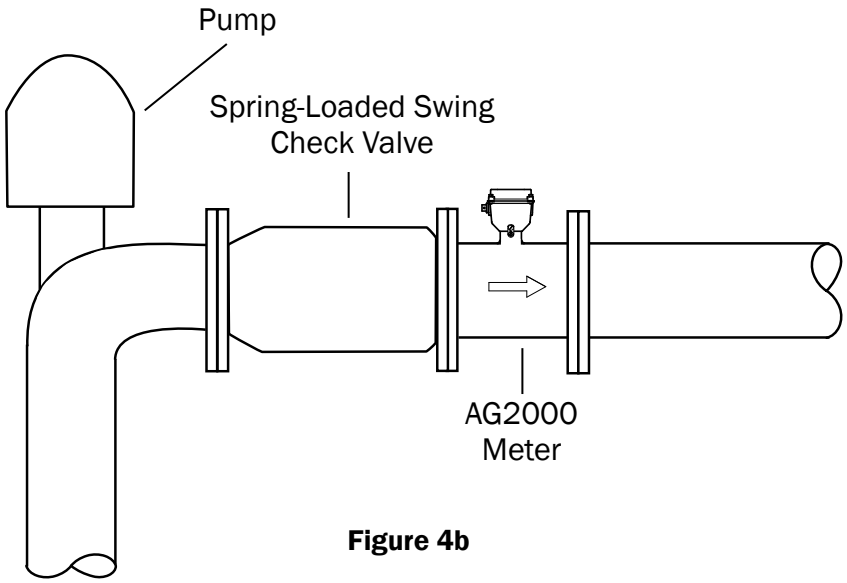

Figure 4b

After a series of tests on these installation configurations, variations in meter accuracy were determined to be less than 1% of the flow rate. Analysis of this data along with other compiled data indicates that direct coupling to a pump discharge or spring-loaded swing check valve seems to have no significant impact on the accuracy of the AG2000 meter.

Conclusion. It is always optimal to install a flow meter with the traditional recommended straight pipe standards to achieve the highest level of accuracy. Nevertheless, the AG2000-Series flow meter performed within +/- 2% accuracy in applications with no straight pipe upstream or downstream of a butterfly valve, 90˚ elbow, pump discharge, or spring- loaded swing check valve.

NOTE: It is always recommended that chemigation injection be performed downstream of an AG2000 flow meter.

NOTE: This document does not supercede state and local health code or installation requirements. All applications of this meter must comply with applicable regulations.