

USING VORTAB FLOW CONDITIONERS TO IMPROVE TURBINE FLOWMETER PERFORMANCE

The following is a summary of tests that were conducted to demonstrate the benefit of using a VORTAB Flow Conditioner upstream of a Turbine Flowmeter. The tests were conducted with a 4" in-line Turbine Flowmeter in natural gas at standard temperature and pressure.

Two of the test runs included in-line swirl inducers. Test run "V1" induced a left-hand swirl and test run "V2" induced a right hand swirl. Refer to figure 1 for the piping layout and figure 2 for the results of the tests. The data shows inaccuracies of up to 14% for test runs "V1" and "V2". The other test runs on figure 2 have a VORTAB installed. These test runs include an as found "TX", a left hand induced swirl "T1", and a right hand induced swirl "T2". Refer to figure 3 for piping layout of tests "TX", "T1", & "T2". Figure 3 also shows the piping layout for tests "T3", "T4", and "T5" which were random upstream flow disturbances with the use of a VORTAB Flow Conditioner. Figure 4 graphs the results of tests "TX" and "T1" through "T5" which is an accumulation of all the tests conducted with upstream flow disturbances and the VORTAB Flow Conditioner installed.

The test results showed that non-ideal upstream piping configurations had minimal effects on the turbine's accuracy when a VORTAB Flow Conditioner was installed. Where as tests without the VORTAB Flow Conditioner showed large errors with non-ideal upstream installations.

Testing with other flowmeter technologies has shown the advantages of calibrating flowmeters with the VORTAB Flow Conditioner as a matched pair. The data collected shows that this holds true for the Turbine Flowmeter that was tested. Refer to test run "TX" in figure 4. Using test run "TX" as the baseline, inaccuracies in flowmeter performance due to the upstream flow disturbances that we tested were limited to within +/- 0.2% when the VORTAB Flow Conditioner was installed.

Don Lundberg, Staff Engineer VORTAB Company



PIPING CONFIGURATIONS WITHOUT VORTAB



FIGURE 2

FIGURE 3



PIPING CONFIGURATIONS WITH VORTAB



