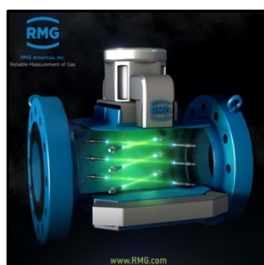


RMG's GT400 Upstream Piping Surface Roughness Test Results

Written by John Lansing



Introduction

Traditionally gas ultrasonic meters are sent to a flow calibration facility with the upstream and downstream piping spools that will be installed in the field. Clients typically specify using a flow conditioner along with two upstream and one downstream spool. AGA Report No. 9 defines this combination of piping, flow conditioner and meter as a "metering package." The reason for calibrating the USM with the specific spools and flow conditioner used for the field installation is to ensure there is no bias that might arise by using different piping or flow conditioners. Shipping the complete metering package from the fabricator to the calibration facility and then on to the final destination can be costly. Typically, the complete metering package is also not disassembled after testing due to concerns this might affect the meter's accuracy. With cost being even more important in today's climate, one client decided to evaluate calibrating only the meter with the calibration facility's piping and flow conditioner. This would significantly reduce the metering package installed cost. Prior to their testing, little data existed on what, if any, affect there would be.

Test Details

To obtain valid independent data to share with upper management, the client decided to purchase four 8" 10D spools (same dimensions as their standards call for) with a wide range of surface finishes. These four spools would have an internal surface finish that would more than cover the normal range experienced in the field. Each was installed between the CPA 50E flow conditioner and the meter body for all tests. Three USM manufacturers participated in testing which was conducted at TransCanada Calibration (TCC). Data from this testing was published at the 2019 AGA Operations Conference in Nashville, TN. At that time RMG was not part of the testing as the GT400 was just being re-introduced into the NA market. In order to obtain comparable data to show RMG GT400's meter performance, the client agreed to loan RMG the piping. All testing was conducted at TCC in June 2019 and witnessed by the client. Subsequent to this test, PRCI decided to test 16" meters to help validate the results of the 8" data. This Tech Note summarizes the results for the 8" testing and the 16" PRCI testing.

Performance Results – 8" & 16" Meters

The 2019 results for the 8" USM testing are shown to the right. The four spool piece surface finishes were 40, 98, 185 & 250 μ inch. The table shows the FWME difference from the 98 μ inch spool which was considered the baseline. In 2020 PRCI conducted testing on 3 brands of 16" USMs at the TCC facility using two surface finish pipes of 86 & 357 μ inch between the CPA 50E and the meter. To help reduce costs, only two spools were used. Below and to the right are the results for the RMG GT400 16" meter. This graph shows both the rough and smooth piping results. The GT400 was new and had not been previously calibrated. The table below shows the difference in error between the Rough Pipe in **Black** and the Smooth Pipe in **Red** (see the graph) for each gas velocity. The TCC computed FWME difference between the spools is 0.01%.

Velocity (FPS)	Rough vs. Smooth %
99.9	-0.07
75.1	0.02
50.3	-0.02
24.9	-0.01
10.0	0.04
5.0	0.02

Summary

Test results for the 8" and 16" RMG GT400 meters showed very little difference in meter accuracy regardless of what surface roughness spools were used. This information, along with other PRCI data, will be used to support an update to AGA Report No. 9. This update will specifically address allowing the use of calibration facility piping and flow conditioner(s) in lieu of sending the "metering package" to the calibration facility. This will translate into significant cost savings.

RMG Tech Notes

This is the 6th Tech Note in our series. Previous Tech Notes are posted on our website (RMG.com), or we can send them to you directly via email. Please contact us at SalesUSA@RMG.com.

