

RMG GT400 Gas Ultrasonic Meter Performance Summary



Introduction

The RMG GT400 gas USM is a 6-path chordal meter designed to outperform traditional 4-path meters by providing superior swirl compensation. All meters use **the same path configuration** with line sizes starting at 3". The totally sealed titanium transducers are extremely reliable and will not be damaged or change performance when subjected to two-phase conditions due to hydrates or other liquids. They provide the highest level of acoustic power by using



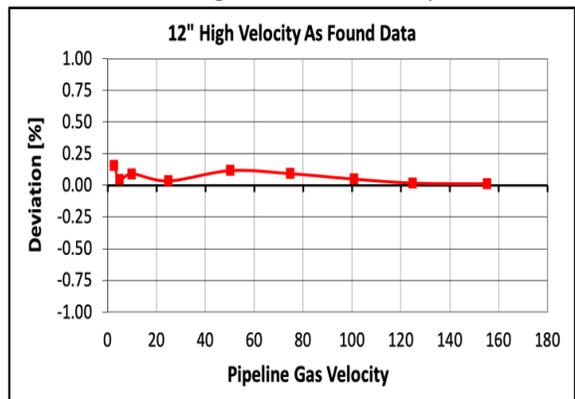
micro-tubing for housing transducer wiring. The GT400 hazardous approvals include Class 1, Division 1, Groups B C D T6, has Measurement Canada approval, and is "renewable gas ready" for gases up to 20% Hydrogen.

GT400 Performance Benefits

One benefit of high acoustic power is the ability to continue operating when significantly over-ranged. The graph to the right shows test results of a 12" GT 400 tested at TCC achieving 155 FPS while maintaining 100% transducer performance. The extremely high acoustic sound pressure level (SPL) also permits operation in regulator applications that were previously not possible.



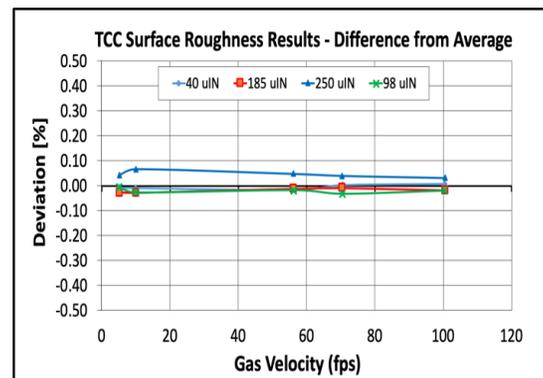
This picture (left) shows an 8" meter operating at 45 PSIG with a regulator installed immediately **upstream** reducing pressure from 580 PSIG. Performance is 100% even though the gas temperature is -4F. The GT400 is also very



insensitive to a wide range of upstream piping surface roughnesses as shown in the graph (below right). Testing was conducted using 4 different internal surface roughnesses, 40, 98, 185 and 250 μ-inch between the CPA 50E and the 8" meter (below left). The 98 μ-inch spool was chosen as the baseline. These results are from an Enterprise Products test at the TCC facility in June 2019. They have been submitted to the Pipeline Research Council International for inclusion in a future surface roughness report.



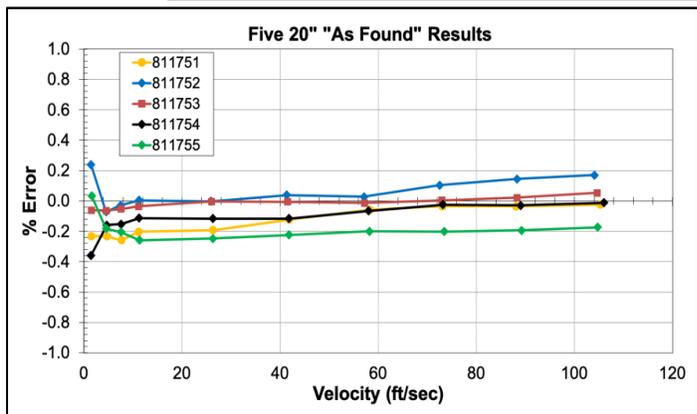
This meter was also used to perform a rotational CPA 50E test similar to report



Gas Velocity	Difference
70.04	-0.11
40.56	-0.08
25.11	-0.11

that was published at two previous CEESI USM conferences on three other USM meter manufacturers (table at left).

In 2019 five 20" meters were tested at the CEESI facility in Garner, Iowa. The graph to the right summarizes the "out of the box" performance results before any meter factors were applied. All five of these meters were within ±0.15% of each other and within ±0.2% relative to the facility prior to any meter factor being applied. These also show the rangeability is far greater than 20-1.



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German Engineering and Manufacturing

The GT400 is designed and manufactured in Butzbach Germany which is about a half-hour drive from Frankfurt. Meters arrive at the facility already machined and painted where they are assembled in a “clean room” environment, as shown by the following pictures, before shipment to Houston. Figure 1 shows a meter being assembled and Figure 2 are meter bodies and spools waiting to be processed.



Figure 1 – Meter Assembly Table



Figure 2 – Meter Production Area



Houston RMG Operations Facility

RMG Americas, Inc. opened the doors on their new Houston facility in July 2019. The office is located at 8460 North Sam Houston Parkway West. At this location (pictures to the right) USMs from 3” thru 16” are inventoried for immediate delivery along with the TRZ 03 and TME gas turbine meters. This 5,000 square foot facility includes offices, meter setup and repair, shipping/receiving, conference, training and storage areas.

Summary

RMG is 150+ years old with more than 200 employees around the world. It has been producing a wide variety of high-quality natural gas flow measurement products including flow computers, volume correctors, turbine meters and gas chromatographs for more than 40 years. RMG has been manufacturing gas ultrasonic metering products for more than 30 years. The GT400 the latest generation of gas USM, and is a well-proven, extremely reliable meter with the best warranty in the industry. RMG has more than 6,000 GT400 USMs and more than 50,000 turbine meters installed in various world areas.

RMG is an active member of AGA, PRCI, and other industry conferences and organizations, and is very committed to bringing their technology and innovation to the Americas.

