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**Piping Configuration Effects in Rotary Meters**

Inlet piping configuration effects are well known in turbine and ultrasonic gas meters, where a non-uniform flow profile across the pipe diameter can lead to some parts of the measurement device being subject to flow velocities significantly different from the average. In a turbine meter this takes the form of swirl and jetting, which latter can lead to over-registration, while in an ultrasonic meter the situation is less clear-cut and depends on which signal paths are affected. To counter these effects meter suppliers may specify an inlet calming length of 5 – 10 diameters of straight pipe, or they may require a flow conditioning device such as a perforated plate with its attendant pressure loss. Also, inlet piping diameter must be closely matched to meter diameter for best results.

Rotary-piston meters have always been thought to be immune to inlet piping effects, since they pick up a constant-volume pocket of gas from the inlet side and transport it to the discharge side without regard to the inlet velocity profile. It has, however, been observed in the Jemena Meter Centre that the presence or absence of a short length of pipe on the inlet to a rotary meter can make an observable difference to its accuracy performance. It is proposed to investigate this phenomenon more completely, using a number of piping configurations including straight sections of various lengths, elbows and elbow pairs both in-plane and cross-plane and inlet diameter mismatches. The investigations will be performed using two test rigs at the Meter Centre, one with sonic nozzle flow references covering a flow range of 0.1 – 300m3/h and the other with rotary references for low flows and a turbine reference for high flows, covering the flow range 0.5 – 6500 m3/h. The use of different test rigs with different measuring principles will ensure that the effect is due to the test meter alone and not some interaction with the test rig. Since rotary meters are used for customers with large gas consumption the monetary effects of inaccuracy due to incorrect assumptions about inlet piping configuration can be significant.