

TeST “Watchdog” Inter-Laboratory Comparison Test

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Outline

- TeST – what and why
- Description of Facilities
- Test Artifact
- Results
- Conclusions

The logo for TeST consists of a vertical black line intersected by a horizontal black line. To the left of the intersection, there are three overlapping squares: a yellow one at the top, a red one in the middle, and a blue one at the bottom. The text "TeST" is written in a blue, sans-serif font to the right of the vertical line.

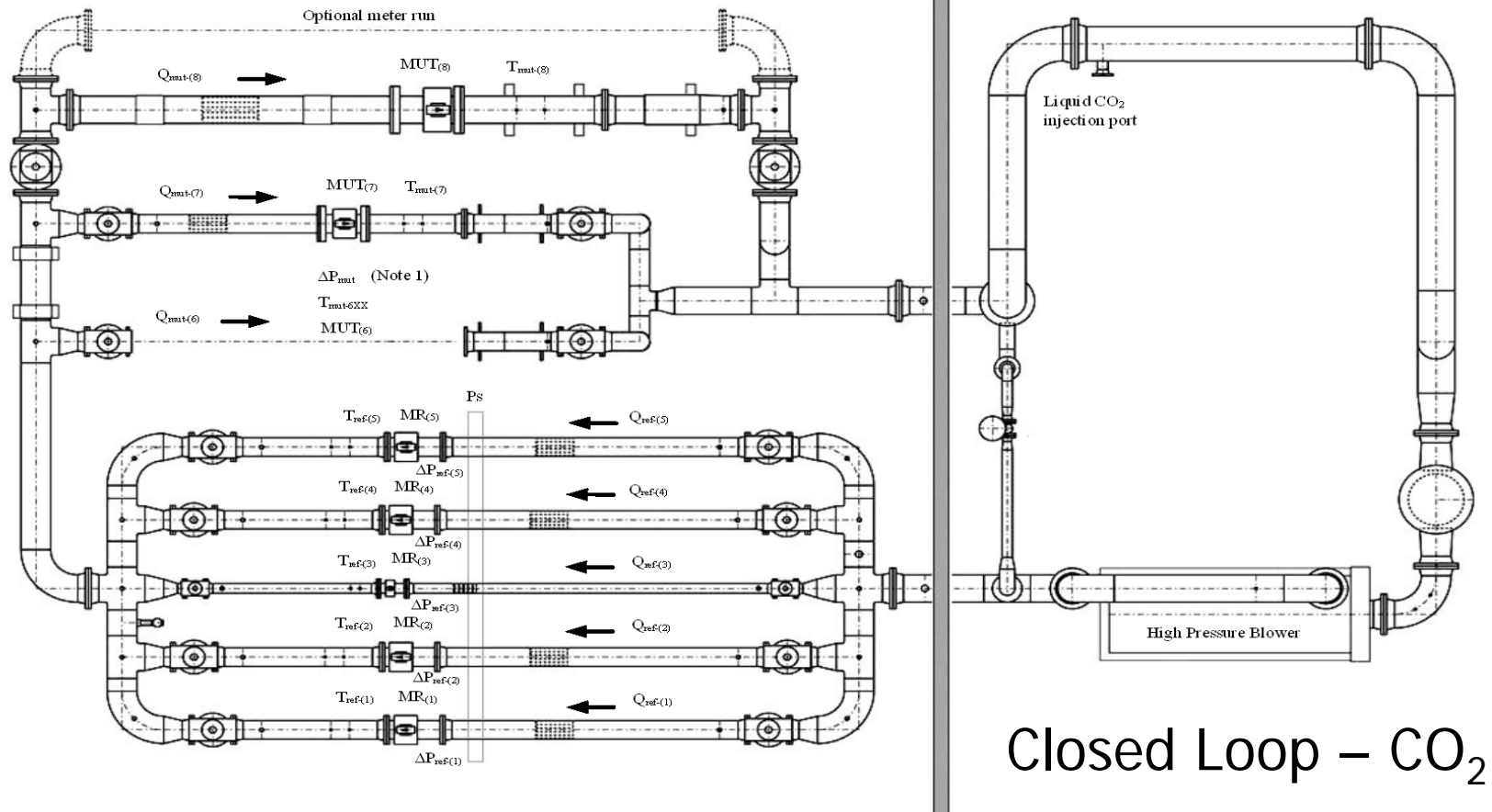
TeST

- Terasen, Southwest Research and TransCanada Pipelines developed the TeST watchdog initiative.
- The TeST artifact provides inter-comparison between the flow laboratories.
- Intended to provide long-term comparisons and assessment of reference stability.
- Contributes to ISO quality requirements for participation in inter-lab comparisons.

Terasen Triple-Point Flow Loop

Reynolds # matching

$P_{\max} = 240 \text{ psi}$



Reference Turbine Meters

Terasen Triple-Point Flow Loop

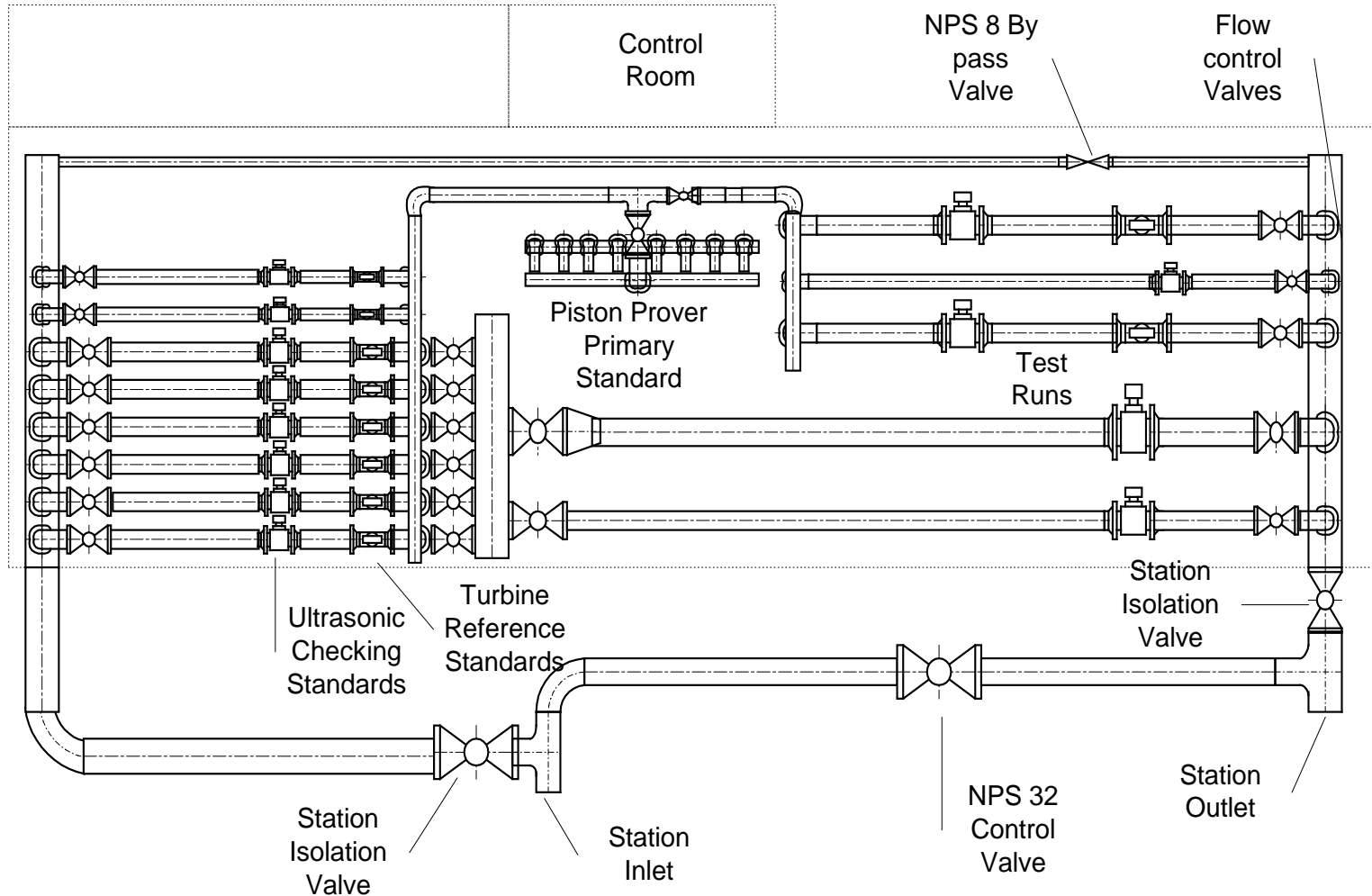


SwRI Metering Research Facility

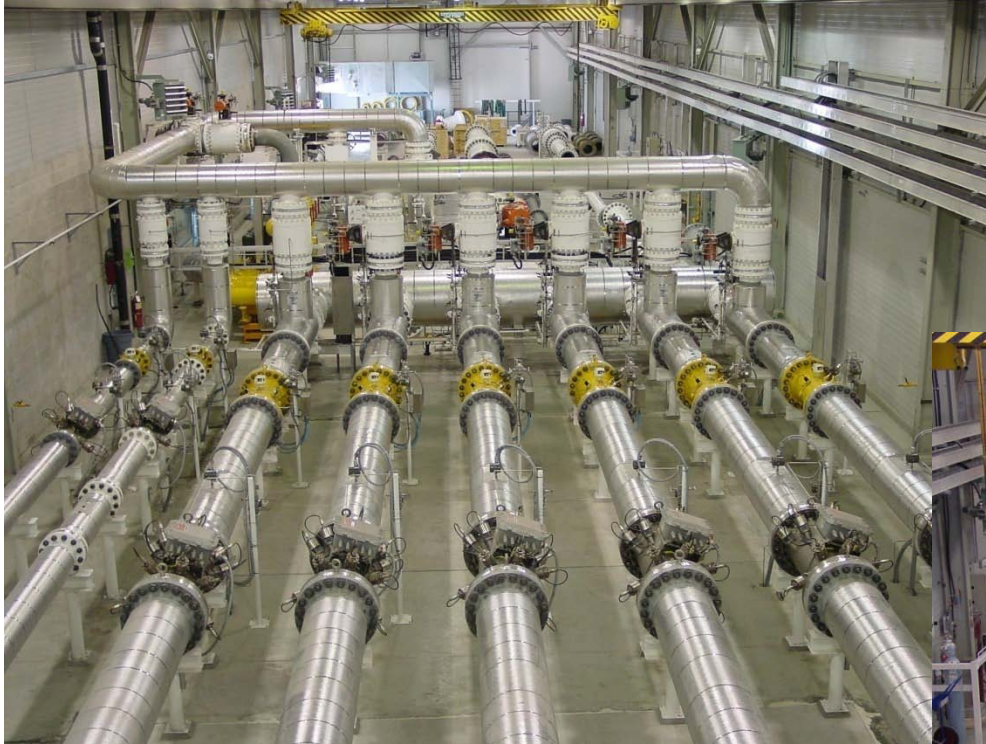
- Closed-loop, natural gas flow.
- Critical flow nozzles as working standard.
- Mass-time primary calibration system.
- Temperature and pressure control.



TCPL – TransCanada Calibrations



TCPL TransCanada Calibrations

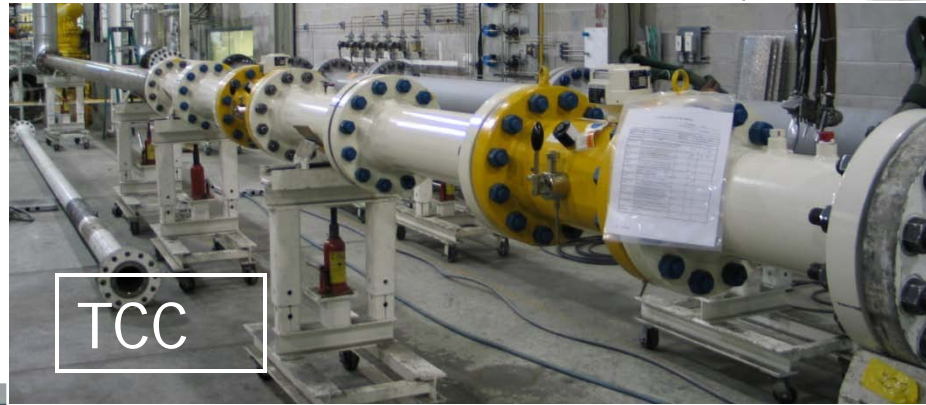


- Flow through, natural gas.
- Nominally 900 psi.
- Large flow capacity.
- Multiple test headers.



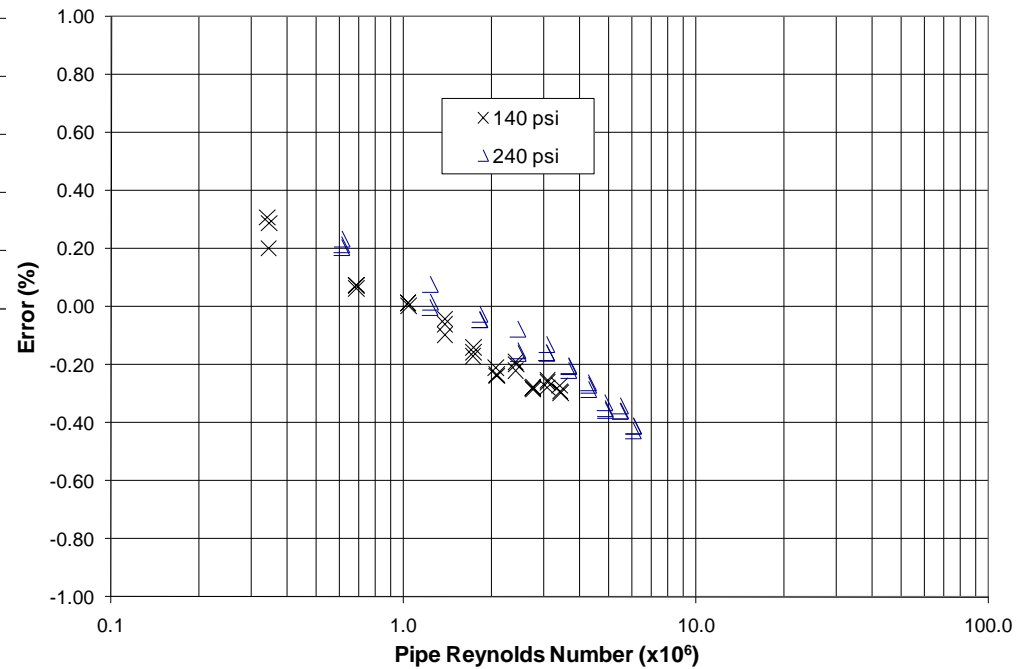
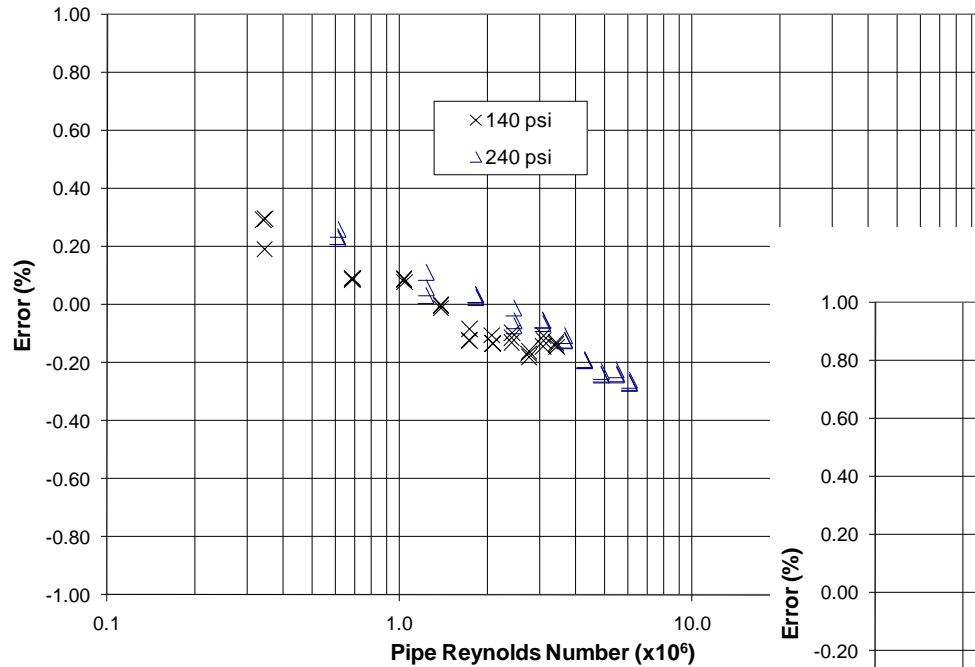
Bank of reference turbine meters
with ultrasonic check meters.

TeST Artifact

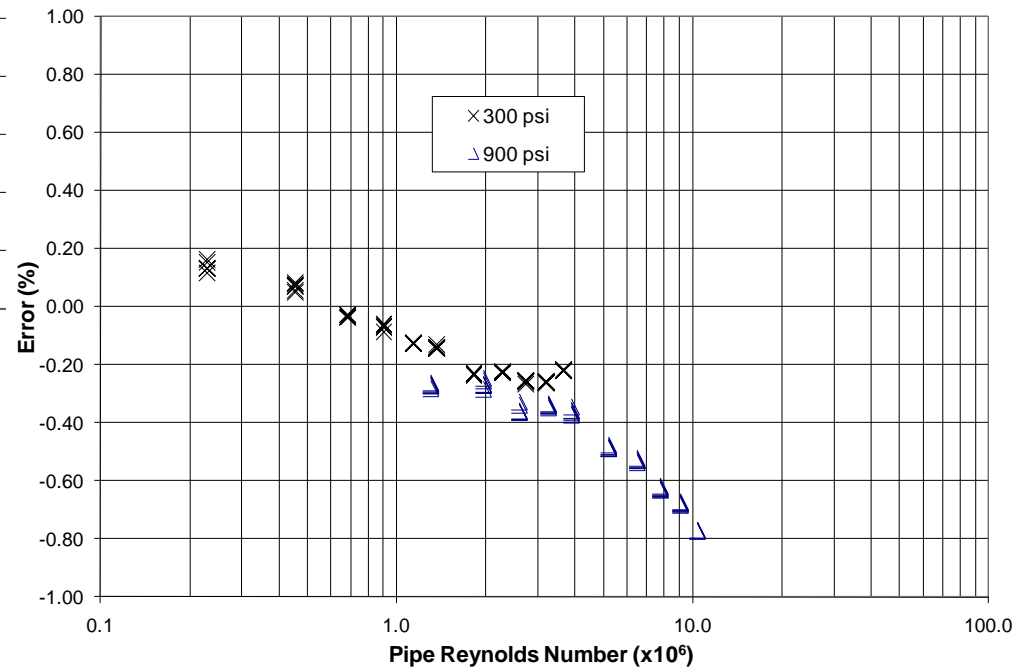
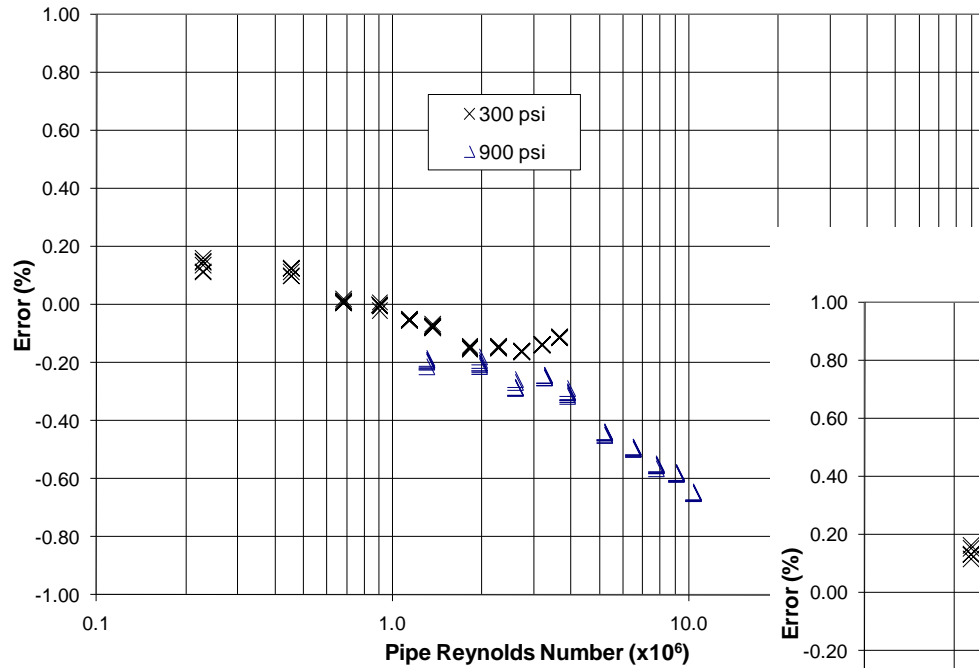


Dual Instromet turbine meter package with a CPA-50E plate upstream of each meter.
Each lab uses its own P&T measurement

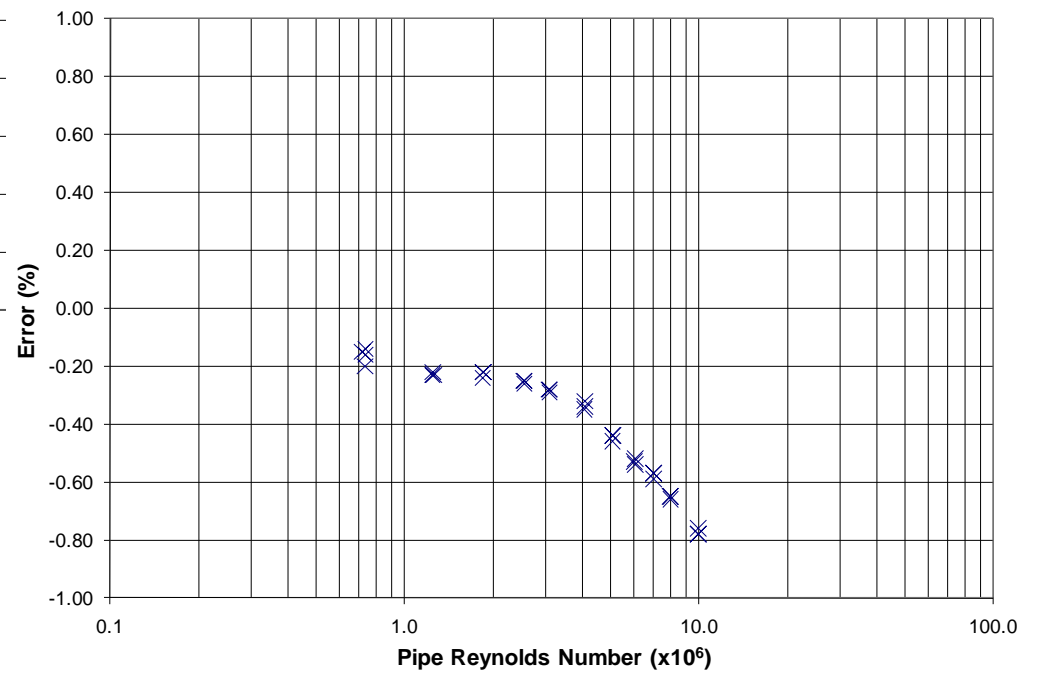
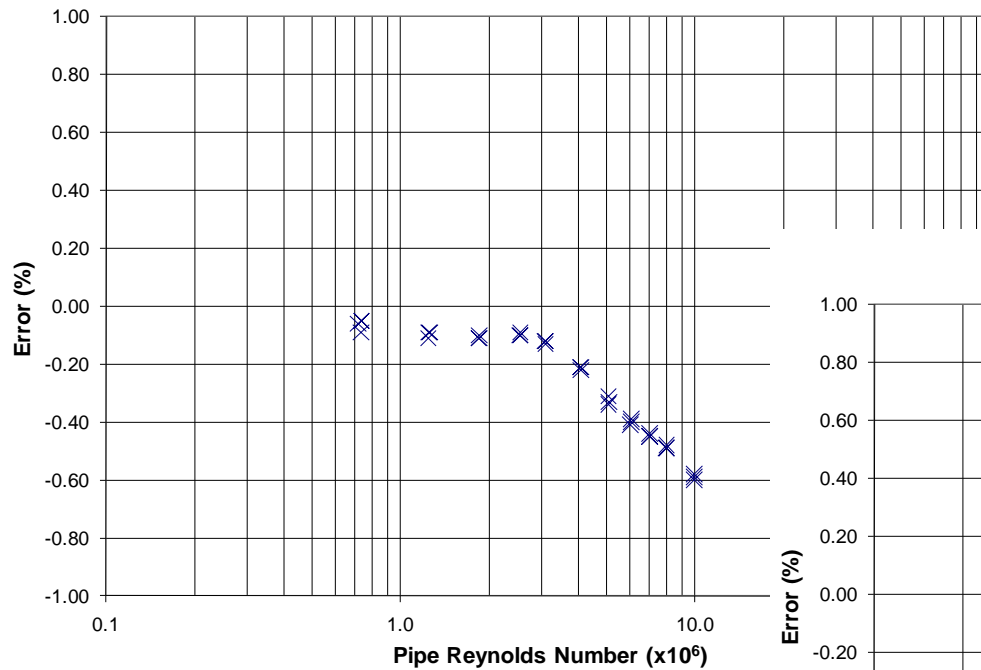
Terasen Data



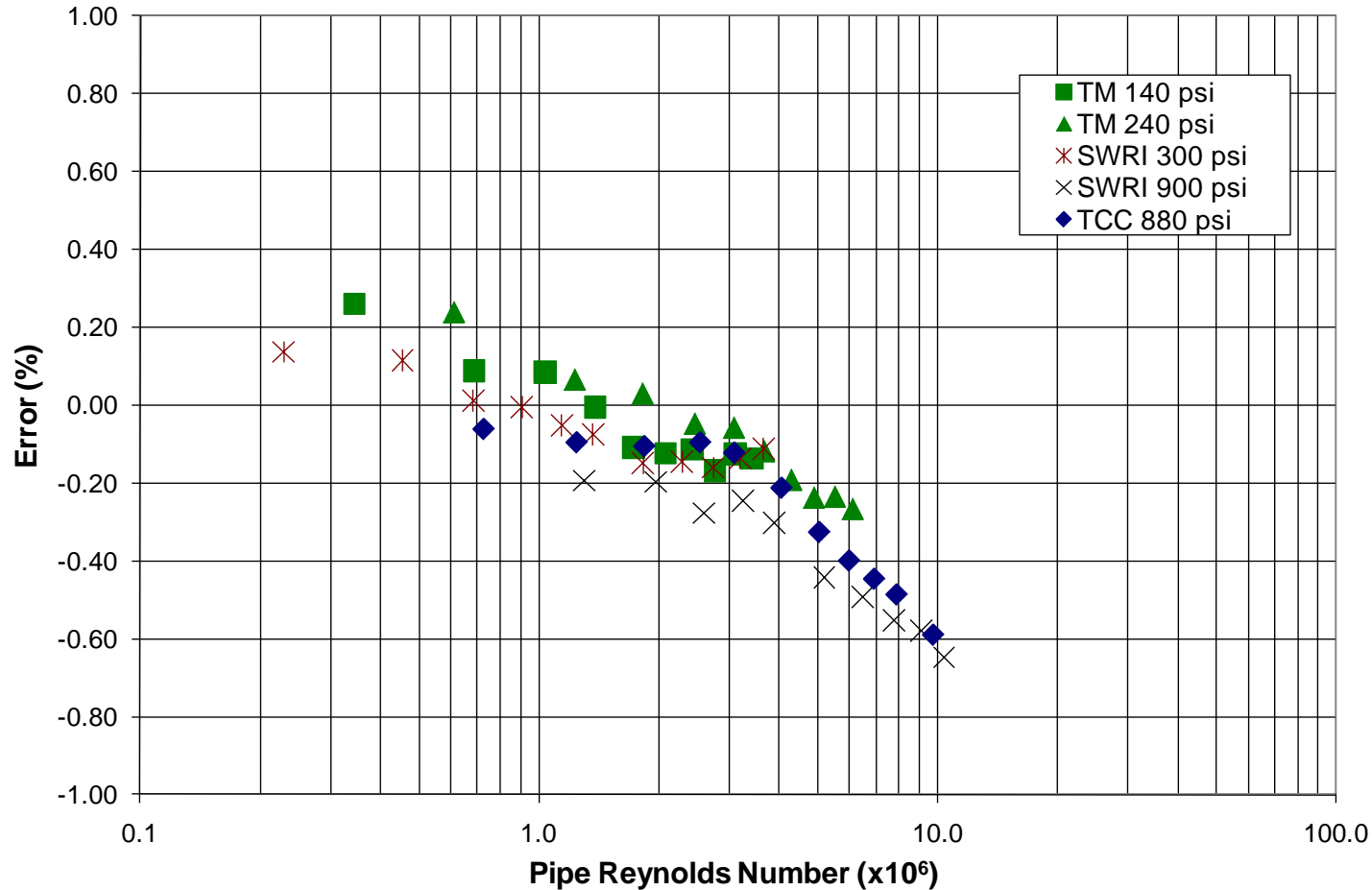
SwRI Data



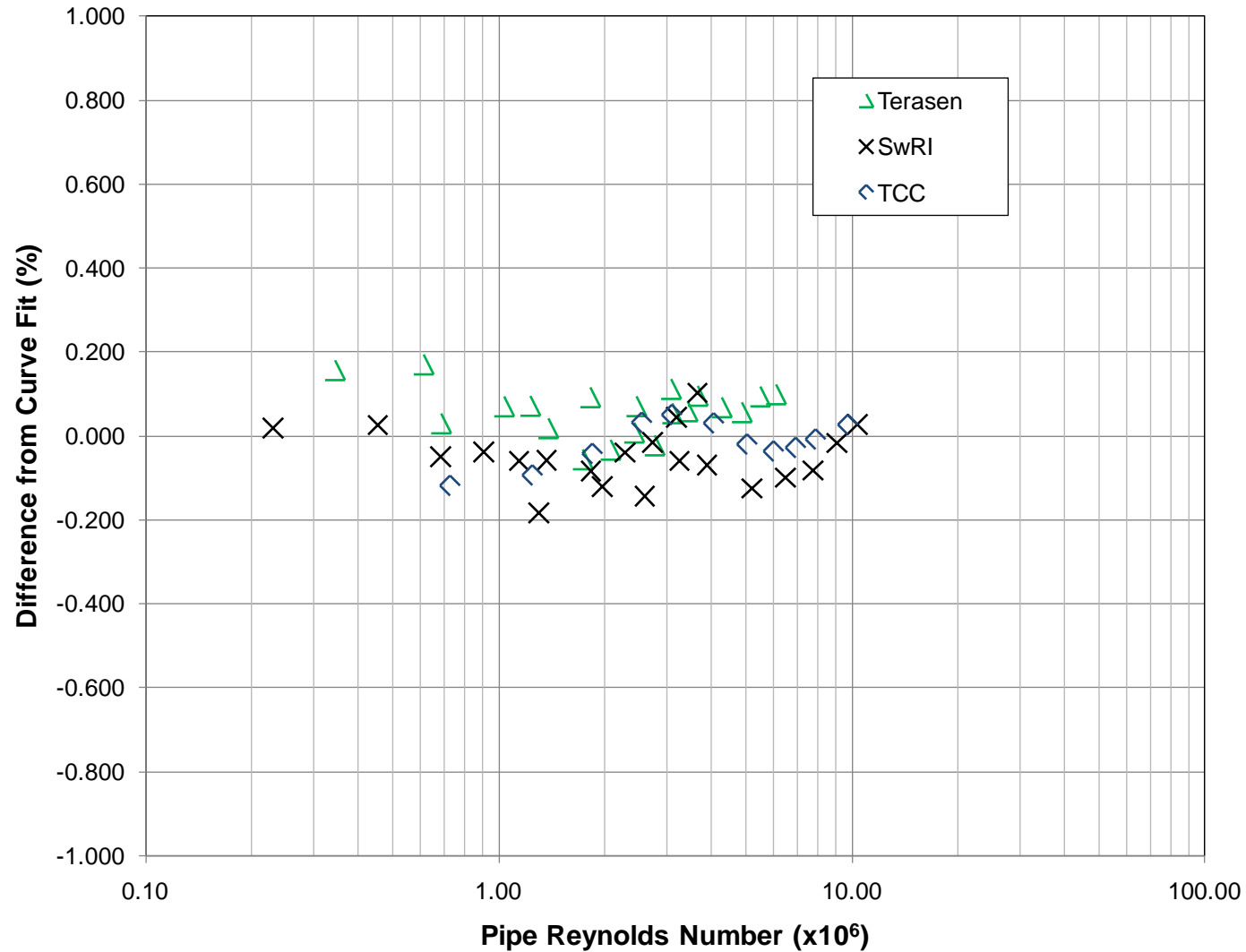
TCC Data



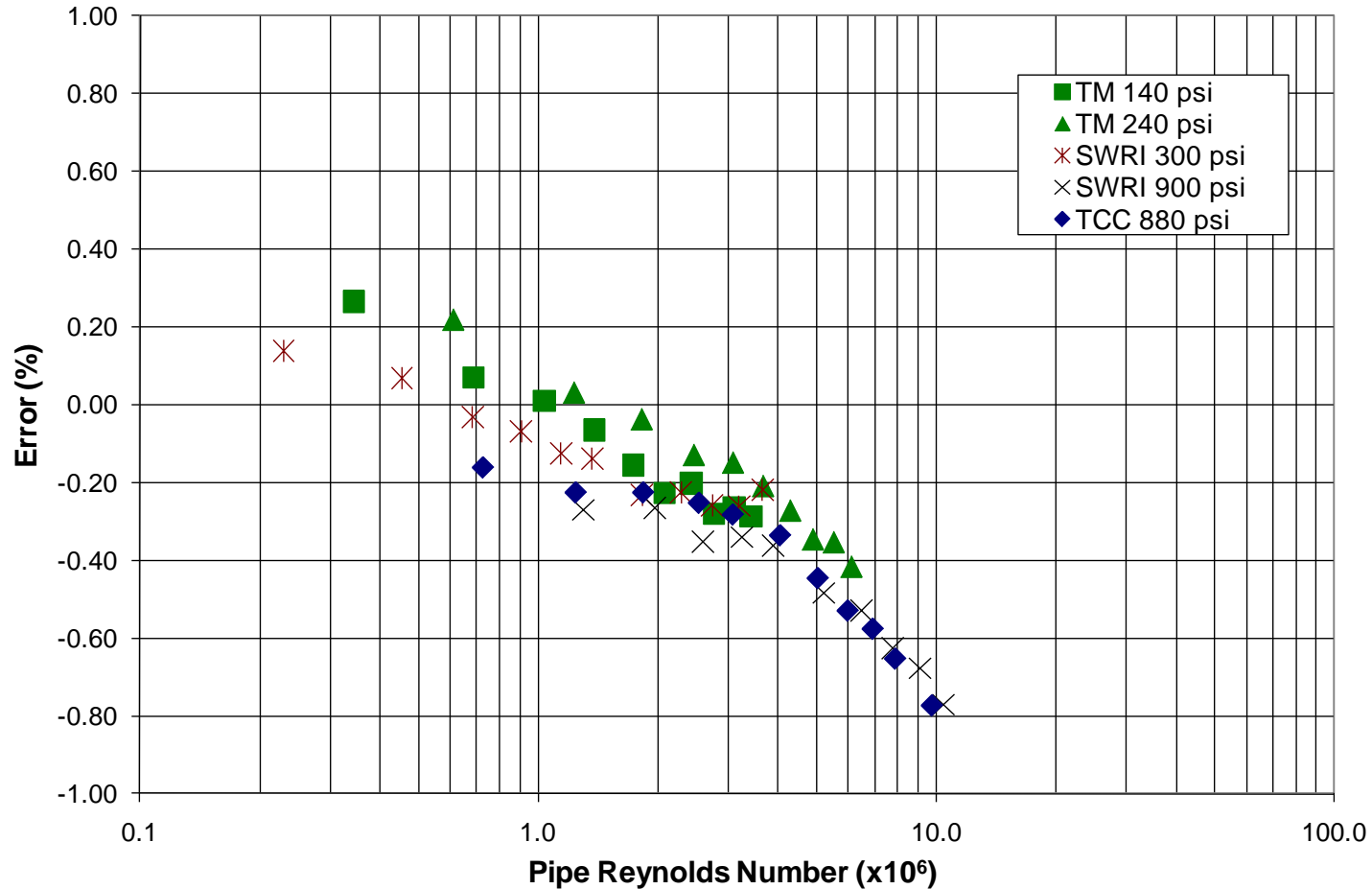
Combined Results – upstream



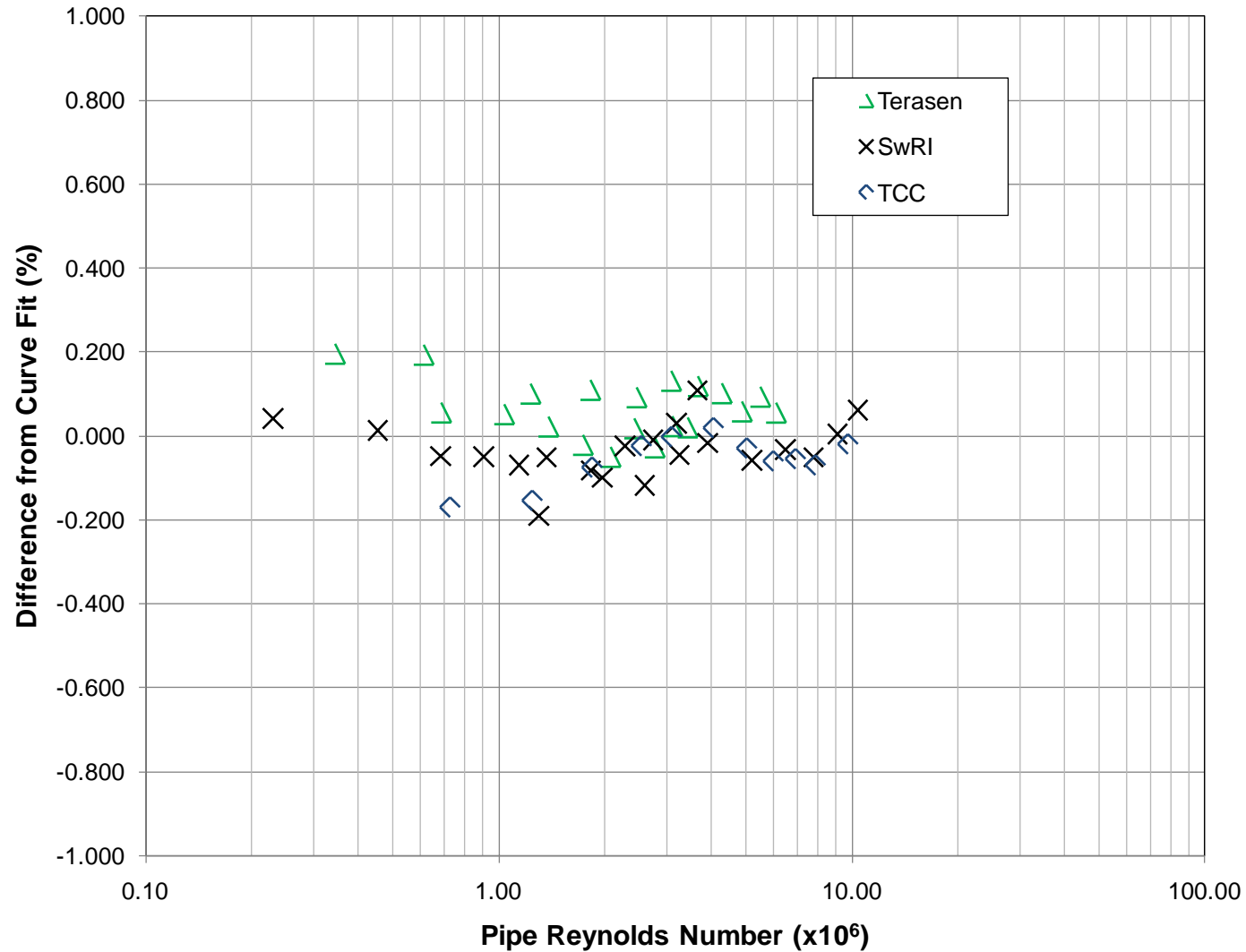
Combined Fit Results – upstream



Combined Results – downstream



Combined Fit Results – downstream





Conclusions

- The baseline for the TeST artifact has been established at the participating labs.
- The data from Terasen, SwRI and TCC all fell within $\pm 0.2\%$ band.
- A close-out test will determine if the TeST artifact's performance is unchanged.
- Future tests may include reversing the meter order.