

TEST REPORT

Performance Tests of a Daniel 12-Inch Profiler Plate Flow Conditioner

Prepared for:

Daniel Measurement & Control, Inc.
9720 Old Katy Road
Houston, Texas 77055-6131

Prepared by:

Gas Research Institute Metering Research Facility
at
SOUTHWEST RESEARCH INSTITUTE
6220 Culebra Road
San Antonio, Texas 78238-5166

Daniel P. O. No. 49395
SwRI Project No. 18.03108.01.022
MRF Report No. 00-124

January 2001

Approved:

Edgar B. Bowles, Jr.

Edgar B. Bowles, Jr.
MRF Program Manager



SOUTHWEST RESEARCH INSTITUTE
SAN ANTONIO HOUSTON
DETROIT WASHINGTON, DC

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Gas Research Institute Metering Research Facility at Southwest Research Institute

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GRI METERING RESEARCH FACILITY (MRF)

Meter Calibration Sheet

Calibration Date: August 21-26, 2000
Report Date: January 22, 2001

MRF Report No.: 00-124
SwRI Project No.: 18.03108.01.022
Client P.O. No.: 49395

Title: Performance Tests of a Daniel 12-Inch Profiler Plate Flow Conditioner

Client Information:

Company Name: Daniel Measurement & Control, Inc.
Address: 9720 Old Katy Road
City: Houston
State, ZIP: Texas 77055-6131
Client Representative: John Lansing
Telephone Number: 713-827-3389
FAX Number: 713-827-3392

Meter Information:

Manufacturer: Daniel Measurement & Control, Inc.
Type: Ultrasonic
Size: 12-inch
Model No.: SeniorSonic
Meter: GRI Ultrasonic Research Test Meter

Calibration Facility:

X HPL

LPL

DTS

Test Conditions:

Gas: Natural Gas
Pressure (psia): 415 (nominal)
Temperature (°F): 70 (nominal)

Gas Composition:

<i>Component</i>	<i>Representative Mole Fraction (%)</i>
Methane	95.7998
Ethane	1.8059
Carbon Dioxide	1.2626
Nitrogen	0.8869
Propane	0.1708
Isobutane	0.0205
n-Butane	0.0239
Isopentane	0.0081
n-Pentane	0.0054
n-Hexane	0.0058
n-Heptane	0.0053
n-Octane	0.0037
n-Nonane	<u>0.0013</u>
TOTAL	100
Heat Content (BTU/scft)	993.4
Density @ STP (Lb/ft3)	0.0446

Gas Research Institute Metering Research Facility at Southwest Research Institute

Mailing Address:
P.O. Drawer 28510
San Antonio, Texas 78228-0510

Shipping Address:
6220 Culebra Road
San Antonio, Texas 78238-5166

Contact: William J. Astleford
Telephone: (210) 522-2327
FAX No: (210) 522-2369

GRI METERING RESEARCH FACILITY (MRF)

Meter Calibration Sheet

Calibration Date: August 21-26, 2000
Report Date: January 22, 2001

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SwRI Project No.: 18.03108.01.022
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Calibration Information:

1. Daniel provided the meter and the Profiler plate. The MRF provided the installation piping and all necessary instrumentation.
2. Temperature was measured with a bare RTD located in a threadolet 3D downstream of the meter. Pressure was measured at the meter body.
3. The meter configuration file remained unaltered throughout the testing.
4. Initially, a baseline test was conducted. The Profiler plate was located 10D upstream of the meter, and there was a 100D separation distance between the meter and an upstream 90-degree elbow.
5. Next, the meter was tested in a double elbow out of plane configuration. The Profiler plate was located 10D upstream of the meter, and there was a 5D separation between the Profiler plate and the discharge plane of the 90-degree out of plane elbows. This configuration was tested with the meter in the vertical orientation (electronics below the meter denoted as 0°) and then with the meter rotated 90°.
6. The meter was then tested in a double elbow in plane configuration. The Profiler plate remained at 10D upstream of the meter with an additional 5D of pipe between the plate and the discharge plane of the 90-degree elbow. The tests included both 0° and 90° orientations.
7. Finally, the installation was returned to the configuration described in Item 4, and the baseline test was repeated.
8. The results of these tests are contained in Figures 1 and 2 on the next two pages.

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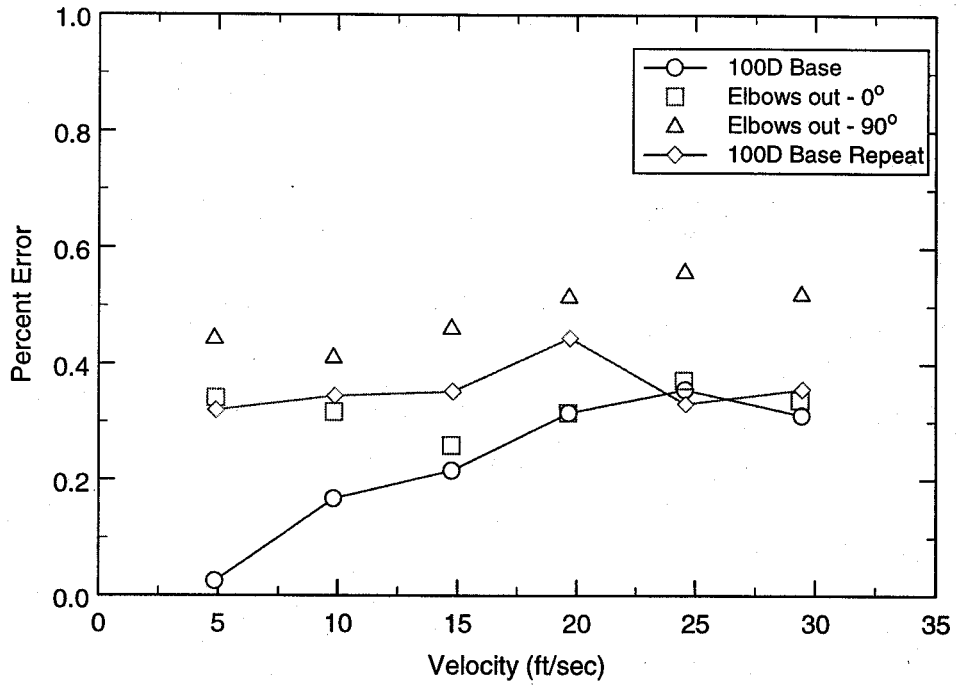


Figure 1. Daniel Profiler Performance with Double Elbows Out of Plane Upstream of Daniel Ultrasonic Flow Meter

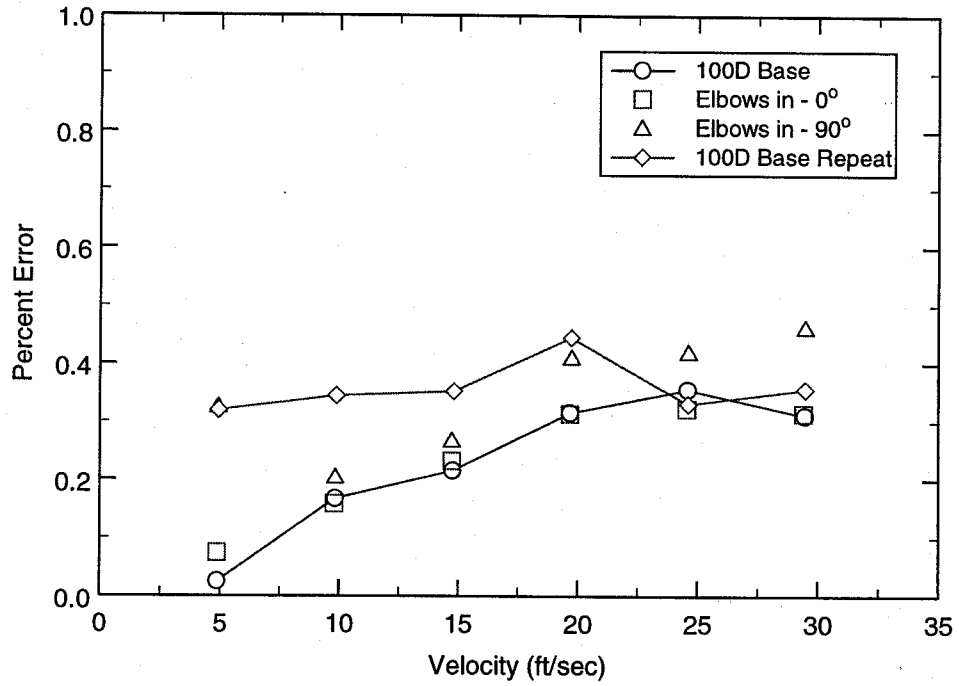


Figure 2. Daniel Profiler Performance with Double Elbows In Plane Upstream of Daniel Ultrasonic Flow Meter

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Gas Technology Institute Metering Research Facility
April 26, 2001

Mr. John Lansing
Daniel Measurement & Control, Inc.
9720 Old Katy Road
Houston, TX 77055-6131

Subject: Addendum to GTI MRF Report No. 00-124, "Performance Tests of a Daniel 12-Inch Profiler Plate Flow Conditioner"

Reference: GRI MRF Report No. 00-124
SwRI Project No. 18.03108.01.022
Daniel P. O. 049395

Dear Mr. Lansing:

Please attach this Addendum to the subject report that was transmitted to Daniel on January 25, 2001. In accordance with your request, the table below summarizes the performance of the Daniel Profiler plate in terms of meter flow-weighted mean error for various piping installation configurations upstream of a Daniel 12-inch ultrasonic flow meter. In all cases, the flow conditioner was located 10D upstream of the flow meter and 5D downstream of the disturbance.

Configuration	FWME*	Shift Relative to Baseline
100D Baseline	0.28	n/a
Elbows out – 0 deg	0.33	0.05
Elbows out – 90 deg	0.51	0.23
Elbows in – 0 deg	0.28	0.00
Elbows in – 90 deg	0.38	0.10
100D Baseline – repeat	0.36	0.08

* Flow-Weighted Mean Error

I trust that this data will meet your needs. If there are any questions, please call me at (210)-522-2327. We appreciate the opportunity to be of service to Daniel, and we look forward to working with you again.

Sincerely,



William J. Astleford
Consultant

WJA/cz
H:/MRF Reports/MRF00-124/Transltr.doc
cc: Mr. E. B. Bowles, Jr., SwRI

