

Re: Mud Flow in the Return Line

I. Introduction

The Canty Mud Flow Analyzer monitors the flow in the return line using visual analysis technology. The system mounts where the flapper system is installed and is pre-calibrated to the pipe diameter. The system can be mounted on top of the pipe, or in the more advantageous position of 30 degrees off the top dead center allowing the camera to see up the pipe wall.

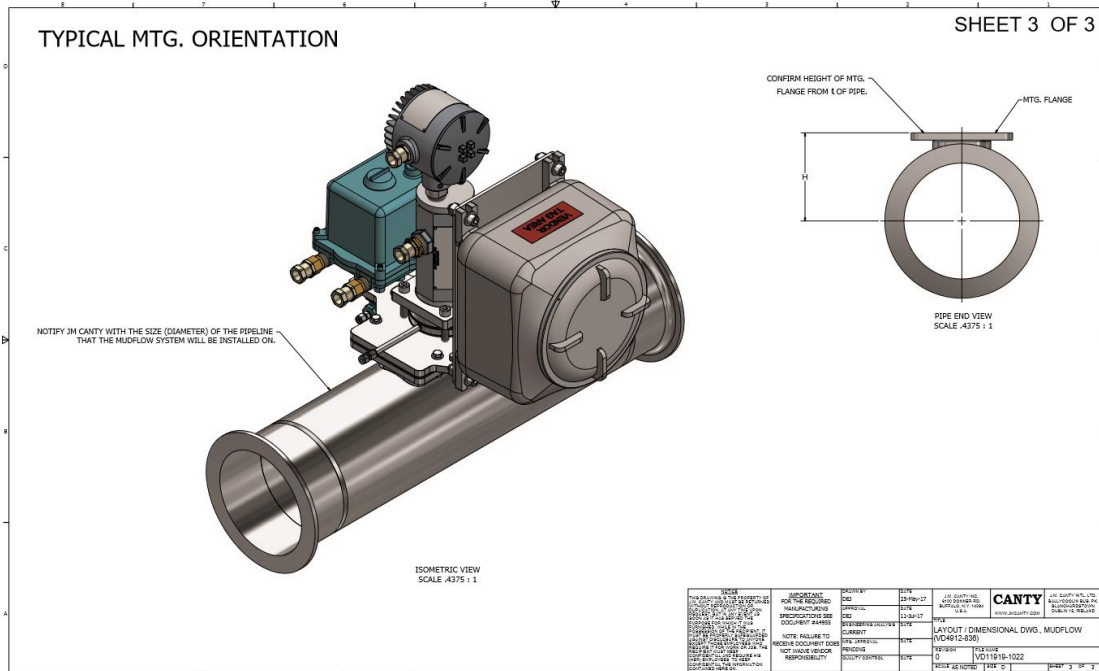


Figure 1. Canty Mud Flow Analyzer

II. Test Data

A. Water Based Mud:

A Canty system was mounted onto a test rig and trialed at various flow rates.

Table 1.Flow in Return Line

Test Scenarios	Canty Result	Expected Result
Flow accuracy at 3.3 gpm-Slanted Canty Position-WBM-9ppg	3.15	3.3
Flow accuracy at 42 gpm-Slanted Canty Position-WBM-9ppg	30	42
Flow accuracy at 92.5 gpm-Slanted Canty Position-WBM-9ppg	95	92.5
Flow accuracy at 19.7 gpm-Slanted Canty Position-WBM-9ppg	19.8	19.7

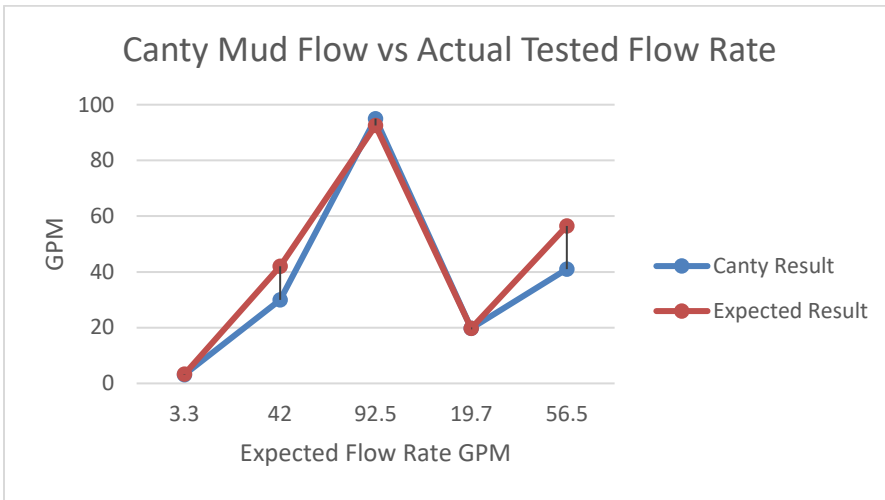


Figure 2. Graphical Results of Flow in Return Line

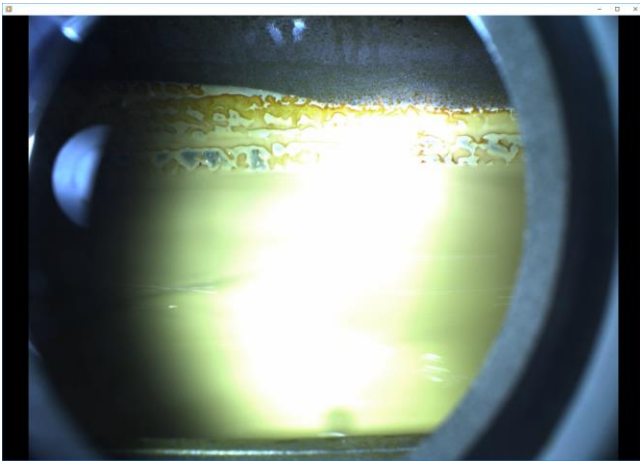


Figure 3. Image of Flow @ 42.5 gpm



Figure 4. Image of Flow @ 95.2 GPM

B. Testing vs Coriolis Meter

Testing was carried out using water, WBM and OBM. Water was tested first. Flow in a partially filled pipe due to gravity is well understood. The Canty calculation is based on these known equations.

Table 2. Calculated Flow vs Coriolis Meter

VERIFIED Stream Width (in)	GPM (coriolis)	GPM (calculated)
5.97	> 5	29
3.2	> 5	4.2
3.5	> 5	4.2
4.02	7	8.4
5.1	26	21
6.8	60	75
6.8	70	75
7.8	90	90
8.8	154	243
9.1	196	301
10.1	365	522

The meter generally under reports as the flow increases.

C. WBM / OBM Trials

Table 3. WBM Canty Analyzer

Stream Width		GPM
9.4		457
4.9		21
9.1		197
9.7		340
9.3		239

Table 4. OBM Canty Analyzer

Stream Width		GPM
5.5		29.4
6		37.8
9.2		289
6.4		84

These measurements assume the same velocity as water.

