Performance - Slow Flow Test

Application

This test applies to any metering system.

Note: For liquefied petroleum gases, consult also Part 4, STP-26 - Procedure for Testing Liquefied Gas Meters using a Vapour Displacement Prover.

Purpose

The accuracy curve of a meter is dependant on the flow rate. Every meter is rated, and approved, with a minimum and maximum flow rate within which it must operate accurately. This test verifies the accuracy at a flow rate which is slightly above the approved minimum or slowest metering speed, whichever is the greatest.

Note 1: In order for this test to be valid, the meter must be operated above the minimum approved flow rate and as close as practical to the following target test flow rate:

- For all meters other than dispensers and refuellers

\[
(\text{Minimum Approved Flow Rate}) + (10\% \text{ of Minimum Approved Flow Rate})
\]

- For dispensers and refuellers

\[
(\text{Minimum Approved Flow Rate}) + (5 \text{ Litres/ min.})
\]

Note 2: Some bottom loading installations have pre-programmed start and stop flow rates to prevent “hammer” in the piping. Where this occurs attempt to have the system set to a manual mode if it is available.

Note 3: On metering systems with more than one outlet downstream of the meter, this test must be conducted on the outlet which offers the potential for the lowest flow rate. For truck mounted metering systems with a hose reel and a quick pump off, the hose reel is considered the correct outlet to conduct this test through.
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Procedure

Establish the flow rate by partially opening the nozzle, quick shut-off, or other control valve downstream of the meter under test, including the prover inlet valve where necessary. Consult STP-21.

Adjust the flow rate as necessary to ensure the meter is operated above its minimum rated flow rate, as per note 1 above.

Operate the meter steadily at the slow flow target test rate for as long as possible while filling the test measure or the prover.

A minimum of starts and stops of the product flow during accuracy tests ensures that outside influence factors are kept to a minimum.

Where possible, run the test without stopping until the liquid level is in the readable portion of the prover neck, then calculate the error from the indicated volume as in the example below:

prover volume (after prover shell correction) = 500.1 litres
meter registration = 500.2 litres

Meter error (registration) = ((500.2 - 500.1) / 500.1) x 100 = +0.019% (over registration)

Record the results. This result will be needed to determine whether a repeatability tests is warranted.

Interpretation of Results

All results must be within applicable tolerances.

Revision 1

Note 3 under Purpose was added to clarify which outlet this test should be through on systems with more than one outlet.

Revision 2

Added target test flow rate criteria under Note 1 for dispensers and refuellers and all other meters. Minor editorial changes also made.