

API 18.2 & Metered Trailers

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*note: in conjunction with Trade Star Energy and sponsored by CES

HSSE Moment

Behavioral-based safety is a reinforcement action taken by an organization's management to identify the immediate and root causes of unsafe behavior and then apply corrective measures to reduce unsafe actions by employees and eliminating unsafe environments where possible.

“Industry standards developed by API support the industry goal of zero accidents,” said Lisa Salley, API’s vice president for global industry services.

“This standard is a great example of what can be done when industry, regulators and all key stakeholders work together to achieve the common goal of improving safety for industry operations.

This standard enables personnel to take measurements of crude oil from a lease tank without opening the hatch on the tank, thus protecting them from potentially hazardous vapors and gases.”

Purpose

- Discuss API 18.2
 - Scope of changes
 - What it means for gauging safety
- Discuss Benefits of 'On Trailer' Systems
 - Accuracy
 - Efficiency

API 18.2

New Language

- This standard defines the minimum equipment and methods used to determine the quantity and quality of crude oil being loaded from a lease tank to a truck trailer without requiring direct access to a lease tank gauge hatch.
- Methods and equipment described are grouped by tank zone, trailer zone, and the transition zone between the two. The equipment used for measurement is dependent on the existing design of the lease equipment, the equipment used to transport the product, or a combination of the two.
- Some sites may require measurements from multiple zones in order to arrive at an accurate load quantity and quality.

API 18.2

From Recommendation to Standard

- The new standard integrates proven methods of custody transfer from other existing API Manual of Petroleum Measurement Standards.
- The new standard was developed by API under its rigorous standards development process accredited by the American National Standards Institute, ANSI, the same body that accredits programs at several national laboratories.
- API's standards development process is open, transparent and ensures that the best minds from government, academia, the public and industry fully participate in the development of API standards, and API undergoes regular third-party audits to ensure its program meets ANSI's Essential Requirements for openness, balance, consensus and due process.

Affects?

Data – Led to OSHA & NIOSHA issuing a ‘Tank gauging Hazard Alert’

- During 2010-2014, nine fatalities were identified.
- Of the nine worker fatalities, six occurred in 2014, one in 2013, one in 2012, and one in 2010.
- Three fatalities occurred in North Dakota, three in Colorado, one in Texas, one in Oklahoma, and one in Montana.
- All of the fatalities occurred at crude oil (production) tanks.
- Four of the fatalities occurred during tank gauging. Five additional fatalities occurred during sampling by pumpers / truckers.
- All nine of the fatalities occurred among employees who were working alone or not being observed.
- In at least one case, the victim had sought medical evaluation for health effects (dizziness, disorientation, etc.) experienced during prior gauging activities.

Hierarchy of Controls; Eliminate, Substitute, Engineering Controls, Administrative Controls, PPE... API 18.2 allows for the elimination of people working in a toxic environment.

Operations – Accuracy

Let's start out with a question.

- What is .0001 of a barrel?

A load is give or take 220 barrels (BBLs)

- $220 \text{ BBLs} \times 42 \text{ gallons (gal)} = 9240 \text{ gal} \times .0001 = 0.924 \text{ gal per 220 BBLs}$

Just less than one gallon.

The max tolerance for monthly Coriolis proving's is .0025.

*note at each monthly proving there is a new meter factor given.

Let's do the math on the maximum tolerance of .0025.

- $220 \text{ BBLs} \times 42 \text{ gal} = 9240 \text{ gal} \times .0025 = 23.1 \text{ gal}$

Operations – Accuracy

360 individual oil truck loads over an 18-month period. Each of the loads were measured (purchased) manually following API Standards. Simultaneously, each load was measured with a truck mounted Coriolis meter system.

The following are some of the relevant observations:

1. Ambient air temperatures ranged from 105°F to -17°F.
2. Manually observed oil temperatures (MPMS, Chapter 7) ranged from 96°F to -11°F while meter observed temperatures ranged from 99.84°F to -9.60°F.
3. Manually observed variance in temperature ranged from 14.5°F above the meter observed to 23°F below meter recorded temperature.
4. Manually observed gravity variance was 3.6 degrees above and 5 degrees below meter observed gravities.
5. Manually gauged gross barrels, as determined by (MPMS, Chapter 12) varied by as much as 22.44 barrels more than the meter and 8.69 barrels less than the meter on individual loads.

* note; Observed gravity of oil (MPMS, Chapter 12) was as low as 32.8 and as high as 49.4

Operations – Accuracy

The data below addresses the proving results of 12 truck mounted Coriolis meters.

Standard volumes through these meters average 10,000 BBLs to 12,000 BBLs per month. The composite factor range for this sample is .9968 on the low end to 1.0051 on the high end, a variance of .0083.

*note; each proving was performed by a 3rd party certified prover.

**note; there was no occasion where a meter did not prove within the prescribed tolerance of .0025

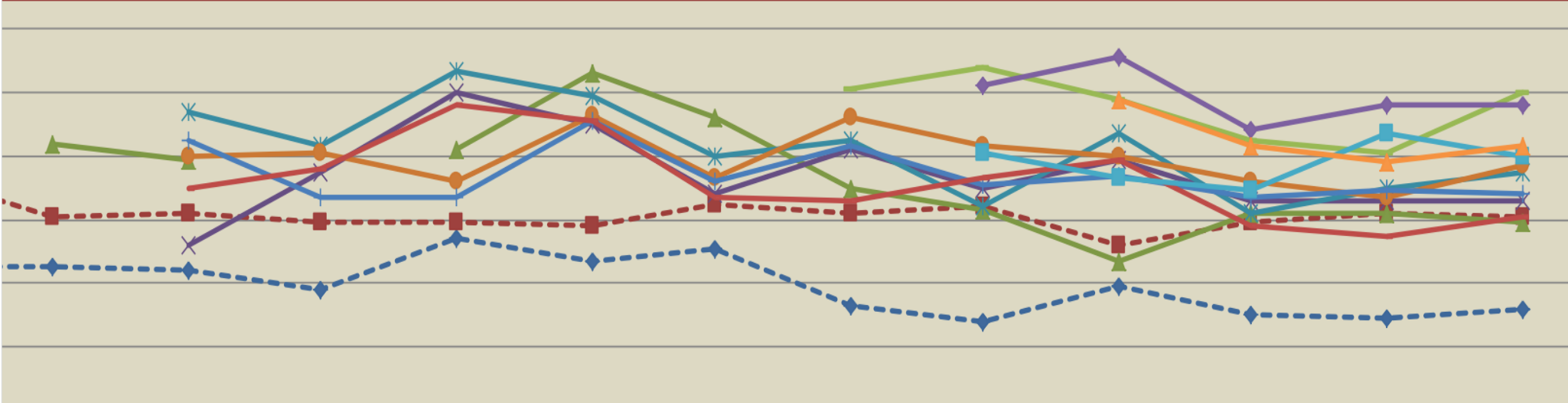
“The meters will not hold up to the trucks and rough roads”. That “the meter accuracy can not stay in tolerance.” I’m here to tell you the Coriolis Meter it’s self stays together!

Now some of the other parts and piece we have had some problems with falling apart. (Installer error or fabrication shop design flaw.) We have overtime figured out how to keep those additional items together.

Operations – Accuracy

Trucking Truck Mounted LACTs - Official Monthly Meter Factor

October-14	November-14	December-14	January-15	February-15	March-15	April-15	May-15	June-15	July-15	August-15	September-15
0.9985	0.9984	0.9978	0.9994	0.9987	0.9991	0.9973	0.9968	0.9979	0.9970	0.9969	0.9972
1.0001	1.0002	0.9999	0.9999	0.9998	1.0005	1.0002	1.0004	0.9992	0.9999	1.0002	1.0001
1.0024	1.0019		1.0022	1.0046	1.0032	1.0010	1.0003	0.9987	1.0002	1.0002	0.9999
	0.9992	1.0015	1.0040	1.0030	1.0008	1.0022	1.0010	1.0019	1.0006	1.0006	1.0006
	1.0034	1.0023	1.0047	1.0039	1.0020	1.0025	1.0004	1.0027	1.0002	1.0010	1.0015
	1.0020	1.0021	1.0012	1.0033	1.0013	1.0032	1.0023	1.0020	1.0012	1.0007	1.0017
	1.0025	1.0007	1.0007	1.0031	1.0012	1.0023	1.0011	1.0014	1.0007	1.0009	1.0008
	1.0010	1.0016	1.0036	1.0031	1.0007	1.0006	1.0013	1.0019	0.9998	0.9995	1.0001
						1.0041	1.0048	1.0038	1.0025	1.0021	1.0040
							1.0042	1.0051	1.0028	1.0036	1.0036
							1.0021	1.0013	1.0009	1.0027	1.0020
								1.0038	1.0023	1.0018	1.0023



Operations – Efficiency

With the current manual API standard for buying oil what can go wrong?

- Drivers does not leaving wood back or hydrometer in long enough.
- Mercury in wood-back and hydrometer separating.
- Numbers on strap/tape are worn off.
- Strap/tape brass plumb bob is not pointed any longer and point is rounded of .5 inches.
- Theft leaks or doesn't work
- Grind-out centrifuge tubes or vilels you can not read the numbers or see the lines.
- Centrifuge does not work.
- -20F to -40F degrees out driver does not complete all the steps properly.

Operations – Efficiency

If you pay your drivers an hourly rate and by the time you put in insurance, taxes, workers comp. and other benefits you may have. That driver could be costing \$35 plus per hour?

- Let's use the \$35.00 per hour Driver's wages. If you can haul 4 loads in a 12-hour period hand gauging and take off 30 minutes a load, saving 2 hours a day. Which comes out to \$70.00 per day and 350 a week, \$1400.00 a month and \$16,800 a year. Or the drive could go preload for the next driver. If you pre load another load for the next driver it would also make additional revenue from the truck. May be an extra \$150 plus in revenue to the truck each shift. $\$150 \times 25$ days for truck per month equals \$3750.

Operations

Advantages: Your recruiting pool gets bigger for better Drivers. What do I mean? How many times have you hired a great driver has great back ground check and everything else and as soon as you start to teach them how to buy oil they quit? They ether flat out tell you they do not want anything to do with buying oil or they disappear and a few days later from one of their buddies/your drivers, you find out they also won't buy oil.

- Quicker load times.
- Mean less fuel burned
- less hours per load to pay a driver.

Cost: \$45-\$55K per unit

Summary, Q&A

From a safety standpoint, eliminating the need to work in a hazardous environment has always been the case – operationally, there is no reason to not add this technology to your arsenal.

Q&A