



HYDRAULIC FRACTURING **CASE STUDY**

Permian Basin Operator Processes 2 Billion Pounds of Proppant with Single TECO SAM Meter

Customer

Major pressure pumping contractor operating in the Permian Basin of West Texas. The company provides comprehensive hydraulic fracturing services including high-pressure sand proppant delivery, blending operations, and completion services for major oil and gas producers in one of North America's most active unconventional plays.

Challenge

Permian Basin hydraulic fracturing operations present some of the most demanding conditions for flow measurement equipment. High ambient temperatures, continuous 24/7 operations, and extremely high proppant volumes create an environment where equipment failures can have severe financial impacts.

The pressure pumping contractor was facing recurring mag meter failures with traditional polyurethane-lined meters equipped with coated electrodes. Typical failure modes included:

- Rapid electrode coating erosion leading to signal loss and inaccurate flow measurements
- Liner separation from tube walls caused by adhesive failure in high-heat conditions
- Electrode seal failures allowing process fluid to leak into meter bodies
- Excessive signal noise interfering with accurate proppant concentration measurements

With operational costs exceeding \$20,000 per hour, unplanned meter failures were extremely expensive. The company needed a reliable flow measurement solution that could handle continuous high-volume operations without frequent replacements. Accurate proppant measurement was critical for well completion quality and billing accuracy.

Benefits

- Over 2 billion pounds of sand proppant processed
- Eight+ years of continuous operation
- Zero liner or electrode failures

Solution

In January 2017, TECO installed its first commercial LP SAM unit at the customer's Permian Basin operation. The installation included:

- **Advanced ceramic liner technology:** Magnesia partially stabilized zirconia (MgPSZ) liner with hardness comparable to industrial diamonds, installed by heat-shrink process without adhesive for maximum integrity
- **Solid tungsten carbide billet electrodes:** Polished solid tungsten carbide rods with no coating to erode and no head to shear off, dramatically reducing signal noise
- **Protected electrode sealing system:** Electrode seal located outside the flow tube in a protective boss, isolated from abrasive slurry forces
- **Seamless integration:** Drop-in replacement matching existing meter lay length and compatible with customer's existing transmitter, requiring no piping modifications or control system changes

The meter was precisely calibrated to work with the customer's existing magnetic flowmeter transmitter using TECO's ISO 17025:2017 accredited flow laboratory. Installation was completed during a scheduled maintenance window with minimal disruption to operations.

Results

The TECO LP SAM has demonstrated exceptional performance and reliability:

- **Extraordinary throughput:** The meter has processed over 2 billion pounds of sand proppant—the count was actually lost after 2 billion pounds as the meter continued operating
- **Continuous operation:** The meter is still in service today, more than eight years after installation, with no failures or replacements
- **Zero liner failures:** The ceramic liner has shown no signs of wear, damage, or separation despite processing billions of pounds of abrasive sand
- **Maintained signal quality:** The polished tungsten carbide electrodes continue to provide clear, low-noise signals for accurate flow measurement
- **Eliminated costly downtime:** Compared to frequent replacements with traditional meters, this single SAM eliminated multiple 3-4 hour outages costing \$60,000-\$80,000 each
- **Reduced safety risks:** Fewer meter changes mean reduced exposure to personnel injury, equipment damage, and environmental incidents

The customer reports that the TECO LP SAM has delivered exceptional value through eliminated downtime, reduced maintenance costs, and consistent measurement accuracy. The meter's longevity has far exceeded traditional mag meters, with operational life more than 10 times longer than polyurethane-lined alternatives.



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