TECO

HYDRAULIC FRACTURING

CASE STUDY

Pressure Pumping Company Achieves Five Years of Continuous Operation with TECO SAM Magnetic Flowmeter

Customer

Leading pressure pumping contractor operating in Alberta, Canada. The company provides hydraulic fracturing services to oil and gas operators throughout Western Canada, specializing in high-volume sand proppant delivery for unconventional resource development.

Benefits

- Five years of continuous operation without failure
- Eliminated frequent meter replacements
- Significant reduction in downtime costs

Challenge

Magnetic flowmeters on blender units are critical for accurate proppant delivery in hydraulic fracturing operations. These meters must precisely measure extremely abrasive sand-water slurries flowing at high velocities while operating in harsh environmental conditions ranging from extreme summer heat to bitter winter cold.

The company was experiencing frequent mag meter failures due to three primary issues:

- Electrode coating wear: Tungsten carbide coatings on electrodes were eroding away, leading to signal degradation and meter failure within months
- Electrode head shear: Electrode heads were breaking off under the stress of abrasive flow, causing short circuits and process fluid leaks
- Polyurethane liner failure: Liners were separating from the tube wall, leading to flow obstruction and catastrophic meter failure

Each meter replacement required 3-4 hours of downtime at operational costs exceeding $20,000 per hour. The company was replacing meters every 8-9 months, resulting in significant costs and production losses. They needed a more durable solution that could withstand the extreme conditions of hydraulic fracturing operations while maintaining measurement accuracy.

Solution

In March 2016, TECO installed the first LP SAM (Low Pressure Severe Application Meter) as a beta test unit. The LP SAM featured:

- Magnesia partially stabilized zirconia (MgPSZ) ceramic liner installed by heat-shrink process without adhesive, providing exceptional wear resistance and structural integrity
- Solid tungsten carbide billet electrodes with highly polished surfaces—no coating to wear off and no head to shear
- Protected electrode seal design with the seal located outside the tube in a protective well, isolated from abrasive slurry forces
- Drop-in replacement configuration matching existing lay length and transmitter compatibility, requiring no piping or wiring changes

The meter was calibrated in TECO's ISO 17025:2017 accredited flow laboratory before installation. TECO worked closely with the customer's operations team to ensure seamless integration with existing blender systems and transmitter equipment.

Results

The TECO LP SAM exceeded all expectations:

- **Extended operational life**: After 16 months of continuous operation, the meter was returned to TECO in July 2017 for evaluation and was found to be in perfect operating condition
- **Sustained performance**: The meter was returned to service and continued operating without issues
- **Long-term reliability proven**: In 2021, five years after installation, the meter was returned for routine calibration and showed no electrode shorts to ground, no liner damage, and no case damage
- **Successful recalibration**: The meter calibrated successfully and was returned to service, demonstrating the durability of TECO's design
- **Eliminated unplanned downtime**: Compared to 8-9 month replacement cycles with traditional meters, the SAM operated for over five years without failure
- **Significant cost savings**: Eliminating multiple meter replacements saved hundreds of thousands of dollars in downtime costs and equipment expenses

The success of this beta installation demonstrated that TECO's LP SAM could deliver more than 5 times the service life of traditional magnetic flowmeters in abrasive hydraulic fracturing applications.