

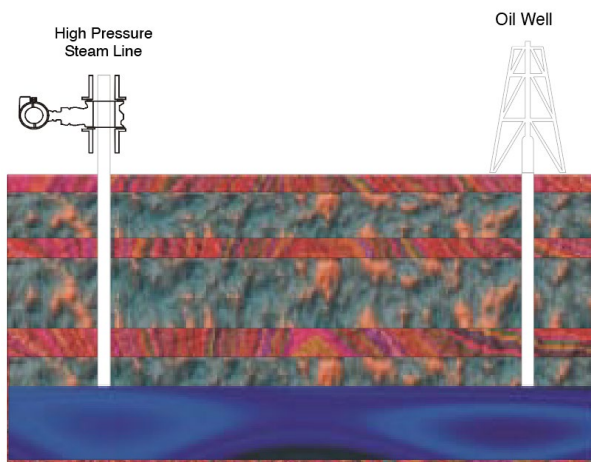
# Optimizing Steam Injection for Enhanced Oil Recovery

Vortex VY Flowmeter Series

**Steam injection is one of the most effective enhanced oil recovery (EOR) methods, but harsh operating conditions demand reliable, maintenance-free flow measurement solutions.**

## Executive Summary

Accurate steam flow measurement is essential for maximizing oil production, improving energy efficiency, and reducing operational costs in enhanced oil recovery projects. Traditional flow measurement technologies often require complex installations and frequent maintenance, which can lead to costly downtime. **The Vortex Flowmeter VY Series** from Yokogawa offers a robust, high-accuracy solution designed to thrive in extreme environments—making it ideal for demanding oilfield applications like steam injection.



## Application

In many oil fields, especially in mature wells, much of the recoverable oil remains trapped in porous rock. Steam injection—delivered at high pressure and temperature—is a proven method to heat and emulsify trapped hydrocarbons, reducing viscosity and driving oil toward production wells.

This process can significantly increase production rates, often quadrupling daily output. Because steam is injected continuously, reliable, accurate, and low-maintenance flow measurement is critical for ensuring operational efficiency and minimizing energy waste.

## Challenge

Oilfield steam injection systems often operate in **extreme environments**—such as subzero Arctic conditions—with **high-pressure steam lines** (ANSI Class 1500, 1.5" ID or larger). Many traditional flow measurement systems use orifice plates and differential pressure transmitters, which require **heated enclosures** to prevent freezing in impulse lines.

This design not only increases installation and infrastructure costs but also adds multiple potential leak points and frequent maintenance requirements, making operations both expensive and resource-intensive.

## Solution

Yokogawa's **Vortex Flowmeter VY Series** is engineered for durability, accuracy, and simplicity in demanding oil and gas applications:

- **All-in-one inline design** eliminates impulse lines and heated shelters.
- **Wide turndown ratio (up to 30:1)** ensures accurate measurements across variable steam flows.
- **High-temperature and high-pressure capabilities** meet Class 1500 flange standards, with a temperature range from  $-196^{\circ}\text{C}$  to  $+450^{\circ}\text{C}$ .
- **Advanced Spectral Signal Processing (SSP)** technology ensures stable readings, even in environments with strong vibrations.
- **Smart diagnostics and predictive maintenance** features enable condition-based maintenance, reducing unexpected downtime.
- **Future-ready digital communications** with HART, FOUNDATION Fieldbus, and Modbus for seamless integration into control systems.

## Conclusion

For oil producers leveraging steam injection to increase well productivity, the **Vortex Flowmeter VY Series** delivers unmatched reliability, measurement precision, and cost savings. By eliminating the need for impulse lines and heated enclosures, the VY Series not only simplifies system design but also ensures consistent performance in the harshest conditions.

Upgrade your steam injection system with **Yokogawa's VY Series** and experience:

- Higher production efficiency
- Lower lifecycle costs
- Smarter, more resilient flow measurement

## Key Benefits

### How It Helps EOR Operations

- **Lower Installation Costs:** No impulse lines or heated shelters required.
- **Improved Accuracy & Reliability:**  
 $\pm 0.75\%$  accuracy for liquids,  $\pm 1.0\%$  for gas and steam, with minimal drift.
- **Low Pressure Loss:** Reduces process energy consumption and improves overall system efficiency.
- **Rugged, Maintenance-Free Design:** No moving parts; ideal for harsh, remote oil field environments.
- **Diagnostics & Remote Monitoring:** Built-in self-diagnostics support predictive maintenance strategies.
- **Wide Operating Range:** Handles extreme temperatures and pressures for challenging steam service.



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