

# Field Pump Testing

A Proactive Performance-enhancement Tool

*Comprehensive pump testing and analysis identifies reliability issues, prioritizes maintenance schedules*



*New pumps are specified to meet an expected set of performance characteristics. Over time, these performance-related parameters may change, negatively impacting unit operations. Even the most precisely engineered pump will eventually exhibit degraded performance. Identifying and analyzing poorly performing pumps in operation is a critical part of achieving the goals of increased reliability and reduced downtime.*

Utilizing proven assessment procedures and state-of-the-art instrumentation, the Flowserve Pump Improvement Engineer (PIE) team can effectively identify and correct issues related to pump performance and reliability, regardless of OEM. The path to realizing these goals is comprehensive field testing and analysis of operating pumps by Flowserve PIEs.



## Field Testing Benefits

- Use as a maintenance-planning tool by clearly identifying pumps showing early signs of degradation or approaching imminent failure
- Postpone unnecessary time-based maintenance if equipment is operating to near-design expectations
- Determine where a pump is currently operating in proximity to its best efficiency point (BEP), regardless of changing service conditions
- Identify and resolve root cause failure issues related to “bad actor” pumps
- Reduce energy usage of major pumping systems and critical equipment

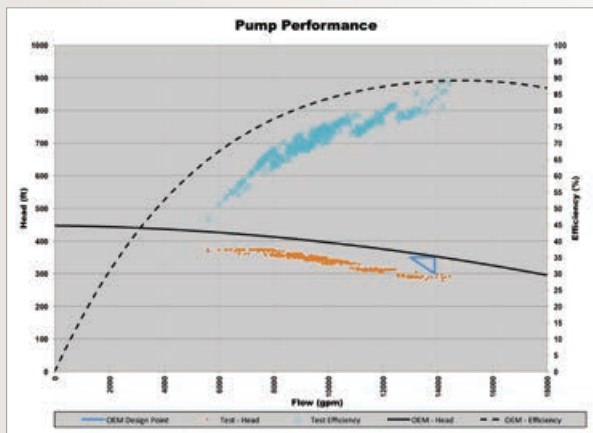
## Field Testing Protocol

- Conducted by highly experienced, independently certified and qualified field engineers, including Level 3 Vibration Institute category or higher.
- Use of minimally invasive testing equipment, with no disruption to process operations
- Deployment of highly accurate and calibrated instrumentation, including multichannel, wireless monitoring devices
- Application of complete analysis tools and field acquisition systems focusing on vibro-elastics (vibration, pressure and noise) engineering data to address pump and rotor dynamics, structural dynamics and acoustic (pressure pulsation) problems
- Clear, concise report identifying deficiencies with corrective action solutions
- Access to Flowserve engineering support to address hydraulic and materials issues, upgrade and repair opportunities

## Getting Technical

### Data Logging Versus Single Point Measurement

Field performance testing and troubleshooting on critical pumps often presents unique and unexpected challenges. When a system is operated at steady state, single point measurements may adequately provide the diagnostic information needed to define the pump and system characteristics. However, pumping systems are often dynamic, with changes in flow, suction and discharge tank levels, valve positions, etc. Even pumps and pumping systems that operate 100 percent of the time at steady state must be started and stopped, creating dynamics within a system which cannot be easily measured with a single point approach. When dynamic data collection and analysis are required, logging capabilities are needed to provide a more complete picture of the pump and system. This may take different forms, whether it is logging static pressure and flow every few seconds with wireless instrumentation; logging multiple accelerometers and dynamic pressure transducers at a sample frequency of 10 000 Hz or more during a system transient; or a combination of the two.

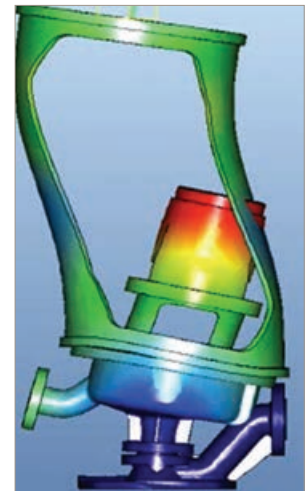


### PIE Capabilities

Flowserve Pump Improvement Engineers have the know-how and tools to maximize pump performance and reliability:

- Basic pump performance testing and data collection, including flow, pressure, temperature, speed and power
- Simultaneous logging of static pressure, flow, speed and temperature, measurements using wireless instrumentation
- Advanced vibration acquisition and diagnostics performed by a Level 3 certified engineer, including:
  - Overall filtered and unfiltered vibration
  - Modal testing with calibrated impact hammers
  - ODS (Operating Deflection Shape) analysis
  - Vibration acquisition during operating transients of speed (i.e., startup, coast down), flow, etc.
  - Temporary installation of proximity probes to measure shaft displacement
- Installation inspection
- Root cause analysis

To learn more about Flowserve pump field testing programs and the unequalled technical capabilities of its PIE team, contact your local Flowserve representative.



Mode shape illustration

Bulletin PS-100-16 (E) June 2014. © 2014 Flowserve Corporation.

#### To find your local Flowserve representative:

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