

# FLUX VIRTUAL FLOW METER

## PRODUCT INFORMATION

Real-time flow rates and true bottomhole pressure at unmatched accuracy

### DEFINED

Accurate information about the flow in your production system enables better and faster decision-making, helps you optimize operations through active adjustment of production from your individual wells, and allows you to detect potential challenges before your production is affected. A Virtual Flow Meter (VFM) is a non-intrusive means to increase the value of existing sensors and unlock insights into the multiphase flow behavior of your assets. Using live sensor data and self-adjusting technology, FLUX VFM ensures a life-of-field valid virtual window into your production systems. The solution provides real-time information, such as individual phase flow rates and true bottomhole pressure at unmatched accuracy.

### BENEFITS

- Access to real-time flow rates
- Accurate predictions through the life of the asset
- Available – insights can be consumed on any surface, e.g., proprietary surveillance dashboards
- Integration – secure connection to proprietary systems
- Non-intrusive – consumes information from existing sensors through data platform/historian
- Low maintenance needs – human intervention practically zero
- Fast to deploy
- Scalable

### FEATURES

- Self-adjusting – automatically updates the underlying models to ensure the most accurate outcome at any time
- Connectivity – securely connects to data platforms, databases, and historians to retrieve sensor and reference data
- REST API – offers 3rd-party applications and dashboards secure access to our cloud-based solutions through a rich interface
- Scenario mode – enables additional workflows on top of FLUX VFM to investigate and optimize different operations

### HYBRID TECHNOLOGY AS FOUNDATION

FLUX VFM is a hybrid technology that combines physics-based, first-principles modeling with machine learning. The solution is self-adjusting and utilize available sensor and reference data to maintain the highest level of accuracy. Provided sufficient model data and good quality sensor data, FLUX VFM targets a maximum full-scale error of 5 to 10% in estimated flow rates. In real-time deployment, FLUX VFM consumes sensor data and operational parameters and delivers real-time phase flow rates.

- FLUX Simulator – a new, fast, and robust transient multiphase flow simulator purpose-built by Turbulent Flux for real-time environments – is the foundation of the physics-based modeling and uses a simulation model to represent the actual production system.
- FLUX Analytics – a toolbox which provides state-of-the-art machine learning and data processing utilities – forms the basis for the machine learning component and input data preprocessing.
- FLUX Optimizer – a multipurpose framework of optimization workflows – caters to predictions always kept valid and reduces the need for maintenance and human intervention to practically zero.

The primary output from FLUX VFM is flow rates. Additional insights such as virtual sensing offers data where sensors are not available or flow stability assessments are facilitated by the FLUX Simulator model. Furthermore, access to a calibrated simulation model enables extensions to scenario simulations. In scenario mode, different operations can be assessed either to understand near-future production if operations are maintained (look-ahead), plan and optimize future operations or potential events (what-if), or retrospectively analyze past operations.

