



Metering for every well

M-Flow's Production Optimization Solution

M-Flow systems increase asset value

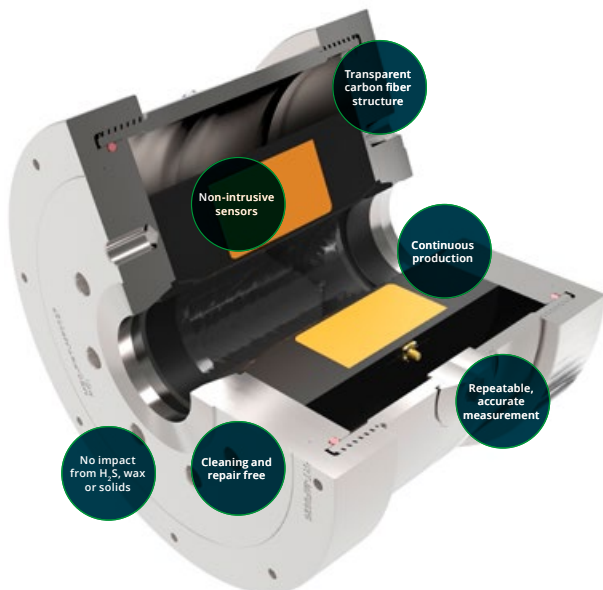
Continual wellhead production monitoring is key to smart field optimization. Shell estimates typical gains of:

- **8% ultimate recovery**
- **10% increased production**

Well by well production data measured directly is key to unlocking this value.

M-Flow delivers wellhead multiphase measurement at:

- **A cost which fits the majority of the onshore market**
- **A reliability footprint targeting a zero intervention lifecycle**



Workscope

The scope covered testing of an M-Flow Multiphase Meter on the flow rig at the National Engineering Laboratory (NEL) in East Kilbride, Scotland.

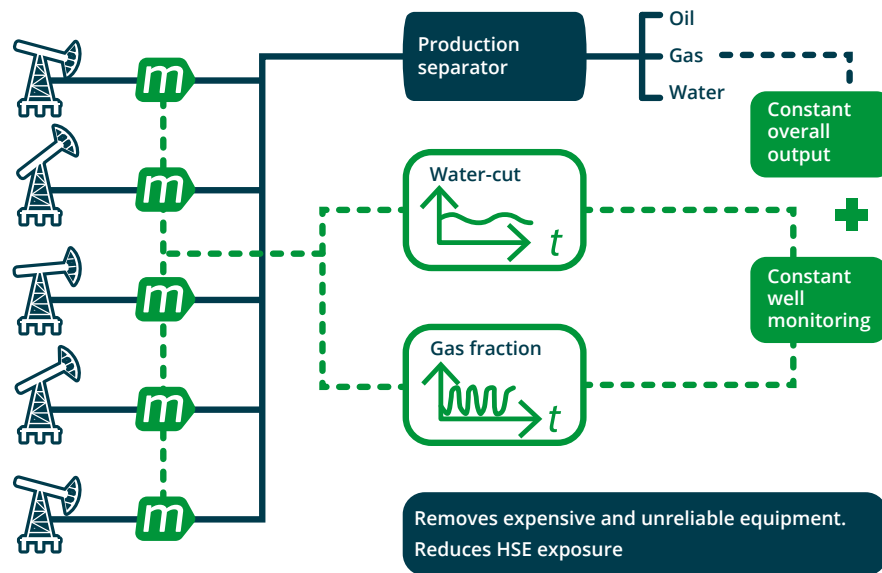
NEL multiphase flow rig testing parameters:
 0–30% water cut;
 0–90% void fraction flows;
 0.15–4.6 m/s superficial liquid velocity.

Objectives

The aim of the testing was to validate the performance of a multiphase meter designed for use with a 3" piping system at the wellhead.

Results Summary

- **+/- 1% absolute uncertainty vs NEL set point**
- **Results are 2x SD to 95% confidence, at > 2m/s SLV**



Analysis and data management of full production profile
 Water cut and GOR changes are a key VFM input

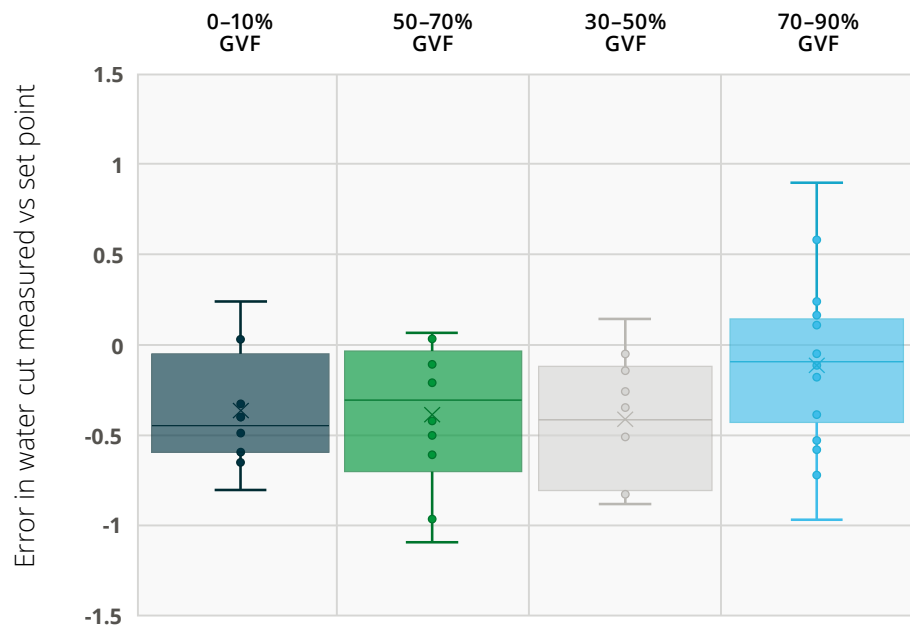
The Smart Oil Field needs the sophisticated measurements M-Flow can provide.

Test results

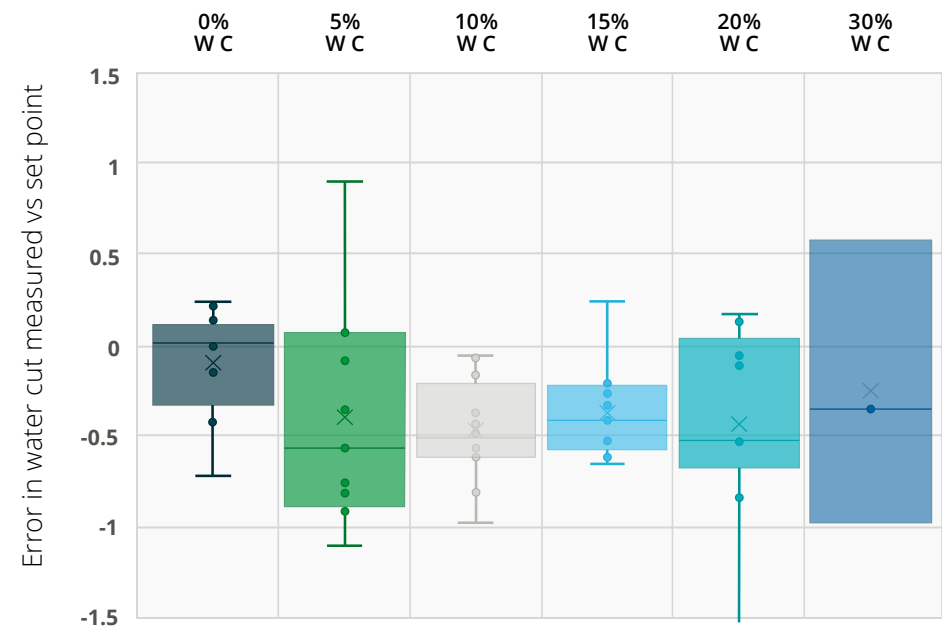
Overall summary of performance

In areas of the test matrix where flow regimes are known to be stable and confidence in set-points is high, the overall performance of the meter rarely strays from +/-1%, to 95% confidence level across a water cut range from 0-30% and gas void fractions of 90%.

Spread of Water Cut Error vs GVF Range for all Water Cut points 0-30%



Spread of Water Cut Error vs Water cut Range for all GVF points 0-86%



* Results for superficial liquid velocities greater than 2 m/s.