

## The perfect solution for wellhead flow measurement with CoriolisMaster, ProcessMaster and VortexMaster

Complete flowmeter instrumentation with a high level of accuracy and low maintenance

Measurement made easy



### The challenge

At most stages during the lifetime of a well, the gas or liquids produced are never pure. Depending on the wellhead, the oil quality, water content or air content differ from well-to-well and from day-to-day.

As a result, measuring wellheads is not easy. Mixtures of oil, water and gas are produced that must be separated into their components.

In the past, mechanical meters and orifice plates were the most common choice for measuring wellheads, especially when measuring liquids.

However, entrained gas frequently damages mechanical meters, resulting in incorrect measurements and ongoing and costly site maintenance visits.

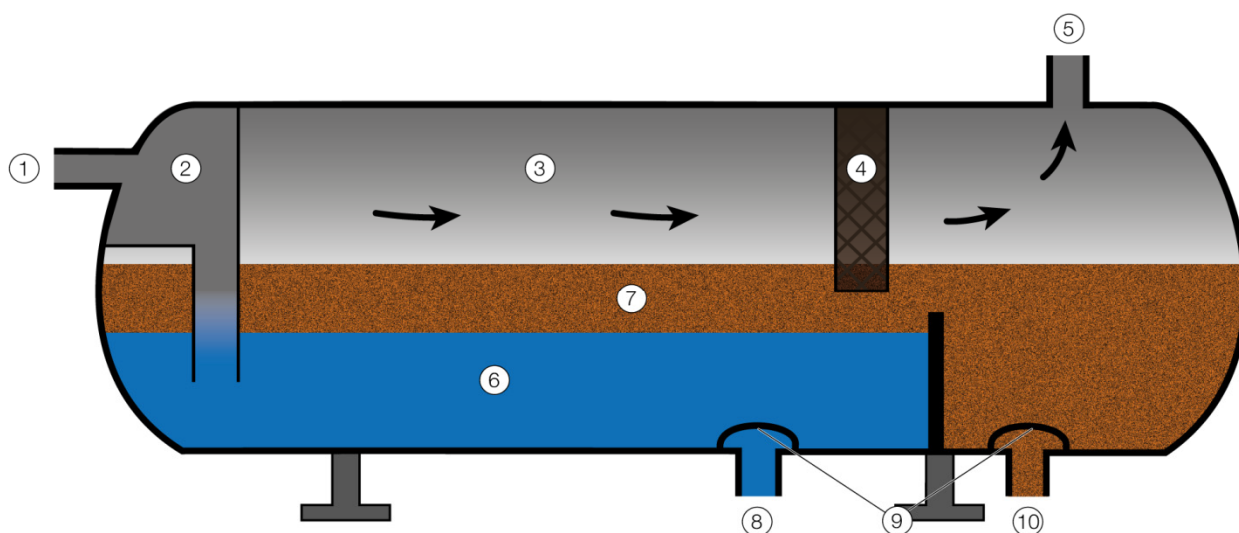
The productivity of the well must be measured but as the conventional method is costly and delivers poor results, there is an obvious need for a less maintenance-intensive and more accurate means of doing so.

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Fig. 1: Separator at the wellhead



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Fig. 2: Schema of a typical oil separator at the wellhead

① Inlet ② Slug catcher ③ Gas ④ Demister ⑤ Gas outlet ⑥ Water ⑦ Oil ⑧ Water outlet ⑨ Vortex breaker ⑩ Oil outlet

## The solution using specific products

### Oil outlet

The ABB CoriolisMaster FCB300 requires almost zero maintenance, as there are no moving parts that can cause wear. Even high percentages of entrained gas do not affect the service life of the meter. In fact, the meter will operate at entrained gas levels of up to 25 %, at which point most other flowmeters fail.

Once correctly installed, the accuracy of the meter can be verified to the highest degree of precision, outperforming conventional meters by far.

The instrument is available in various sizes and with many options.

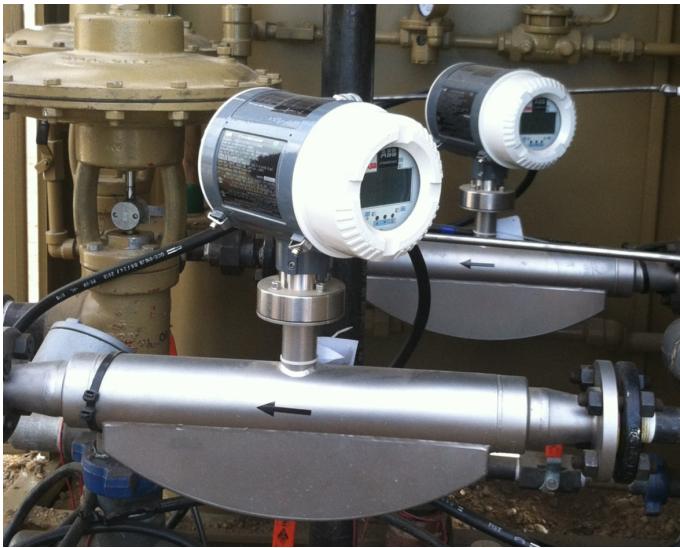


Fig. 3: CoriolisMaster FCB300

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Fig. 4: CoriolisMaster FCM2000-MC2, DN 100

Figs 3 and 4 show the CoriolisMaster FCM2000-MC2 as well as the CoriolisMaster FCB300, which has the benefit of a low pressure drop when used in this application.

Additional features, such as built-in density or concentration measurement, enable in-depth well analysis as well as net-oil or water-cut calculations.



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For both onshore and offshore wellhead applications, a low level of power consumption is often required (typically < 3 watts) and data is transferred via Modbus. For such conditions, ABB offers the CoriolisMaster FCB150, which is made completely of stainless steel.

Two wires for the power supply and two wires for Modbus RTU communication provide the appropriate solution for this application.

Coriolis flowmeters are normally installed at the oil outlet, but can also be used at the water outlet.



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Fig. 5: CoriolisMaster FCB150 with Modbus communication



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Fig. 6: Totalflow XRC 6490 G4, Modbus RTU communication and solar panel for power supply

### Water outlet

Water outlets on the separator can be measured using ABB's ProcessMaster FEP300, an electromagnetic flowmeter that offers low maintenance when used with conductive liquids. The flowmeter is available from pipe size DN 10 up to DN 1000 with any pressure rating, and can be installed in zone 1 or zone 2 (FM class I Div. 1, Div. 2). PTFE is the preferred liner for this kind of application. Accuracy is 0.4 % of the flow rate. For fully enhanced diagnostics including conductivity measurement, ABB offers the ProcessMaster FEP500.



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Fig. 7: ProcessMaster FEP300/500

### Gas outlet

Gas outlets can be measured using ABB's VortexMaster or OriMaster, a differential-pressure flowmeter.

The VortexMaster flowmeter offers low maintenance for gas applications. The flowmeter is available in a wafer design or a flanged meter design. The accuracy of gas measurements is better than 1 % of the flow rate, and the device has a rangeability of 1:15. A meter design made completely of stainless steel is also available if the instrument is installed in an offshore application.

The OriMaster flowmeter is available in a wafer design for all sizes and features a variety of pressure transmitters tailored to each application.



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Fig. 8: VortexMaster FSV400



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Fig. 9: Differential pressure flowmetering of gas

# Notes

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# Contact us

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