

Info sheet: M1001 / rev_12/12

IsoSplit[®] MultiPhase Sampling of gas/condensate and volatile oil reservoirs



IsoSplit[®]

When testing gas/condensate or volatile oil reservoirs, Expro Petrotech recommends the IsoSplit[®] method for isokinetic splitstream sampling upstream of the choke manifold and downstream the test separator. Isokinetic splitstream sampling at the wellhead provides representative well fluid samples. The fluid is closest to the reservoir conditions and dew point, and it has been least affected by phase changes. The sampled fluids will also be in good equilibrium at the wellhead conditions.

When sampling well fluid after the choke manifold, the fluid has been subjected to severe conditional changes, such as high pressure drop and cooling (Joule Thompson effect). This results in a large volume of liquid drop out, and also possible wax and asphaltene drop out. This can be followed by heating in a heat exchanger up to 120 °C. These excessive changes in conditions are not conducive to obtaining good equilibrium and representative sampling of the produced fluids.

In the test separator there is also a temperature and pressure change which will influence the equilibrium compositions of the gas and liquid phases. In this sequence of phase changes (choke, heat exchanger and separator) volatile oil and gas systems create droplets smaller than 2 microns which are too small for separation by standard test separators. The separation vessels in the mini-lab, which are connected upstream of the choke manifold, though of a small scale, provide for a longer residence time (10 - 16 times longer than the test separator) and allow manipulation of pressure and temperature of the sample stream, thus giving better equilibrium and separation conditions.

It is therefore recommended that both PVT and compositional sampling are carried out from the IsoSplit[®] mini-lab which can provide improved equilibrium conditions and higher quality samples than the test separator. The possibility of errors during physical recombination in the PVT laboratory due to differences in the conditioning procedures are also reduced.



Mini-lab sampling provides an independent measurement of GOR which is not influenced by the inherent errors in the gas and liquid phase rate measurements on the test separator.

The test separator GOR will also be influenced by reduced efficiency at higher loads.

The properties of the stabilised liquid from the mini-lab can also be used to follow the well stabilisation. Monitoring the density of produced liquid can give an indication of the relative amounts of retrograde condensation lost in the well.

Gas/condensate reservoirs are saturated with water which drops out during conditional changes. Water accumulated in the test separator can introduce errors in the rate measurements. The mini-lab uses glycol to absorb the produced water and is consequently not affected.

Expro Petrotech[®] will release equipment that can make separat or efficiency measurements on site with the same frequency as the GOR measurements from the mini-lab.

Both IsoSplit[®] isokinetic splitstream sampling at the wellhead and in the separator gas outlet should be used to measure the producing gas/ liquid ratio. They are comparative methods, the wellhead measurement being independent of the test separator.

The isokinetic splitstream sampling in the gas outlet of the test separator provides a correction of the measured separator GOR. It can be used for separator efficiency studies, but will always be influenced by the degree of uncertainty in the separator flow measurements.

A flow-after-flow test starting with increasing and followed by decreasing rates can be used to study liquid loading in the formation.

Samples will be analysed by a laboratory with a good control of their compositional analysis. GC compositions to C10+ is generally sufficient, provided this is supported by detailed Paraffin, Naphthene and Aromatic (PNA) analysis and/or True Boiling Point (TBP) analysis data.

Further information is given in the brochures for IsoSplit® wellhead sampling, IsoSplit® separator sampling and PVT separator sampling. "Nature will reveal its secrets if you know how to ask"



For further information, please contact us at petrotech@exprogroup.com

Expro Petrotech

Kvalamarka 26 N-5514 Haugesund Norway

Tel: +47 52 700 700 Fax: +47 52 700 710

Analytical Data Services UK

Unit 11+12 Brickfield Trading Estate, Brickfield Lane, Chandlers Ford Eastleigh, Hampshire UK SO53 4DR

Phone: +44 2380 275333 Fax: +44 2380 275321

Fluid Sampling & Analysis – UK

Fluid Analysis Centre 2/4 Cremyll Road Reading, Berkshire UK RG1 8NQ

Phone: +44 1189 515 800 Fax: +44 1189 597 399

Fluid Sampling & Analysis – Australia

Expro Group Australia Pty Ltd Level 3 1060 Hay Street, West Perth WA 6005 Australia

Phone: + 61 892 135 555 Fax: +61 892 135 599

Fluid Sampling & Analysis – Malaysia

a.s. Petrotech Knowledge (Malaysia) Sdn. Bhd Level 2 & 3, Wisma Volkswagen 7 Lorong Maarof,59100 Bangsar, Kuala Lumpur Malaysia

Phone: +603 228 20 973 Fax: +603 228 21 098

Fluid Sampling & Analysis – Brazil

Rua R6,10, Novo Cavaleiros, Macae-RJ, Rio de Janeiro CEP: 27933-390 Brazil

Phone: +55 22 2106 4200