Fluids sampling & analysis

EXPRO

Accurate and traceable

Reliable sampling and analysis solutions

The Expro fluids sampling and analysis team defines the reservoir oil and gas properties, essential for well flow management.

The cornerstones of our success are our experienced personnel, innovative equipment and certified sampling and analysis techniques. Our team of sampling engineers, well site chemists, pressure/volume/temperature (PVT) technologists and fluid phase behaviour specialists have provided services for a wide range of customers in 37 countries.

Expro's state-of-the-art equipment for PVT, compositional analysis and analytical chemistry, enable Expro to provide the most comprehensive and quality assured data available to the industry.

Expro is the global leader in the provision of:

- Wellsite open hole sample verification and analysis
- Reservoir fluid sampling
- Rate measurements
- Gas/Liquid ratios (CGR/GOR)
- Analysis of reactive non-hydrocarbon components
- Compositional and PVT analysis
- Flow assurance
- Sulphur speciation
- Sample management

Onsite Services

Wellsite open hole sample verification and analysis

Wireline fluid samples collected during logging operations can offer early characterisation of the reservoir fluid and yield invaluable information to help plan the next stage of the testing or appraisal process.

Expro has designed and constructed mobile laboratory systems to provide objective high quality data which can be used as an independent verification of sample quality, whichever logging vendor is used.

SmartLab™

SmartLab is designed to determine the quality and contamination level of samples retrieved. The system can be tailored to measure as many parameters as possible, detailing hydrocarbons, water and trace elements. We offer our technical knowledge and experience on site to assist the tool operator in securing the best possible fluid sample.

SmartLab provides on-site PVT sample validation and detailed compositional analysis for oil, water and gas.

TurboPVT™

Customers can obtain PVT onsite well fluid analysis service results in as little as eight hours with our TurboPVT service. This is an on-site reservoir fluid analysis service which delivers speedy and accurate PVT data based on a combination of measurements and tuned Equation of State (EOS) predictions. This equipment is compact and is especially cost-effective for operations in remote locations where logistics are challenging.

Reservoir Fluid Sampling Services

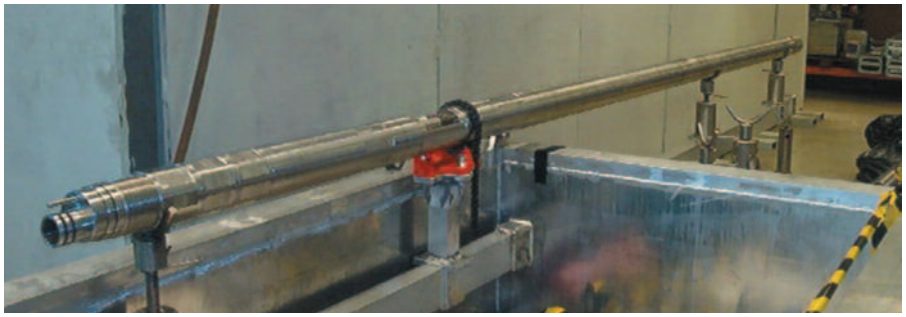
Expro offers a complete range of cased hole reservoir fluid sampling options. Our sampling tools and sample bottles are designed to cope with the extremes of pressure, temperature and the corrosive fluids encountered in deep, sour wells.

Our non-corrosive sample carriers, single phase bottom hole samplers, and surface sampling equipment is state of the art and designed to ensure that representative reservoir fluid samples are obtained. Our PVT experts liaise with the sampling teams to ensure that optimum samples are obtained.

We have a unique sampling capability – particularly for gas condensate systems, where conventional sampling and measurement techniques can leave a high degree of uncertainty in the measured condensate/gas ratio (CGR), increasing the potential for incorrect characterisation of the reservoir fluid.

Our “split stream” well head testing method supplies independent CGR data together with the necessary compositional and phase equilibrium data for feasibility studies and designs for production and transportation of oil and gas.

Well stream analysis is carried out together with practical simulations of processing operations. The testing equipment consists of a test manifold for multiphase sampling and a laboratory allowing condensate/gas ratio measurement followed by hydrocarbon evaluation. Our testing equipment is also suitable for various plant performance tests.



IsoSplit Well-head sampling

We offer wellhead multi-phase sampling and metering for gas/volatile oil reservoirs, as well as online wellhead three-stage process simulations, including PVT sampling.

IsoSplit Separator Sampling

The techniques presently used in the oil and gas industry for the recombination of surface samples to obtain representative well stream compositions rely on correct measurement of oil and gas rates. The efficiency of the test separator deteriorates, however, with high gas loads. This is a consequence of the carry over of dispersed liquid in the gas phase. This carry over is not normally accounted for in the gas/liquid ratio measured for the gas and liquid samples resulting in gas/liquid ratio uncertainty.

By applying the IsoSplit separator sampling technique, representative “wet gas” samples are collected for comparison with the standard PVT gas samples. By comparing the composition of the two samples, a correction factor may be calculated to correct the GOR/ recombination ratio.

PVT Separator Sampling

Expro offers separator PVT sampling as part of the total sampling package. This type of separator sampling is aimed at recreating the reservoir fluid composition by recombining gas and liquid samples using the separator pressure, temperature gas/liquid ratio to determine the amount of gas and liquids going in to the mixture.

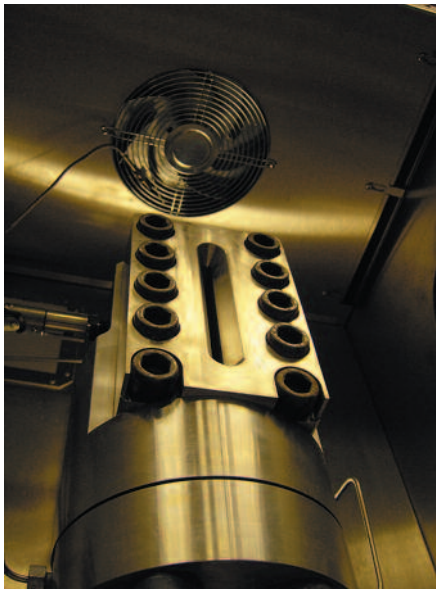
Fluid Analysis Services

The successful development of hydrocarbon reservoirs requires the most accurate analysis of the reservoir fluid that can be obtained. Small measurement errors can scale up in to real-life uncertainties of millions of barrels and hundreds of millions of wasted dollars due to wrongly-specified production facilities.

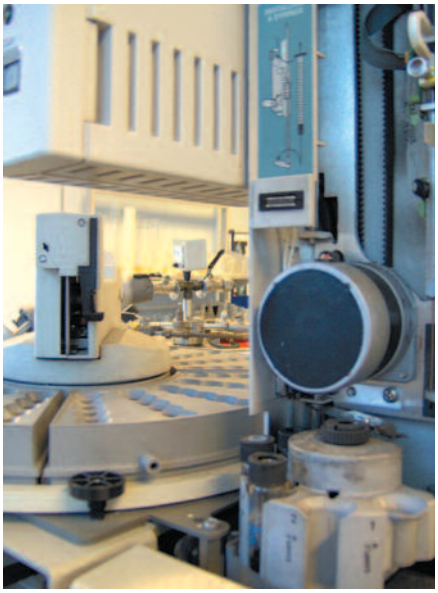
The Expro Fluid Analysis Centre

Expro's Fluid Analysis Centre (FAC) offers specialised fluid sampling, on-site analysis, PVT, flow assurance measurement and interpretation services dedicated to reservoir and process engineering requirements. Rigorous calibration and verification procedures are used and measurements are traceable to national standards.

The Expro Fluid Analysis Centre is accessible from most countries, with large laboratories in the UK and Norway, and satellite facilities in North Africa, Russia, the Middle East and Malaysia – The Expro Gold System.



HTHP PVT cell



A GC autosampler

GOLD System™

Expro's Global Onsite Laboratory Data Systems bring full specification PVT and Compositional Analysis closer to our customers, removing the increasingly onerous requirement to ship samples across national boundaries. These operate as satellite laboratories to Expro's Fluid Analysis Centre, with all instrument calibration and certification carried out to the same rigorous standards, and all data checked and verified by senior FAC personnel.

Expro's GOLD System in action

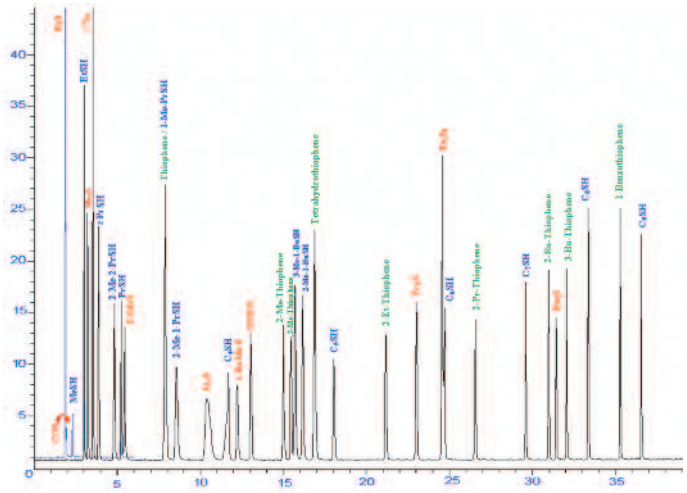
Analytical data services

Expro's analytical data services teams provide detailed high-end analysis of hydrocarbon contaminates such as mercury and sulphur. They also provide some of the highest quality water analysis available to the industry.

Sulphur and Sulphur Speciation

The reactive nature of some sulphur compound presents a real technical challenge to their accurate measurement in hydrocarbon systems. Expro's analytical service team have developed methodologies which allow samples to be collected without danger of degredation. This, together with sophisticated speciation analysis, allows the operator to plan an appropriate mitigation strategy.

Expro's sulphur chemiluminescence chromatographs offer the first sulphur speciation service which can be brought to the wellsite. Thirty six sulphide, mercaptan and thiophene species can be identified and quantified.



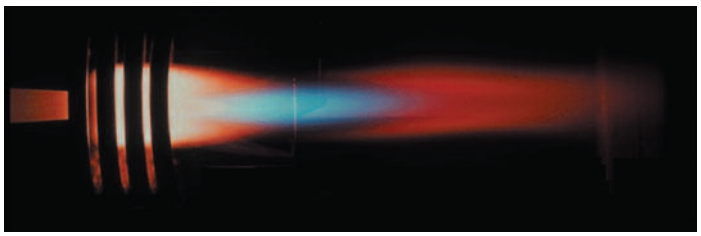
Sulphur chromatogram showing sulphur species

Mercury Analysis

Mercury quantification offers similar technical challenges to those posed by sulphur compounds. Expro's analytical personnel use a variety of methodologies to provide reliable data. As well as measurement during exploration and appraisal well testing, accurate analysis is also required for plant trials and assessing the efficiency of removal units.

Water Analysis

A wide variety of elements in water can be measured using a variety of techniques – including ICP (inductively coupled plasma chromatography) and IC (ion chromatography). Organic acids and physical properties can also be measured.
Expro offers a unique service in that full ion analysis can be measured on minute quantities of water entrained in oil samples.



Spectrometer plasma flame

Sample Management

Expro also offers comprehensive well site to laboratory management of all hydrocarbon, non-hydrocarbon, trace element and water samples. The service range is aimed at securing the highest quality data for facility design related to cost, efficiency, safety and environment. Services and products are provided through a global network of sampling operations and reservoir fluid analysis centres.

Upon receipt of samples at Expro Base, Dyce, all sample containers are cleaned and inspected to check the integrity of the containers. Sample details are collated from the containers and are then inputted (logged on) to Expro's SMS (Sample Management System) database. This assigns a unique sample number to each individual sample and generates a weatherproof label for it. This sample is labelled and then stored in its location, within Expro's licensed facilities.

Expro's business is well flow technologies and specialised services, and our mission is to:

- **measure**
- **improve**
- **control** and
- **process**

flow from high-value oil and gas wells.

Our expertise is marketed through five segments:
Well Testing & Commissioning, Production Systems, Wireline Intervention, Connectors & Measurements and Deepwater Intervention.

For further information on fluid sampling & analysis, please contact us at:
fluids@exprogroup.com

Contacts

Expro fluids analysis centre
2-4 Cremyll Road
Reading
Berkshire, RG1 8NQ

Tel +44 1189 515 800

Expro analytical data services
5 West Links
Tollgate Business Park
Eastleigh
Hampshire
SO53 3TG

Tel +44 23 8027 5333

Expro fluids sampling centre
Kvalamarka 26
Box 575
Kvala
5501 Haugesund
Norway

Tel +47 52 700 700