



EXPRO

WELL FLOW MANAGEMENT™

/ Production



A global leader in fast-track,
cost-effective and enhanced
production solutions.

The production solutions we provide allow our customers
to plan the optimal exploitation of their reservoirs.



Expro has been providing production solutions for 30 years and is recognised as a global leader for the provision of fast-track and cost-effective production facilities.

Our project management capabilities, combined with our market-leading technologies, allow us to assist our customers across the production phase of their wells, from accelerated first oil to mature field production enhancement.

We offer a key range of production solutions, including:

- **Early Production Facilities**
- **Permanent Production Systems**
- **Mobile Offshore Production Units**
- **Production Enhancement packages**
- **Water handling and treatment plants**
- **Seawater injection packages**
- **Gas compression and injection packages**
- **Production testing, including in-line and extended**
- **Fluids metering, sampling and analysis**
- **Flow measurement, including single and multiphase**



What we offer

Early Production Facilities (EPF)

Expro is a global market leader in the supply of fast track, modular production facilities; on either a sale or lease, operate and maintain basis.

Early production facilities and fast-track production systems enable Expro's customers to create early cash flow with minimum cash outlay. They also provide real-time production data that enables our customers to appraise reservoir performance before installing permanent facilities.

Our solutions provide our customers with the ability to bring new developments on stream quickly, ahead of permanent facilities being installed, thus offering compelling financial and operational benefits. In addition, our early production facility solutions can be used for small reserves that would otherwise not meet acceptable risk criteria or would be uneconomic to produce with a permanent facility, thereby the EPF in effect becomes the permanent 'life of field' solution.

Other benefits include:

- Through the experience of Expro PTI's combined team, we have an established track record for delivery of EPF projects in timescales that are unrivalled
- Our engineering excellence and operational reliability optimises operator productivity, sustaining us as a provider of choice
- Our EPF solutions are built around modular, prefabricated equipment with reconfiguration flexibility for production optimisation
- They are operated by experienced personnel, with state-of-the-art control and safety systems, including real-time monitoring and data acquisition services





Mobile Offshore Production Units (MOPU)

Expro, in conjunction with marine partners, offers two types of MOPUs. A static MOPU, utilising a converted jack-up drilling rig, or a floating solution (FPSO), utilising a converted oil tanker. Expro typically provides the top-side process package with the marine partner providing the hull for conversion, including the mooring and export umbilical. Expro has considerable experience in integrating the topsides facility as well as providing operation and maintenance for the life of the contract, thereby providing time and cost benefits for our customers.

Production Enhancement packages

Across the world, production has gone past peak oil. With increasing demand and depleting reserves, every oil company is seeking to maximise production.

In mature oil fields, many wells are no longer producing, i.e. they are idle or producing little oil, not necessarily due to depleting reserves, but due to declining reservoir pressure. Continuous efforts are, therefore, needed to ensure the production from these fields is maximised and the optimum amount of recoverable oil is extracted from these reservoirs.

Production enhancement is an innovative solution that utilises the well unloading concept, using standard well testing equipment. It is unique as it uses existing equipment repackaged as a new solution.

The well unloading packages handle low pressure production, boosting the oil and gas flow rates and processing them for reintroduction into the operator's process plant facilities. Our well unloading packages are flexible and mobile, allowing easy re/deployment. A single unloading package can tie in multiple wells, giving enhanced productivity.

There are distinct advantages of utilising well unloading units. These are:

- Continued production from a well which would not be able to deliver naturally, increased production equals increased revenues
- Ability to tie multiple wells into one well unloading unit, no need for multiple downhole electrical submersible pumps
- Flexibility - can be moved from well to well and platform to platform
- Cost effective - no need to supply a rig or crane barge for any installations



Water handling and treatment plants

Expro water handling and treatment plants meet all global environmental legislation.

We provide for the safe discharge of produced water overboard with oil-in-water levels below regulatory limits or, alternatively, our water handling and treatment plants can allow for the efficient re-injection of produced water back into the reservoir, subject to an injection well being available.

Seawater injection packages

We offer seawater treatment and injection packages for reservoir water flooding purposes that meet all required global environmental standards.

Gas compression and injection packages

As alternatives to gas flaring, Expro can re-compress gas for export, or inject it back in to the reservoir via a gas injection well.

Production testing, including in-line and extended well testing

Typically, EPFs are installed ahead of permanent production facilities. This early production process provides customers with the opportunity to gather data to better understand the reservoir behaviour and flow regime. This allows for appropriate equipment selection for the final design of the permanent facility, thereby avoiding costly mistakes.

Fluids metering, sampling and analysis

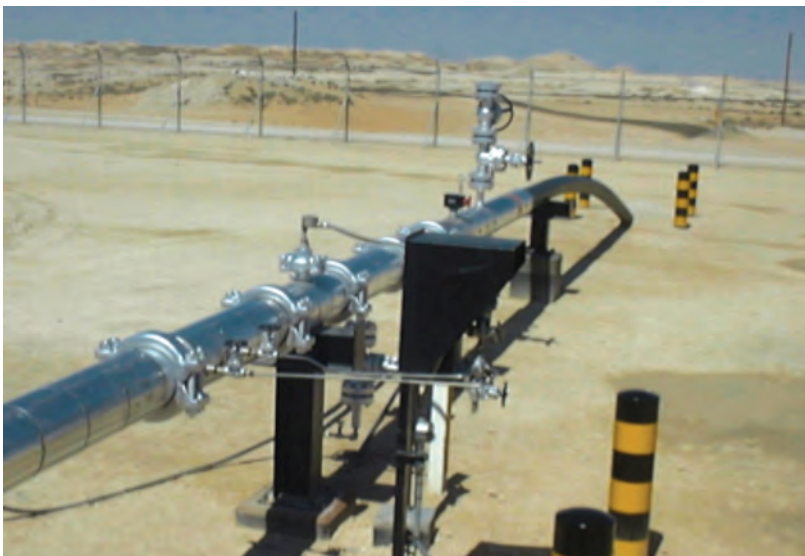
Expro offers a comprehensive range of metering, sampling and analysis of produced fluids.

These services are focused on providing the operator with the information necessary to monitor and optimise production rates and to prevent plant or environmental damage from corrosive and toxic components.

- Wet gas and gas condensate three phase rate measurement - using venturi meter and tracer technologies - for production monitoring, to verify the performance of other metering devices or even to replace test separator measurements.
- Onsite fluids sampling and analysis
- Independently certified produced water analysis
- Independently certified reactive trace component measurements, notably for H₂S and sulphur species, mercury and mercury species, arsine and arsenic species
- Production and process plant surveys - to measure concentration and partitioning of reactive trace components through the process trains, providing a mass balance from inlet to export
- Enhanced oil recovery studies – multi contact and minimum miscibility tests
- CO₂ injection studies
- Fluid compatibility studies – to test for solids deposition potential

We lead the industry in providing:

- **Highest measurement standards**
- **Highest standards of competence, traceability and certification**
- **Best customer service**



Flow measurement, single and multiphase surveillance solutions



Expro Meters offers on-demand, cost-effective, non-intrusive flow meters and measurement services for individual well, flowline and overall field production surveillance.

These solutions enable our customers to realise increased value from their wells and fields through improved production monitoring, optimisation of well performance, increased efficiency and reduced metering costs.

At the heart of Expro's flow measurement offerings is SONAR flow technology, which is embodied in our SONAR meter products: ActiveSONAR™ and PassiveSONAR™.

SonarTest™

Expro Meters provides clients with non-intrusive production testing solutions utilising our proprietary SONAR meters, operated by trained and experienced field engineers and supported by our multi-disciplinary base engineering team. SonarTest complements a programme of conventional well testing by offering a quick, safe, reliable and cost-effective solution for applications requiring periodic wellhead surveillance.

SonarMonitor™

For real-time 24/7 surveillance, clamp-on SONAR flow meters provide an easily installed, cost-effective solution for permanent wellhead monitoring and high value, downstream applications. ActiveSONAR and PassiveSONAR meters feature robust design for long service life. The non-intrusive design enables installation in one day without shutting in the well or process. There is no pressure drop, no potential leak paths to monitor and the widest turn-down ratio of any flow meter.

Single Phase applications

- Gas rate measurement; permanently (SonarMonitor) and periodically (SonarTest)
- Programs of individual gas and water injection well surveillance across the field to enable field-wide reservoir pressure optimisation



- Production enhancement verification – measurement before, during, after Stimulation, Acidizing, Re-perforating, Deliquification, and other production enhancement operations
- CO₂ and H₂S environments
- Pipelines, gas storage, large diameter pipes

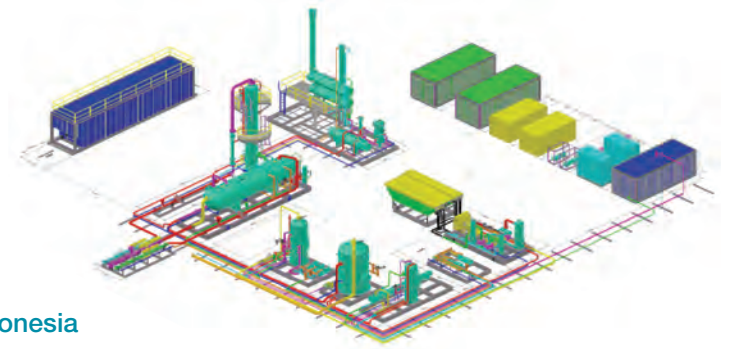
Multiphase applications

Expro has developed the Total Production Surveillance (TPS) system for flow measurement of black oil and gas condensate production wells. It utilises SONAR clamp-on flow metering technology and leverages a combination of PVT models and multiphase flow correlations.

- Multiphase reporting using TPS for under-saturated reservoirs with a known/stable gas/oil ratio (GOR)
- Clamp-on testing to verify electrical submersible pump (ESP) performance
- Gas with inferred liquid rates for condensate/gas ratio (CGR)/water/gas ratio (WGR) trending

Case Studies

Early Production Facilities



Salamander Energy Ltd – Kambuna EPF, Sumatra, Indonesia

Expro PTI undertook early in 2009, the complete turnkey supply of an onshore EPF facility, located at Pakalan Brandan, North Sumatra, Indonesia. The facility was designed as a complete 'standalone' onshore oil and gas processing facility, including oil and gas separation, gas compression, gas dehydration and metering, condensate stabilisation and pumped export via a 20km pipeline, power utilities, firewater system.

The design production rates for the plant are 40 Mmscf/d and 4000 BCPD respectively.

The project was mobilised within 16 weeks from our Batam Yard facility, and was installed, ready for production within 20 weeks overall from contract award.



Expro PTI ongoing services include the complete operational manning for the facility, design and logistic support, utilities, maintenance etc.

All elements of the project were completed wholly by Expro PTI staff, other than pressure vessel fabricators for vessel refurbishment work. No other major contractors were employed on the project.

Production Enhancement

Well unloading for Chevron on various fields throughout Thailand

- Chevron originally identified a number of candidate wells that were unable to flow through the production facilities due to low well flowing pressures.
- By installation of bespoke packages of equipment, including multi-well manifolds, separation equipment and high volume / pressure pumps, Expro PTI was able to flow multiple wells into single unloading packages allowing produced oil to be pumped back into the production line at normal line pressure.
- Expro PTI supports each well unloading package in the field with a full crew of operators and supervisors, providing 24 hour operational coverage and maintenance support.
- The initial contract commenced in 2004 and is currently firm through to 2014.

Expro's mission is **well flow management**. We provide services and products that **measure, improve, control** and **process** flow from high-value oil and gas wells, from exploration and appraisal through to mature field production optimisation and enhancement.

With a specific focus on **offshore, deepwater** and other **technically challenging environments**, we provide a range of mission critical services across **three key areas**:

- Well Test & Appraisal Services
- Subsea, Completion & Intervention Services
- Production Services

Our vision is to be the **market leader** in well flow management, using the industry's best people, to deliver the highest standards of **safety, quality** and **personalised customer service**.

We provide a range of solutions including:

- Exploration & Appraisal Testing
- Subsea Safety Systems
- Drilling & Completion
- Flowback & Clean-up
- Production
- Well Integrity & Intervention

Expro's **40+ years** of experience and innovation empowers the company to offer **tailor-made solutions** for customers across the energy sector. With over 5,400 employees in over 50 countries, Expro offers a **truly global service solution**.

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Production

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Fluids

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- Flow measurement, including single and multiphase

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