



PRODUCTION OPTIMISATION

Delivering downhole solutions through innovation and expertise.

exprogroup.com

The ability to perform cost-effective intervention programmes is critical to ensure that performance is optimised throughout the life of the well. Expro's range of wireline intervention services ensures that the latest tools are always available and our customers are offered the optimal solutions.

Expro's philosophy is rooted in continuous cycle of measurement, intervention and assessment at a field and well level, where Expro ensure the tool string deployed is designed to provide the information required for accurate and confident decision making.

Expro can support throughout the entire lifecycle, from initial design through to eventual abandonment:

- Downhole video monitoring
- Well integrity monitoring
- Production monitoring
- Production optimisation
- Well abandonment

Perforating services

Expro provides a comprehensive range of perforating services that help ensure operational efficiency and safety. Gun systems can be deployed on both electric line, where explosives are initiated by applying power from a surface shooting panel along the conductor cable, or by using Expro's Slickline memory trigger system, which utilises a memory programmable device with built in safety features for applying electrical power remotely downhole for standard slickline operations after a memory correlation run.

Expro has a successful track record in carrying out both surface activated and memory trigger perforating systems and has access to latest gun systems technologies from leading gun and explosive suppliers across the globe.



Tubing punches / cutters

Tubing punches

Expro provides small diameter hollow steel carriers made specifically for perforating circulation holes in tubing or drill pipe, enabling communication between annulus and tubing prior to any tubing cut operation. Large flow areas can be achieved by multiple puncher guns or utilising non-explosive perforating torch from MCR patented technology. Expro holds a global license with MCR to offer non-explosive punch and cut, deployed using either electric line by surface power, or by slickline by memory trigger for operations ranging from 1.5" coil tubing to 9⁵/8 " casing. Expro has four technologies available for tubing cutting:

- Explosive Jet Cutter (can be run on e-line or memory trigger mode)
- Radial Cutting Torch (can be run on e-line or memory trigger mode)
- Downhole Electric cutting Tool (e-line deployed)
- Split Shot Cutter (can be run on e-line or memory trigger mode)



Radial cutting torch (RCT)

The RCT is a patented cutting device from MCR used to sever tubing, casing, drill pipe and coil tubing. The RCT utilises a proprietary mixture of various powdered metals, a torch body and a nozzle section which together, burn like a cutting torch on ignition by the gas generator. The RCT assembly is lowered into the well on e-line, slickline or coil tubing to the desired depth. The RCT is fired through a thermal generator with a resistant coil. The generator creates heat to ignite the main load. Highly energised molten plasma is produced in the torch causing an increase in internal pressure.



Split shot cutter

The Split Shot® Cutter was designed for use where traditional cutters were not effective or could not be used due to size restriction. The Split Shot® Cutter is run in the linear configuration and placed adjacent to any collar or connection. Magnetic positioning devices spring de-centralisers are used to position the cutter against the liner wall. After detonation, the collar or connection is split, allowing the pipe to be freed for easy removal.

Perforating torches (PTS)

The PTS is a patented device from MCR used to punch large holes in tubing, casing, drill pipe and coil tubing. The PTS uses the same technology and principle as used in the Radial Cutting Torch which is highly energised molten plasma.

In the PTS however, the plasma is ejected from either a single vertical nozzle (0 degree phased tool) or two vertical nozzles (180 degree phased tool).

Non-explosive thru – tubing bridge plug

Non-explosive thru-tubing mechanical bridge plugs pass through small restrictions and are set in casing diameters up to 3¹/₂ times their run in diameter. The main features are:

- Run through small restrictions, set in casing and provide positive seal
- Removable via drilling and/or milling
- 100% non-explosive isolation operation using non-explosive setting tool, non-explosive cement plug placement on top of the plug
- Robust bi-directional anchor system
- Up to 3¹/₂": 1" expansion ratio
- Wait-on cement time is the same as for thru-tubing mechanical bridge plug
- The NeoWideRange T-TBP sets in a wide range of casing size

Bridge plug

Expro uses industry recognised bridge plugs from various providers including, Owen Tools Premium and Magna bridge plugs. These can be run on both e-line and slickline. Plugs range in size up to 95/8" casing and the options are available for both explosive and non-explosive activation.

Setting tools include: • Owen Multi-Stage • Owen Compact

- Baker 5, 10 and 20

Kinley perforator

Expro's unique Kinley perforator punches a clean, round hole in the tubing wall, activated by slickline jar action or electrical firing head. The perforator uses a measured amount of gun powder detonated by explosive pellet (primer).

The perforator can be used to punch a single shot circulating hole (0.334" to 0.75"), insert a check valve (up to 1/4") or set orifice (1/32" to 1/2") to enable a cost effective solution for remedial gas lift operations.



Slickline trigger



The Expro Slickline Trigger is a high-integrity, memory based tool, suitable for any remote explosive or non-explosive operation where the operator requires the highest possible degree of safety and control.

Design features ensure safety is not compromised, on surface or downhole, by means of both mechanical switches and electronic safety features of time, pressure and temperature combined with an accelerometer sensor.

The Expro Slickline Trigger can be used to fire any perforating gun, tubing punch, tubing cutter or setting tool on slickline without the need for radio silence.

Applications

Deployment on slickline for:

- Perforating guns
- Tubing punchers
- Tubing cutters
- Bridge plugs

Benefits

- No E-line rig-up required
- Reduced personnel
- Reduced cost and increased efficiencies
- Easier pressure control
- Radio safe

Features

- Micro processor controlled firing sequence
- Hardcoded interlocks for increased safety
- Electronic pressure sensor
- Electronic temperature sensor
- Accelerometer movement detection
- Mechanical pressure and temperature switches for surface safety

Modelling

Conventionally perforated wells still represent the majority of reservoir completions. Optimising the perforating scheme by applying both appropriate technology and modelling techniques can provide insights into significant gains for oil and gas well production.

However, delivering well performance requires a greater degree of focus on the interface between the wellbore and the reservoir.

This is because a significantly large portion of pressure loss occurs around the vicinity of the perforations and near wellbore region. In addition, the performance characteristics of the perforations are impacted by the reservoir rock geomechanics, fluid properties and mud invasion, all of which affect well productivity and/or injectivity.

Optimisation of a perforated completion therefore requires comprehensive knowledge and understanding of the relationships among all influencing factors. It is for this reason we utilise industry leading modelling tools such as PROSPER[™] to carefully design and optimise the perforation scheme in order to achieve the full potential of the well.



