

QUANTUM PERFPAC System

Single-trip perforating and gravel and frac packing

APPLICATIONS

- Cased hole gravel packs and frac packs
- Single and multizone completions
- Vertical to highly deviated wellbores
- Land, shelf, and deepwater wells
- Underbalanced or overbalanced perforating

BENEFITS

- Reduced rig time
- Increased well productivity from reduced formation damage
- Reduced completion fluid costs through minimized fluids loss

FEATURES

- Field-proven perforating, testing, and sand control components
- Big-hole, high-shot-density tubing-conveyed perforating guns
- QUANTUM MAX* or QUANTUM* gravel pack systems, including the fullbore setdown service tool
- Optional system that uses Alternate Path[†] technology, including the MZ Alternate Path system
- Minimized fluids losses and formation damage

The QUANTUM PERFPAC* system is a one-trip perforating and gravel-packing system that combines tubing-conveyed perforating guns, a gravel- or frac-pack treatment, and perforating test tools. The QUANTUM PERFPAC system has been in use since 1993, reducing rig time and fluid loss in hundreds of cased hole sand control wells.

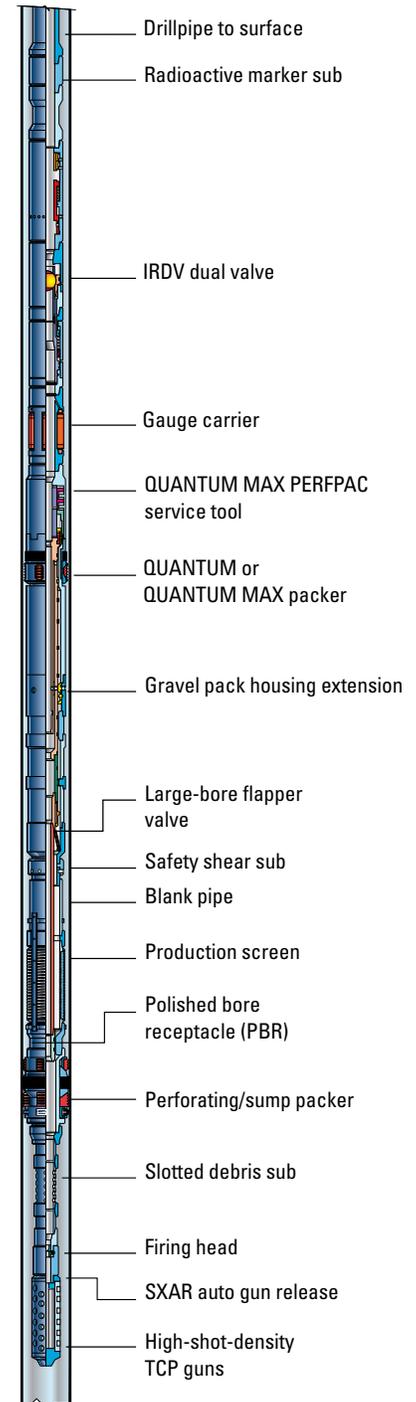
The QUANTUM PERFPAC system combines multiple conventional technologies that work together to provide a robust, versatile method for combining tubing-conveyed perforating (TCP) with sand control operations.

Perforating with high-performance, big-hole perforating charges maximizes wellbore productivity. A variety of firing head systems are readily adapted to the system, including the HDF hydraulic delay firing head, the BHF bar drop hydrostatic firing head, and the eFire* electronic firing head system. Perforating can be performed in overbalanced, underbalanced, or balanced conditions.

The SXAR automatic gun release ensures that the guns are dropped into the rathole at the instant before they fire, eliminating mechanical gun shock to the rest of the QUANTUM PERFPAC assembly and minimizing the risk of stuck guns.

The IRDV* intelligent remote dual valve plays a major role in the success of the QUANTUM PERFPAC system by spotting the cushion and controlling the well during the perforation and clean-up phases. Its unique preset command activates an equalizing and bypass feature when the perforating packer is pulled and moved down below the perforations. This prevents premature setting of the gravel-pack packer caused by pressure fluid surges, and it reduces hydraulic sticking of the perforating packer.

After the perforating, the bottomhole assembly is lowered so that the sand control screens can be placed across the recently perforated interval or intervals. The perforating packer is set mechanically, after which it serves as the sump packer. The QUANTUM MAX or QUANTUM packer is then set, and the service



QUANTUM PERFPAC single-trip perforating and gravel packing system.

QUANTUM PERFPAC



Run bottomhole assembly to perforation depth

Fire guns

Reposition screens across perforations and set packers

Pump gravel pack or frac pack

Produce

tool is released by applying pressure down the workstring. The plug is then dropped into the workstring, enabling the service tool to perform conventional gravel packing or frac packing.

When the gravel-pack or frac-pack operations are completed, the QUANTUM PERFPAC service assembly and washpipe are removed from the wellbore.

The QUANTUM PERFPAC system is an efficient, reliable completion system that can be used in single completions, the lower zone of a stacked completion, or a multizone completion that uses the MZ Alternate Path system.

Rig time is reduced by eliminating the need to remove the perforating tools from the wellbore prior to installing the sand control equipment. The system also minimizes completion fluid losses, especially important with expensive completion fluids. Productivity is maximized by eliminating the need for fluid-loss pills.

QUANTUM PERFPAC system operation.

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