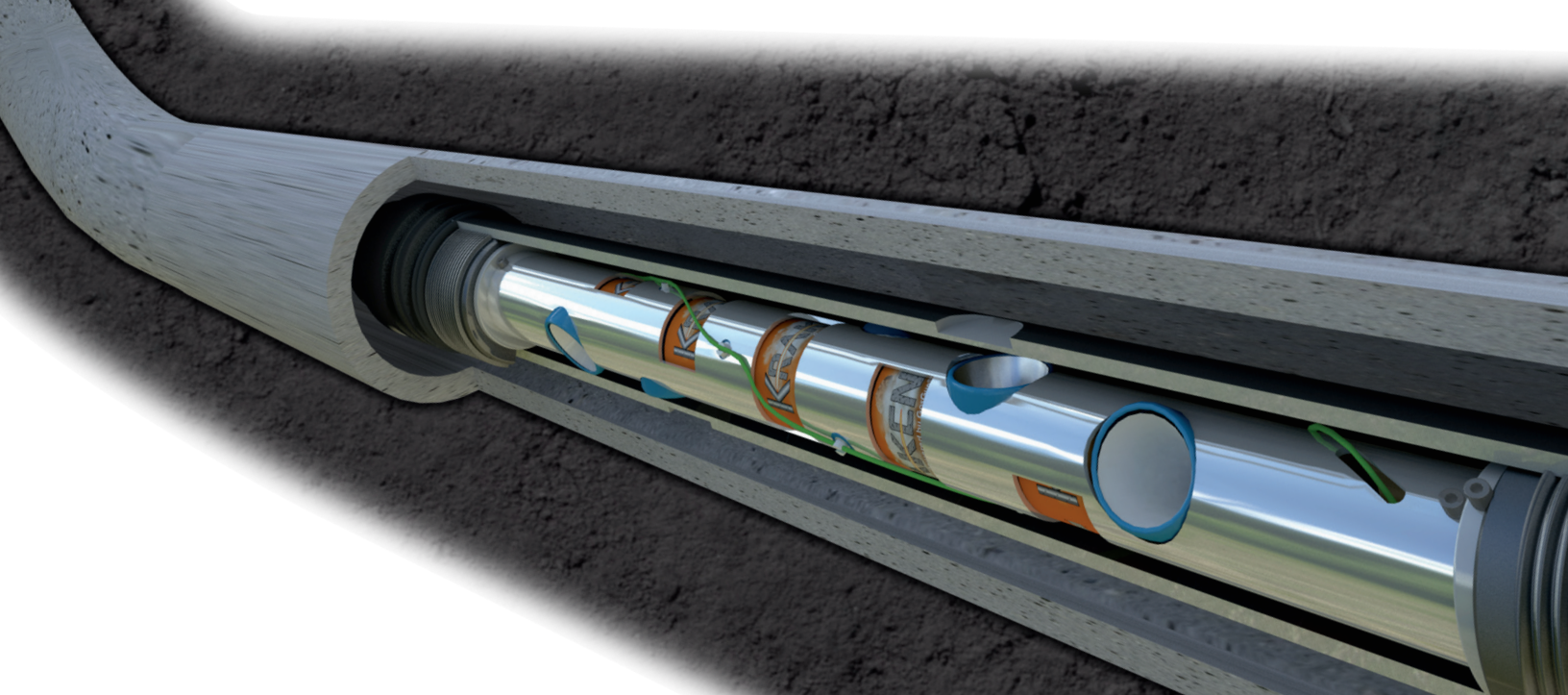
Optimize Plug and Perf

ENHANCED ENERGETICS

	Kraken PnP	Conventional PnP
Improve productivity index	✔✔	✗
Lower breakdown pressure	✔	✗
Increase hydraulic frac efficiency	✔	✗
Eliminate or reduce acid	✔	✗
Complete more stages per day	✔	✗

Optimizing plug-and-perf (PnP) completion performance with Kraken® propellant boosters improves unconventional well profits. Completion engineers recognize that step changes in completion performance are unlikely with conventional shaped charge and gun designs. Integrating Kraken propellant boosters with shaped charges can help extend the technical limit of conventional perforating performance by

- Breaking down every perforation tunnel in advance of pumping operations
- Maximizing pumping rates and minimizing time to achieve rate
- Reducing pumping pressures
- Increasing prop volume, which drives higher production.



Kraken Enhanced Perforating Technology

Kraken technology is a progressively burning, solid propellant designed to increase penetration, eliminate clogged perforations and overcome near-wellbore damage from compaction caused by traditional perforators. Progressively burning Kraken propellant boosters generate high-pressure gas in the perforation tunnels, which creates fractures that improve well connectivity. Engineers who analyze Kraken results by breakdown pressure, initial production or injection increase (IP/II), operating time and safety will observe that the return on incremental investment in enhanced perforating performance routinely exceeds their expectations.

Enhanced Energetics offers a proven propellant-enhanced perforating technology (U.S. Patent 10,024,145 B1) designed to lower total cost of operations and improve profitability of vertical and horizontal producing and injection wells. Kraken® enhanced perforating is significantly more effective than standard perforating at improving completion and recompletion performance in conventional, unconventional and saltwater disposal wells. Standard gun systems and shaped charges can easily be enhanced with Kraken technology to

- Perforate and stimulate in one trip
- Create fractures in every perforation tunnel prior to hydraulic fracturing
- Bypass skin to enhance productivity or injectivity index
- Break down the formation to lower treating pressures and improve rates.

Gun size	2.75, 3.125, 4.0 in. [70, 79, 102 mm]
Typical gun swell	0.22 in. [5.6 mm]
Maximum shot density	6 spf [19 spm]
Maximum pressure	20,000 psi [138 MPa]
1-hr temperature rating*	280°F [138°C]
10-hr temperature rating*	260°F [127°C]

*Exceeding maximum temperature ratings can result in unintentional detonation.

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