

Innovations Streamline Completions

By Colter Cookson

As operators continue to increase lateral lengths and proppant volumes in horizontal wells, they are asking the companies that provide completion equipment and services to deliver products that can work longer and harder. Those companies have answered the call.

At the same time, completion companies say they are refining old ideas and proving new ones to improve safety, efficiency, and production. Their innovations cover every aspect of the completion process, from the proppant itself to perforating and pumping.

Durable Pumps

The Thunder series of pumps from Gardner Denver increases the time between major overhauls from 5,000 to 10,000 hours, reports Greg Hash, the company’s director of engineering. He points out that this brings the pump’s maintenance cycles in line with those of the engine and transmission, minimizing downtime.

“The new pumps increase stroke length from the typical eight inches to 11 inches, meaning that for every rotation of the crankshaft, the plunger travels 11 inches forward and backward instead of eight,” Hash says. “The 37 percent longer stroke lets the pumps deliver the same amount of work at a slower speed, reducing wear and tear on the pump and consumables such as valves, seats and packing.”

The long stroke is one of many factors that contribute to the pump’s durability, Hash says. “By using computer-aided tools, we have come up with designs and geometries that reduce stress on the pump,” he illustrates. “We also developed a coating that is self-lubricating and resists wear and abrasion, extending the life of critical power end components such as bearings and crossheads.”

To minimize downtime associated with maintenance, Hash says Gardner Denver

has made several improvements to the pump’s design. “On the power end, we made access points larger to simplify major overhauls,” he begins. “Rather than using oversized components, we put in normal-size fasteners and bolts so technicians can work with standard hand tools and torque wrenches.

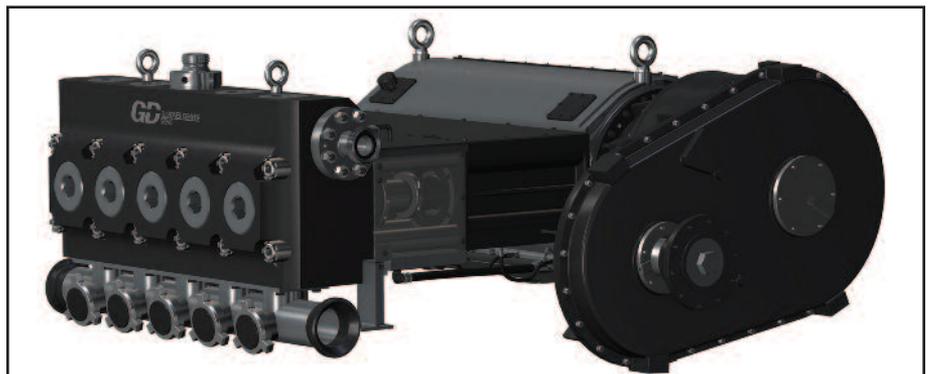
“On the fluid end, which plays a bigger role day-to-day because it houses the consumables, we have deployed a proprietary valve spring retainer configuration that makes it easy to replace valves and seats. The field hand only needs to put the Falcon retainer into the fluid end and turn it 90 degrees to lock it in place. It is obvious when that happens, and it can be confirmed visually, so he does not need to worry about alignment with other components within the fluid end.”

Instead of running the Thunder series at slower speeds than its predecessors, Hash notes that a few customers are maintaining traditional speeds. “That trades some of the cost reduction associated with longer consumable life, but provides greater capacity, which may reduce the number of pumps needed for an application by 20-30 percent,” he explains.

Hash points out that the Thunder series adapts an 11-inch stroke design proven by a series of 3,000-horsepower pumps to a smaller footprint. With the triplex pump weighing 16,000 pounds and the quintuplex bordering on 20,000 pounds, Hash says the pumps work for a wider range of applications, and can be retrofitted onto trailers designed for legacy 2,200-2,500 horsepower pumps.

Gardner Denver has done extensive stress testing on the pumps to verify they perform as computer models predict, Hash assures. “We did 2 million cycles at full rod loads,” he adds. “Pumps traditionally are designed for 1 million full load cycles, but we wanted to run twice as long to confirm the pumps could double maintenance intervals.”

The Thunder series’ triplex and quintuplex models are undergoing field trials in Canada and the Permian Basin, Hash says. “So far, we have gotten great feedback from our partners,” he relays. “They are impressed with the pumps’ efficiency, and ability to minimize stress and vibration. In fact, one customer says the triplex is smoother than any quintuplex he has used, which is a testament to the power end’s construction and design.” □



With its 11-inch stroke, stress-reducing geometry, and high-quality steel components, this Thunder series quintuplex hydraulic fracturing pump from Gardner Denver can go twice as long between overhauls as a traditional design. The company says this durability aligns the pump’s maintenance intervals with those of the trailer’s engine and transmission.