

HAYMAKER

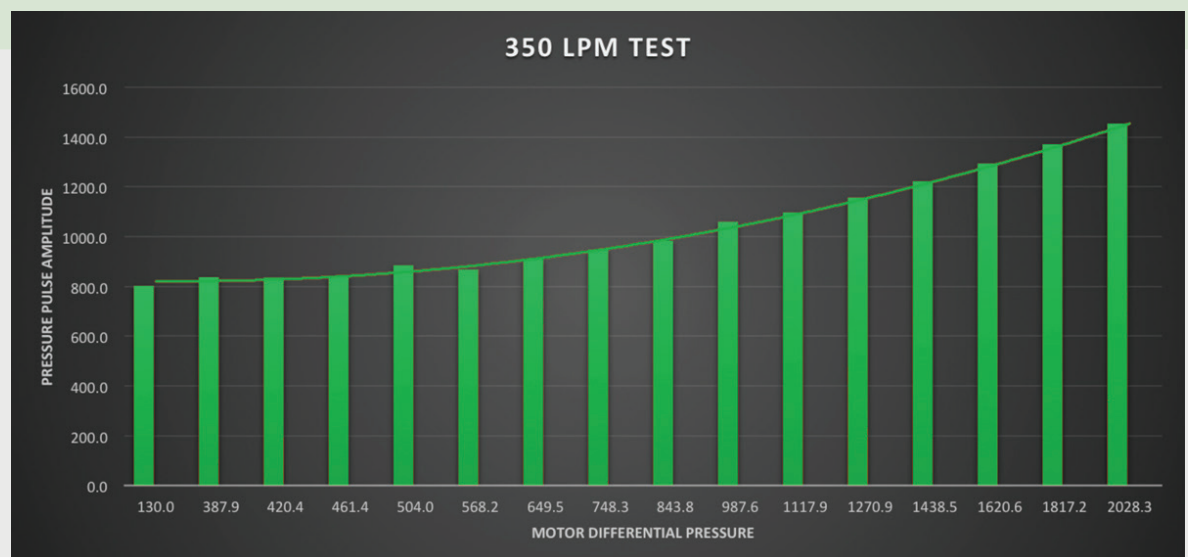
COILED TUBING FRICTION REDUCTION DEVICE



The Haymaker is a coiled tubing friction reduction device that uses a negative pressure pulse to create an axial force at a low frequency. The resulting fluid hammer effect stimulates the coiled tubing to reduce frictional drag. Consequently, target depths are achieved on extended reach wells and valuable time is saved while running in coil tubing and milling out plugs.

KEY POINTS

- Power section and valving system can be tuned to change pressure pulse frequency and magnitude
- Low frequency allows the high amplitude pressure pulse time to act on the coiled tubing effectively
- Fluid hammer effect produces hydraulic pull, improving weight transfer
- Negative pulse valving system improves debris removal
- Can be used with a variety of fluids including N₂



HOW IT WORKS

To achieve maximum tool efficiency, approximately 5%-8% of the fluid being pumped down the coil tubing is vented to the annulus through a nozzle near the bottom of the Toe Tapper. This venting generates a more efficient negative pressure pulse, which produces the fluid hammer effect responsible for breaking friction.

The lower frequency of the tool provides more effective friction reduction as the pulse has more time to act on the coiled tubing. The fluid venting also permits slightly higher pump rates, which in turn improves debris removal and well cleaning.

TECHNICAL SPECIFICATIONS

| Tool Size (OD) | 2.125" (54 mm) | 2.875" (73 mm) | 3.125" (79.28 mm) |
|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Overall Length | 44" (1.12 m) | 58" (1.47 m) | 65.8" (1.67 m) |
| Weight | 27 lbs. (12kg) | 74 lbs. (34 kg) | 98 lbs. (44 kg) |
| Recommended Flow Rate | 0.71-1.43 bpm (110-230 L/min) | 1.2-4.00 bpm (190-630 L/min) | 2.4-5.00 bpm (380-820 L/min) |
| Maximum Operating Temperature | 350°F (175°C) | 350°F (175°C) | 350°F (175°C) |
| Operating Frequency | 4-7 Hz | 5-8 Hz | 5-8 Hz |
| Operational Pressure Drop Generated* | 875-1,550 psi (6,000-10,700 kPa) | 297-2,600 psi (2,050-18,000 kPa) | 700-2,500 psi (4,825-17,200 kPa) |
| Tensile Strength | 20,000 lbs. (89 kN) | 78,000 lbs. (347 kN) | 120,000 lbs. (533 kN) |
| Torsional Strength | 1,695 ft.lbs. (1,250 Nm) | 3,500 ft.lbs. (4,745 Nm) | 3,800 ft.lbs. (5,152 Nm) |
| Connections | 1 1/2" AMMT | 2 3/8" PAC | 2 3/8" REG |

*If there is a pressure limitation, lower pressure tools are available. Please contact sales.

