

Hydraulic Fracturing Case Study

CHANDLER
ENGINEERING
AMETEK

Utilizing Chandler Engineering Pressurized Viscometer to Develop Award-Winning Ultra Frac HT Fluid Technology



Sector

Hydraulic Fracturing /
Pressure Pumping



Organization

CNPC USA and
CPET Downhole



Location

Houston, Texas, USA



Project

Develop HT
Fluid Technology

The Customer

CNPC USA and CPET Downhole were recognized with the 2025 Meritorious Award for Engineering (MEA) Innovation by Hart Energy in the Hydraulic Fracturing / Pressure Pumping category.

The Project

CNPC's award-winning contribution: UltraFrac™ HT Frac Fluid technology, was designed for high-temperature applications up to 230°C (446°F), using a synthetic polymer gel, zirconium crosslinker, and multifunctional additive for stability, friction reduction and clean breaking. CNPC demonstrated industry leading performance and innovation. The team utilized the 5550 Pressurized Viscometer from Chandler Engineering to achieve their goal.



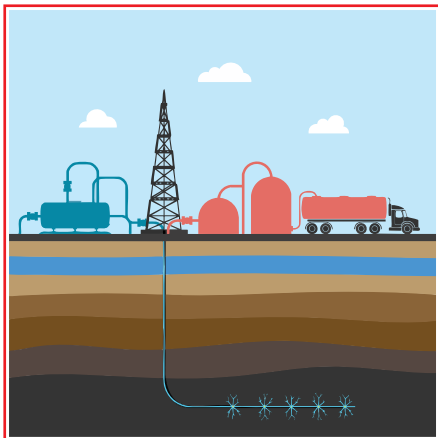
The Challenge

As the United States moves toward a cleaner, more sustainable energy future, the need for reliable, high temperature fluids will grow by the year 2050. The same rigorous fluid analysis and performance validation made possible by the 5550 in oil and gas applications can be directly applied to geothermal development, where thermal stability, efficiency, and reliability are paramount.



The Solution

In both sectors, the ability to engineer and fine-tune fluid systems under true downhole conditions is not just a technical advantage, but a strategic necessity. The 5550 stands as a key enabler of this progress, helping operators maximize performance, mitigate risk and drive innovation.



Hydraulic Fracturing

In modern hydraulic fracturing, fluid systems must balance thermal stability, viscosity control, and efficient proppant transport under some of the harshest well conditions. Chandler Engineering's 5550 pressurized viscometer permits engineers to characterize and fine tune these properties with the same accuracy required for HPHT fluid technologies such as CNPC's award winning UltraFrac.

Performance

Chandler Engineering's 5550 HPHT Rotational Viscometer is capable of replicating both deep oil and gas and geothermal reservoir conditions:

- **Pressures:** Up to 2,000 psi / 13.9 MPa
- **Temperatures:** Up to 500°F (260°C)
- **Controlled Shear & Timed Profiling:** Essential for assessing viscosity, crosslink timing, thermal endurance, and break behavior
- **Shear Rate Range:** 0.17 to 1700 sec⁻¹ (0.1 to 1000 rpm) with standard R1 rotor & bob combination

Oil and Gas Benefits:

- Ensures gel strength and friction reduction at temperatures greater than 230°C.
- Predictable crosslink and break behavior minimize clogging and enhance cleanup.



Geothermal Benefits:

- Geothermal Wells often reach 200 - 300°C; similar rheological demands make the 5550 well-suited for developing heat transfer fluids or completion fluids.
- Advanced fluid design can improve circulation, reduce thermal degradation, and protect well integrity.
- Supports optimization of clean heat exchange fluids, which is critical for minimizing scaling and enhancing efficiency in Enhanced Geothermal Systems (EGS).

Chandler Engineering's equipment is widely used in the industry due to its adherence to API and ISO standards, ensuring high quality and consistent results.

