

TerraTherm™ geothermal water based drilling fluid system

Expertly tailored over 30 years – TerraTherm™ fluid system is carefully designed, stress-tested and validated in the field to withstand extreme temperatures in the world’s most challenging geothermal applications.

Keeping you one step ahead of your Geothermal drilling challenges

TerraTherm™ fluid system offers exceptional flexibility. Designed formulation based upon downhole conditions to combat extreme geothermal challenges. Tailored formulations offer rig site augmentations when dealing with unforeseen challenges keeping you one step ahead of unforeseen conditions like temperature fluctuations, unpredicted changes in lithology to well control events.

TerraTherm WBM Geothermal drilling fluid applications data			
Number of wells drilled	> 240	Average depth drilled	2,050
Max depth achieved	4,628 m	Average Bottom Hole Static Temperature	205 °C
Max Bottom Hole Static Temperature	480 °C	Average days of drilling per well	59 days

The main advantages of TerraTherm system

- Newpark’s proprietary line of geothermal additives help to deliver a unique advantage to our clients allowing fluid customization for their drilling fluid challenges.
- Extreme bottom hole temperatures up to 480 °C encountered in Larderello field, Tuscany Italy
- Additives designed to prevent high temperature gelation in these extreme environments
- Our fluids are designed to withstand the high temperatures affording excellent hole cleaning while mitigating sag prevention
- Full line of lubricants that stand up in these high temperature environments
- Mitigation of HSE risks through or line of corrosion inhibitors and scavengers
- Newpark’s loss prevention software ClearBridge™ affords the customer, industry proven solutions customized for your downhole challenges. The software allows the user the agility to make changes as per real time applications

Rigorous lab testing and digital simulation to assure results



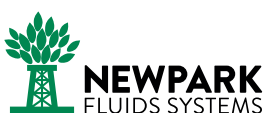
No two geothermal wells are the same. Extensive laboratory testing and modeling in our proprietary ClearTrack™ hydraulic modeling software enables our expert engineers to fine tune our TerraTherm fluid formulation to your exacting specifications. Including modeling of:

- Equivalent static density (ESD) for well control
- Equivalent circulating density (ECD) management in narrow hydraulic windows
- Managed pressure drilling (MPD) applications
- Surge and swab calculations

Lab testing results for critical Bottom Hole Static Temperature

HT WBM fluid properties before hot-roll (BHR) and after 24 hours after static-aging (ASA) at 204 °C (400 °F)

Parameters	Unit	BHR	ASA @ 204 °C for 24 hrs	Rheology profile
Density	sg	1.50	1.50	
pH	-	9.3	8.9	
Rheology Temperature	°F	120	120	
600	Dial reading	77	22	
300	Dial reading	56	17	
200	Dial reading	48	15	
100	Dial reading	37	12	
6	Dial reading	18	9	
3	Dial reading	15	9	
PV	cP	21	5	
YP	lbs/100 ft ²	35	12	
Gels 10"/10'	lbs/100 ft ²	17/44	13/35	
API fluid loss	ml/30 min	3.5	5.0	
Gelation	Visual check	-	None, Fig 1	
Flocculation	Visual check	-	None, Fig 1	
Sag Factor*	-	-	0.515	*Sag Factor = Density Bottom/ (Density Top + Density Bottom)



Contact Newpark fluids specialists for more information
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