Xaminer® Hostile Formation Tester (XHT) Service

OBTAIN FORMATION PRESSURES AND FLUID SAMPLES IN TOUGH ENVIRONMENTS

HOSTILE FORMATION TESTER HISTORY

Obtaining formation pressure measurements and fluid samples in a hostile, high-pressure and/or high-temperature environment is very challenging, but achievable. Collecting accurate pressure data and efficient PVT-quality fluid samples in an efficient manner is an ultimate objective. In the past, Halliburton developed the Hostile Sequential Formation Tester (HSFT™) tool, which enabled pressure measurements and fluid sampling at 400°F (200°C) and 25,000 psi with efficiency not previously seen in the industry and well above the industry standard. Followed by the release of the second-generation Hostile Sequential Formation Tester (HSFT-II™) tool, which enhanced capabilities in more drastic hostile conditions to obtain pressure measurements and fluid samples at 450°F (232°C) and 30,000 psi with the incorporation of dual probes and oval pad options.

XAMINER® HOSTILE FORMATION TESTER (XHT) AND PVT SAMPLING

Building on previous successes and reliability of the HSFT and HSFT-II platforms, which have completed thousands of efficient operations, the XHT formation tester was designed and developed to enable enhanced pressure transients and improved PVT sampling in hostile environments of up to 450°F (232°C) and 30,000 psi.

ADVANTAGES OF XHT FORMATION TESTER

The XHT formation tester acquires formation pressures with variable pretest volumes and drawdown rates enabling the user to take an unlimited number of tests with full control of each individual test. The XHT tool allows the flow of fluids from the reservoir using a superiorly designed flow control pump, with pumping rates ranging from 0.5 to 25 cc/sec and pump pressure differential of up to 10,000 psi. The high-horsepower pump allows the formation fluid to be pumped for extended periods of time enabling faster cleanup and PVT sampling into the 450-cc PVT sample chambers, which can be configured for either zero-shock standard PVT and N₂ compensated.

This new XHT formation tester tool is designed with two options:
- **Dual Probe**: This may operate simultaneously or individually, allowing fluid intake redundancy and pressure anisotropy detection.
- **Oval Pad**: Great for laminated low-permeability reservoirs with a greater fluid flow area for both pressure measurements and faster fluid sampling.

At our Material Test Laboratory, the XHT formation tester tool has passed extensive testing and qualification benchmarks to meet the challenging operations environments, including pumping for extended periods of time at pressure and temperature of up to 450°F (232°C) and 30,000 psi.

XHT MEASUREMENTS

- Formation pressure using quartz gauge and variable volume pretest chambers
- Anisotropy using the dual probe measuring interference between the probes spaced 6 inches apart
- Fluid bubblepoint and compressibility at any stage of the pumping process enables fluid cleanup to be monitored and such important fluid property to be measured
- Formation fluid temperature measured as the fluid flows into the tool probe section
**Xaminer® Hostile Formation Tester (XHT) Specifications**

### Dimensions and Ratings

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric/Unit</th>
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</thead>
<tbody>
<tr>
<td>Maximum Temperature</td>
<td>450°F (232°C)</td>
</tr>
<tr>
<td>Maximum OD</td>
<td>4¼ in. at Pump</td>
</tr>
<tr>
<td></td>
<td>Tool OD 3¼ to 4¼ in.</td>
</tr>
<tr>
<td>Maximum Pressure</td>
<td>30,000 psi (207 Mpa)</td>
</tr>
<tr>
<td>Weight</td>
<td>1,458.7 lb (661.6 kg) Variable PT</td>
</tr>
<tr>
<td></td>
<td>1,943.3 lb (881.4 kg) 6 PVT Samples</td>
</tr>
<tr>
<td>Length (Makeup)</td>
<td>56.4 ft (17.2 m) Variable PT</td>
</tr>
<tr>
<td></td>
<td>71.37 ft (21.75 m) 6 PVT Samples</td>
</tr>
<tr>
<td>Min/Max Hole Size</td>
<td>5¼ to 12¼ in.</td>
</tr>
</tbody>
</table>

### Borehole Conditions

- **Borehole Fluids**: Salt, Fresh, Oil, Air
- **Recommended Maximum Logging Speed**: Stationary
- **Tool Positioning**: Centralized, Eccentralized

### Probe Section

- **Probes**: 2
- **Probe Vertical Spacing**: 6 in.
- **Snorkel Cleaning**: Each Set
- **Probe Operation Options**: Single, Dual, Oval
- **Diameter at Dual Probe**: 3.62 in.
- **Pretest Fixed**: 2 x 12 cc @ 10,000 psi, 2 x 7 cc @ 20,000 psi
- **Quartz Pressure Gauges**:
  - **Precision**: ± 0.02% of Full Scale
  - **Resolution**: ± 0.01 psi (0.07 kps)
  - **Accuracy**: ± 1 psi (6.89 kps)

### Versatile Pretest Section

- **Variable Pretest Volume**: 0.5 to 273 cc (10,000) 1 to 681 cc (4,000)
- **Variable Pretest Rate**: 0.5 to 10 cc/sec (10,000) 1 to 25 cc/sec (4,000) @ 500 psi
- **Pretest per Station Number of Pretests**: Unlimited
- **Pretest Control**: Surface Control

### Pump Section

- **Pump Rate @ 500-psi Differential Displacement**: 0.5 to 10 cc/sec (10,000) 1 to 25 cc/sec (4,000) Variable
- **Pump Control**: Surface Control
- **Pump Pressure Monitored**: Inlet and Outlet Pressure
- **Hydraulic Oil Cooling**: Yes

### Sample Chambers Section

- **Volume**: 450 cc
- **Chamber Type**: Standard PVT and N₂ Compensated
- **Chambers per Section**: 3
- **Maximum Number of Chamber Sections**: 3
- **Zero Shock**: Yes
- **Overpressure**: Max Pump Differential (Limit 34,000 psi)

### Fluid Identification

- **Bubblepoint**: Pressure vs. Volume Inflection
- **Fluid Compressibility**: 1/psi
- **Fluid Temperature Sensor**: Monitoring Changes in Temperature while Pumping

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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