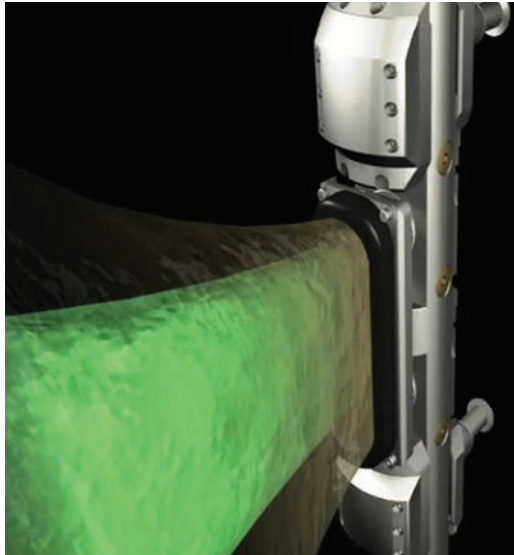


Innovative Halliburton Oval Focused Pad helped operator obtain cleaner samples faster

Unique dual flow sections of Reservoir Description Tool (RDT™) tester with Oval Focused Pad helped obtain clean samples in half the time



OVERVIEW

Operators want the cleanest formation fluid samples in the most efficient manner possible. However, depending on the tool design and the formation characteristics, these tests can be time-consuming.

While collecting fluid samples from an offshore well for a major operator in Brazil, Halliburton recommended using its new Reservoir Description Tool (RDT™) tester with Oval Focused Pad. The Oval Focused Pad tester has a larger contact area than any other focused probe in the industry and separates fluid samples into two sections while pumping. This enables the tool to filter out mud filtrate contamination and obtain a cleaner sample faster than other tools. The RDT tester with Oval Focused Pad obtained clean samples from the formation in just an hour and a half — rather than the expected three hours. The samples taken from clean side of the oval focused pad had contamination levels as low as only 1.3 percent, proving the effectiveness of the tool.

CHALLENGE	SOLUTION
<p>Reduce pump-out time</p> <p>The operator wanted to obtain these samples as quickly as possible. Although sampling time varies between sample stations and formations, conventional sampling in this offshore well took three hours in one sampling station.</p>	<p>Dual flow sections provided clean sample in half the time</p> <p>The RDT tester with Oval Focused Pad divides fluids into two sections. The system discards contaminated fluids in the outer section and captures cleaner fluids in the inner section. Halliburton showed that this technology could cut sampling time in half for this job.</p>
<p>Unknown formation permeability and fluid viscosity</p> <p>Varying formation permeability and fluid viscosities affect the pumping rate of testers. Lower permeability formations or higher fluid viscosities require slower pump rates than higher permeability formations. Many formation testers are not designed to pump faster in highly permeable formations.</p>	<p>Widest variation of pumping rates in the market</p> <p>The RDT tester has both the slowest and fastest pumping rates in the market, allowing for total flow rates from 0.2 – 90 cc/sec that are matched to reservoir conditions. In this highly permeable formation, Halliburton could pump at higher rates for faster results.</p>
<p>Obtain cleanest sample possible</p> <p>The operator sought the cleanest fluid samples possible, with less than two percent contamination. It also needed accurate readings of fluid density and resistivity and real-time contamination analysis during testing.</p>	<p>Sensors helped obtain cleaner sample</p> <p>Halliburton used its Fluid Identification (FLID) sensor, which combines high-resolution fluid density, fluid resistivity and capacitance in one tool. The RDT Oval Focused Pad tester used FLID sensors in each section, providing real-time contamination analysis to guarantee the cleanest sample possible.</p>

LARGER FASTER CLEANER

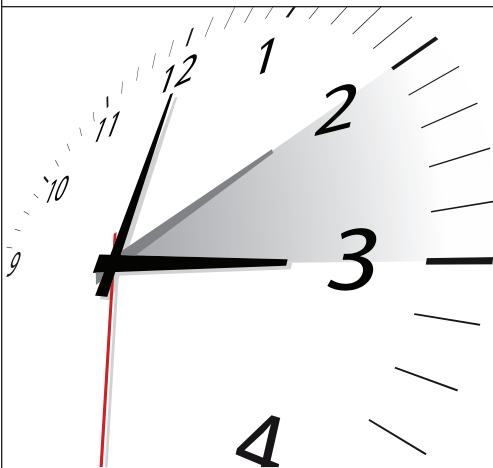
The RDT tester with Oval Focused Pad combines focused probe technology with the 7 1/4-inch oval pad (7 1/4-inches between the ports, 9-inches total). This provides a larger, faster and cleaner sample than any other tool on the market.

Halliburton delivered formation fluid samples with only 1.3 percent contamination as it conducted formation evaluation on an offshore well in Brazil.

LESS THAN
20%
contamination

FASTEST PUMP ON THE MARKET

The RDT tester has both the slowest and fastest rates in the market, so it can be used in formations with both high and low permeability. The flow rate of the inner and outer sections can each be varied from 0.1 to 45 cc per second independently, optimizing flow rates for reservoir conditions.



ZERO LOST TIME DUE TO SAFETY INCIDENTS

Halliburton showed the operator the RDT tester with Oval Focused Pad could obtain a clean sample in half the time. Instead of three hours to collect a clean sample in this formation with a standard Oval Pad, only an hour and a half was needed with the RDT tester with Oval Focused Pad.

Unique dual flow sections of the Halliburton Reservoir Description Tool (RDT™) tester with Oval Focused Pad helped obtain clean samples in half the time



Dual Probe



Oval Pad



Oval Focused Pad

Search for more efficient way to get cleaner fluid samples

Reservoir testing and fluid sampling provide key information to determine reservoir volume, expected production, and other critical information that can aid in formation evaluation. Operators want the cleanest formation fluid samples possible, but also want these samples as quickly as possible.

Halliburton demonstrated latest Oval Focused Pad technology

While planning a fluid sampling job for a major operator in Brazil, Halliburton recommended its Reservoir Descriptions Tool (RDT™) tester with Oval Focused Pad to collect these samples. Halliburton wanted to demonstrate the speed the Oval Focused Pad tester could obtain uncontaminated samples. This unique technology combines the RDT focused probe tester with Oval Pad geometry to help deliver clean formation fluid samples in less time with fewer sanding issues. The operator agreed to this demonstration and used the tester for two sampling stations on an offshore well.

Dual flow paths of tester helped obtain faster, cleaner samples

The operator needed fluid samples with less than five percent contamination and wanted to filter produced solids to mitigate risk of an abbreviated sampling job. To reach that goal in this offshore well would have taken three hours with a standard Oval Pad and even longer with the regular probe present in most tools. However, the design of the RDT tester with Oval Focused Pad helps to provide these uncontaminated samples faster than other tools.

The 7 1/4-inch Oval Pad creates a larger contact area than other probes, enabling faster pump rates through a larger flow path. The RDT tester with Oval Focused Pad also has dual flow sections. Fluids are pumped into the inner and outer sections, with the more contaminated fluids discarded in the outer section and the cleaner fluids captured in the inner section for analysis.

Halliburton also used its unique Fluid Identification sensor, which combines high-resolution fluid density, fluid resistivity and capacitance in one tool and provides real-time analysis. The FLID sensor in the clean side showed that the fluid reached five percent contamination in about half the time the outer section took to reach the same condition. By the end of the pump out, the samples taken from the inner section had contamination levels as low as 1.3 percent while the outer section sample taken at the same moment presented the expected five percent contamination.

Unique dual flow sections of the Halliburton Reservoir Description Tool (RDT™) tester with Oval Focused Pad helped obtain clean samples in half the time



RDT tester pumped at fastest rate in market

Another advantage of the RDT tester with Oval Focused Pad is its unique pumping ability. The RDT tester with Oval Focused Pad has both the slowest and fastest rates in the market. This is key when formation permeability is unknown. Lower permeability formations require slower pumping rates, which most tools can handle. However, in highly permeable formations, most tools can't switch to a higher pumping rate. The RDT tester with Oval Focused Pad can deliver a combined flow rate of 0.2 cc per second to 90 cc per second.

The advantage of the RDT with Oval Focused Pad tester for this job was that its larger area allowed the pumps to work at higher rates with a reasonable drawdown of 1200 psi. This condition made it possible for Halliburton to flush 292 liters from the formation in 3.25 hours, a pump rate of 90 liters per hour.



Halliburton proved speed and reliability of Oval Focused Pad

Halliburton successfully collected samples with the RDT tester with Oval Focused Pad, proving the benefits by delivering samples with less than two percent contamination in just an hour and a half. Because of these impressive results, the operator is including the RDT tester with Oval Focused Pad in its wireline program on future wells.

