

ARMADA® FLUID SAMPLING SYSTEM

Accurate Fluid Sampling in Normal to Hostile Cased Hole Environments



At the heart of Halliburton
is well testing.

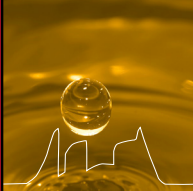
Solving challenges.™

HALLIBURTON

Testing & Subsea

ARMADA[®] FLUID SAMPLING SYSTEM

*Accurate fluid sampling for normal
to hostile cased hole environments*



A Revolutionary Advance in Fluid Sampling

Tubing Conveyed Carrier for Downhole Fluid Sampling

The need for accurate fluid sampling in cased-hole environments led Halliburton to develop the Armada® Fluid Sampling System. This tubing conveyed system collects more fluid from more hostile conditions than any other available tool. And it does it all while eliminating several complications that can cause non-productive time (NPT).

Designed to Operate in Hostile Environments

Halliburton designed Armada for high pressure, high temperature conditions. It operates for extended periods at 20,000 psi at 400°F on coiled tubing. The tubing creates a stable platform for sampling in high-pressure wells.

The ceramic coating of the samplers prevents the absorption of toxic elements like H2S that could corrode the samplers over time. If H2S were absorbed into metal, it could skew sample results.

Flexible triggering of up to nine samplers

Up to nine ceramic coated Inconel® samplers collect a total of 3.6L of fluid, which allows extensive testing and improves confidence in sample accuracy. The individual samplers can be triggered in three groups by annulus pressure or acoustic signals. This enables the tool to gather samples from three different flow rates.

Once the fluid is obtained, a nitrogen piston is used to maintain sample pressure during recovery. This pressure allows monophasic sampling and ensures that the fluid is an accurate representation of downhole conditions.

Because a common nitrogen source is used to pressurize all samplers, recovery pressure can be increased by reducing the number of samples taken, if necessary.

Enabling Accurate Planning

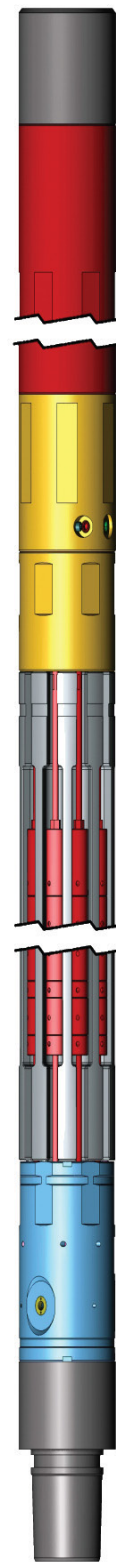
Using Armada, operators can capture a precise representation of well fluids. This gives you accurate data to make decisions about wellbore placement, pipeline investment and production platforms.



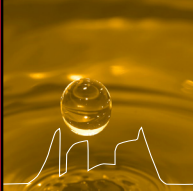
Available in Two Configurations
Both the 5- and 7-inch configuration of Armada utilize a common nitrogen source to pressurize samples

Success Story

At one West African offshore well, the operator was concerned that chemical mitigation could affect samples. To improve the accuracy of samples, the operator ran two Armada® carriers, along with several other carriers, to collect a total of 30 samples over eight days. Despite the length of the operation, 29 of the 30 samples were successfully obtained.



5 Inch Configuration

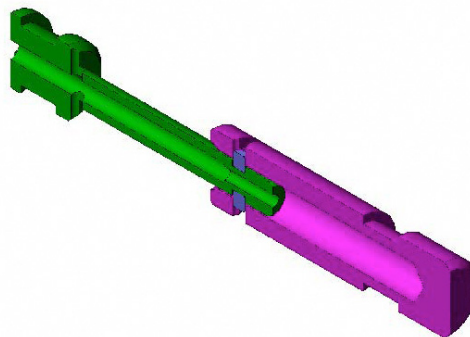


Pre-Assembled and Pressure Tested

Before Armada is shipped, it's completely assembled and pressure tested at Halliburton. Once it arrives, it only needs to be charged with nitrogen before it's ready to use. This improves personnel safety and reduces non-productive time (NPT).

Prompt Feedback Verifies Sampling Success

As soon as the Armada system is retrieved, it can be checked to ensure that samples were successfully gathered. Personnel can use a Gauss meter to determine how many samples were taken. They can also check the pressure of the nitrogen section to quickly confirm the number of samples recovered.

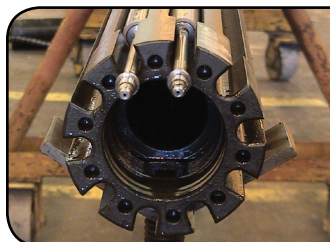


Junk Chamber Isolates Contaminated Fluid
A special chamber collects and isolates the initial surge of fluid that's often contaminated with debris. This helps ensure that the sample is free of contaminants, and greatly improves the reliability and accuracy of the test results.

ARMADA® FLUID SAMPLING SYSTEM SPECIFICATIONS		
Carrier Version	5 Inch	7 Inch
Carrier Length	384 in.	224 in.
Carrier Weight	1,137 lbs.	1,025 lbs.
Carrier OD	5.375 in.	7.03 in.
Max. Allowed Surface Nitrogen Charge Pressure	11,500 psi	15,000 psi
Connections to Tool String	3.875 CAS Box X Pin	5.25 CAS Box X Pin
Maximum Working Temperature	400°F (204°C)	400°F (204°C)
Configuration	Up to nine samplers and one gauge set	Up to nine samplers and one gauge set

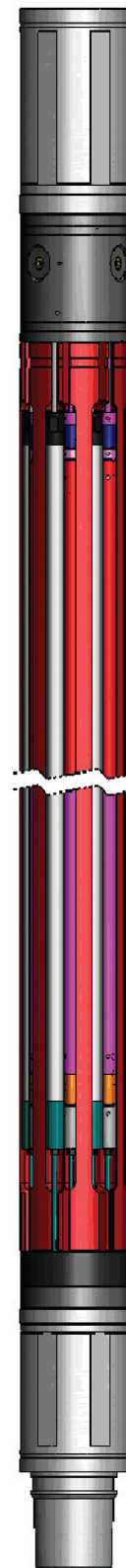
ARMADA® CERAMIC-COATED INCONEL® SAMPLERS	
Sampler Length	186.5 in.
Sampler Weight	36.5 lbs.
Sampler OD	1 in.
Sampler Volume	400 cc
Maximum Working Pressure	20,000 psi
Maximum Working Temperature	400°F (204°C)

Inconel is a registered trademark of Special Metals Corporation and Huntington Alloys.




Smooth Bore Prevents Hang-Ups With Other Tools

The interior of Armada is a completely smooth bore. This allows operators to run intervention tools through the system without fear of damaging the samplers.



7 Inch Configuration



Partner confidently with Halliburton because as we continue our leadership with proven, comprehensive, fit-for-purpose well test solutions that are designed specifically for you to assess the financial health of your reservoirs, we've always been well testing. We'll always be well testing. At the heart of Halliburton is well testing.

Armada[®]

Fluid Sampling System

www.halliburton.com

Sales of Halliburton products and services will be in accord solely with the terms and conditions in the contract between Halliburton and the customer that is applicable to the sale.

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H07824 07/11

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