

# Xaminer<sup>®</sup> Magnetic Resonance (XMR<sup>™</sup>) Service

## HIGH-RESOLUTION, HIGH-EFFICIENCY, NEW NMR TECHNOLOGY

### OVERVIEW

The Halliburton Xaminer<sup>®</sup> MR (XMR<sup>™</sup>) service is a true new-generation magnetic resonance technology, engineered to provide excellent bed resolution and evaluate your reservoir's full range of pore sizes from micro to macro. The XMR sensor provides full MR solutions for basic-to-advanced formation evaluation requirements.

Vertical resolution in thin beds, carbonates, and organic shales is greatly improved over previous magnetic resonance (MR) sensors with a short antenna aperture. Industry-leading pore-size characterization for micropores is achieved from a very fast interecho spacing.

### Simultaneous Multi-Acquisition Logging

Best-in-class magnetic resonance answer products are derived from 2D and 3D solutions, which integrate seamlessly into multisensor answer products, including ShaleXpert<sup>™</sup>, TurbiditeXpert<sup>™</sup>, CarbonateXpert<sup>™</sup>, and TightGasXpert<sup>™</sup> services.

Direct reservoir-quality assessment is provided from fractionalizing the total MR fluid-filled porosity into components of microporosity, capillary-bound fluids, and moveable fluid volume. A continuous permeability estimate is available from multiple methods (Coates, logarithmic mean, and Swanson).

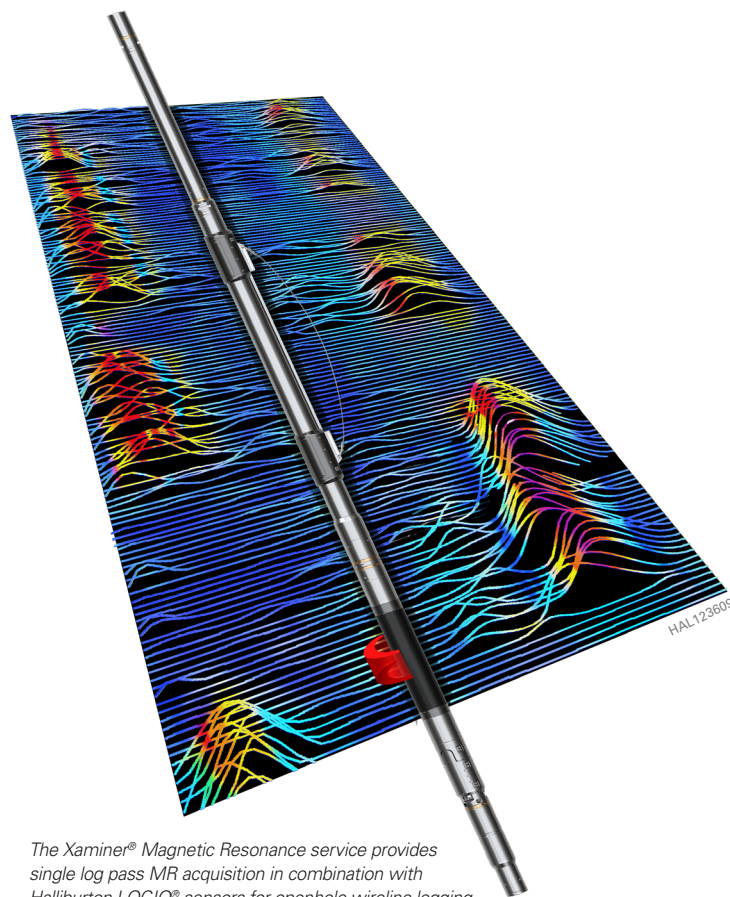
### Single Log Pass

The XMR service is fully combinable with the Halliburton LOGIQ<sup>®</sup> openhole logging suite of sensors to reduce rig time for openhole wireline logging and maximize drilling rig efficiency. The XMR service is deployed as a decentralized sensor with a bowspring to address a wide range of hole sizes from 5.875 in. (149 mm) to 17.5 in. (444 mm).

### BENEFITS

#### The Xaminer<sup>®</sup> MR (XMR<sup>™</sup>) service provides:

- » 2D and 3D fluid characterization solution products for reservoir evaluation of gas, condensate, heavy-to-light oils, and water with Diffusion, T1, and T2
- » Carbonate pore-size classification with T1 and T2 acquisition and analysis
- » Organic/unconventional reservoir evaluation with T1T2 2D map analysis and interpretation
- » Integration solution products from multisensor analysis
- » Reservoir-quality assessment from moveable and bound-fluid evaluation and permeability



*The Xaminer<sup>®</sup> Magnetic Resonance service provides single log pass MR acquisition in combination with Halliburton LOGIQ<sup>®</sup> sensors for openhole wireline logging.*

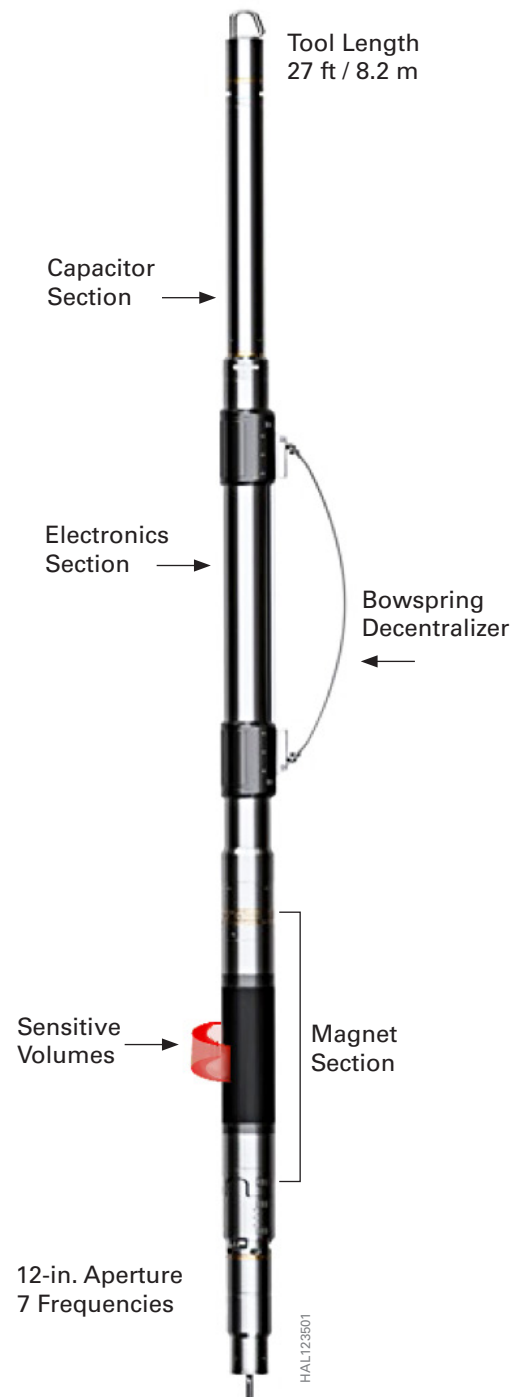
### FEATURES

- » Fully combinable with all Halliburton LOGIQ<sup>®</sup> openhole sensors
- » Single log-pass capability for all applications
- » Excellent thin-bed and pore-size resolution
- » A wide range of hole-size capabilities
- » All drilling muds  $\geq 0.02 \Omega\text{-m}$

## Xaminer® Magnetic Resonance (XMR™) Specifications

Wireline NMR Sensor Dimensions and Ratings	Xaminer® MR Sensor Wireline Magnetic Resonance
Max Working Temp	350°F/175°C
Max Working Press	35,000 psi (2,413 bar)
Max Torque Limit	600 ft-lb (83 kg-m)
Max Compression Limit	35,000 lb (15,876 kg)
Max Tension Limit	35,000 lb (15,876 kg)
Sonde OD	5 in. (127 mm)
Length	27 ft (8.2 m)
Weight	850 lb (385 kg)
Tool Positioning	Decentralized
Borehole Conditions	
Borehole Fluids	All ( $R_m > 0.02 \Omega\text{-m}$ )
Min Borehole Size	5⅞ in. (149 mm)
Max Borehole Size	17½ in. (444 mm)
Open/Cased Hole	Open
Rugosity Effect	No effect if not in sensitive volume
Mudcake Effect	No effect if not in sensitive volume
Measurements	
Frequencies of Operation	7
NMR Measurement Geometry	7 concentric arcs
NMR Measurement Accuracy	±1 pu or 5% (whichever is greater)
NMR Measurement Repeatability	1 pu standard deviation on porosity measurement
Static Vertical Resolution	12 in. (30.48 cm)

### Xaminer® MR Tool



For more information, contact your local Halliburton representative or visit us on the web at [www.halliburton.com](http://www.halliburton.com)

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

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