FORMATION EVALUATION | FORMATION TESTING

Integrated characterization section C

Reservoir Description Tool (RDT™) formation tester

New generation of downhole fluid composition

The Reservoir Description Tool (RDT™) Integrated Characterization Section (ICS) expands measurements of fluid composition downhole by using ICE Core® technology. Based on our unique multivariate optical computing technique, this enables high-resolution hydrocarbon compositional analysis.

Measurement of saturates, resins, aromatics, and asphaltenes (SARA)

With superior signal-to-noise ratio compared to conventional downhole techniques, our ICE Core technology uses direct optical computing of the full wavelength to create a unique fingerprint of the fluid, including differentiation of the C6+ SARA fractions.

Gas composition

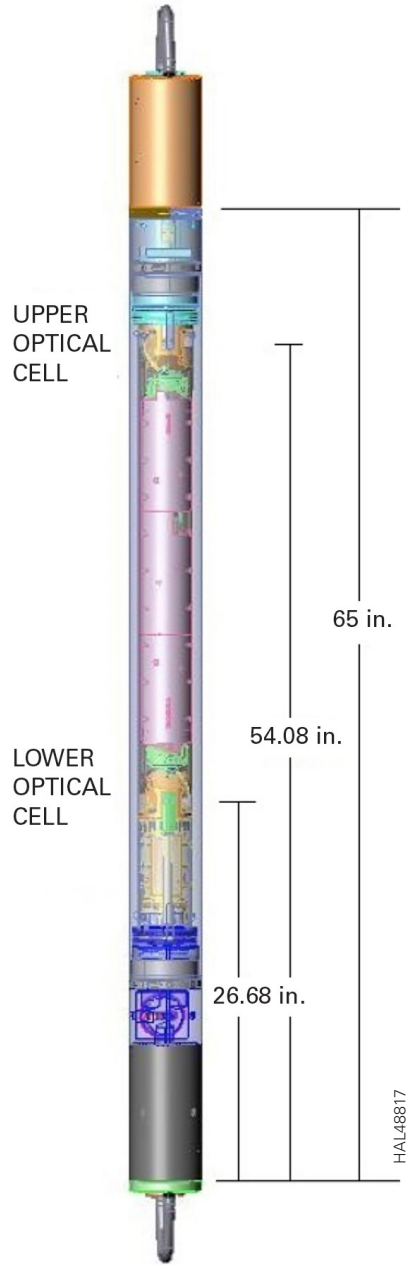
ICE Core technology measures single-phase gas components—C1, C2, C3, C4-5, and CO_2. We measure total gas GOR directly, not as an estimate from C1, making the measurement more accurate.

Display weight percentage

The ICS measures an absolute density of each measured component. It can be displayed in weight percentages, making the final results directly comparable to lab measurements with an easy-to-use composition display.

Sample purity determination

The ICS with multiple ICE Core samples uses gas and the liquid-phase composition to determine contamination. As methane gas isn't present in oil-based mud, the gas volume and GOR can be used. When combined with the SARA composition, the change in liquid-phase content can also be determined as the SARA fingerprint of filtrate and native fluid differs.



DATA SHEET

DIMENSIONS AND RATINGS				
Max Temperature		350˚F (177˚C)	300°F (149°C)	
Max Pressure		25,000 psi (172 MPa)	30,000 psi (207 MPa)	
OD		4.75 in. (12.065 cm)		
Length		5.40 ft (1.646 m)		
Weight		261 lb (118.38 kg)		
BOREHOLE CONDITIONS				
Borehole Fluids	Salt ■	Fresh ■	Oil ■	Air ■
Recommended Logging Speed		Stationary		
Tool Positioning		Centralized ■	Eccentralized ■	
OPTICAL SENSING UNIT				
Quantity		One		
Number of Channels		20		
Detectors		Single Thermopile		
Optical Window		Sapphire		
MEASUREMENTS				
STRAIN GAUGE PRESSURE TRANSDUCERS				
Accuracy		Resolution		
+/- 0.1% full scale		0.2 psi (1.4 KPa)		
FLUID TEMPERATURE				
Accuracy		Resolution		
3% full scale		0.02°F (-18°C)		

ICS-C - COMPOSITIONAL SPECIFICATIONS OPTICAL SENSOR VERSION 3

SENSOR	RANGE	ACCURACY	FLUID TYPE			
			Volatile Oil	Light Oil	Medium Oil	Gas/ Condensate
GOR	0 to 2000 GOR units	Greater of 200 scf/bbl or 20% of Range		✓	✓	
GOR	2000 to 4000 GOR units	Greater of 500 scf/bbl or 25% of Range	✓			
Methane	0.02 to 0.3 g/cc	10% Partial Density	✓	✓	✓	✓
Ethane	0.02 to 0.12 g/cc	15% Partial Density		✓	✓	✓
Propane	0.015 to 0.07 g/cc	20% Partial Density		✓	✓	✓
Butane/Pentane	0 to 0.04 g/cc	25% Partial Density				✓
CO_2 (gas phase)	0.015 to 0.07 g/cc	20% Partial Density				✓
Saturates	0.3 to 0.7 g/cc	10% Partial Density		✓	✓	
Aromatics	0.05 to 0.3 g/cc	20% Partial Density	✓	✓	✓	
Resins	0.04 to 0.19 g/cc	20% Partial Density		✓	✓	
Asphaltenes	0.02 to 0.14 g/cc	20% Partial Density		✓	✓	
C6 Plus	0.35 to 0.80 g/cc	10% Partial Density		✓	✓	
Phase (water cut)	0 to 100%	10% by Volume		✓	✓	
API	20 to 40	+/- 4 API Units		✓	✓	

For clean samples with less than 15% contamination, single-phase samples, and for transmittance better than 10%

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THE RANGES FOR DIFFERENT FLUID TYPES ARE BASED ON TABLE BELOW +/- 15%			
OIL TYPE	**RESERVOIR FLUID**	**API RANGE**	**GOR SCF/BBL**
Heavy	>0.875 g/cc	15 - 20 API	< 400
Medium	0.690 - 0.875 g/cc	20 - 32 API	250 - 1,250
Light	0.525 - 0.775 g/cc	32 - 40 API	1,000 - 1,750
Volatile	0.400 - 0.740 g/cc	35 - 50 API	1,650 - 3,500
Condensate	0.245 - 0.600 g/cc	40 - 65 API	3,200 - 25,000
Wet Gas	0.010 - 0.450 g/cc	N/A	20,000 - 50,000
Dry Gas	<0.375 g/cc	N/A	>50,000

Note:
- Table 4 excludes subcategories of Extra Heavy, Medium Heavy, and Medium Light.
- Table 4 ranges assume reservoir fluids from 3,000 to 15,000 psi and 150°F to 300°F.

PHYSICAL STRENGTHS	
Hardware	Tool Joints RDT
Tension	200,000 lb (90,719 kg)*
Compression	200,000 lb (90,719 kg)*
Torque	600 ft-lb (813 N-m)*

* Strengths apply to new tools at 70°F (21°C) and 0 psi.

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

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