

Compensated Neutron (CNL) Tool



The Compensated Neutron (CNL) tool measures the hydrogen content of the formation surrounding the wellbore. The hydrogen content is related to porosity, and can be used for gas detection in combination with other tools in both open and cased hole applications.

Description

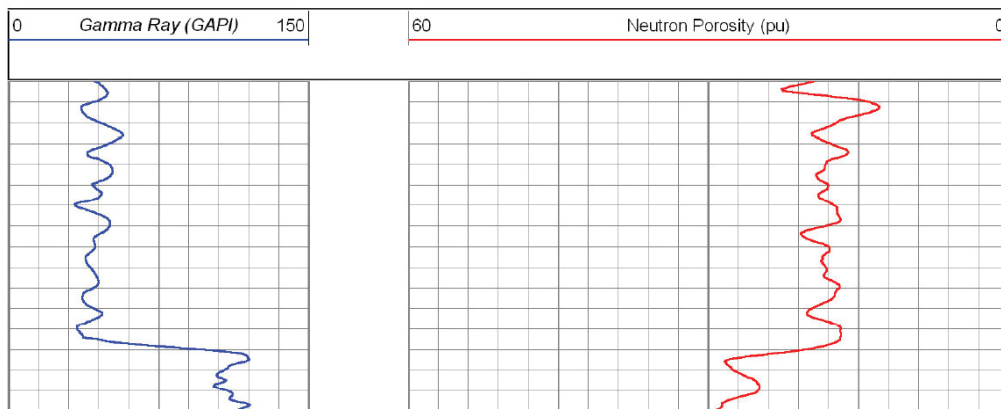
The CNL tool contains a neutron emitting source producing fast neutrons that bombard the formation. The emitted neutrons are thermalized by collisions with other nuclei. The hydrogen nuclei are considered the chief moderator of neutrons, thus porosity is measured based on the hydrogen content of the formation. Some of the thermalized neutrons are scattered back to the tool where they are counted by two neutron detectors filled with He-3 gas. The detectors are spaced at fixed distances from the source to compensate for hole rugosity and borehole effects. The porosity measurement consists of counting the number of neutrons reaching the detectors and relating them to the pore space in the rock.

Typical uses for the CNL tool are:

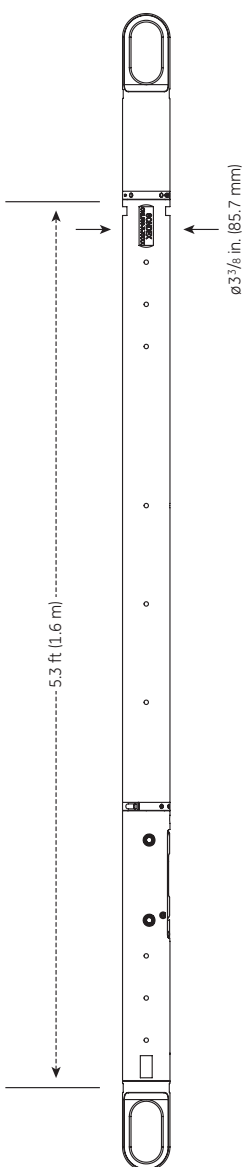
- Porosity measurement
- Lithological identification
- Clay analysis
- Gas detection

Features

- Can be run in both open and cased hole environments
- Fully compatible with Sondex Ultrawire* tools
- Modeled for both AmBe and Cf neutron sources
- Industry-leading neutron detectors with excellent signal-to-noise ratio, gamma discrimination, and shock and vibration ratings



Compensated Neutron (CNL) Tool



| Specifications | |
|---------------------------------|---|
| Maximum OD | 3 ³ / ₈ in. (85.7 mm) 5 in. (127 mm) with eccentricizer |
| Makeup length | 5.3 ft (1.6 m) |
| Weight | 125 lb (57 kg) |
| Maximum temperature | 302°F (150°C) |
| Maximum pressure | 20 kpsi (137.9 Mpa) |
| Minimum hole | 6 in. (152 mm) |
| Maximum hole | 16 in. (406 mm) |
| Sensor Offsets | |
| SS Detector | 1.71 ft (0.52 m) |
| LS Detector | 2.23 ft (0.68 m) |
| Borehole Conditions | |
| Borehole fluids | Salt, fresh, oil |
| Maximum logging speed | 33 ft/min (10 m/min) |
| Tool position | Eccentralized |
| Measurement | |
| Accuracy | 0–20 pu +/- 1 pu |
| | 20–30 pu +/- 2 pu |
| | 30–60 pu +/- 6 pu |
| Vertical resolution | 2.0 ft (0.61 m) |
| Depth of investigation | Dependent on hydrogen index |
| Measurement range | 0–60 pu limestone units |
| Primary curves | Limestone porosity, sandstone porosity, dolomite porosity |
| Hardware and Power Requirements | |
| Tool bus | Ultrawire* |
| Power | 75 mA (18V DC) |



GE imagination at work

Visit us online at:
www.ge-energy.com/oilfield

*Trademark General Electric Company.
 Copyright © 2013 General Electric Company. All rights reserved.
 GEA18060G (03/2014)