

# Static Spontaneous Potential Tool

## General Tool Description

Static Spontaneous Potential Tool (SSPT) is an electric logging tool that provides means of measuring Static Spontaneous Potential in conductive borehole fluids under harsh downhole conditions. The SSPL tool consists of two main sections, an electronics section and a sonde section. The sonde section (similar to the DLL sonde) has five sets of electrodes centered around a center electrode M0. Starting from the top to the bottom for the upper half of the sonde, we have:

- Electrode A2, used as guard current return
- Electrode A1, used as guard
- Two monitoring electrodes M2 and M1
- A measure electrode M0
- M1', M2', A1', A1\*', A2', electrodes symmetrical with respect to the above electrodes (the middle of the measure electrode M0 is the plane of symmetry).

The SP current  $I_{sp}$  flows through the mud and causes a electrical potential ( $V_m$ ) between M1 and M2. Supply a current from A1 and return to A2 for producing a focusing current, which works like the laterolog. The focusing current will reduce the  $V_m$  to minimum. The ideal value of  $V_m$  is zero. In this focusing condition, no current flows through the mud between M1 and M2, and the potential of measure electrode M0 is SSP. The focusing current is AC Source, A computed focusing scheme is used to implement the focusing conditions.

## SSPL advantages

- Less affected by the formation thickness, formation resistivity, and borehole conditions.
- Better resolution to define the boundaries of the permeable formations.
- Matched resolution with DLL log.
- Better estimation of the formation water resistivity  $R_w$ . the  $R_w$  can be estimated by the following equation:

$$SSP = K \cdot \log(R_{mf}/R_w)$$

## SPECIFICATIONS:

Diameter:	3.5 in. (8.9 cm.)
Length (Total)	130 in. ( 3.3 m.)
Length (Electronics Section only)	39.4in. (1.0 m.)
Length (Sonde Section only)	90.6 in. (2.3 m.)
Weight (Total)	255 lb.( 115Kg.)
Weight (Electronics Section only)	88 lb. (40 Kg.)
Weight (Sonde Section only)	167 lb. (75 Kg.)
Operating Voltage	100VDC 60mA OR 250VAC 60Hz 35mA OR 180VAC 60Hz 40mA

## MEASUREMENT RANGE:

SSP Measurement	-500mV~+500mV
Vertical Resolution,	20 in. (50 cm)

## LIMITATIONS:

Maximum Operating Temperature:	350° F (177° C)
Maximum Operating Pressure:	15,000 PSI

