

Fluid Conductivity & Resistivity @model

(1) $\sigma_f = s_w \cdot \sigma_w(T) + s_o \cdot \sigma_o(T) + s_g \cdot \sigma_g(T)$

where

s_w, s_o, s_g	volumetric fractions of water, oil and gas phases: $s_w + s_o + s_g = 1$
$\sigma_w(T), \sigma_o(T), \sigma_g(T)$	electrical conductivity of water, oil and gas phases
T	fluid temperature

In many practical applications the [electrical conductivity](#) of hydrocarbons is much less than that of produced water $\sigma_w(T) \gg \sigma_o(T) \gg \sigma_g(T)$ so that (1) can be approximated as:

(2) $\sigma_f \approx s_w \cdot \sigma_w(T)$

[Fluid Resistivity](#) of the multiphase fluid mix can be found as:

(3) $\rho_f = \sigma_f^{-1}$

See also