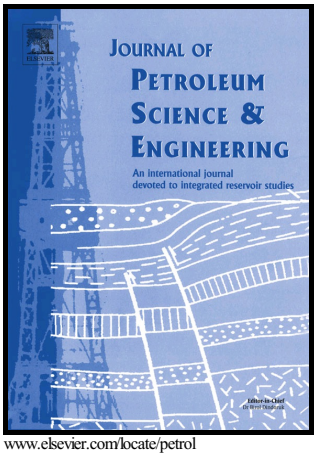


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**Equation Chapter 1 Section 1**

## Abstract

Drilling fluids usually gel at rest in order to avoid cuttings to precipitate over the drill bit when circulation is interrupted. At flow start-ups, pumping pressures higher than the steady-state circulation pressure are usually required to surpass the gel strength. The gel-liquid transition may have significant importance, especially in ultra-deep waters where high pressures and low temperatures take place. In the current work, controlled shear rate rheometric tests were conducted to investigate the yielding of an oil based drilling fluid. An algebraic equation, that accounts for both shear rate and shear history, is proposed to predict the gel breaking. This equation requires less fitting parameters than the current structural kinetic models available in literature, and is quite useful to represent the pressure peaks that take place during drilling fluid flow start-ups. The equation fit to rheometric data and is able to predict satisfactorily the start-up shear stress of a gelled drilling fluid at different shear rates.

Key words: drilling fluids; constant critical strain; start-up tests; fitting equation



## Nomenclature

*AAD%*: Average Absolute Deviation [%]

$C_1$: Constant dependent of the boundary conditions [-]

$C_2$: Constant dependent of the boundary conditions [-]

$\gamma$: Strain [-]

$\dot{\gamma}$: Shear rate [$s^{-1}$]