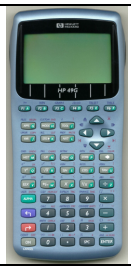
Program Version	Creation Date	State & City	Country	Calculator	ROM Version
1.00	05/06/2002	NEUQUEN	 Patagonia ARGENTINA		HPHP49-C Rev. #1.18

Program Author : *Miguel Angel CAPORALINI HERK*

Program Title

Rheology and Hydraulics for Non-Newtonian Drilling Fluids, of Oil and Gas Wells (Calculus)

Library Number	Checksum (CRC)	Bytes
L925	# 9EC9h	72,223.50

I'm writing this program in UsrRPL Language and after create a Library (L925), wich perform calculations as follow :

Very Important :

a) If no exist Data, you must input first it with [0.New Data].
b) Else, you can use the others Options.

Head of Program

0.New Data
1.Modify Data
2.Purge Data
3.To Calculus
4.Quit & Home

Known Data Constants of Well
NEW / MODIFY

1 of 2

FR	Flow Rate (Gal/min)
FL	Drilling Fluid Density (Lb/Gal)
L0	Total Drill Pipe Length (ft)
D0	Outside Drill Pipe Diameter (in.)
D1	Inside Drill Pipe Diameter (In.)
L1	Total Drill Collars Length (ft)
D2	Outside Drill Collars Diam. (in.)
D3	Inside Drill Collars Diam. (in.)
L2	Tot.Surface Casings Length (ft)
D4	Inside Surface Casings Dia.(in.)
D5	Bit Diameter (in.)
D6	Bit Nozzle #1 Diameter (in.)

2 of 2

D7	Bit Nozzle #2 Diameter (in.)
D8	Bit Nozzle #3 Diameter (in.)
V1	Shear Stress at 600 rpm (lb/100 ft^2)
V2	Shear Rate at 600 rpm (sec^{-1})
V3	Shear Stress at 300 rpm (lb/100 ft^2)
V4	Shear Rate at 300 rpm (sec^{-1})
V5	Shear Stress at 100 rpm (lb/100 ft^2)
V6	Shear Rate at 100 rpm (sec^{-1})
V7	Shear Stress at 3 rpm (lb/100 ft^2)
V8	Shear Rate at 3 rpm (sec^{-1})
D9	Particle Equivalent Diam. (in.)
PD	Particle Density (lb/gal)

For New and Modify input known data:

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You can see what the window have a right top of screen the message (1 of 2), and (2 of 2). For save into memory each window with data, you must press F6 Key (OK), and wait a few seconds.

Notes:

1) **The values of V1 to V8, are extracted from … Fann viscosimeter, where :**
   - **Viscosity Range is : 1 to 300,000 cP (for Newtonian viscosity too, with standard rotor, bob and spring combination).**
   - **Maximum Temperature is : 200 Fahrenheit Degrees.**
   - **Rotor Speed is variable : 1 at 600 rpm**
2) **For Average Settling Velocity of Initial Shear Rate Estimate, assume = 1 ft/sec**
3) **For the ratio of particle surface areas, assume = 0.8 ”**
4) **For factors friction, if the Reynolds # is <= 2100 is laminar flow; else (> 2100), is turbulent flow. This conditional is considerated in the program and the calculus to be verified this values.**

0.Rheological

Power Law Constants	0.Drill Pipe (without unit) 1.Annulus (without unit)
Fluid Consistency Index	0.Drill Pipe (dyne sec^{-n}/cm^2) 1.Annulus (dyne sec^{-n}/cm^2)
Pipe Average Bulk Velocity	0.Drill Pipe (ft/sec) 1.Drill Collars (ft/sec)
Annulus Average Bulk Velocity	0.Annulus Section #1 (ft/sec) 1.Annulus Section #2 (ft/sec) 2.Annulus Section #3 (ft/sec)
Effective Pipe Viscosity	0.Drill Pipe (centiPoise (cP)) 1.Drill Collars (centiPoise (cP))
Effective Annulus Viscosity	0.Annulus Section #1 centiPoise(cP) 1.Annulus Section #2 centiPoise (cP) 2.Annulus Section #3 centiPoise (cP)
Pipe Reynolds Number	0.Drill Pipe (without unit) 1.Drill Collars (without unit)
Annulus Reynolds Number	0.Annulus Section #1 (without unit) 1.Annulus Section #2 (without unit) 2.Annulus Section #3 (without unit)
Pipe Friction Factor	0.Drill Pipe (without unit) 1.Drill Collars (without unit)
Annulus Friction Factor	0.Annulus Section #1 (without unit) 1.Annulus Section #2 (without unit) 2.Annulus Section #3 (without unit)

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Pipe Friction Loss Pressure Gradient	Drill Pipe (lb/in^2/ft)
	Total Drill Pipe (lb/in^2)
	Drill Collars (lb/in^2/ft)
	Total Drill Collars (lb/in^2)
	Total Drill Pipe & Drill Collars (lb/in^2)
Annulus Friction Loss Pressure Gradient	Annulus Section # 1 (lb/in^2/ft)
	Total Annulus Section # 1 (lb/in^2)
	Annulus Section # 2 (lb/in^2/ft)
	Total Annulus Section # 2 (lb/in^2)
	Annulus Section # 3 (lb/in^2/ft)
	Total Annulus Section # 3 (lb/in^2)
	Total Annulus (all Sections) (lb/in^2)
	Total Depth Annulus (lb/in^2/ft)
Bit Nozzles Friction Loss	(lb/in^2)
Hydrostatic Pressure Gradient	(lb/in^2/ft)
Circulating Pressure Gradient	(lb/in^2/ft)
Equivalent Circulating Density	lb/gal

1.Annulus Settling Velocity

Power Law Constant	(without unit)
Fluid Consistency Index	(dyne sec^{-n}/cm^2)
Initial Settling Shear Rate Estimate	(sec^{-1})
Initial Effective Viscocity	(centiPoise (cP))
Settling Velocity First Approximation	(ft/sec)
Second Settling Shear Rate Estimate	(sec^{-1})
Second Effective Viscocity	(centiPoise (cP))
Settling Velocity Second Approxim.	(ft/sec)
Third Settling Shear Rate Estimate	(sec^{-1})
Third Effective Viscocity	(centiPoise (cP))
Settling Velocity Third Approxim.	(ft/sec)

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For any questions, please contact me to :

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