INHIBILUBE D.

RESEARCH AND DEVELOPMENT

BY CHEM. ENG. CARLOS RODRIGUEZ.

INTRODUCTION

The rock-fluid interaction study is of great value when developing water based mud formulations. Some aspects of wellbore stability, borehole caliper and rate of penetration are directly related to the appropriate inhibition of the formation clays making it paramount to monitor and control during drilling operations

Inhibilube D is a innovative inhibitor developed by Carlos Rodriguez which is unpublished work performed on his own for personal and profesional engineering development, this chemical formula is not only cost effective compared to traditional amine based inhibitor but superior to a traditional Brand used in Canada in the Clearwater formation región where oil based muds are prohibited due to environmental regulations.

Inhibilube D is a liquid non toxic product suitable to use for environmental sensitive regions.

LABORATORY RESULTS

PRODUCT	QUANTITY	UNIT
WATER	893.00	LT/M3
XCD	2.00	KG/M3
PAC-HV	1.00	KG/M3
PAC-LV	1.00	KG/M3
CAUSTIC SODA	2.00	LT/M3
HIBSTAR F	10.00	LT/M3
BARITE	390.00	KG/M3

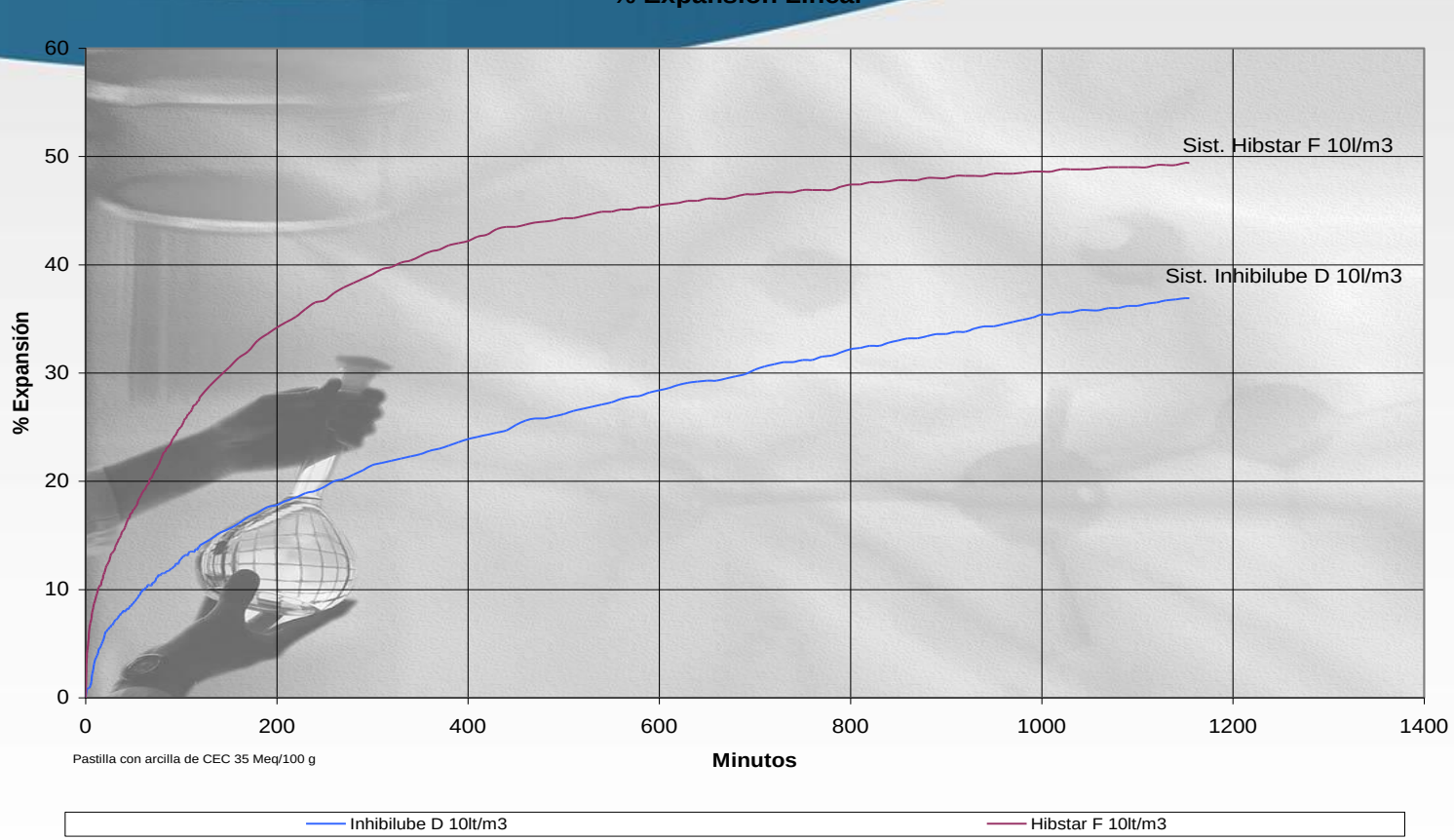
Temperature 120°F	A/R	D/R
Density (gr/cc)	1.30	1.30
600 rpm (cps)	31	30
300 rpm (cps)	25	24
200 rpm (cps)	20	19
100 rpm (cps)	15	14
6 rpm (cps)	5	5
3 rpm (cps)	4	4
Gel strength 0/10 (min)	4/5	3/5
Visc. Ap. (cps)	16	15
Plastic viscosity (cps)	6	6
Yield Point lb/100 ft2	19	18
Ph	11	11
API Filtrate (ml)	13.4	14.1
Lubricity(amp)	.31	.31

PRODUCT	QUANTITY	UNIT
WATER	893.00	LT/M3
XCD	2.00	KG/M3
PAC-HV	1.00	KG/M3
PAC-LV	1.00	KG/M3
CAUSTIC SODA	2.00	LT/M3
INHIBILUBE D	10.00	LT/M3
BARITE	390.00	KG/M3

Temperature 120°F	A/R	D/R
Density (gr/cc)	1.30	1.30
600 rpm (cps)	32	30
300 rpm (cps)	24	23
200 rpm (cps)	22	19
100 rpm (cps)	18	14
6 rpm (cps)	6	5
3 rpm (cps)	4	4
Gel strength 0/10 (min)	5/7	5/6
Visc. Ap. (cps)	16	15
Plastic viscosity (cps)	8	7
Yield Point lb/100 ft2	16	16
Ph	11	11
API Filtrate (ml)	5.4	6.3
Lubricity(amp)	.26	.26

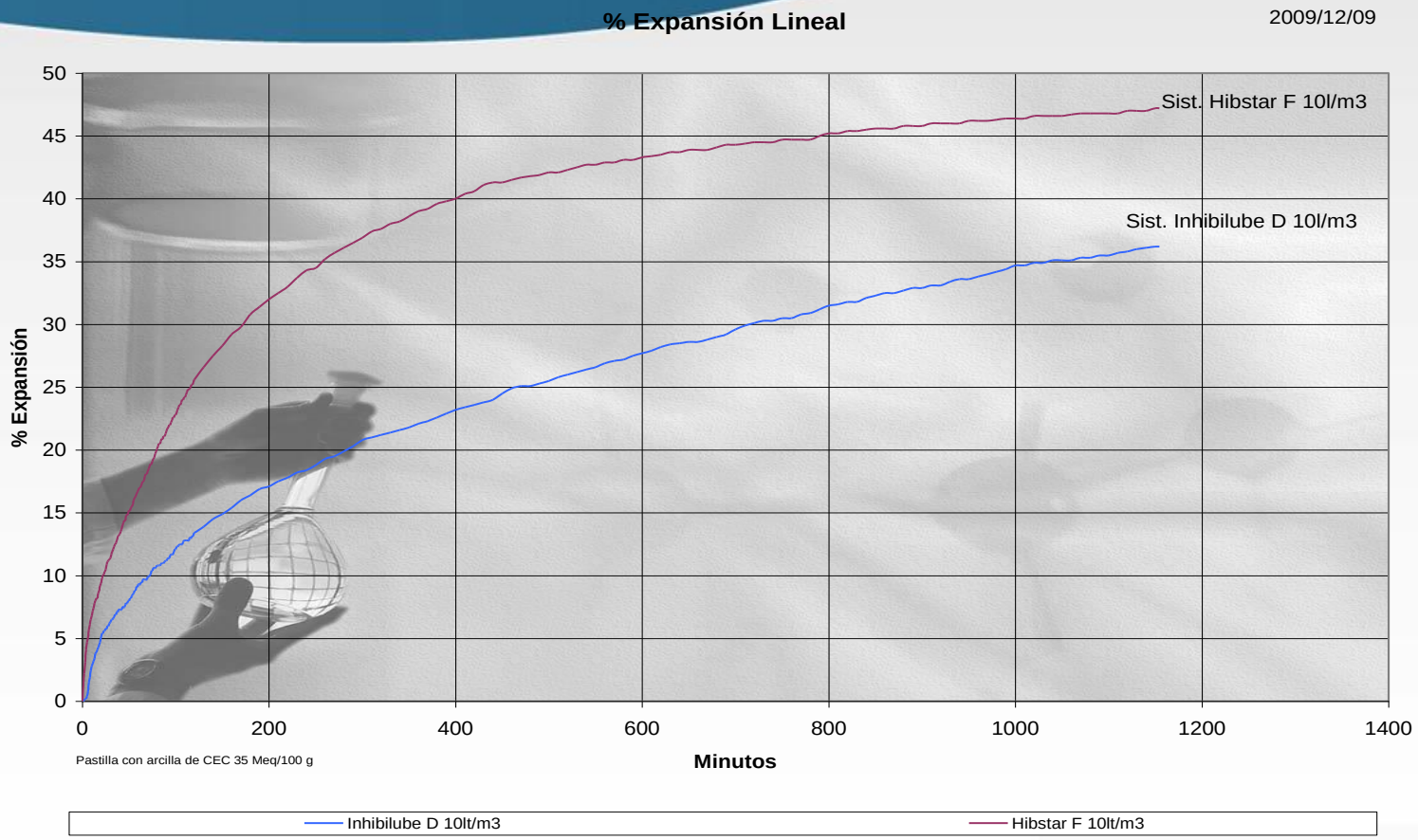
LINEAR SWELLMETER

Linear swellmeter test results using Inhibilube D with a Clearwater raw core simple 22 meq/100gr



The Clearwater Formation is a stratigraphic unit of Early Cretaceous (Albian) age in the Western Canada Sedimentary Basin in northeastern Alberta, Canada. It was first defined by R.G. McConnell in 1893 and takes its name from the Clearwater River near Fort McMurray. The Clearwater Formation consists of primarily of black and green shale, with some interbedded grey and green sandstone and siltstone and ironstone concretions,

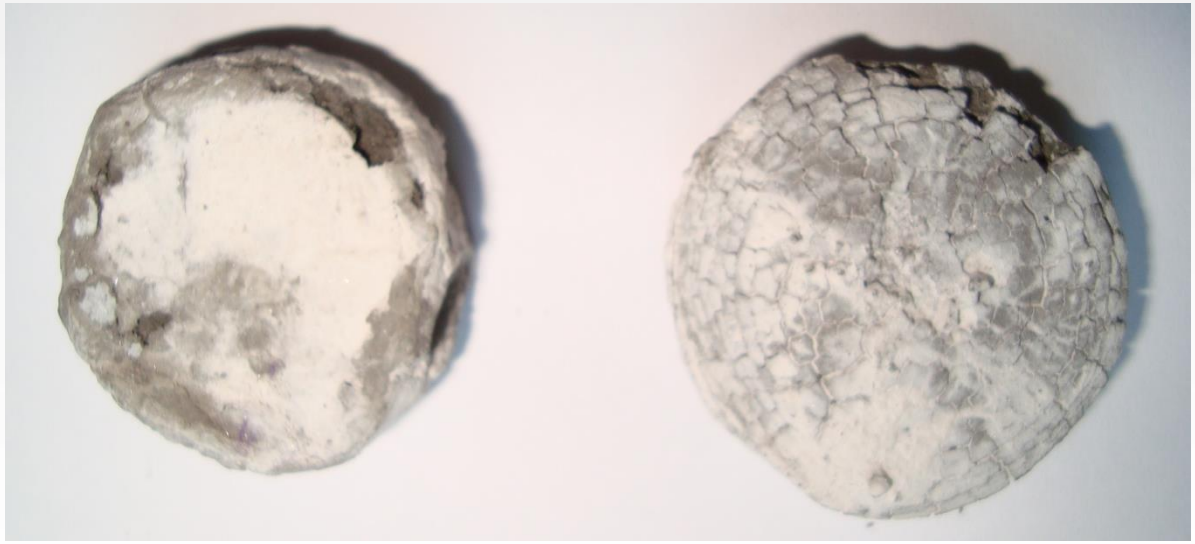
LINEAR SWELLMETER



Less formation swelling diminishes erosion, drag while tripping and after drilling, securing casing setting

DISPERSION TEST

Clear water core simple after 6 hours of dispersión test @ 150 °F.

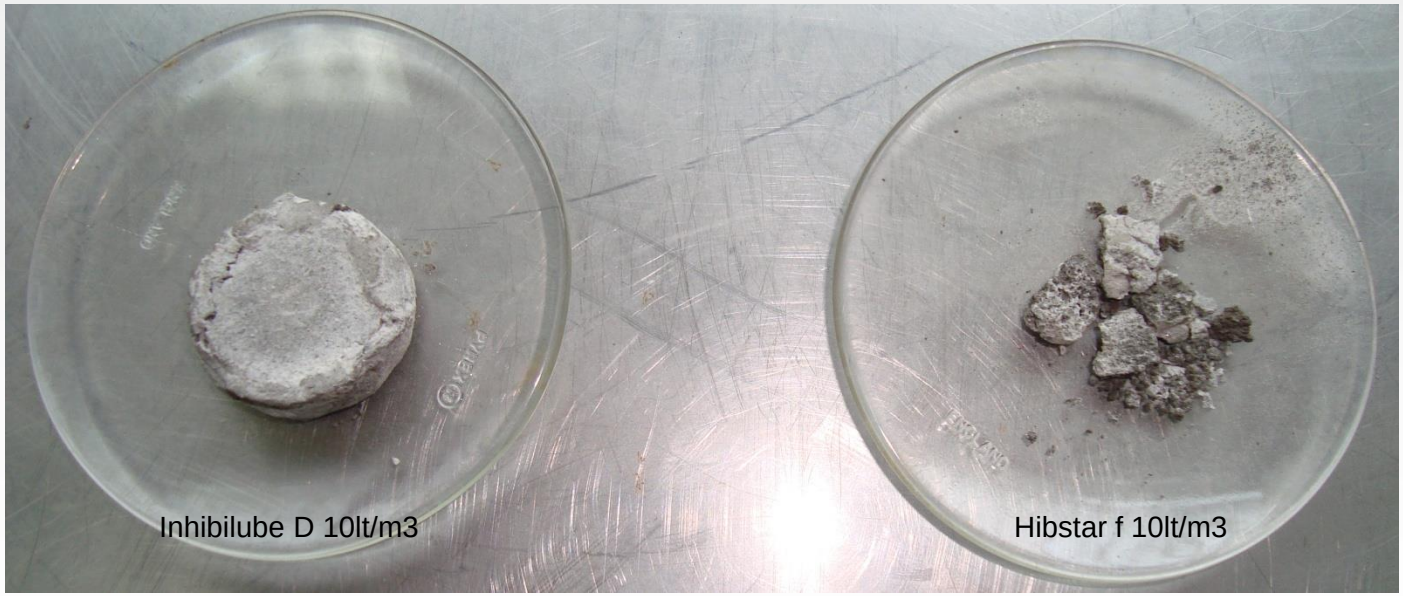


Inhibilube D 10lt/m3

Hibstar f 10lt/m3

DISPERSION TEST

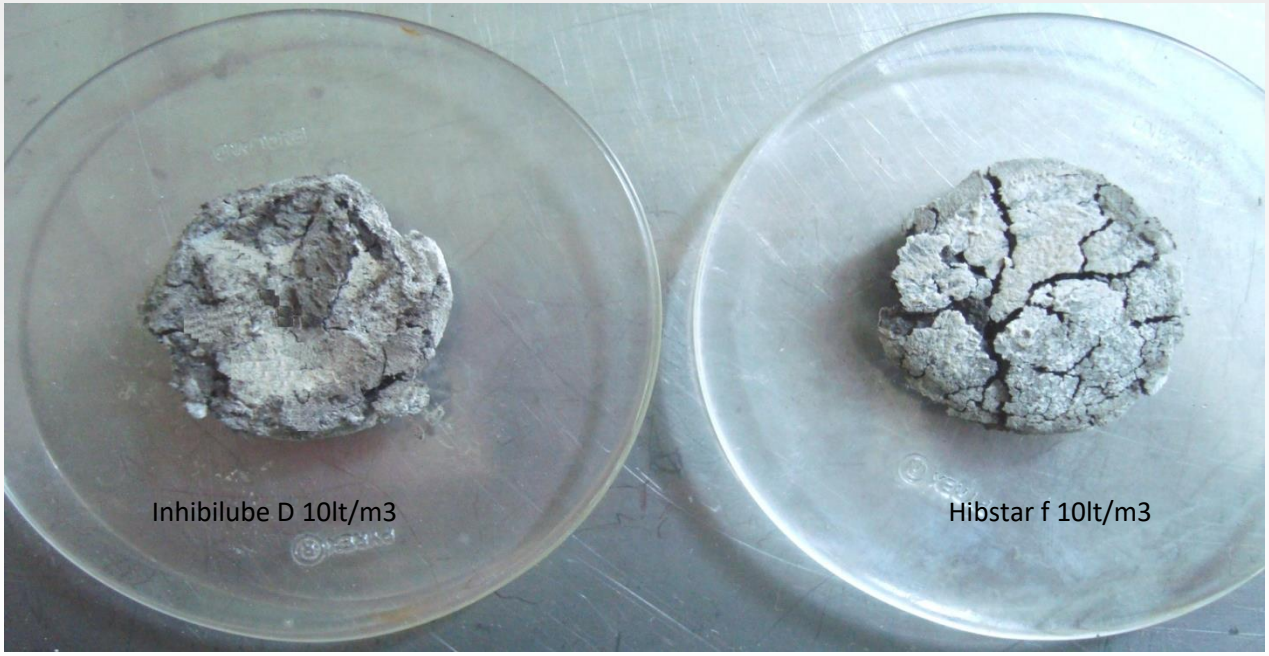
Clearwater core sample after 14 hours of dispersión @ 150 °F.



Beyond linear swellmeter to simulate and quantify formation hidration, the difference is much appreciated in the extended dispersión test as erosion and clay swelling continues in the open hole at variable anular velocities and flow regimes, less dispersión creates less sloughing and better borehole stability.

DISPERSION TEST

Clearwater core sample after 14 hours of dispersión with Hyperdrill 247rd @ 200 °F.



Inhibilube D is compatible con Hyperdrill 247rd @200 °F and other partially hydrolized polyacrylamides.

WATER BASED MUD WITH INHIBILUBE AND POTASSIUM CHLORIDE @200°F

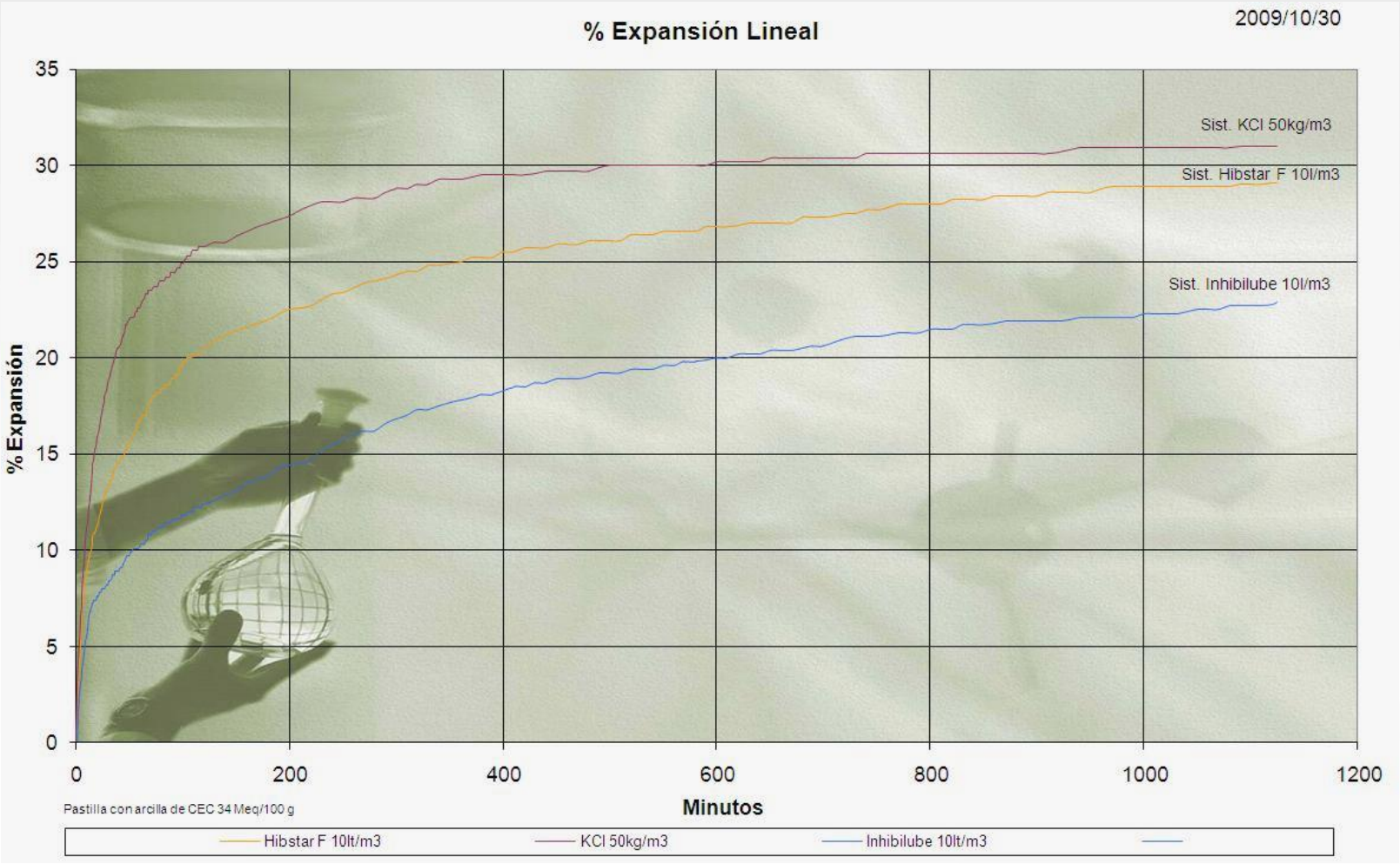
PRODUCT	QUANTITY	UNIT
WATER	888.00	LT/M3
XCD	2.00	KG/M3
PAC LV	1.00	KG/M3
PAC HV	1.00	KG/M3
CAUSTIC SODA	2.00	LT/M3
INHIBILUBE D	15.00	LT/M3
BARITE	390.00	KG/M3

PARAMETER	BHR 16HR	AHR 16HR @200F
Density (gr/cc)	1.30	1.30
600 rpm (cps)	33	30
300 rpm (cps)	22	21
200 rpm (cps)	17	19
100 rpm (cps)	12	11
6 rpm (cps)	4	4
3 rpm (cps)	3	3
Gel strength 0/10 (min)	3/5	4/6
Visc. Ap. (cps)	17	15
Plastic viscosity (cps)	11	9
Yield point lb/100 ft2	11	12
Ph	11	11
API Filtrate (ml)	5.4	6.2
Lubricity (amp)	.26	.26

PRODUCT	QUANTITY	UNIT
WATER	888.00	LT/M3
XCD	2.00	KG/M3
PAC LV	1.00	KG/M3
PAC HV	1.00	KG/M3
CAUSTIC SODA	2.00	LT/M3
POTASSIUM CHLORIDE	50.00	KG/M3
BARITE	390.00	KG/M3

PARAMETER	BHR 16HR	AHR 16HR @200F
Density (gr/cc)	1.30	1.30
600 rpm (cps)	33	31
300 rpm (cps)	23	23
200 rpm (cps)	20	21
100 rpm (cps)	14	15
6 rpm (cps)	5	6
3 rpm (cps)	5	5
Gel strength 0/10 (min)	4/5	4/6
App Viscosity. (cps)	17	16
Plastic viscosity (cps)	10	8
Yield point lb/100 ft2	13	15
Ph	11	11
API Filtrate (ml)	8.4	8.9
Lubricity (amp)	.31	.31

LINEAR SWELLMETER



CONCLUSIONS:

Inhibilube D is a personal professional development by Chem. Eng Carlos Rodriguez, has a superior performance to commercial amines, providing lower clay swelling which translates into better borehole caliper and stability. This has a significant impact in directional drilling of wells with a shallow KOP (like Samaria 978 and 675 which I currently supervise from the operator side) or any other well that is drilled with a high angle using water based mud for different reasons whether is cost reduction or environmental impact among others.