

Riteks GCL-4

Self Stabilizing Latex

General Description

Riteks GCL-4 cement additive is a liquid additive designed to lower equivalent circulating density (ECD) and impart excellent fluid-loss control, high-temperature suspension properties, and acid resistance to cement slurries. Riteks GCL-4 additive is successful across a wide range of well conditions (60°F/16°C to 350°F/ 176.7°C circulating temperature) and is used in both primary casing cementing operations and remedial squeeze work.

Application and Features

Cement can be treated with Riteks GCL-4 additive to obtain slurries with excellent wetting properties, low viscosities, and increased resiliency. These properties help increase bonding strength, resulting in a tighter annular seal and superior zonal isolation. GCL-4 additive helps provide resistance to attack on the cement sheath by corrosive fluids such as acids, while cements containing GCL-4 additive have increased corrosion resistance over standard cements.

Under high-temperature downhole conditions, Riteks GCL-4 additive also provide excellent solids-suspension properties in high-density slurries, and it can also exhibit excellent rheological properties while helping to control slurry segregation. Slurries can be designed with GCL-4 to function in gas migration control, and these slurries can provide low fluid loss control, delaying static gel time, and shortening transition time, and can also aid in foam cementing.

Normally, dispersants and defoamers are used with GCL-4 to keep the latex suspended in the slurry and to help prevent entrained air. The typical concentration range of GCL-4 is 1 to 3 gal/sk.

Typical Physical Properties

Form:	Opaque white liquid
Specific Gravity:	1.00-1.03
Density:	~8.50 lb/gal
Viscosity (Brookfield #2/20 rpm):	100 cps
pH:	7.7
Solids Content:	50%
Freeze Point:	32°F (0°C)
Glass Transition Temp. (Tg):	+6° C
Particle Diameter:	0.15 Microns
Residual Monomer:	0.07 % Max

Typical properties given do not constitute a supply specification.

Benefits

Riteks GCL-4 can provide the following benefits to the cement system:

- Lowers ECD resulting in consistent pump rates and better mud displacement
- Improved Wettability for Increased Bonding Strength to the casing
- Resistance to attack by corrosive fluids
- Mechanical data shows that Riteks GCL-4 is more resilient than normal cement slurries.
- Flexural Strength Modification
- Superior solids suspension properties
- Exceptionally low fluid loss, while exhibiting excellent rheological properties
- Functions at bottomhole circulating temperatures (BHCTs) of 60°F to 350°F.
- Slurries containing up to 18% salt typically do not require the use of a stabilizer, although we would recommend Riteks Latex Stabilizer to aid in saturated salt slurries to help prevent coagulation.

Health and Environmental Data

Before handling or using this product please refer to the Safety Data Sheet for complete health, safety and environmental information. Dispose of waste in accordance with local, state and federal regulations.

Laboratory Performance Results - See Page 2 & 3

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Riteks GCL-4 PERFORMANCE RESULTS

Riteks GCL-4 was evaluated and tested by CSI TECHNOLOGIES for categories including: fluid loss, rheology properties, free fluid, thickening time, compressive strength and static gel strength. Riteks GCL-4 performed exceptionally well under all testing categories required for a latex cement system.

Test results are as follows:

SLURRY FORMULATION FOR TEST

Class H Cement - Mixed at 16.4 lb/gal.
+ 35% Silica Flour
+ 1.6 gal/sk Riteks GCL-4
+ 0.08 gal/sk Retarder
+ 0.05 gal/sk Antifoam.

FLUID LOSS - Cement Slurry Fluid Loss Results

Temperature	Collected Fluid (mL)	Time (min)	AP Fluid Loss (mL/30 min)
250° F	30	30	60

FREE FLUID - Cement Slurry Free Fluid Results

Temperature	Conditioning Time	Measured Free Fluid	Free Fluid (%)
190° F	02:00 (hh:mm)	0 (mL)	0

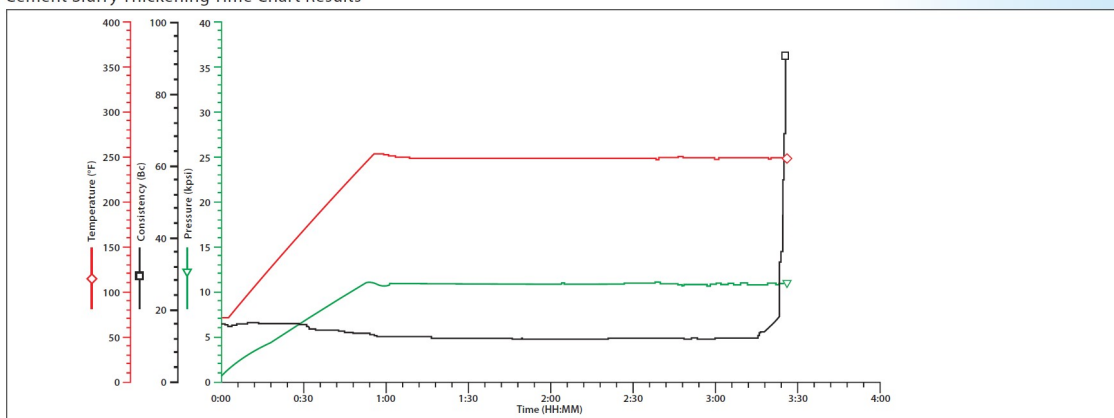
RHEOLOGY - Latex Cement Slurry Rheological Properties (R1B1 configuration)

Temperature	RPM							PV (cP)	YP (lb _f /100ft ²)	10 Sec Gel	10 Min Gel
	300	200	100	60	30	6	3				
80° F	86	64	39	26	17	7	3	76	12	4	14
190° F CUP	70	54	34	26	20	12	10	56	16	10	12

THICKENING TIME - Cement Slurry Thickening Time Results

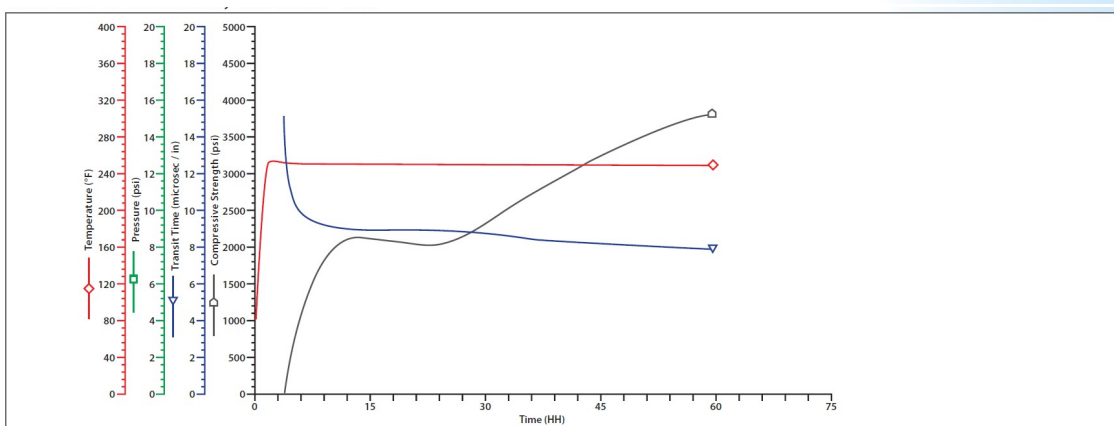
Temperature	Pressure (psi)	Thickening Time		
		40 Bc	70 Bc	100 Bc
250° F	10,850	3:24	3:25	3:26

Cement Slurry Thickening Time Chart Results



FLUID LOSS - Cement Slurry Fluid Loss Results

Temperature	Pressure (psi)	Compressive Strength				
		50 psi	500 psi	12 Hr	24 Hr	60 Hr
250° F	10,850	3:59	4:31	2,105 psi	2,035 psi	3,824 psi



STATIC GEL STRENGTH - Cement Slurry Static Gel Strength Test Results







Temperature	Pressure (psi)	100 lb/100ft ²	500 lb/100ft ²	Transition Time
250° F	10,850	3:18 hrs:min	3:55 hrs:min	37 minutes



Cement Solubility in 15% Hydrochloric Acid Solution

- The mix of the non-latex cement sample is a conventional Class G System.
- The mix of the latex slurry cement sample is a conventional Class G System with the addition of Ritek's GCL-4 at 1.5 gal/sk and antifoam at 0.3% bwoc.
- Both slurries were mixed at 13.5 lb/gal with the non-latex slurry having a yield of 2.06 ft³/sack and the latex slurry having a yield of 2.08 ft³/sk.
- The size of the test samples was approximately 2" cubes. These cubes were cured at 190°F for 24 hours prior to the start of testing. Each cube was measured for weight and volume prior to being submerged into a 15% HCL acid bath. The cubes were soaked in the acid bath and removed for weight and volume measurements at 1 hour, 24 hours and 48 hours.

	Non-Latex Slurry		Latex Slurry	
	Weight Loss	Volume Loss	Weight Loss	Volume Loss
1 Hour	10.4%	11.3%	1.7%	0.2%
24 Hour	42.1%	42.4%	7.2%	0.9%
48 Hour	54.8%	55.7%	10.7%	3.4%

	Non-Latex	Latex
1 hr.		
24 hr.		
48 hr.		

Visual comparison of Latex and Non-latex slurries after 15% HCl bath at 1-, 24-, and 48 hours.

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