

WELL CEMENTING ADDITIVES

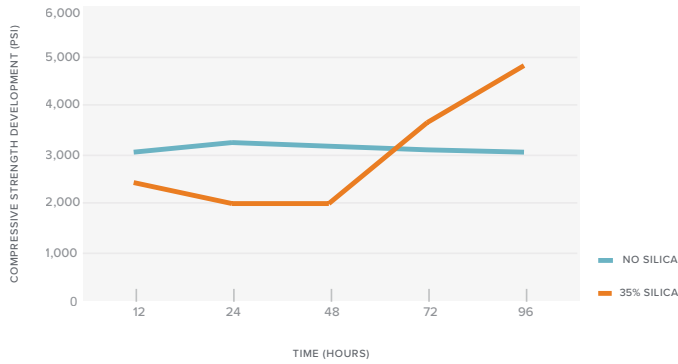
STRENGTH IN THE HARSHTEST CONDITIONS

SilverBond® well cementing additives are produced from high purity quartz ore for predictable physical and chemical functionality. Well cementing grades are engineered to concentrate particles in the 10-13 micron size range to maximize the silica – calcium hydrate reaction.

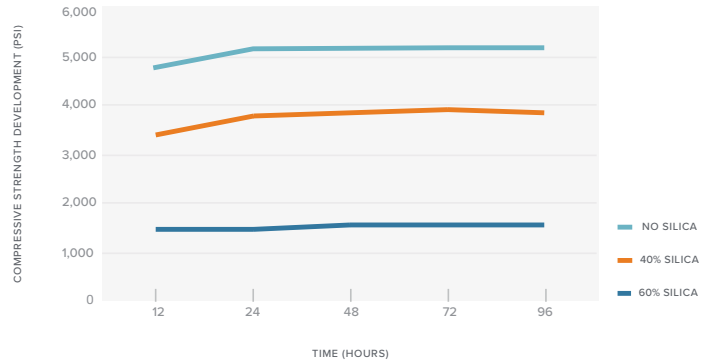
As downhole temperatures increase, the calcium-silicate-hydrate phase of Portland cement can metamorphize, resulting in strength retrogression and a more permeable casing that could compromise zonal isolation. When incorporated into Portland cement systems, SilverBond® additions will prevent this thermal deterioration. SilverBond® stabilized Portland cement exhibits superior compressive strength with significantly lower permeability to ensure casing integrity in both primary and squeeze applications and over the life of the well. Loading levels are site dependent; with concentrations directly proportional to increasing downhole static temperatures.

COMPRESSIVE STRENGTH DEVELOPMENT VS TIME (PSI VS HOURS)

96 HOUR ULTRASONIC COMPRESSIVE STRENGTH ANALYSIS
250°F/120°C BHST



96 HOUR ULTRASONIC COMPRESSIVE STRENGTH ANALYSIS
350°F/175°C BHST



AVERAGE PHYSICAL PROPERTIES

*% CaO Consumed in DI Water @ 90°C FOC 16 Hours.

Median Particle Size (µm)	Surface Area, BET (m2/g)	Pozzolanic Activity*	Specific Gravity	Moisture Content (%)	Bulk Density, Compacted (lb/ft3)	Silicon Dioxide (SiO2)	Loss on Ignition (LOI)
D50	-	-	ASTM C-128	ASTM C-566	ASTM C-29	-	-
10-13	1	15.4	2.65	<0.1	85-90	>98.5%	≤0.16%

Mean Values. These Do Not Represent A Specification.

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