IntegraBond™ PERM

CEMENT SYSTEM

A cement system resistant to corrosion in acidic environments caused by CO_2 and H_2S.

APPLICATIONS

- Formations producing CO_2 or H_2S
- CO_2 sequestration projects
- CO_2 EOR projects
- Wide range of temperatures
- Wide Range of slurry densities
- Primary and remedial cementing operations

FEATURES & BENEFITS

- Improves the cement's resistance to attacks from CO2 and H2S
- Provides minimal permeability and improved mechanical properties
- Allows fit-for-purpose designs for specific applications
- Zero Portlandite content reduces carbonation
- Lower heat evolution during setting (less shrinkage and cracking)
- Compatible with virually all API and ASTM cements and most American Cementing additives

OVERVIEW

IntegraBond™ PERM are corrosion resistant cement systems designed specifically to maintain integrity and hydraulic sealing capacity in acidic environments caused by carbon dioxide (CO_2) and hydrogen sulfide (H_2S).

Whether in CO_2 sequestration projects, CO_2 EOR projects or from formations producing CO_2 or H_2S, these gases will attack and degrade normal cement systems. The degradation of typical Portland cements by CO_2 occurs due to carbonation of cementitious phases and subsequent leaching leaving a porous and weakened cement matrix. IntegraBond™ PERM cement systems are designed to reduce carbonation by limiting cement permeability and portlandite phases and thus stop the degradation process and ensure long-term well integrity.

TYPICAL PROPERTIES

TYPICAL TEMPERATURE RANGE	Up To 450°F BHST
TYPICAL SLURRY DENSITY RANGE	12 To 20 lb/gal

API CLASS G COMPARISON

	SLURRY DENSITY	WATER PERMEABILITY	PORTLANDITE CONTENT	COMPRESSIVE STRENGTH	TENSILE STRENGTH
	ppg	microdarcy	%	psi	psi
API Class G	15.8	2.1	9.5	4,870	378
IntegraBond PERMA system	15.8	0.002	Not detectable	4,674	459
Class G with 4% BWOC bentonite	14	10.8	9.2	1,633	170
IntegraBond PERMA system	14	0.15	Not detectable	2,529	272

Notes

- Cement slurries were prepared according to API specification 10B using fresh water. Cement specimens were cured at 200°F and 3,000 psi for 72 hrs.
- Water permeabilities were measured under a confining pressure of 4,500 psi with a water injection pressure of 3,000 psi at 200°F .
- Quantities were determined by X-ray powder diffraction using the reference intensity ratio method.