IMRAE
QUALITY THRU PRODUCT INNOVATION

CoatMasters®

"A novel product engineered to provide the highest performance in integral waterproofing protection."

Product Information

IMRAE is proud to launch **CoatMasters® 9007** Admixture for integral waterproofing of concrete, greatly reducing water absorption to 1.0% maximum level based on dosage. Tested according to British Standard requirement (BS 1881: Part 122: 1983) for determination of water absorption, increases compressive strength properties, and densifies film properties upon cure. The results provide long term protection from efflorescence from various salt build-ups over an extended amount of time.

CoatMasters® 9007 is a product of novel technology made from new generation of high molecular weight silicon emulsions and other trade secret blends, designed to protect cured concrete from moisture and other type of fluid penetration. All products are compatible with most type of major cementitious mix design compositions.

Sample C (control) after 5 minutes

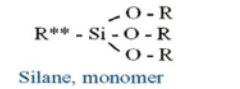
Sample X crystalline type admixture after 10 minutes

Sample I made CM9007 admixture (after 5-days)

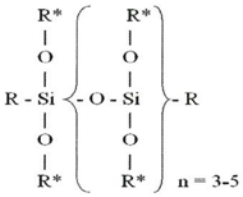
Samples of precasted GFRC panels subjected to 70-lbs head force of water pressure on a ¼ inch thick square foot panels. From left-to-right, C-control (no waterproofing admixture); I-control mix design with CM 9007 @ 15-ozs/sack; and X-control mix design with crystalline water proofing type admixture.
Water penetrations were observed on samples C and X; however, no evidence of penetration was observed on sample I with CM9007 admixture.

The silicones or silanes used in the hydrophobisation of construction or construction materials can be subdivided into three classes:

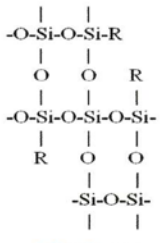
- Monomeric alkyl alkoxy silanes
- Oligomeric alkyl alkoxy siloxanes
- Polymeric siloxanes



Silane, monomer



Siloxane, oligomer



Polysiloxane
(Silicone Resin)

R, R*, R** = alkyl

Illustration of standard cement reaction with water (using standard cement chemistry abbreviation)

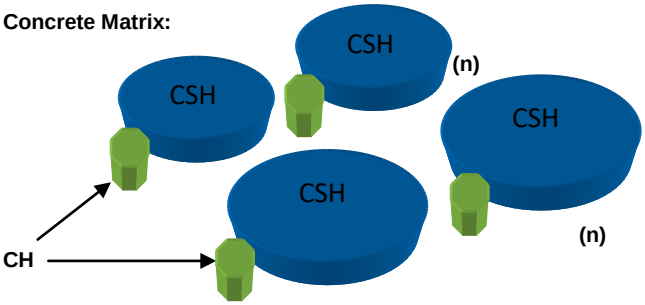
Tricalcium Silicate (50-70% in cement):

C_3S (1) + H (1.34) → CSH_4 (1.75) + CH (0.61)

Dicalcium Silicate:

C_2S (1) + H (1.49) → CSH_4 (2.39) larger molecules formed than those from tricalcium silicates + CH (0.191) smaller molecules formed than those of calcium hydroxide

Concrete Matrix:



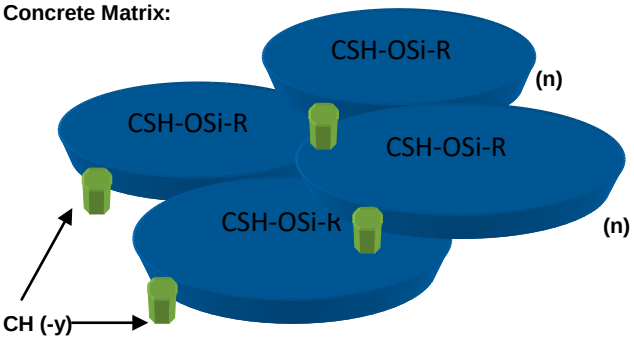
Integral admixture reaction on hydration of cement

Tricalcium Silicate: C_3S (1) + H (1.34) + R-O-Si (x) → CSH_2-OSi-R (1.75 +x) + CH (0.37-y)

Dicalcium Silicate:

C_2S (1) + H (1.49) + R-O-Si (x) → CSH2-OSi-R (2.39 + x) much larger molecules formed than those from regular tricalcium silicates + CH (0.191-y) much smaller molecules formed than those of regular calcium hydroxides.
Where ( ), x and y denotes approximate molar volumes

Concrete Matrix:



Molecular structure determines key properties

The alkylated silicon reacts (R-O-Si) with the amorphous calcium silicate hydrate (CSH) increasing its molecular size, and thus reducing the molecular size of calcium hydroxides (CH) due to the "further" Ca/Si imbalance. In the concrete matrix the molecular structure of alkylated silicates blocks capillary pores which greatly reduces absorption of water. This creates tiny microscopic voids rendering the matrix breathable for passage only of water vapors.

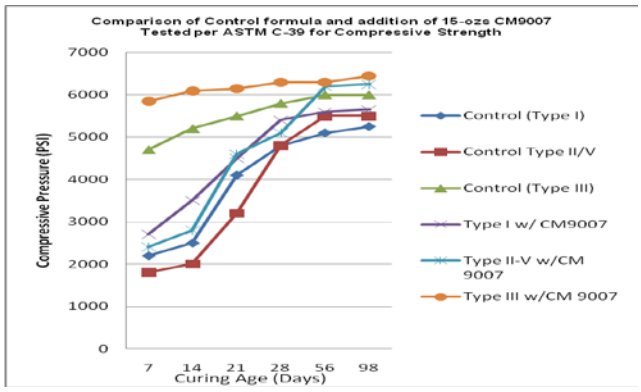
Environmentally and Regulatory compliant water based system is also FDA compliant. All chemical materials used are verified and listed under CFR (Code of Federal Regulations) to be compliant at its cured state property.

The use of **CoatMasters® 9007** admixture, as an integral part of any cementitious composition, totally eliminates the need for any VOC related add-on coating sealers, such as water repellants and acrylic type sealers.

Resulting performance characteristics on GFRC:

- Eliminates efflorescence effect from cementitious compositions.
- Provides excellent water repellency from water and salt water solutions.
- Reduced salt transmission and chloride ion penetration thus providing additional corrosion protection.
- Excellent freeze thaw stability, and greatly reduces tendency for cracking.
- Maintains natural appearance of any cementitious substrate materials.
- Protects structure from various harmful growths of mosses, fungi, and algae.
- Contributes to the lowering of W/C water to cement mix ratio for increased flexural strengths.
- Improved workability when used with polycarboxylates type plasticizers. **(Note: Decrease in workability time is observed when used with certain type of highly anionic water reducers such as sulfonates. Compatibility testing with existing chemical type reducers are highly recommended, especially for shotcrete type applications.)** For questions, and support please contact IMRAE for technical assistance.
- Increases compressive strengths flexural strengths (both yield and ultimate strengths) from 300 - 400 PSI in 7 and 28-days per ASTM C-39
- Exhibits no gain or loss of surface tension enabling additional coating or texturing requirements if needed.
- Very compatible with recycled mix materials such as pozzolan, and fly ash.

Meets ASTM Performance Standards:



ASTM E514-90 – Determines resistance to water penetration and leakage through unit masonry subjected to wind-driven rain.

ASTM C-666 Determination of resistance of concrete to rapid freeze thaw cycles and thawing (50 cycles).

ASTM C-1202 Determines the electrical conductance of concrete to provide a rapid indication of its resistance to the penetration of chloride ions.

BS 1881: Part 122: 1983 Determines rate of water absorption by drying a cored sample concrete thru predetermined cycles and then immersed in water to measure absorbed moisture.

Independent Test Lab Results for BS 1881

Mix Design w/ CM 9007 dosage at 15-ozs/sack T-III SCC-Mix (W/C: 0.38). However, from the same mix design Increase dosage level further lower water absorption.

March 17, 2009

Mr. Imil Desphy
Imrae Corporation
32347 Rock Rose Drive
Lake Elsinore, CA 92532

Subject: Concrete Absorption Testing - BSI 1881:Part 122:1983
Heider Engineering Services, Inc. Project No.: 080052-3

Dear Mr. Desphy,

At your request, Heider Engineering Services, Inc. performed absorption testing on samples of concrete (2.75" diameter), sampled by your personnel and delivered to our laboratory. At your request, absorption testing was performed in accordance with BSI 1881:Part 122:1983. Please find the test results tabulated below.

Absorption Test, BSI 1881:Part 122:1983

Lab Sample No.	Absorption,% by weight
A1	0.8
A2	0.8
A3	0.9

Please contact us if additional information is needed.

Sincerely,

Dennis W. Heider, PCE
Principal Engineer

3/17/09

Ph: (909) 673-0292
FAX: (909) 673-0272
800-R South Rochester Ave., Ontario CA 91761-8171

Physical Properties

CoatMasters® 9007 Admixture
Appearance: Opaque Milky Liquid
Specific Gravity: 0.982 – 0.986
pH: 8-9
Starting dosage Rate: 5 – 15 fluid oz / sack

Product Packaging

CoatMasters® 9007 are available in 1-gallon, 5-gallon, 55-gallon drum, 220-gallon totes, and bulk tanker containers.

Disclaimer

The information and recommendations made are on our own studies and research that are believed to be accurate. However, no guarantee of accuracy is given mainly due to variations caused by actual application and substrate conditions of the material used. The customer must conduct appropriate testing to ensure compatibility, and suitability for all its intended use.