

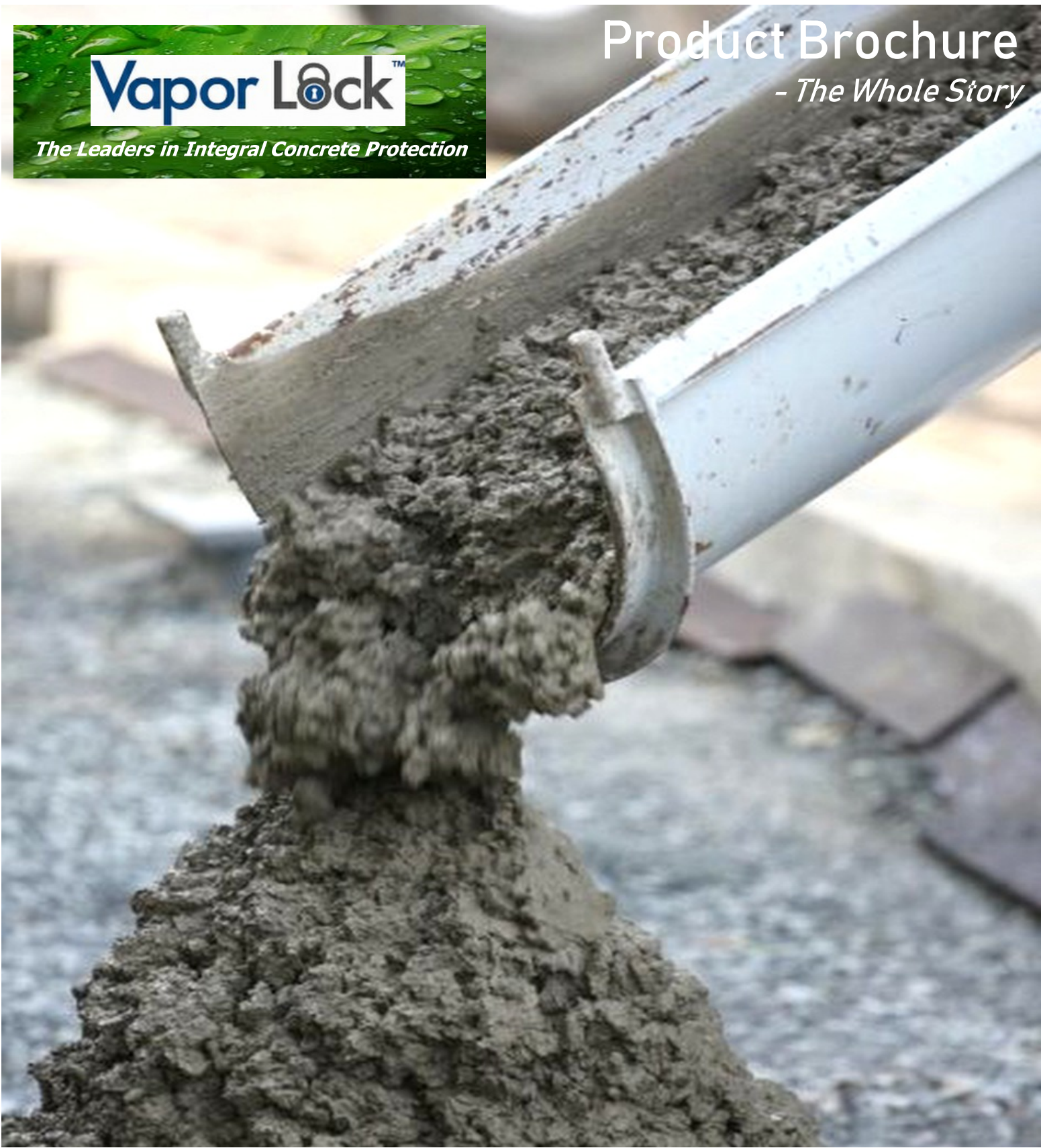


Vapor Lock™

*The Leaders in Integral Concrete Protection*

# Product Brochure

*- The Whole Story*



SPG Go Green  
Specialty Products Group\*

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DURABILITY  
Consultants

*"Enhancing the Capabilities for Those Who  
Build with Concrete"*

# concrete<sup>noun</sup>

con·crete | \ 'kän- ,krēt

Definition 1 : a mass formed by concretion or coalescence of separate particles of matter in one body

Definition 2 : a hard strong building material made by mixing a cementing material (such as portland cement) and a mineral aggregate (such as sand and gravel) with sufficient water to cause the cement to set and bind the entire mass



**CONCRETE** in conjunction with steel is arguably the greatest achievement mankind has ever invented. The synergistic combination of both serve as the foundation of every city in every country on the planet. Concrete, the main “protective component” of Reinforced or Structural Concrete through implication, is supposedly completely

“**solid**” and “**lasts Forever**”. Our goal here is to constructively and respectfully illustrate ...both are false!

We welcome you to take 15 minutes of your time to examine our value proposition on how you can economically and efficiently make your concrete closer to **100% solid** and **last 2 - 3 times longer**.

*Thank you in advance for your time -*







is based around Nano-Silica & Lithium Technology, and is a precise and timely answer to formulating natural, permanent and efficient results in Portland Cement Concrete. Vapor Lock is a liquid pozzolanic admixture that works with the calcium hydroxide (present naturally in cement hydration) and water of convenience (extra water not used in cement hydration) to produce relatively large amounts of additional calcium-silicate-hydrate (c-s-h) gel that permanently disrupts the capillary system formation and locks in the moisture present for superior cement hydration. From this basis of design, we modify specific formulations to address project specific applications that are warranted and insured to meet and exceed real-world, project specific testing levels. This process produces a superior, denser concrete characterized by lower Long-Term Shrinkage with an Ultra Low Permeability. These qualities are based on the lightest Carbon Footprint coupled with the most attractive price point in the marketplace - relevant for almost every project.

### ***CSI MasterFormat Areas of Focus with Vapor Lock:***

#### **03 00 00 - Concrete**

**\*03 05 12 - WATERPROOF CONCRETE CONSTRUCTION\***

**\*\*03 05 13 - CONCRETE MOISTURE VAPOR REDUCING ADMIXTURE (MVRA) & POROSITY INHIBITING ADMIXTURE\*\***

03 30 00 - Cast-in-Place Concrete

03 40 00 - Pre Cast Concrete

03 50 00 - Cast Decks and Underlayment

03 70 00 - Mass Concrete

#### **07 00 00 - Thermal & Moisture Protection**

07 01 00 - Operation & Maintenance of Thermal & Moisture Protection

**\*\*\*There are several areas in this section that should be cross-referenced with 03 00 00 sections\*\*\***

07 10 00 - Damp-proofing & Water-proofing

07 16 00 - Cementitious & Reactive Waterproofing

07 40 00 - Roofing & Siding Panels

07 50 00 - Membrane Roofing

#### **09 00 00 - Finishes**

09 60 00 - Flooring

09 65 00 - Resilient Flooring

**\*\*\*\*09 65 13 - MVRA WARRANTY & INSURANCE\*\*\*\***

09 70 00 - Wall Finishes

09 90 00 - Painting and Coating

#### **31 30 00 - Earthwork Methods**

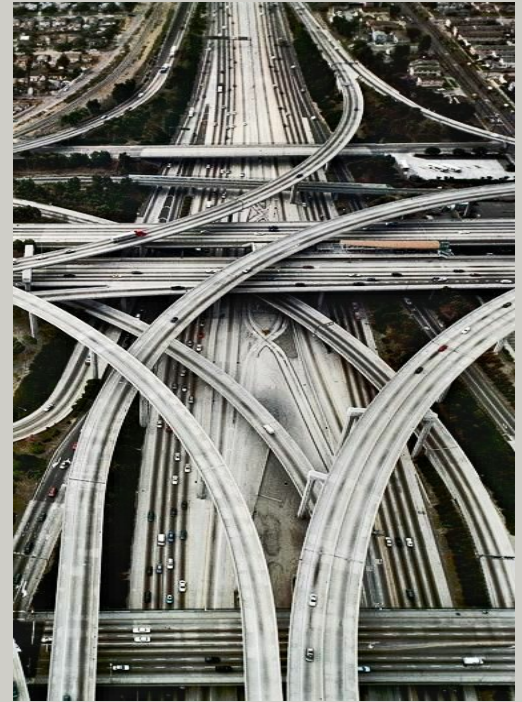
31 32 33 - Shotcrete Soil Slope Stabilization

31 32 36 - Soil Nailing



## BACK STORY

Concrete has long been considered one of man's most awesome achievements. Joseph Monier (1823-1906) a gardener, who began using steel and concrete, *together*, often gets the credit as the "Father of Reinforced Concrete" by his early, practical applications of both. Regardless, by inspecting anywhere in the world, one can argue the synergies of concrete and steel are truly one of the most important and practical systems ever invented. Be it structural highway overpasses, building foundations, dams, or over a 1,000 different applications, concrete & steel have been the prime component on which our civilization will be ultimately judge upon. Any city, in any country will lay testament to vastly improving the quality of our existence as a whole - Reinforced Concrete.



Merriam-Webster defines Concrete as :a hard strong building material made by mixing a cementing material (such as portland cement) and a mineral aggregate (such as sand and gravel) with sufficient water to cause the cement to set and bind the entire mass. The National Ready Mix Concrete Association goes further - "In its simplest form, concrete is a mixture of paste and aggregates (sand & rock). The paste, composed of cement and water, coats the surface of the fine (sand) and coarse aggregates (rocks) and binds them together into a rock-like mass known as concrete."

"Within this process lies the key to a remarkable trait of concrete: it's plastic and can be molded or formed into any shape when newly mixed, strong and durable when hardened. These qualities explain why one material, concrete, can build skyscrapers, bridges, sidewalks, and superhighways, houses and dams" - NRMCA.

The ingredients of concrete haven't changed much since the early 1900s, when the combination of steel and concrete skyrocketed. What has changed is the availability of new and beneficial admixtures used in concrete. In past times, concrete admixtures were mostly used in extreme conditions; i.e. extreme hot or cold weather for example. Today, admixtures are used on a daily basis to achieve High Performance Concrete mixes.





## FOCUSING ON WHERE THERE ISN'T ANYTHING

The way concrete dries, cures, and hydrates (three distinct actions) all have to do with water leaving concrete. The voids, holes, cracks, and fissures that was once occupied by water (and un-hydrated cement) all become and contribute to a capillary system. This mechanism of concrete 'getting hard' is the same mechanism that acts as Concrete's 'Achilles heal' or vulnerability. Deleterious materials may enter into the concrete matrix, migrate towards the structural steel and eat away and weaken it. Or, it may allow moisture from within the concrete or from the sub-base below, to migrate upwards and manifest itself from failed flooring and coatings, to promoting "sweating slab syndrome", to poor roofing installations, to promoting mold and bacteria - all costly, negative impacts.

Since the 1950s, there have been studies on the benefits of a disruptive capillary system (Powers, Copeland and Mann) - Capillary Continuity Or

Discontinuity in Cement Pastes. The concept of a "...dense, compacted concrete..." and the strong correlation to a "durable" concrete is born. From here numerous studies on both the permeability and durability characteristics of concrete have branched off from this primary starting point - a *Disrupted Capillary System*.

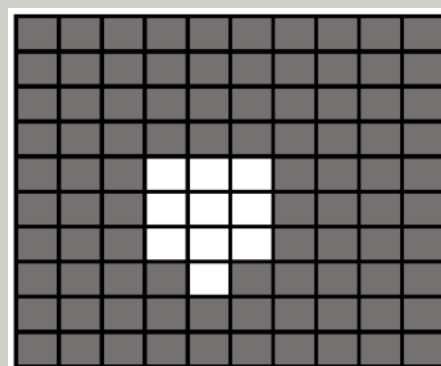
Two men, Professors Hamlin Jennings and Jeffrey Thomas, took up this concept and performed some of the most significant work in the '90s. Both from the Dept. of Civil & Environmental Engineering at Northwestern University (Evanston, IL), in 2010 were the driving forces in MIT's Concrete Hub creation - <https://cshub.mit.edu/> This served as a platform for their work involving the first fully quantitative model of the nanostructure of calcium silicate hydrate (C-S-H), the major component of hydrated cement. This allowed for the first time the measurement of the capillary system in concrete - or where there is nothing....only air and quantifying the weak part of concrete.

**Table 5.1:** Phase data for a Type I OPC paste made with a w/c of 0.45.

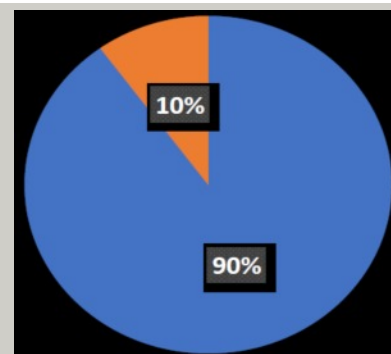
Phase	Density (g/cm <sup>3</sup> )	Volume %	
		At Mixing	Mature Paste
<b>C<sub>3</sub>S</b>	3.15	23.40	1.17
<b>C<sub>2</sub>S</b>	3.28	7.35	0.78
<b>C<sub>3</sub>A</b>	3.03	4.42	0.00
<b>C<sub>4</sub>AF</b>	3.73	2.87	1.39
Gypsum ( <b>C<math>\bar{S}</math>H<sub>2</sub></b> )	2.32	3.47	0.00
C-S-H (solid) <sup>a</sup>	2.65	0	29.03
C-S-H (with gel pores) <sup>b</sup>	1.90	0	49.99
Calcium hydroxide ( <b>CH</b> )	2.24	0	13.96
Ettringite ( <b>Aft</b> )	1.78	0	6.87
Monosulfoaluminate ( <b>AFm</b> )	2.02	0	15.12
Water	1.00	58.49	31.69
Gel porosity	--	0	20.96
Capillary porosity	--	58.49	<b>10.73</b>

<sup>a</sup> Formula 1.7C-S-1.6H.

<sup>b</sup> Formula 1.7C-S-4.



Visual examples of 90%....



Named the Powers-Brownyard volumetric model of cement hydration, Jennings and Thomas were able to quantify the volumes of all the phases of Portland Cement paste; from birth to maturity. Their research showed at 28 days, in a normal 0.45 w/c ratio mix, almost 11% Capillary Porosity (above). And this number grows to 17% in a 0.50 w/c ratio mix (a 55% increase!). ***This is the area of focus for Vapor Lock technology; addressing that area in concrete....where there is no concrete.***

## TESTING

***A key component to this technology has been significant time spent with organizations including ASTM Technical Committees, ACI National Committees and numerous Structural Engineering Association's various chapters as well as the ASCE, to seek out the most illustrative and 'real-world' testing protocols that properly and conservatively show the benefits of Nano-Silica technology. With that and the thinking of "there is no perfect silver bullet test", we put forth the following tests and protocols to illustrate the benefits of a Disrupted Capillary System in Concrete -***

**ASTM D5084 - Coefficient of Permeability** This protocol is borrowed from the soils folks and is encompassed in a 23-page protocol that used varying head-pressure to move water through a concrete specimen with a centimeters per second result - movement over time. As one of the key components of a 10-Year warranty and insurance package, there have been 1,000s of these tests performed. The Vapor Lock admixture as a general rule will never be higher than 0.174 US Perms per this protocol; and usually in the 0.02 US Perm range.



***\*\*\*Note - this protocol is very similar to the DIN 1048 (German) and BS EN12390 (British) protocols, and deviations of CRD-C48-92 (Army Corp.) used by the crystalline growth products; ASTM D5084 is a faster, non-subjective (measurable), scientific model to illustrate the same thing.\*\*\****

<b>ASTM 5084 Results</b>					
<b>"Coefficient of Permeability"</b>					
<b>~~SAMPLE PERM RATINGS~~</b>			<b>cm/second</b>	<b>US PERMS</b>	
Plain Concrete			6.500E-05	1134.810169	
" "			5.69E-06	99.339536	
" "			3.20E-07	5.586758	
Stego 15			4.811E-10	0.0084	
Stego 10 Class A			1.260E-09	0.022	
Stego Class C			2.119E-09	0.037	
Raven VB 6			5.155E-08	0.9	
Koester Vap 2000 Topical			3.036E-08	0.53	
Ardex MC			6.301E-09	0.11	
<b>w/cm ratio</b>	<b>agg. type</b>	<b>SoCal Vapor Lock Projects</b>	<b>cm/second</b>	<b>US PERMS</b>	
<b>WARRANTY</b>	<b>*****</b>	<b>VAPOR LOCK MAXIMUM THRESHOLD</b>	<b>1.00E-08</b>	<b>0.17458618</b>	
	HR & LW	UCSD Muir Housing	1.00E-09	0.01745862	
0.50	HR	Grimmway Academy	4.72E-11	0.00082405	
	L wt. agg.	USC Cinema	1.39E-09	0.02426748	
	L wt. agg.	Lightweight @ 12oz.	7.55E-10	0.01318126	
0.40	HR	Forum Renovation	3.21E-10	0.00560422	
	HR	Kaiser MOB	2.04E-09	0.03561558	
0.59	HR	Memorial	1.48E-09	0.02583875	
0.60	HR	Western U. Housing	2.51E-09	0.04382113	
0.50	HR	Old Town Kern	2.06E-09	0.03596475	
0.45	HR	USC Dance Mix #17136	2.33E-09	0.04067858	
0.43	HR	USC Dance Mix #17536	1.48E-09	0.02583875	
0.50	HR	Building Y, Steve Anderson	3.36E-09	0.058660956	
	HR	Park Square at Seven Oaks	4.03E-09	0.07035823	
0.40	HR	Theta Chi Frat	4.43E-09	0.07734168	
0.45	HR	Hawaiian Gardens	5.67E-09	0.098990364	
0.45	HR	Konawaena Middle School - w/out Super P	6.34E-09	0.11068764	
0.45	HR	Konawaena Middle School - with Super P	2.62E-09	0.04574158	
0.45	HR	SD Airport - Misc. w/VL	6.17E-09	0.10771967	
0.38	HR	SD Airport - Decks & Beams w/VL	4.37E-09	0.076294161	

A small sampling of West Coast (Including Hawaii) projects utilizing Vapor Lock in mixes; both flooring, shrinkage reduction and general waterproofing applications. You can start to see that the benefits

of Vapor Lock are most apparent in mixes from 0.45 to 0.55 w/cm ratios. And that our results rival those permeances of a Class A vapor barrier (Stego's 10-mil).

# Modified ASTM C1152 - Standard Test Method for Acid-Soluble Chloride in Mortar and Concrete

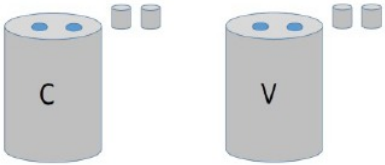
This is a genuine attempt to discern the penetration potential (or “transport mechanism”) of concrete starting at the surface. Acid is injected into concrete specimens and layers are slowly pulverized and tested for chloride content. Unfortunately, this protocol always showed wide swings as chlorides are found in aggregates that usually don’t have a significant impact on

steel/reinforcement corrosion. Fortunately, rather recently, Dr. Tyler Ley, Ph.D., P.E., at Oklahoma State University, proposed a modified version using potassium iodide (to mimic the movement of chloride ions) and an X-Ray machine to take timed glimpses into a sealed concrete specimen. **nXRF or Nano X-Ray Fluorescence**. Below, the protocol and our latest results -

Step 1

Outside chemical penetration

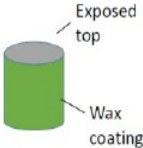
- Two - 1" diameter cores were taken from the surface of cylinder C and V.



Step 2

Outside chemical penetration

- Next, we coat all the surfaces but the top with wax.



Step 3

Outside chemical penetration


- Place the material in potassium iodide solution.
- Since all sides but the surface are coated with wax then the chemicals will only penetrate from the surface.
- Take X-ray image at 0,1,5,10 days.
- Why potassium iodide?

## Three Reasons....

1st reason - Iodide will absorb X-rays

No Iodide

With Iodide



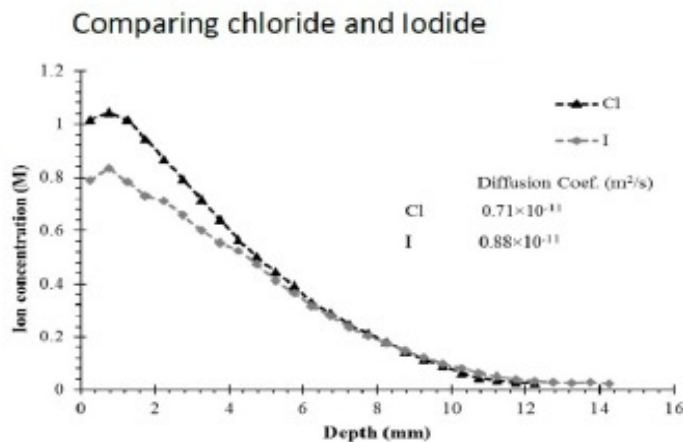
2nd reason - Iodide shows up in X-rays vs. water....

Water on top

KI solution on top



3rd reason - Iodide and chlorides act very similar in penetration of mortar/paste.



### Mix Designs

4500 psi, Pump Mix  
1" top size agg., w/c = 0.45

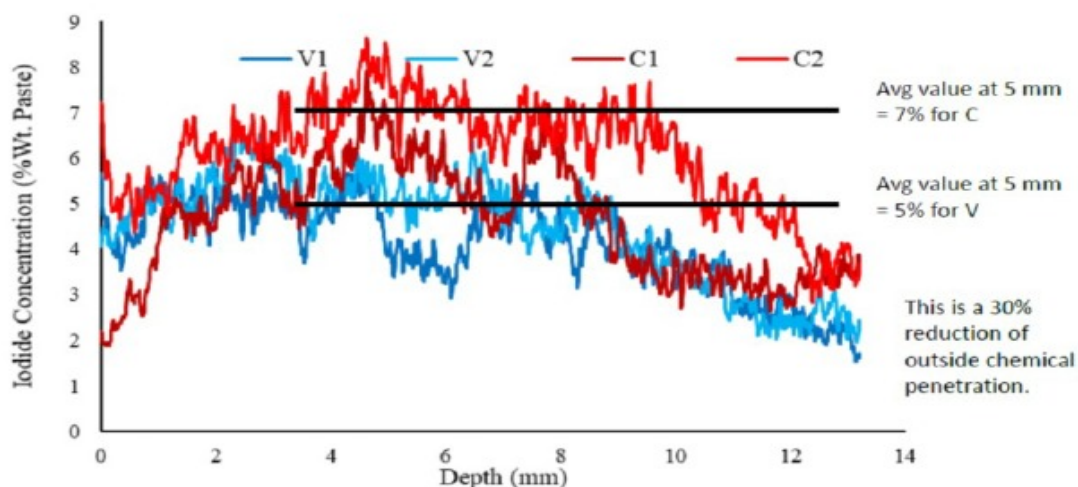
\*Sand is a blend of local and Orca (Vancouver/Polaris Materials) sand.

\*\*This was pre-project testing for Kaneohe-Kailua Wastewater Conveyance and Treatment Facilities Project; Oahu, Hawaii.

Materials	Weights
1" Aggregate	1,053 lbs.
3/8" Aggregate	708 lbs.
Sand	1,393 lbs.
Cement	630 lbs.
Water	283 lbs./34.0 gallons
MasterPozz 322	25.2 ounces
- 4 ounces per hundred weight	
Control C Mix - amine salts/carboxylic acids admixture	24 ounces
Control V Mix - Vapor Lock 40/40 admixture	63 ounces

### Overall Comparison

Concentration profiles of all the samples after 10 days of ponding.



### Summary

- Two cores were tested from each cylinder.
- Both cores showed good agreement with each other for sample C and V.
- There is a 30% reduction at 10 days of exposure for sample V when compared to C. Similar results were found at 5 days of exposure.



# ASTM C441 - Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction

An interesting procedure where glass is pulverized and added at over 200% of cement (an absurd amount used to speed up a long process), and mortar bars are prepared - proportions below in

Table 1. Both control and Vapor Lock enhanced samples are cast, cured in a moisture room for 24 hours, and then stored at 100 degrees F for 14 days. Results are in Table 2 -

Table 1 – C441 Mix Proportions

Material (g)	Control	Vapor Lock 20/20
Buzzi Cement	400	400
Vapor Lock	0	0.26
Graded Pyrex Glass	900	900
Water	217	218
Flow (100 – 115 %)	103	100

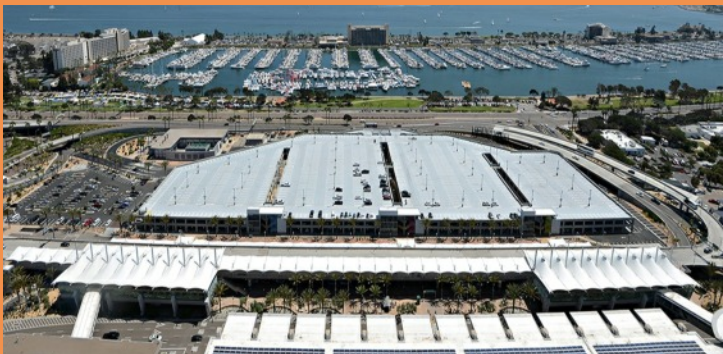
Table 2 – Expansion Due to ASR Test Results (%)

	Length (inches)		Length Change (%)
	Initial	14 Days	
Control 1	0.0536	0.0576	0.044
Control 2	0.0640	0.0678	0.042
Control 3	0.0655	0.0679	0.028
Average			0.038
17-124-1VL	0.0724	0.0740	0.020
17-124-2VL	0.0665	0.0677	0.016
17-124-3VL	0.0600	0.0614	0.018
Reference	0.0438	0.0434	---
Average			0.018
Reduction of Mortar Expansion as % of Control			52.6

As you can see, there was on average just over 50% reduction in the mortar expansion of the Vapor Lock enhanced specimens. The less developed pore structure of Vapor Lock concrete can resist/slow the destructive Alkali Silica Reaction all too common in certain areas of the country. The Portland Cement Association has a good piece that explains ASR in more detail - [http://www.cement.org/docs/default-source/fc\\_concrete\\_technology/is413-02---diagnosis-and-control-of-alkali-aggregate-reactions-in-concrete.pdf](http://www.cement.org/docs/default-source/fc_concrete_technology/is413-02---diagnosis-and-control-of-alkali-aggregate-reactions-in-concrete.pdf) Clearly this much glass in the mix throws the mortar into a hyper-agitated state (normal shrinkage of mortar + the glass expansion), yet another way to illustrate a pore structure restricting both ingress and egress within the concrete/cement matrix.



Terminal 2 Parking Plaza; San Diego Airport - 25,000 cubic yards of Vapor Lock enhanced concrete helped contribute towards the 2019 National Design-Build Merit Award Winners in Aviation



**ASTM C1202 - Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration or Rapid Chloride Permeability Test; also known as AASHTO T277**

A long-term, industry standard protocol/test for concrete “resistivity” is the ASTM C1202 - Rapid Chloride Permeability test (RCPT). This involves epoxy around a round 4” specimen and a 60-volt charge attached to it. Hydrogen peroxide solution on one side and salt water on the other side; the charge induces back and forth

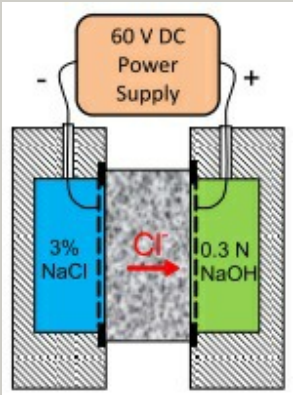
movement through the specimen. The total ion movement (of which chloride ions are part of) is measured after 6 hours. The fine folks at Grace do a good job explaining the pros & cons of this protocol - [https://gcpat.com/sites/gcpat.com/files/2017-06/TB-0100CPT\\_v2.pdf](https://gcpat.com/sites/gcpat.com/files/2017-06/TB-0100CPT_v2.pdf)

Rapid Chloride Permeability of Concrete				ASTM C 1202	
Location of Specimen within Cylinder		Top			
Discription of Specimen					
Presence of Reinforcing Steel		No		Location of Reinforcing Steel	N/A
Presence of Overlay		No		Thickness of Overlay	N/A
Presence of Surface Treatment		No		Thickness of Surface Treatment	N/A
Test Date 1	1/13/2017	Test Date 2	2/14/2017		
Test Age 1 (Days)	29	Test Age 2 (Days)	61		
Test Period (Hours)	6 hours	Test Period (Hours)	6 hours		
Total Charge Passed (Coulomb)	1157.41	Total Charge Passed (Coulomb)	761.38		

As part of a “pre-job” mix testing, we took a solid 0.38 w/c mix (straight cement) and performed Rapid Chloride Ion tests at one and two months. The results are judged by the criteria to the right.

The highlighted areas above shows 1,157 coulombs passed at one month, towards the bottom of the “Low” side of Chloride Permeability and 761 at the two month mark - solidly in the “Very Low” range or ‘internally-sealed concrete’ - An astute way to describe the solid combination of Ultra Low Permeability and inherent Corrosion Control provided by a Permanently Disrupted Capillary System.

Table: Chloride Permeability Based on Charge Passed		
Charge Passed (Coulombs)	Chloride Permeability	Typical of
>4,000	High	High W/C ratio (>0.60) conventional PCC
2,000–4,000	Moderate	Moderate W/C ratio (0.40–0.50) conventional PCC
1,000–2,000	Low	Low W/C ratio (<0.40) conventional PCC
100–1,000	Very Low	Latex-modified concrete or internally-sealed concrete
<100	Negligible	Polymer-impregnated concrete, Polymer concrete





Alex Spanos Athletic facility utilized Vapor Lock in all their slabs that supported beautiful, moisture-insensitive sports floors; UCSD - La Jolla, CA



## ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

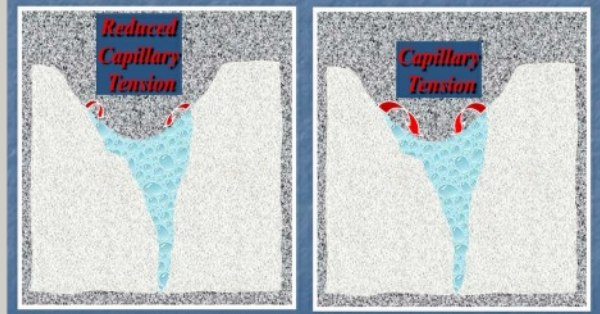
Another intuitive and vital element to the long-term *durability* of concrete is its shrinkage (or creep) characteristics. The above referenced ASTM test is rather long and arduous. For this reason it is not particularly practical for pre-project testing. For that reason, many parts of the country have adopted a uniform modification established by the National Ready Mix Concrete Association (NRMCA) <https://www.nrmca.org/aboutconcrete/downloads/TIP17w.pdf> - In essence, we are shortening the

“cure time” to 7 days, and taking a final reading at Day 28; giving us a look at 35 actual days of shrinkage. Although this probably doesn’t take into account “autogenous shrinkage” you can make certain assumptions; i.e. to meet a one-year spec of 500 microstrains (0.05% change), you may meet a 400 microstrain spec (0.04% change) at 35 days (28 day rack dry and 7 days “wet cure”). This is the protocol our testing lab partners have adopted and comparisons we make.

### Conventional Shrinkage Reducing Admixtures

Traditional SRAs use harsh chemicals to change the surface tension of water which is designed to reduce stress on the water leaving the pore/capillary structure during curing/drying. This alone is rarely effective and needs to be incorporated with substantial mid and high range water reducers/plasticizers. Often, given enough time, the long-term shrinkage curve closes as months and years go by, lowering the overall effectiveness. Also, it is not uncommon to lose about 10% of 28 Day compressive strengths of a mix.

### Shrinkage-Reducing Admixtures: Mechanism



Vapor Lock’s Nano-Silica technology upon contact with cement begins creating additional c-s-h gel from the available “free water” in the mix, and the calcium hydroxide present. This technology approaches Shrinkage Reduction in a drastic new way of “utilizing” water that would normally lend towards shrinkage/creep in a beneficial way of adding c-s-h product to the matrix. The disrupted

capillary system locks in remaining water/moisture for further cement hydration (additional developed product).

Below, ASTM C157 Modified tests with Vapor Lock versus a popular, conventional SRA and the respective results.

#### 5,000 psi (3,000 @ 3 days) Boom Pump Mix

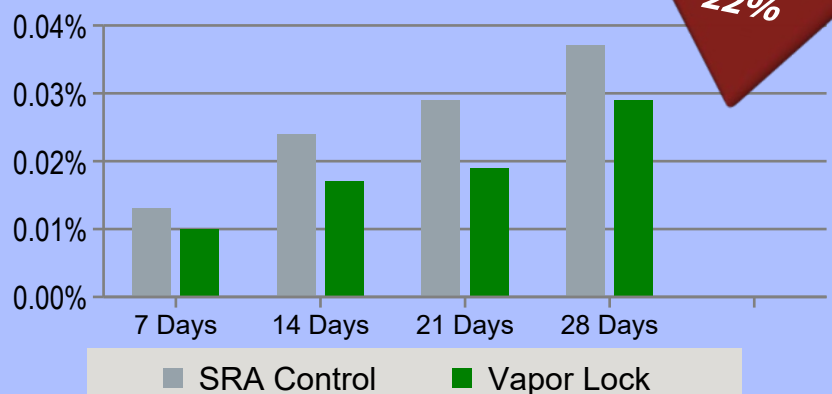
Cement	663 lbs.
Fly Ash	117 lbs.
Sand	1,313 lbs.
1" x #4 Agg.	1,051 lbs.
3/8" x #8 Agg.	554 lbs.
Water	295.7 lbs. (35.5 gallons)
WRDA 64	27.3 ounces
*SRA	64 ounces
*Vapor Lock	78 ounces

28-Day (3 specimen average)

Control w/ SRA = 0.037% change

Vapor Lock enhanced; 0.029% change

ASTM C157 (Modified)  
0.38 w/c mix; 7 Day Wet Cure &  
28 Day Air Dry



A REDUCTION  
of  
22%

## ASTM C876 – Standard Test Method for Corrosion Potentials of Uncoated Reinforcing Steel in Concrete; also known as AASHTO T259

In line with the same efforts of the Rapid Chloride Permeability test (ASTM C1202) to “expedite” comparisons of corrosion inhibitors effectiveness, ASTM C876 uses electrical resistivity with a connection between the reinforcement (rebar) in the sample and the surface of the concrete using a copper sulfate electrode/probe. Falling (negative) millivolts (measured in 0.001 of a volt). The higher the negative voltage drop, the greater the probability of steel corrosion occurring; illustrated by the chart on the right.



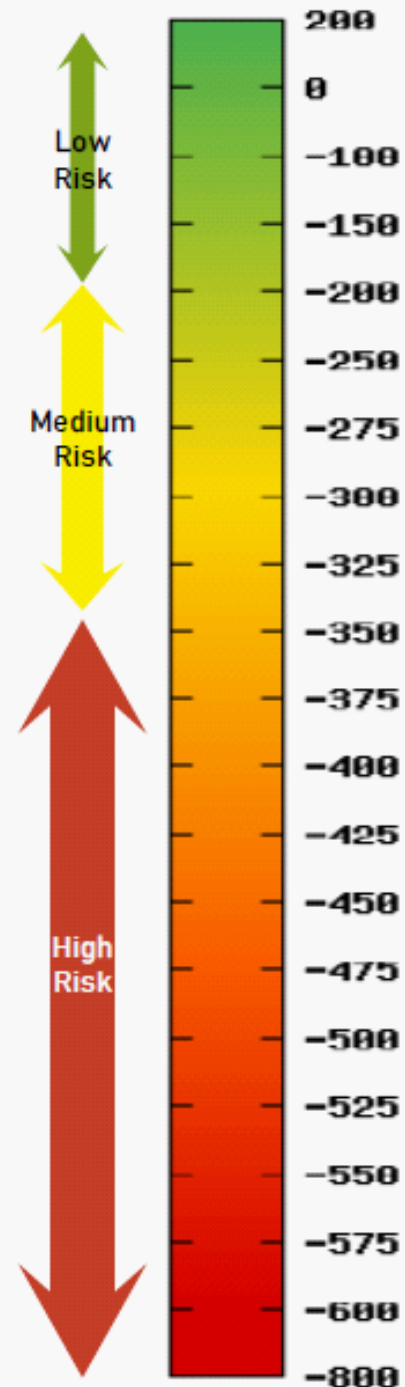
The samples were made with three pieces of uncoated, untreated #4 rebar in a standing triangle pattern. The top bar was exactly 1” below the surface and a “weakened” plane induced with a 1/32” shim at the mid-point. The actual samples were dammed with Plexiglas and cycled with heavy saturations of salt water (20%+ sodium chloride) on a weekly basis of wetting, drying, re-wetting, etc. A common (Southern California) 4,500 psi, 1” top size agg. mix design was used, with variations of commercially available corrosion inhibiting and water proofing admixtures;

- 5.5 gallons of calcium nitrite,
- 2.5% crystalline growth (by cement content),
- Vapor Lock 40/40
- and a plain control.



Measured Potential (mV)  
w/Copper Sulfate Electrode  
*versus*  
Probability of steel corrosion activity -

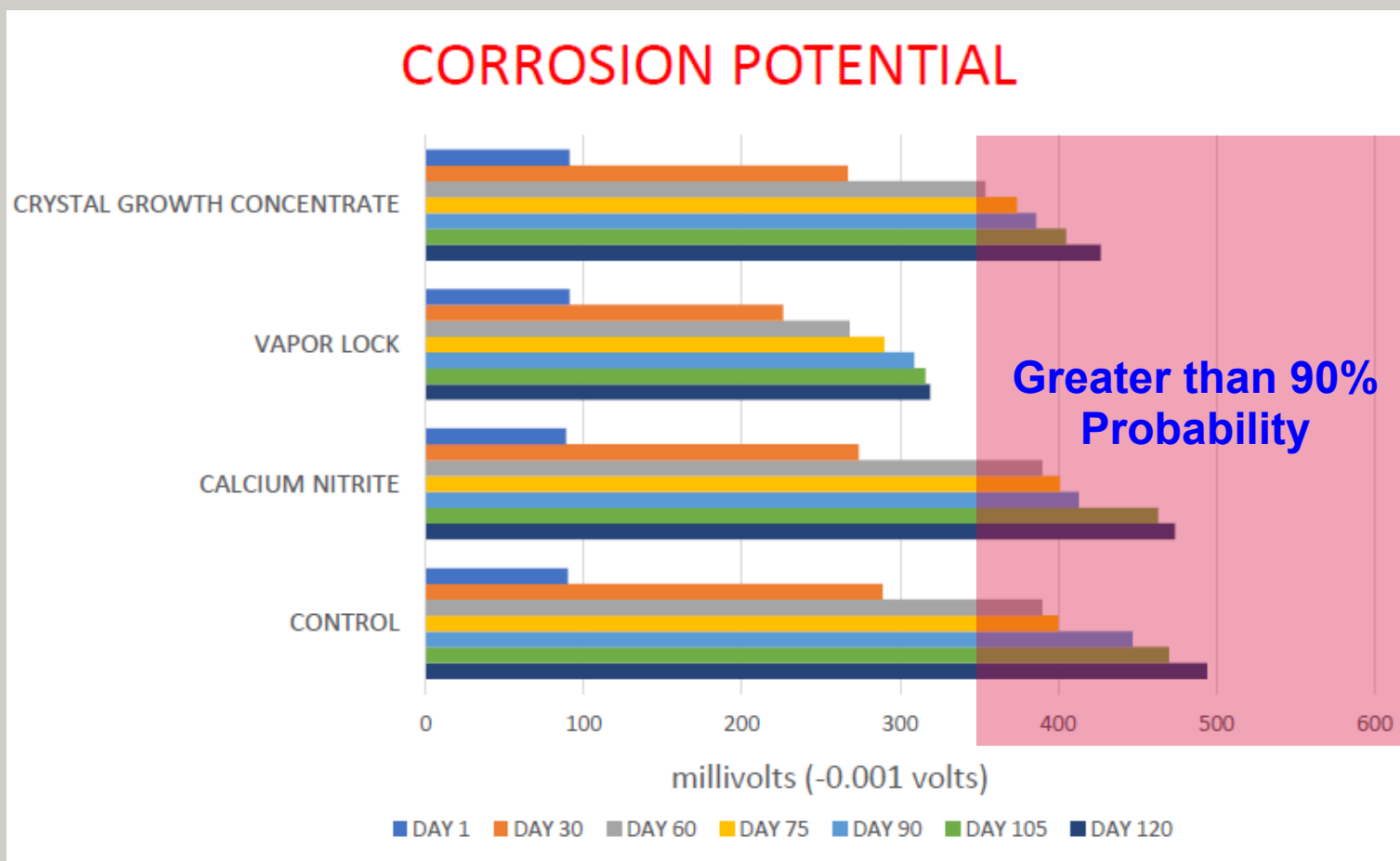
> -200 Less than 10%  
-200 to -350 Uncertain  
< -350 More than 90%





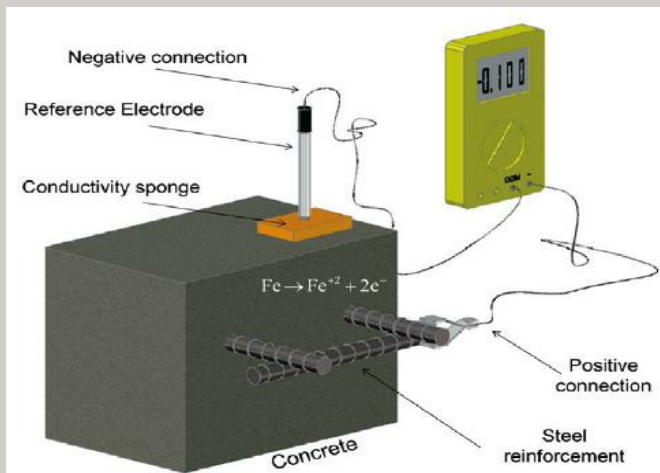
## ASTM C876 – Standard Test Method for Corrosion Potentials of Uncoated Reinforcing Steel in Concrete, continued.

The results of the four mixes are below -



As you can see from the results above, the harsh chloride environment, coupled with a rapid wetting and drying protocol, quickly moves all the samples into the “Medium Risk” or Uncertain area of probable corrosion potential. After about 30 days, the results move apart though; with the quick production of additional product disrupting the capillary system of the Vapor Lock enhanced samples and substantially slowing the fall in “resistivity”. The crystal growth

product self-described takes 120-180 days to produce additional product; by then, the damage of corrosion has already occurred. The calcium nitrite sample was nearly identical to the control; with little change to the capillary structure. By Day 60, all three specimens are into the (greater than - 350 mV) “High Risk” zone. The below gives some context to the Half Cell testing protocol involved -



Measurements are taken from a high-impedance voltmeter. From the positive side, a connection to the (top) rebar is secured. The negative side, connected to a 360-degree copper-sulfate electrode probe. At set intervals, we can periodically measure drops in millivolts (0.001 Volts), giving us insight towards concrete’s “resistivity” or *transportation potential* of destructive elements inwards towards steel encased in concrete.

## TESTING SUMMARY -

**ASTM D5084 - Coefficient of Permeability** - Depending on the w/cm ratio of the mix, you can expect between a **60% - 99.99% reduction in Permeance** of your concrete (i.e. a 0.52 w/c ratio mix will go from roughly 200 US Perms down to 0.02 US Perms).

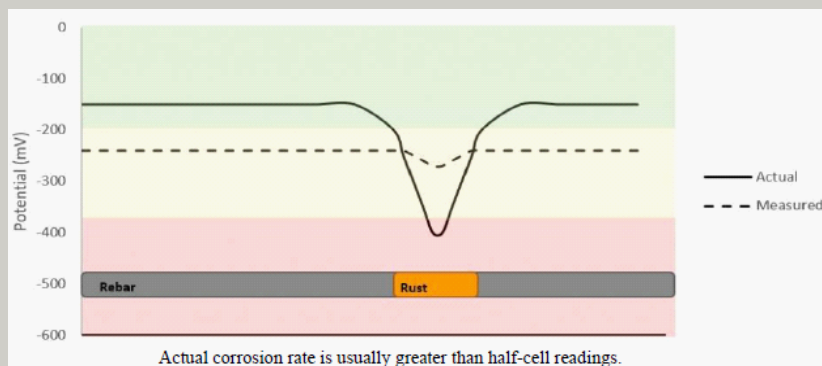
**Modified ASTM C1152 - Nano X-Ray Fluorescence Depth of Saturation Testing for Acid-Soluble Chloride in Mortar and Concrete** - Vapor Lock enhanced specimen showed a **30% reduction in depth of penetration** versus a control with Cortec MCI. Hawaiian material mixes; considered High Performance Concrete.

**ASTM C441 - Test Method for Effectiveness of Pozzolans or Ground Blast-Furnace Slag in Preventing Excessive Expansion of Concrete Due to the Alkali-Silica Reaction** - A **52.6% reduction in Alkali-Silica reaction** versus control; greatly inhibiting negative reactions at the Interfacial zones.

**ASTM C1202 - Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration or Rapid Chloride Permeability Test** - A solid 0.38 w/cm mix enhanced with Vapor Lock showed 1157 coulombs (Low) at 29 days and 761 coulombs (Very Low) at 61 days.

**ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete** - High-sack content mix showed a **21.6% reduction** with Vapor Lock over a half gallon of the leading conventional SRA in the same mix. *On average, you can expect a 15 - 25% decrease over a plain control.*

**ASTM C876 – Standard Test Method for Corrosion Potentials of Uncoated Reinforcing Steel in Concrete** - In common 4,500 psi structural mixes, Vapor Lock showed a **35.4% improvement** over the control mix, and a **32.7% improvement** over the calcium nitrite mix; both at 120 days using a conventional Half-Cell instrument.



An important note - the half-cell potential test is the only corrosion monitoring technique standardized by ASTM; giving us perhaps the greatest gauge of concrete's true "Transport" mechanism. By recording drops in millivolts ("potential" values), it allows us to gauge the loss of the protective layer around the rebar (from the destructive anodic/cathodic process) and anticipate future corrosion potential. Knowing actual values are usually 3-5 times greater than recorded values around areas of degradation (rust).

***\*Although some of these protocols were designed and adapted around Corrosion Inhibition, the overall "disrupted capillary" symptoms can be equally inferred to be helping overall Concrete Durability as well.***

***\*\*We continually extend the invitation for "pre-job" testing for your project's mix design considerations; no guesses....only exact targets and goals for Ultra Low Permeability, Shrinkage Reduction and Corrosion Inhibition.***



### ***What the Industry has to say about the importance of your Concrete's Permeability....***

The Industry leader - the Portland Cement Association, talks about achieving **Durable Concrete** in great length. It states *"Corrosion of embedded metals in concrete can be greatly reduced by placing crack-free concrete with low permeability and sufficient concrete cover. Low-permeability concrete can be attained by decreasing the water to cementitious materials ratio of the concrete and the use of pozzolans and slag. Pozzolans and slag also increase the concrete resistivity thus reducing the corrosion rate even after it initiates."*

<https://www.cement.org/learn/concrete-technology/durability/corrosion-of-embedded-materials>



## PRODUCTS

The basic technology of adding silicates to the surface of concrete has been around since the week after concrete was invented. The evolution of Nano-Silicas as an Integral Concrete Admixture is over 20 years old. The preceding testing is constantly evolving and expanding, showing a value

proposition not seen since Super-Ps. The following are ASTM C494, Type S admixtures based off Nano-Silica and Lithium technologies honed for precise applications; with specific warranty and insurance components:

# Vapor Lock™ 20/20

**MVRA - MOISTURE VAPOR REDUCING ADMIXTURE**

**- For Warranted & Insured Flooring, Architectural Coatings & Roofing Installations**

# Vapor Lock™ 20/21

**ULTRA-LOW PERMEABILITY ♦ SHRINKAGE REDUCING WATER/DAMP PROOFING ADMIXTURE**

# Vapor Lock™ 40/40

**CORROSION INHIBITING ADMIXTURE**

**- Combats both the Initiation & Propagation phases of Steel Corrosion**

These are the core Vapor Lock concrete admixtures. The systems below are complimentary systems that enhance the admixture line above -

## *Shield Wall 39*



A cold, spray-applied, two-part Elastomer System with outstanding characteristics make this membrane ideal for water/moisture and gas containment. \* Used in High Risk situations (i.e. below water table/constant hydrostatic pressure, methane/radon, etc.)

## **Vapor Lock 120 & 555 for Cement Treated Bases & Soil Stabilization Systems**



- A two-part system where Vapor Lock 120 replaces up to 50% of the cement or lime in the surface tilling and Vapor Lock 555 is typically applied to the surface. Waterproof with compaction and hardness similar to that of asphalt.

# Vapor Lock 20/20

## MVRA - MOISTURE VAPOR REDUCING ADMIXTURE

For Warranted & Insured Flooring, Architectural Coatings & Roofing Installations

### Product Description

Vapor Lock is a clear liquid pozzolanic concrete admixture that works with the calcium hydroxide in portland cement and extra mix water (water not needed for cement hydration) to produce additional calcium silicate hydrate gel (c-s-h). Vapor Lock immediately creates relatively large amounts of additional c-s-h within the cement matrix that inhibits the formation of capillaries and bleed channels in the plastic concrete. This natural process permanently reduces the porosity of the concrete and is considered a ***Permanent Capillary Break***. This allows for all critical paths involving the installation of flooring, coatings and roofing to be ***guaranteed***.



**Vapor Lock**™ is quoted, sold and supplied by all Ready Mix Suppliers throughout North America.

### Product Advantages

Vapor Lock uses naturally occurring elements within concrete to produce *additional* c-s-h gel that floods the capillary system producing *Ultra-Low Permeability* concrete - something *already* present in concrete. It does **NOT**;

- Require Additional Labor; added automatically when your concrete is being placed,
- Require mid/high range water reducers or difficult low water:cement ratio mix design restrictions,
- Change the set or physical characteristics of the mix (i.e. lower compressive strengths, retard set, etc.)

**Vapor Lock**™

- affords the opportunity to design any and every kind of floor covering imaginable, while eliminating the worry and expense that accompany normal construction installation.





**BACK STORY** - In 1998 the EPA legislated it's way clear of all high-VOCs (solvent based) architectural coatings, sealers, and flooring adhesives. Overnight, water-based adhesives fell from the tens of thousands parts per million in VOCs down into the hundreds. With these new adhesives came new problems - the least bit of moisture (in the form of vapor) transmission from either the sub-base or within the concrete itself moves to the surface. The results caused huge indoor air quality issues and failed floorings. In 2005, Vapor Lock, which started out as a concrete densifier - came to the forefront to solve this problem.

## Product Benefits

Once Vapor Lock is dispensed into concrete during batching/mixing, it immediately begins to change the pore structure. This is evident as the initial screeding and floating takes place - *little to no bleed water comes to the surface.* The relatively large amount of additional c-s-h virtually eliminates the creation of tiny capillaries - the superhighway of water/vapor travel through the concrete (cement matrix). It is through this action, that Vapor Lock enhanced concrete benefits, which include:

- Ultra Low Permeability concrete - a *Warranted* maximum level of 0.174 US Perms, eliminating the ingress/egress of water, moisture/vapor, and any deleterious material,
- A Denser, "Non-Sweating", more **Durable** piece of concrete three-dimensionally throughout the entire matrix (not just on the surface) which can replace most topical sealers,
- Reduced Bleed Water equates into less Curling, Plastic Shrinkage Cracking and Long-Term Shrinkage (Creep), as well as a uniform color/tone to the overall surface presentation,
- And the **Integral Solution** is always the lightest carbon footprint of any available system.

## CASE STUDY

Good & Roberts, G/C on the Lot 5 Urban Villages just north of the Cal State campus in San Marcos, CA, and the 78 freeway, built a 62,000 sq.ft., 3-story Concrete Tilt-up Office Building. With the s-o-g already completed, the owners became concerned about moisture/vapor issues on the lightweight concrete over metal decking and their abbreviated schedule. The second floor is leased by surgeons and medical professionals that demand high-end antiseptic floorings. The up-

charge for Vapor Lock for the second story was approximately \$9,000; in-place, Warranted & Insured on-time protection. The first floor, having been placed prior to the introduction of Vapor Lock had to be topically remediated at just north of \$59,000. **Conclusion:** *On-grade slabs can be budgeted at less than \$1.00 a sq./ft. in the design stage with Vapor Lock (and an installed vapor barrier) - or \$7.00 a sq./ft. weeks before the keys get turned over.*



Pima Medical/Urban Villages - San Marcos, CA  
Good & Roberts General Contractors  
Minegar Concrete Contracting, Inc.



Second Floor Vapor Lock Moisture/Vapor Control  
Integral Concrete placement - Warranted &  
Insured protection - all critical paths met.

# Vapor Lock™ 20/21

ULTRA-LOW PERMEABILITY ♦ SHRINKAGE REDUCING  
WATER/DAMP PROOFING ADMIXTURE

## Product Applications -

Vapor Lock is a pozzolanic *Nano-Silica* concrete admixture that creates relative large amounts of additional c-s-h. This natural process, changes the pore structure of enhanced concrete almost immediately. Because of the relatively large amount of “extra” c-s-h *created* and *enhanced* with Vapor Lock, we find a far less developed capillary/pore structure in the cement matrix, from the plastic stage through the hardened stage, even many years later. Vapor Lock imparts characteristics that allow the engineer/specifier to replace certain conventional systems, saving substantial time and money -

- A true ***Durability*** admixture; protecting two ways, by creating an Ultra Low Permeability piece of concrete with less long-term Drying Shrinkage,
- Ancillary benefits of a sealed capillary structure allow for the elimination of conventional topical sealers and coatings,
- Serves as a Stand Alone Waterproofing system (Membrane Free Construction) or acts in concert with traditional membrane systems (Belt-and-Suspenders),
- A denser, “Non-Sweating” piece of concrete, with a more mono-chromatic color; either in horizontal or vertical construction. Plain or reinforced.



## CASE STUDY

The developers, Allgire Construction working within a fixed budget, replaced ALL vertical & horizontal membranes and utilized Vapor Lock in the 12” thick structural shotcrete walls. Located in Downtown San Diego (16<sup>th</sup> & Market St.) They were working with a seasonal 7 foot water table. No over-excavation was

## ***“Membrane Free” Construction***

required, as piles were placed, then wooden lagging, and then reinforcement. The waterproofing was added with the concrete. A simple 15-mil vapor barrier was used on the s-o-g sections. They saved ***\$200,000 and got their podium three weeks sooner.***

### **Nook East Village; Downtown San Diego, CA**

- 91 micro units in the hip east district with the entire subterranean water-proofed with Vapor Lock enhanced concrete - only!

Owner - Trestle Development

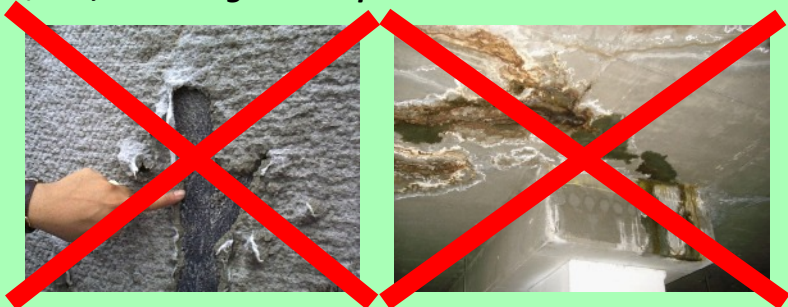
G/C - Allgire Construction

Architect - Joseph Wong Design & Associates

Concrete Contractor - Thunder-Jones Concrete

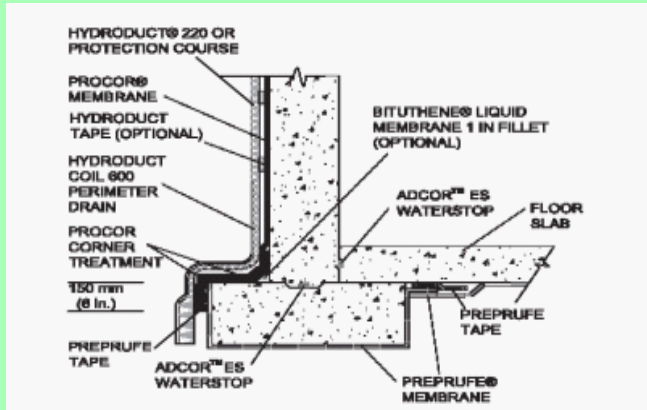
Shotcrete Contractor - Nationwide Shotcrete

Ready Mix - Cemex; Mission Valley Plant



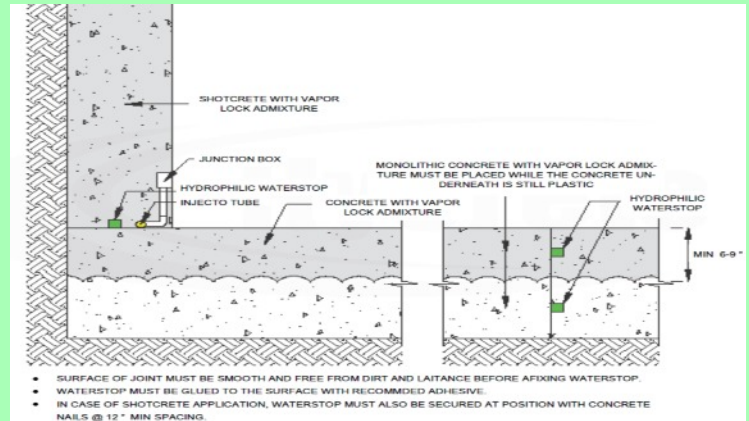


## Popular Membrane/Waterproofing System



Convention has led us to wrap membranes and coatings around our concrete, steel and what's inside. Traditional waterproofing membranes (like the system above) require perfect installation and several trips dictated by various other trades. Next to that, a

## Integral Concrete Waterproofing System



wall/mat slab detail that contains Integral Concrete Waterproofing (As well as Shrinkage Reducing & Corrosion Inhibiting) admixture. Chances are you've seen a lot of details in your line of work....now which detail in your mind, has the highest risk of ruin??



### CASE STUDY

**WHERE:** San Diego International Airport

**WHEN:** First deck pour, April 30, 2017

**HOW BIG:** 3 Levels, 2,683 stalls (1,700 covered stalls), 1,269,000 sq.ft.

**HOW MUCH:**  
Total Cost - \$128,000,000

Swinerton Builders and Watry Design working together with the Airport Authority, ultimately chose a cast-in-place, post tensioned design. Both 2<sup>nd</sup> and 3<sup>rd</sup> level decks and all of the ramps utilized the Vapor Lock 20/21 concrete admixture throughout - an ***Integral Solution*** to both shrinkage & corrosion protection. About 25,000 cubic yards. The mix was provided by Hanson Aggregates, a 5,000 psi mix (2,750 psi @ 3 days) and a ***0.036% Shrinkage specification***.

The finish entailed a beautiful 14" rotary swirl by hand - March 1, 2018, was the opening. Project Superintendant, Gary Conover, can be emailed with specific questions - [GConover@swinerton.com](mailto:GConover@swinerton.com)





- **Mat (Raft) Foundations - Replaces High Density Polyethylene (HDPE);**

Typically a leading candidate for use in Mat or Raft (also called “Boat Foundations”). This system can be easily replaced with Integral Waterproofing in only the top 6 inches of the total depth (usually 2 - 5 feet thick). Lower Heat of Hydration and a complete Water/Damp Proofing will be achieved.



- **Walls; Poured-in-Place or Structural Shotcrete - Replaces Bentonite Panels or Sheets;**

Bentonite has historically been the choice for blindside applications (waterproofing is installed first, with concrete being installed next) and is marketed by numerous manufacturers. Unfortunately, Shotcrete is almost impossible to adhere to bentonite. There have been numerous applications of using Integral Waterproofing in concrete walls for over a decade now.



- **Podium/Plaza Decks - Replaces Hot Applied Coatings;**

It's not uncommon to place a slightly thinner section containing all the necessary structural steel first. Then install a hot applied, asphaltic coating (and very often a drain board to physically evacuate water) with a topping slab to follow. With proper slope-to-drain, Integral Waterproofed concrete can replace this system - in one lift.



- **Hillside Pinnings - Replaces Bentonite Panels;**

Because there is no footing/stem wall, this application is considered a “pinning”. Corrosion, shrinkage and Permeability are all major concerns. Vapor Lock is preferred by structural shotcrete applicators over fly ash!



# Vapor Lock™ 40/40

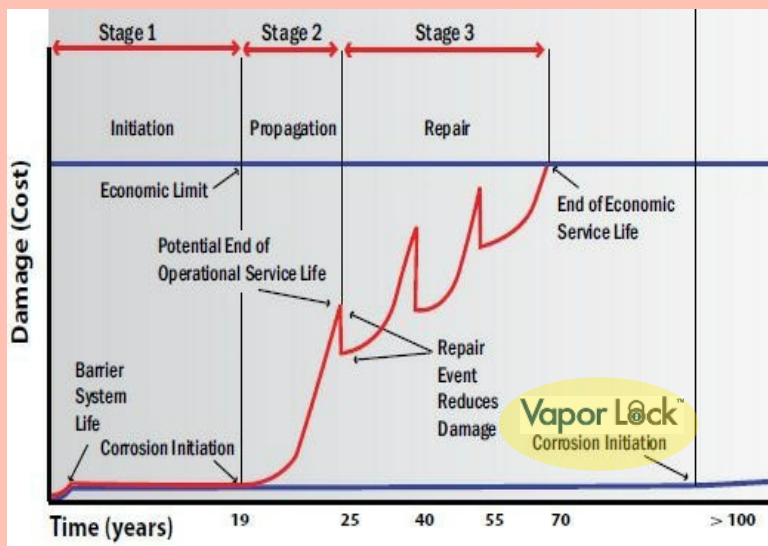
## ASTM C494 - Type S

### CORROSION INHIBITING ADMIXTURE

***Protects both the Initiation & Propagation phases of Corrosion with MFC***

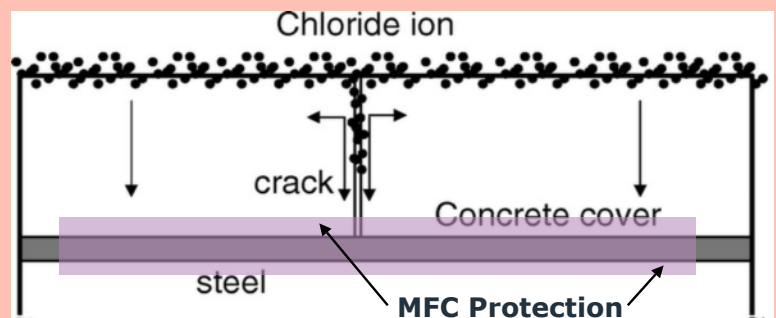
Vapor Lock 40/40 is the first, dual action, maximum performance Corrosion Inhibiting concrete admixture in the marketplace. Vapor Lock 40/40 has the same base of delivery as the 20/21 formula (Ultra Low Permeability & Shrinkage Reducing) coupled with a state-of-the-art ferrous coating that dramatically slows the oxidation process. This

coating is robust, works at the nano-level, and is "self healing" in nature. This encapsulating film is effective well after a crack develops in the cement matrix. This second sphere of protection does not change the set-neutral effects of the Vapor Lock 40/40 formula. All of the features and benefits of regular Vapor Lock are still present and working.



Vapor Lock 40/40 addresses corrosion of steel within concrete from both phases; *initiation* and *propagation*. First, the unsurpassed Shrinkage Reduction and Ultra Low Permeability fight to keep the constant and passive levels in and around the steel/concrete matrix. And if that balance is interrupted and the electro-chemical process begins, it is greatly slowed by the film coating supplied by Vapor Lock's second sphere of protection.

This second sphere of "post crack" protection *Migrating Film Coating (MFC)*, is the key to true Corrosion Protection. It is the hardest part of mixing proven chemistry with technology that does not adversely affect concrete's characteristics and ultimate performance, something other products can't say....



***Easily the most effective concrete admixture in the marketplace to date. Coupled with a sound mix design can approach doubling the expected life cycle of all concrete structures.***



There have been previous attempts to utilize long-chain hydrocarbons (i.e. waxes, animal fats), nitrates/nitrites, amine salts, and carboxylic acids to varying effect to combat corrosion. Even if these admixtures successfully “migrate” and coat encased steel, the mixes become volatile and hard to handle; with lowered compressive and flexural strengths, hyper-acceleration and coatings degrading. The Vapor Lock formula has a track record for over a

decade of eliminating the movement of moisture through concrete in the flooring universe. Established and documented ability of disrupting the capillary system in concrete to the highest degree possible. And now, the additional component of the Migrating Film Coating (MFC) element that permanently coats and protects all your encased steel in the 40/40 admixture - quickly changing the long-term life cycles of today’s reinforced concrete structures.

### Corrosion Inhibitor Admixtures - Check List

Vapor Lock™ **CALCIUM NITRATES** **WAXES/ PRECIPITANTS**

ADDRESSES CORROSION  
PROPAGATION; WITH  
FILM COATING AROUND  
STEEL



YES

ADDRESSES CORROSION  
INITIATION; WITH ULTRA  
LOW PERMEABILITY



NO

NO; Only Mix  
Design Constraints

SET NEUTRAL



NO; Hyper Acceleration

NO

DROP IN COMPRESSIVE  
& FLEXURAL STRENGTH



YES; About  
10% Lower

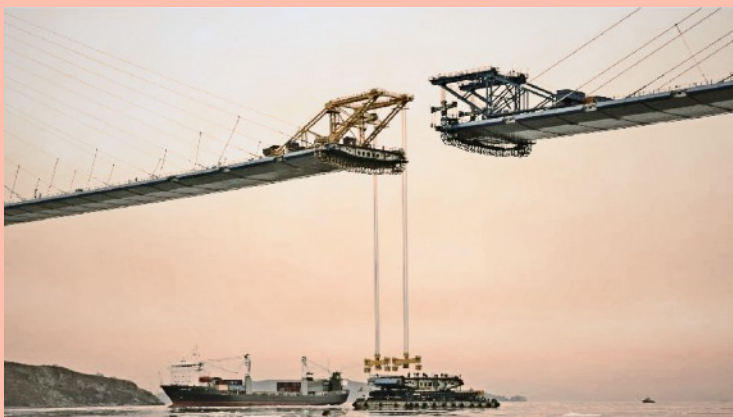
YES; About  
30% Lower

ACTS AS A SHRINKAGE  
REDUCER



NO; Increases Shrinkage

NO



*“The Last Missing Piece of  
Intelligent concrete design -  
marrying Ultra Low Permeable  
Concrete, Shrinkage Reducing  
characteristics with a robust,  
migrating Steel Film  
Coating...to produce a Lifetime  
of Concrete Durability”*





## Product Benefits - Structural Shotcrete Applications

Shotcrete - is defined as concrete which is transmitted via hose and pneumatically projected at maximum velocity on a surface; usually walls or ceilings. It goes through placement and compaction concurrently due to force that is projected with a nozzle, and is most often less expensive than conventional poured-in-placed methods. It usually requires just one side of form-work and can accommodate a variety of finishes, making it almost impossible to distinguish from other systems. Shotcrete can

cover structural steel and become a structural unit; a load bearing, shear wall element in a structural engineer's design.



***If the shotcrete applicator had the opportunity to design one concrete admixture, invariably they would prefer one that would eliminate the extra mix water and provide extra “fines” or “cream” that would aid in finishing. That happens to be the two consistent and main characteristics of Vapor Lock enhanced concrete. Any place in the world you have Vapor Lock concrete, once you screed and “float” the surface, you will visually see little to no bleed water come to the surface. A dream for a Shotcrete Applicator!***



**Vapor Lock over Carlisle; Encinitas, CA**



**Vapor Lock - Hillside Pinning with NO Fly Ash; Beverly Hills, CA**



The key to any successful shotcrete project is a certified and experienced nozzleman. Introducing shotcrete is a fast paced, kinesthetic exercise, with the key being consistent and total consolidation of concrete around all reinforcement. Every project should prescribe a realistic mock-up like the one on the left. These samples are usually cored and sliced to show the lack of “shadowing” behind any rebar. The consolidation rivals some of the best poured-in-place wall systems out there. Shotcrete is an economical and fast application of rich, high-sack content concrete installed in areas problematic for conventional formwork.

# Product Warranties & Insurance

**S**pecialty Products Group, the manufacturer of Vapor Lock admixtures, has done everything in it's power to eliminate RISK pertaining to everything touching your concrete. As an owner, or CM with 'skin in the game', you can rest assured with all SPG's Integral Concrete Admixture systems;

- Flooring, Roofing and Architectural Coatings Installations,
- Water/Damp Proofing (Stand-alone or Belt-and-Suspenders),
- Shrinkage Reducing & Corrosion Inhibiting.

For the first two areas of concern, SPG has secured the most substantial, third party insurance broker to secure *Project Specific (non-aggregate)* insurance through Lloyds of London. Our Warranty & Insurance samples are below -



Notice very few "lawyer" words. Project specific Insurance, that allows contractor & designer third party riders for everyone's confidence. \$20,000,000 CAD....about \$15.4 Million USD.

**S**pecialty Products Group will Warrant any design permeability or shrinkage specification agreed upon. We welcome and participate in all pre-submittal mix design testing. We work with several local labs to laser point an actual compressive strength, shrinkage and permeability level needed....not just ranges - and we stand behind them. On the flooring, roofing & coatings side, no conventional moisture

CERTIFICATE OF INSURANCE					DATE (MM/DD/YYYY) April 16, 2017	
BROKER <b>BrokerLink</b> 86 Woodlawn Road West Guelph ON N1H 1B2			This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policies below.			
INSURED'S FULL NAME AND MAILING ADDRESS <b>Specialty Products Group Inc.</b> 6254 Skyway Drive PO Box 915 Smithville ON L0R 2A0			ISSUING COMPANIES AFFORDING COVERAGE Provided by Certain Lloyd's of London Underwriters BORER0277195A			
COMPANY A			COMPANY B			
COMPANY C			COMPANY D			
COVERAGES This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirements, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.						
LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
CO- LINE	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS (Canadian dollars unless indicated otherwise)	
A	GENERAL LIABILITY	CHE0020	04/16/2017	04/16/2018	EACH OCCURRENCE \$ 20,000,000	
	COMMERCIAL GENERAL LIABILITY				NO AGGREGATE	
	CLAIMS MADE FORM				\$ 20,000,000	
	CROSS LIABILITY				PRODUCTS & COMPLETED OPS. \$ 20,000,000	
	TENANTS' LEGAL				SOLELY EMPLOYEES & SUBSIDIARY DAMAGE \$ 250,000	
	LIABILITY NON-OWNED				POLLUTION \$ 100,000	
	AUTOMOBILE				BIOPHYSICAL DAMAGE \$ 500,000	
A	AUTOMOBILE LIABILITY				\$	
	DESCRIBED AUTOMOBILE FORM				\$	
	ALL OWNED VEHICLES				\$	
	ALL LEASED VEHICLES				\$	
	EXCESS UMBRELLA LIABILITY				EACH OCCURRENCE \$	
	UMBRELLA FORM				AGGREGATE \$	
	OTHER -				RETAINED LIMIT \$	
	PROPERTY				\$	
	BROAD FORM				\$	
	NAVED PERILS				\$	
	OTHER				\$	
ADDITIONAL INSURED The following is hereby added as Additional Insured(s) on the Commercial General Liability but only with respect to liability arising from operations performed by the Named Insured - N/A			DESCRIPTION OF OPERATIONS/LOCATIONS/ SPECIAL ITEMS OPERATIONS: Ad-Mixture Manufacturer			
CERTIFICATE HOLDER			CANCELLATION			
None			Not applicable			
			AUTHORIZED REPRESENTATIVE  Matt Nelson, Account Executive			

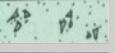
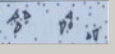
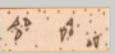


testing is required - our system subordinates them all. On the water/damp proofing side, we offer the state-of-the-art **ShieldWall 39 - Disruptive Membrane system** to compliment our Integral Waterproofing Admixture in high risk areas (i.e. at or below water table). The combination of these technologies qualifies for the same above warranty and insurance.

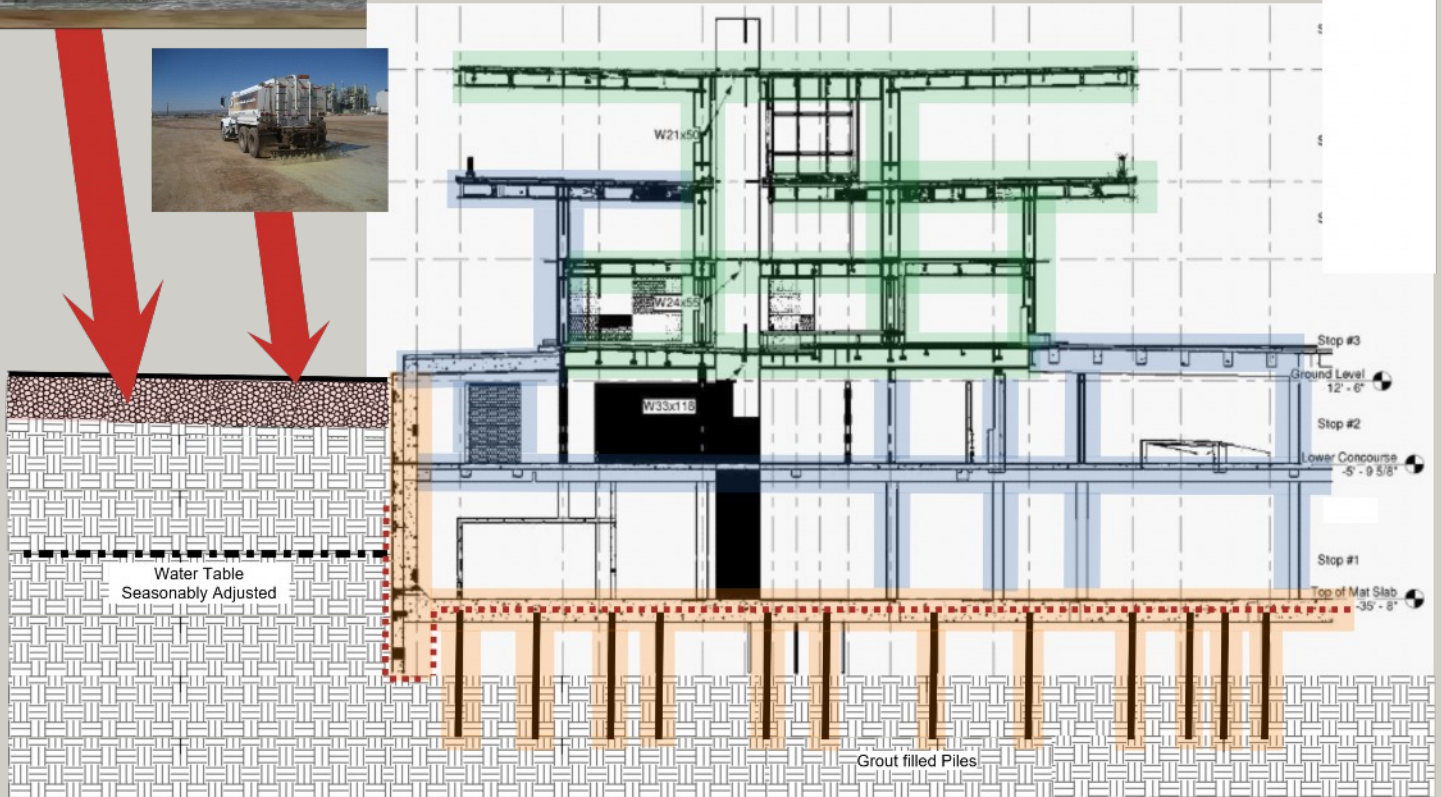
**Vapor Lock™ 100% WaterTight Construction - the Integral Approach; Warranted & Insured**



# LAND & BUILDING PROFILE - TYPICAL DETAIL FOR VAPOR LOCK APPLICATIONS



<b>Vapor Lock™ 20/20</b>	- MVRA; Insured & Warranted protection for flooring, roofing & architectural coatings	
<b>Vapor Lock™ 20/21</b>	- Shrinkage Reduction Admixture & Ultra Low Permeability	
<b>Vapor Lock™ 40/40</b>	- Corrosion Inhibition; SRA, ULP & a robust ferrous coating	
<b>Vapor Lock™ CSC 120 &amp; 555</b>	- Soil Stabilization; cement reduction & topical applications	
<b>Shield Wall 39</b>	- Elastomer Spray-Applied Disruptive Membrane; high risk areas	



## ShieldWall 39

- is a water-based, two-component elastomer modified liquid rubber system which adheres to most substrates. Shield Wall is a sprayed applied, "instant-set" water proof coating. Flash cured, this seamless flexible coating functions as a high quality, protective membrane providing excellent protection from water penetration, salt, fire and most severe chemical attack on all concrete exterior surfaces. It has outstanding elongation (initially over 900%) and will maintain water tight integrity in the face of reasonable structural movement; up to a 5/16" (7.937 mm) crack width.





## Overview & Sustainability -

**The Vapor Lock systems** are at the forefront of the Nano-Silica technology for permanently and consistently disrupting the capillary system in concrete for the most “set neutral” performance handling mixes available. This leads to the industry leading state-of-the-art Moisture/Vapor Proofing, Water/Damp Proofing, Shrinkage Reduction and Corrosion Inhibiting admixtures. Specific systems that do two things; **ELIMINATE RISK** and **GUARANTEE CRITICAL PATHS** - period. It is easily the *Best, Fastest, and Least Expensive way to build your project...*



*Terminal 2 Parking Plaza; San Diego International Airport - the airport authority and the design team of Swinerton Builders & Watry Design chose to spend a couple of dollars more (per cubic yard) and utilize Vapor Lock to meet both the 0.036% change shrinkage specification and achieve 0.0146 US Perms permeance in all 25,000 cubic yards for the 2<sup>nd</sup> and 3<sup>rd</sup> levels and all the ramps. A truly Durable Concrete choice -*

Today, the term **Sustainability** is one of the most overused terms out there. The Vapor Lock admixture is just one part of a system - an intelligent concrete mix design; about a half to three quarters of a gallon, overall. The results are a denser, superior piece of concrete that exhibits significantly less Long-Term Shrinkage, state-of-the-art Ultra Low Permeability, a more monolithic unichrome color, and when used with proper “ways & means” (i.e. adequate concrete coverage), will extend both the initiation and propagation stages of encased steel corrosion ***towards a doubling of the life cycle for reinforced concrete.*** Vapor Lock is priced and supplied by your local commercial ready-mix concrete producers, and should be considered at multiple levels of design where *RISK* is involved. Whether moisture/vapor concerns are effecting flooring installation critical paths, or a heavy water proofing schedule has your hands tied - Vapor Lock is the intelligent option, and worthy of consideration.

We welcome all design professionals, discerning constructors and interested owners to reach out today for a “Hosted” Breakfast or Lunch to discuss how the Vapor Lock systems can precisely add value to your project - while providing professional development credits. We’ll leave the term Sustainability to your review and how it relates to Vapor Lock’s ability to almost double the life cycle of your project.



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