



# CRETO™

Worldwide Inc.  
Permanent as the Pyramid

## CRETO DPS

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Solve concrete problems once and for all

CRETO-Worldwide Inc.

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In this document we show how CRETO DPS is a perfect fit to protect concrete against moisture, freeze/thaw, dusting. We will show how DPS can help the paint trade, flooring trade and other trades in their dealings with concrete. Once is forever with CRETO DPS.

# GENERAL OVERVIEW

## **PRODUCT DESCRIPTION**

### Introduction

Top contractors, architects and engineers know the destructive results when masonry and cementitious surfaces are not properly treated and protected. Yet, property owners and maintenance personnel often overlook or are not aware of this construction deficiency until the structure visibly appears to crumble and disintegrate. The penetration of rain, salts, oils, etc., along with freeze-thaw cycles, entering the pores of the concrete are known to cause extensive damages. These pores act like tubes or canals that carry damaging substances below the surface (often through the entire structure), which creates major deterioration problems to concrete structures. Therefore, the job is not finished until a sealant like CRETO DPS is used.

The name CRETO has been utilized since 1918 for 100 years and all the enclosed reports refer to the product by that name. CRETO DPS is a unique product and no other product on the market compares with its effectiveness. We will discuss the great benefits and features in the summary at the end of the technical reports.

# **PRODUCT ANALYSIS**

## **TECHNICAL REPORT NO. 1**

### **General Description of CRETO DPS**

CRETO is a scientific, cost effective, penetrating preservative which waterproofs, seals, cures and strengthens most old and new masonry and cementitious surfaces. It is non-toxic, non-flammable, odorless, clear, and a water soluble liquid compound before reactive process in concrete. Safe and easy to use.

The use of CRETO DPS outlasts and outperforms every other sealant on the market today.

According to the U.S. Testing Laboratories, the interior of a piece of concrete contains a minimum of 361 times the amount of alkali as compared to the surface area. Therefore, CRETO DPS, which penetrates into the concrete going below the surface and chemically reacts with the alkali, is not only very effective and becomes a permanent part of the concrete, not a surface coating. Most other sealer applications are surface treatment and by their own chemical compositions, will react negatively with the moisture and alkali in the concrete and will soon peel off due to this aeration and deterioration. If there is foot or vehicular traffic as well, most sealers on the market will wear off in weeks or months, leaving the concrete unprotected. Since CRETO DPS uses the alkali within the concrete, it cannot aerate or deteriorate, thus giving the concrete a permanent waterproofing, seal and cure concrete. Its colorless, odorless, penetrating action causes a chemical reaction within the concrete, solidifying the component parts into one solid mass, thereby completely stopping leaking and dampness without changing any physical appearance of the structure. CRETO DPS is an internal sealer. Therefore, it only needs to be applied once, since it does not wear off like other coatings.

Foreign matter such as acids, alkali, oils, salts, and other various substances can be very destructive to concrete. When imbedded into the concrete itself, various forms of deterioration result. However, the application of CRETO DPS will aid in preventing such destruction from within, due to the chemical reaction which takes place, reacting with alkali found in the concrete, creating an aero gel, filling the voids and canals in the capillary attraction and dampness that exist beneath the concrete surface. As DPS penetrates it encounters more alkali and produces more aero gel. This process repeats itself until the concrete is permanently sealed, yet allows the concrete to breathe. This reaction will also push any foreign matter to the surface where it can be flushed away.

## TECHNICAL REPORT NO. 2

### WHY USE CRETO DPS?

CRETO has been tested by and/or approved by the AMERICAN SOCIETY OF TESTING MATERIALS, UNITED STATES GENERAL SERVICE ADMINISTRATION, and the UNITED STATES DEPARTMENT OF AGRICULTURE for use in federally inspected food processing areas.

CRETO DPS's simple one-time and permanent application process makes DPS one of the most cost-saving products of its kind on the market today.

DPS compatibility to materials inherent to concrete will not alter or destroy the existing concrete. It will not alter the color, texture, or any other physical characteristics of the concrete surfaces to which it is applied. It leaves a clear natural finish and no film or membrane or any mil thickness shall remain on the surface.

DPS waterproofs, hardens, and dustproofs most concrete and other masonry surfaces. This preserves and extends the material's life, as well as extending paint life.

DPS holds hydrostatic head, stops seepage, dampness, molding, pitting, rutting, dusting, and protects steel within the concrete from rust and corrosion.

CRETO DPS cures new concrete uniformly, resists spot-drying and hairline-checking, and provides a prepared surface for better bonding of toppings, mastics and paints.

DPS will allow the concrete to breathe, yet prevents the penetration of water, grease, oil and acids.

CRETO DPS can be used safely indoors or outdoors since it is non-toxic, non-flammable, odorless, and colorless. In addition, DPS will not harm plants.

It takes only one coat of DPS to do the job. (Only special applications where excessive moisture is present would require additional coatings.) Anyone can apply DPS easily, comfortably and safely. It may be brushed, rolled, mopped, or sprayed (20-30 PSI) onto the masonry surface. CRETO DPS can be applied to dry or wet (not saturated) surfaces, and in temperature conditions above freezing. Coverage is between 150 - 200 square feet per gallon or more, depending upon the porosity of the concrete.

No dilution or mixing is necessary.

By protecting concrete surfaces from moisture and the harsh conditions that exists in all areas, CRETO DPS saves on maintenance, repair or replacement costs.

Whether applied below, on, or above grade, DPS is highly effective and versatile in a wide range of commercial, industrial and residential applications, including sidewalks, curbs, patios, driveways, parking decks, basements, tunnels, concrete bridges, concrete walls, gunnite structures, and more.

CRETO DPS has been proven effective at thousands of widely diverse projects throughout the world, including:

Disney World, Florida

Disneyland, California

Disneyland, Tokyo, Japan

14 Nuclear Power Plants in the USA

1988 Calgary Winter Olympics, Canada

1994 Lillehammer Winter Olympics, Norway

2008 Beijing Summer Olympics, China

Air Force Academy Colorado Springs, Colorado,

Parker Dam Project Power Plant, California side

Sea World, Florida

Forbidden City, Beijing China

Brisbane's South Bank, Australia

Boston Convention Center Exhibit Hall, Boston, Massachusetts

City Center, Las Vegas, Nevada

Goodwill Store, Michigan

Charger Stadium, San Diego, California

Peninsula Hotel, Hong Kong, China

Grand Hyatt Hotel, Hong Kong, China

Utah Valley Medical Center, Provo, Utah

Incheon Bridge, South Korea

Ford Motor Company, Detroit, Michigan

Coffee Bean Silos, Columbia, South America

Washington County School District, St. George, Utah

# CONCRETE AND PROBLEM SOLVING

## TECHNICAL REPORT NO. 3

### Concrete Curing

Cement gel is jelly-like swelling that occurs around each grain of Portland cement when water is added to the concrete mix. Aggregate gel is essentially the same. It is the initial reaction product between cement and water. The gel is the controlling factor in creating, uniformity, and structural quality of concrete. Cement gel relates to the size of the voids and pores in concrete.

The cement gel imparts fatty and cohesive properties to the mix. As hydration of the cement process, the gel partly crystallizes and on drying reverts to almost the original cement grain size.

Gel size and hydration vary widely, depending upon water and temperature. It is this difference that causes variations in the quality of concrete for a given mix design.

In the heat of summer, gels form faster and longer, and large gels absorb more water from the mix. Thus, the resulting concrete has poorer quality. As water is consumed by hydration and rapidly lost through evaporation, internal stresses are created. The eventual results are shrinkage cracks.

In cooler weather, gel formation is retarded. Smaller gels are formed, and less mixing of water is needed. Concrete quality is proportionately better. Water hydration is slower, less shrinkage occurs, concrete is denser, and usually has a higher structural quality.

Therefore, the gel is the governing factor in controlling uniform structural quality and cracking of the concrete. Here, CRETO, due to its chemical reaction forming a silica aero gel, aids in retaining the water in the concrete during the curing process, resulting in a higher quality of the concrete.

For DPS to be used as a cure for new concrete, only 1 gallon is needed for every 150 - 200 square feet of concrete. DPS must be applied to new concrete as soon as the water sheen is gone and the concrete can be walked on without leaving any marks or applied within the first 12 hours after the concrete was finished.

## TECHNICAL REPORT NO. 4

### Capillarity

Capillarity is the transmission of moisture and water in concrete. By definition, it is the action by which the surface of a liquid, where it is in contact with a solid, is elevated or depressed (rises or falls). The attraction or repulsion is caused by capillarity. By capillarity, moisture may travel from a lower to a higher elevation or can travel in any direction. The amount of moisture that can be transmitted from the ground by capillarity action is often underestimated. Tests\* have indicated that as much as 12 gallons of water per 1,000 square feet per day can be transmitted through a concrete slab and if permitted, evaporated into the air. When the slab is covered by floor covering, this moisture will carry alkalies, salts or additives from the concrete. This will collect under the floor covering and attack the bond of the adhesive, resulting in destruction or deterioration of the adhesive itself. This same principal also applies to vertical concrete, where fog, dew and dampness can collect, causing paint and other sealants to peel or wear off. The distance which water will rise from the ground by capillarity is also underestimated. Tests\* indicate that moisture can climb from a water table that may be 20 feet below the ground. Obviously, general ground dampness speeds up the transmission of moisture. It is suspected that this transmission may result from a combination of capillarity alone. Nevertheless, moisture can migrate from this depth.

CRETO DPS, due to its ability to react with alkali and its permeation capability results in the filling of pores and void spaces in the concrete, thus creating a solid mass with a hydrostatic head that eliminates the problems associated with capillarity action.

A simple test can establish the amount of DPS required solving this problem. After your first application, merely tape down several pieces of ordinary dry sponge or foam rubber to the treated surface for approximately 24 hours. Under normal conditions, the sponge will appear dry and the job is completed. However in extreme problem areas of excessive moisture and seepage, repeat the first procedure as many times as necessary until the sponge remains dry. CRETO DPS is now permanently set. No other coating is necessary.

\*By Housing and Home Finance Agency U.S. Government at Forest Products Lab.

## TECHNICAL REPORT NO. 5

### The “Alkali Problem” in concrete walls and subfloors

Alkali is never pure and rarely stable. It is made up of a combination of elements and almost always reacts with other elements.

We start with hydrogen, then lithium, sodium, potassium, rubidium, cesium and francium. Francium is radio-active with a half-life of only twenty minutes. The other five are the very active alkali metals. Each element has electrons and molecules which are always eager to take part in chemical reactions with other elements. The two most important alkali metals are sodium and potassium. We find a hint of them is potassium carbonate and sodium carbonate. Sodium makes up 2.6% of the earth's crust and potassium makes up 2.5%, yet we never see them. They are always found in combinations with other elements. Neither of them could remain pure in air or moisture.

The increased use of concrete subfloors in direct contact with the ground makes it more important than ever to completely understand the moisture and alkali inherent in these subfloors and their effects on paints and floor coverings.

Well known as the “alkali problem”, this condition is primarily a problem of moisture. Alkali is present in every concrete slab and is more detrimental with moisture. On adequately ventilated suspended concrete subfloors, moisture is not present in troublesome quantities.

Where the slab is in direct contact with the ground or a poorly ventilated air space moisture is brought up through the slab by capillary action. It dissolves the alkaline salts in the concrete and appears at the surface as a destructive alkaline solution causing spalling and efflorescence.

Although moisture and alkali conditions may vary greatly, there is always sufficient moisture in the ground and alkali in concrete to present an “alkali problem” on subfloors affected by ground moisture. It is never safe to assume that a concrete slab is dry just because it appears to be dry, even a small amount of residual moisture within the concrete which may react with the alkali content, may result in an unstable base on which to mount paint or floor coverings. This often results in coverings buckling, warping, or separation from the concrete surface.

CRETO DPS will alleviate this problem by sealing and waterproofing the concrete to eliminate spalling and efflorescence, this creating a better surface on to which paint, mastics and adhesives can be firmly secured, and a stronger bonding capability is achieved. Destructive moisture problems, which cause deterioration of paints and adhesives, are thus eliminated.

On surfaces where no covering is used, DPS will prevent foreign matters such as water, oil, grease, and acids from penetrating and causing harm known as spalling.



## TECHNICAL REPORT NO. 6

### Concrete Dusting

The following is a quotation from Chemistry and Technology of Paints by Maximillian Toch, published by D. Van Nostrand Co., New York, New York.

“Portland cement is rock-like alkaline lime substance composed of sand and/or gravel mixed with cement and water. In attempting to apply paints, adhesives or floor coverings, it is recommended to clean the surface first. Surfaces are cleansed with muriatic, sulfuric or acetic acids. The application of these acids to Portland cement destroys the cement because it dissolves out the lime and leaves the sand and aggregate loosely bound.

Portland cement floors ‘dust up’ merely under the abrasion of the heel. Factories that have machinery, calculators, electronic or delicate instruments have found it impossible to operate under these dustier conditions. To alleviate these conditions paint or floor coverings are used.”

This quotation is used to illustrate that concrete alone creates a multitude of problems. Coatings such as paint and floor coverings are used in an attempt to alleviate or enhance the use of masonry. However, such coatings have proven completely ineffectual when excessive moisture and alkali contents are present.

Concrete dusting, (small particles of the surface grinding away), which are caused by any vehicular, foot, machinery and other traffic over the concrete surface, is a costly foe to efficiency due to the damages it causes to machinery, merchandise, equipment and environmental health.

CRETO DPS chemical reaction with alkali and lime which causes the independent particles of concrete to solidify and strengthen the concrete, along with its ability to stop moisture, and permanently eliminate the annoying dusting up to 100% from surface abrasion and also eliminate the need for floor coverings where it is not necessary.

## TECHNICAL REPORT NO. 7

### Aid for the Floor Covering Trade

Before we explain the benefits DPS offers to the flooring trade we want to state: When DPS is applied properly to a concrete slab it does not become a BOND BREAKER. Any topical coating can be applied after treatment.

Floor covering failures are caused by one or more combinations of the following:

- moisture
- alkali
- hydrostatic pressure

To apply ceramic tile, vinyl or linoleum, epoxy and other floor coverings, there usually must be some site preparation consisting of eliminating dust and moisture. Mastic or adhesive of some kind must be applied in order to bond the covering to the surface. Most flooring manufactures will recommend Hydrostatic Pressure must be at 3 lbs or below before applying their flooring of coatings.

We are aware of the make-up of concrete and the problems built into it, in the form of alkali, lime and moisture. Other important factors are porosity and water used to mix with cement and other aggregates. As the concrete is setting up and commencing through its long curing process, water evaporates out of the concrete. When this moisture is gone, it leaves mass voids and pores in the concrete. The slab of concrete acts as a sponge and draws moisture from the ground. The moisture passes through these voids and mixes with the ever present alkali. Thus when the floor covering is applied to the slab, the drawing action of the moisture is sped up. When this alkali moisture is drawn to the surface of the slab, it comes in contact with adhesive. The following results occur: alkaline water, meets with the adhesive the adhesive emulsifies or commences to deteriorate, resulting in bubbles, blistering, warping, cracking and peeling of the covering and necessitating replacement or reapplication of the adhesive.

(ASR) Alkali Silica Reaction is destructive to concrete as moisture is trapped under non-breathable epoxies or vinyl floorings causing the salts or alkali to break down the concrete cream therefor causing floor coverings to lose their bond. Often, ASR is not self-evident until the installation of a non-breathable flooring causes a drawing of moisture to the upper regions of the concrete, increasing the relative humidity.

CRETO DPS, due to its internal chemical reaction, its ability to hold hydrostatic head and lower the PH on the concrete surface and the fact that it is not a surface coating leaving 1/16 in. to 1/8 in. of the concrete surface to allow any materials bonding. DPS will solve the problems related to the floor covering trade by preventing the moisture or RH (relative humidity) from coming in direct contact with the adhesive, mastics or epoxies and alleviating the aforementioned problems.

Often overlooked by contractors is that the penetration of DPS is of extreme importance. Therefore, any surface coating that prevents DPS from entering the pores of concrete must first be removed.

## TECHNICAL REPORT NO. 8

### Aid for The Paint Trade

Before painting concrete, CRETO DPS is a necessity. We have all seen paint that is flaked, blistered, cracked, or crumbling. How do paints blister or crack on concrete surfaces? It is due to a problem called saponification. When soap is manufactured, the basic ingredients are a form of alkali and oil. The combination of alkali in the concrete and the oil in the paint causes saponification, which in this case is more commonly identified as flaking, blistering and peeling of paint from the surface. This occurs when using oil-based paints which are rapidly disappearing from the market.

Although much better than oil based paints, vinyl, rubber or latex based paints are in widespread use today. They also have the tendency to peel and crack off the surface. The prime reason for this is the alkali and lime is still fighting the paints. In the event these surface coatings are used as a sealer or waterproofing agent, they must be applied and periodically reapplied so that eventually the surface contains temporary relief. The FACT is if concrete does not breathe, it will commence to disintegrate.

The application of DPS to concrete surfaces will give an alkali and moisture free surface for better bonding of paints, When applied in accordance with the manufacturer's directions, the paint life on a structure can be increased and provide a longer 'fresh paint' appearance and reducing maintenance costs.

Close examination of the concrete, after CRETO DPS has been applied and the surface washed, will reveal clean pores. In many cases this has the same effect as "etching" which is quite often necessary prior to application of paints and adhesives for better bonding qualities.

Any treated or surface coatings must first be removed so DPS can penetrate.

On occasion, foreign matter such as grease and oil will be floated to the surface after applying DPS. This foreign matter should be flushed off with water, (in excessive areas, several flushing's may be needed), prior to painting.

## TECHNICAL REPORT NO. 9

### Wall Sweating Problems

With respect to wall sweating, it should be remembered that surfaces of most common concrete building materials have an affinity for water molecules. This molecular film is proportionate to the relative humidity. At saturation points, all voids, pores and capillaries can become filled. When the atmospheric condition, inside or outside, which caused the excessive moisture in the first place, is alleviated, the porous wall may become filled to saturation point with moisture in liquid form.

This condition then provides an excellent opportunity for vapor travel. Within a wall. In its travels, the vapor may strike a cold area or dew point and condense in sufficient quantities to reach the interior wall surfaces and appear as wall sweat or bleeding. Both sweating and condensation can be greatly affected by temperatures, humidity, wind velocity, soil moisture conditions, etc.

The aforementioned conditions, if allowed to go unchecked, can cause peeling of paint, spalling, formation of mildew or mold and efflorescence resulting in heavy maintenance costs. All porous concrete materials will have the same effect unless proper steps are taken to avoid such problems.

With an application of CRETO DPS, and due to its unique scientific formulation and results, DPS can stop this type of wall sweating. Application should be the same as for waterproofing.

Hydrostatic Pressure is the pressure created by standing or resting ("Static") water ("Hydro") causing topical coating to fail. As concerns for the environment have grown over the years demanding lower VOC's in products and more water based product failures have increased. In some cases just low amount of moisture can cause failure with the bonding of glues, epoxies, paints and other coatings.

Using CRETO DPS will create an internal moisture barrier starting just below the concrete surface, enabling topical coatings to be placed over concrete slabs or walls. DPS will be holding back Hydrostatic Pressure year after year, never breaking down or changing it is there for the life of the concrete. So once is enough!

TECHNICAL REPORT NO. 10

Specification:

Dilution	non-use as supplied
Freeze Temperature	0 degrees C
Freeze Harm	none-thaw completely
Boiling point	230 degrees F.
Coverage per gallon	150 to 200 sq. ft. or more (depending on porosity)
Shelf Life	2 years
Clean-up	water
Color of Solution	Clear
Color when Applied	none
VOC's	none
Toxicity	none
Flammability	none
Fumes during treatment	none
Organic Properties	negligible
Environmental Hazards	none
Polymerized content	excellent

TEST SPECIFICATIONS

CRETO DPS has been successfully tested in accordance with American Society of Testing Materials, and will meet or exceed the following:

*ASTM-C-67 - Section 13	Results: Significant decrease in absorption.
*ASTM-C-67 - Section 25	Results: Significant decrease in suction.
*ASTM-C-666	Results: Improved resistance to freeze/thaw damage.
*ASTM-C-67 - Section 29	Results: Significant resistance to efflorescence.
*ASTM-C-156	Results: Significant improvement in curing against Hairline cracking and spot drying.
*ORF Method - Dusting Resistance	Results: Improvement against dusting due to abrasion.
*ASTM-C-672/C 672M-03 Deicing Chemicals	Results: No scaling to very slight scaling.
*Compression Strength (Surface coat only)	Results: +15% at 8 days - +23% at 31 days.

United States General Services Administration approved contract purchase order  
#GS-005-56180

Approved by the Department of Agriculture in 1960, 1983 for use in federally inspected food processing plants.

Department of Interior purchase order #304-P53-692, Parker Dam Project, Arizona.

## TECHNICAL REPORT NO. 11

### Application Directions.

#### EASE OF APPLICATION:

It only takes one coat of CRETO DPS to do the job. (Only special applications where excessive moisture is present may require more than one coat). Easy to apply, allowing for low labor costs, comfortably and safely - indoors or outdoors - applied above, on or below grade. Use a sprayer at (20 -30 PSI), or cotton mop to apply DPS.

#### SAFETY:

DPS is non-toxic, non-flammable, fumeless, odorless and colorless. One can apply safely indoors with minimum or no ventilation required. DPS will not harm plants.

#### PREPARATION:

Normal new concrete will not need any prior preparation before applying CRETO DPS. However, old and dirty concrete should be cleaned with CRETO Deep Clean to remove oil, grease and dirt first, this will aid in the application process. Extreme hot/dry climate areas, (i.e. deserts), the concrete surface should be flushed with water prior to application of DPS to reduce evaporation. DPS can be applied to dry or wet (not saturated) surfaces and the temperature conditions and surface temperature must be above freezing for 24 hours or more. Any surfaces painted or treated with other topical coatings must be REMOVED before applying DPS so penetration can be achieved. Remove by scraping, grinding and/or applying suitable removers.

CRETO DPS is not meant to seal visible cracks. "V" out such cracks and seal with CRETO RMO system, apply DPS before repairing cracks with RMO. However, some apparent cracks may be merely surface cracks and not structural fissures which CRETO DPS can penetrate into the cracks and concrete. In such cases DPS will be effective without repairing the cracks.

If CRETO DPS is frozen in the bucket, thaw out completely before using.

SHAKE WELL BEFORE USE.

## IMPORTANT

Always protect glass and aluminum from any contact with CRETO DPS. If contact should occur, rinse immediately with water to remove any DPS off the surface of glass or aluminum. Do not wait! DPS will etch glass or aluminum if allowed to remain on the surface for any extended length of time.