



**KÖSTER**



**MOISTURE CONTROL  
FLOOR PREPARATION**



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## // Moisture Control Systems

Concrete is one of today's most important building materials. Most floor slabs are made of concrete. While concrete itself is permeable to moisture vapor, many modern flooring systems have very low moisture permeability and are susceptible to problems caused by moisture vapor. The moisture control systems manufactured by KOSTER American are designed to be applied on concrete to suppress moisture vapor and the problems associated with it.



## // Why is Moisture Vapor an Issue?

Flooring failures due to water vapor in concrete slabs have been plaguing the construction industry for decades, causing millions of dollars in damage to our economy. Typical damage patterns indicating a serious failure of the flooring system include blisters in epoxy coatings, bubbles in sheet goods, unsightly staining at seams, adhesive bond failure, loose, curling and cracking VCT, warped wood floors and damp and mold infested carpets.



Re-emulsification of adhesive...



...resulting in down time



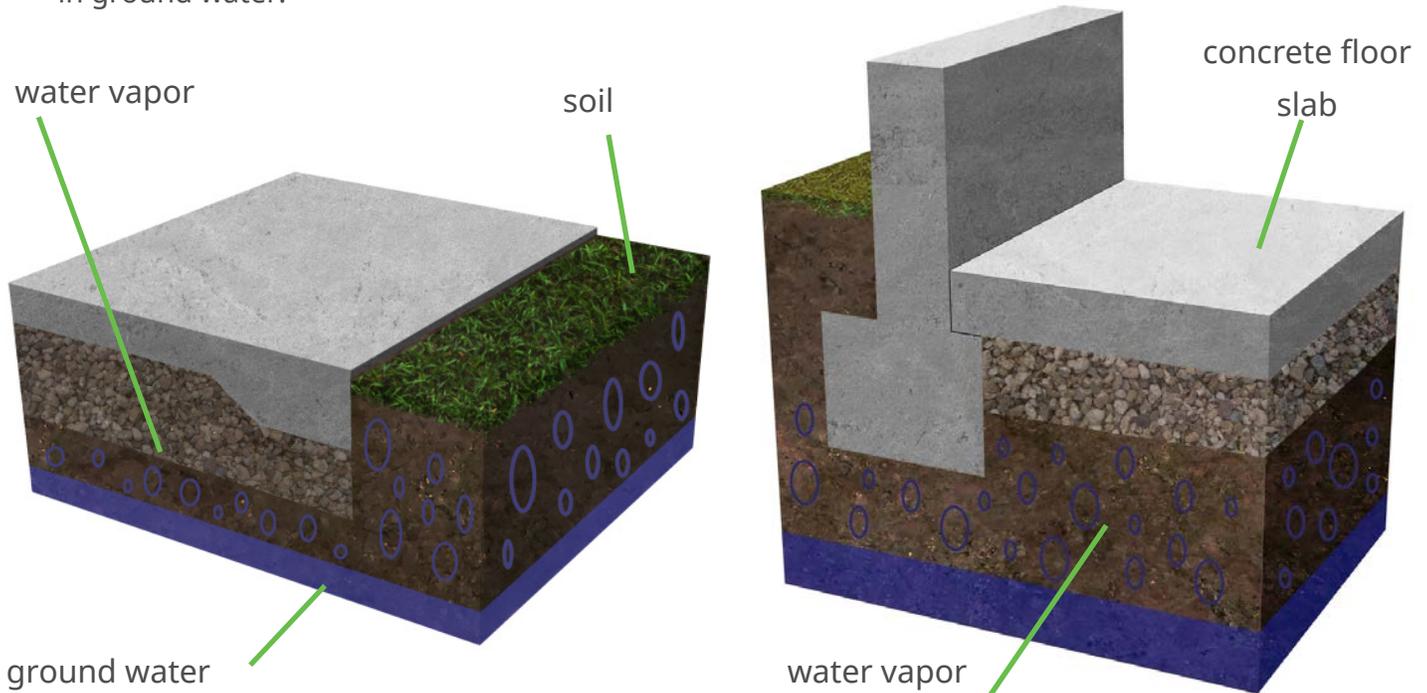
Typical blistering...



...containing high pH corrosive liquid

## // Where does the moisture vapor in floors come from?

Water is present in the ground everywhere, in liquid form as ground water or attached to or between soil particles and in the form of water vapor between the soil particles. While slabs on ground are unlikely to come in contact with liquid ground water, they definitely will come into contact with the water vapor that rises through the soil. If a below slab vapor retarder is missing or defective, water vapor will be able to penetrate the bottom of the slab and accumulate in the slab if it cannot evaporate. Slabs on ground in contact with moist soil can also lead to capillary moisture transfer into the slab. Basement floor slabs may come into contact with liquid water if submerged in ground water.



## // There are many sources of water that can lead to damage of concrete floors.

Water is an essential ingredient in concrete. At the time concrete is made, it contains liquid water. While a part of that water is used in the hydration of cement, another part of it remains in the concrete and slowly evaporates over time. The more water is added into concrete at the time it is batched and during curing, the longer it is going to take to dry to a condition that is acceptable for a flooring system.

Air conditioning and heating systems de-humidify the air in buildings. Since vapor will move from an area of high humidity to an area of lower humidity, a stream of water vapor from the floor slab into the air is set in motion. This process creates a moisture gradient within the slab; lack of a functional vapor retarder below the slab allows moisture to continually re-charge the slab.

Additional sources of water can be broken pipes under a slab, spills onto concrete, building use such as kitchens and bathrooms, cleaning and maintenance, rain and snow, ambient relative humidity and condensate on the concrete

## // What other factors influence floor moisture vapor?

### In new buildings:



- Missing or damaged vapor retarders underneath slabs on ground prevent drying of floor slabs.

- Fast track construction often requires flooring installers to install flooring systems before the concrete has had sufficient time to dry.

- Elevated slabs are frequently made with light weight aggregate concrete. When light weight concrete is made, the porous light weight aggregate is saturated with water before it is added to the mix. The water that is captured in the aggregate of the concrete causes the lightweight concrete to need longer to dry to an acceptable level than normal weight concrete.

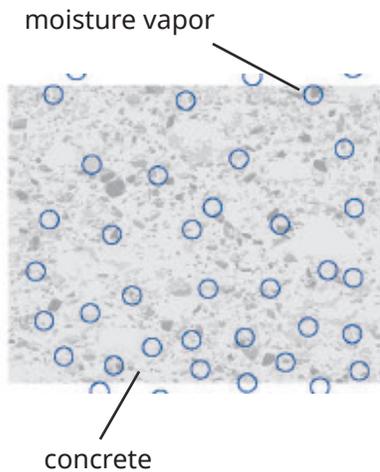
### In existing buildings:



- Renovation of flooring systems: In the past, many flooring systems were more resistant to moisture and high pH. Many flooring systems today have a limited breathability and the adhesives have limits regarding the moisture and pH they can withstand. After a new, low permeable flooring system is installed, moisture vapor is trapped inside the concrete. That sets the condition for the moisture vapor damage mechanism to start, eventually leading to failure of the adhesive and the flooring.

- Changing environmental conditions: Moisture vapor conditions underneath a floor slab on ground can change over time, for example changing seasons, irrigation, or heavy rainfalls over a long time period can increase the soil moisture vapor condition.

# // How does Moisture Vapor Harm Flooring Systems?

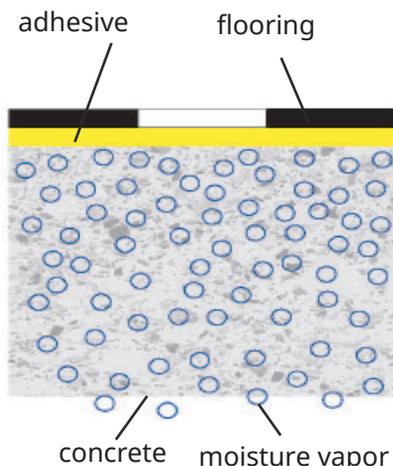


## 1. Concrete without floor covering

Concrete is a porous material. It allows moisture vapor to pass through it.

As long as moisture vapor can pass through the concrete, there will be a moisture gradient with the concrete drier near the top surface and more damp at the bottom.

Moisture can transport salts of various types into and through the concrete causing efflorescence on the surface of the concrete. This can be detrimental to serviceability.



## 2. Concrete with floor covering

When a flooring system is installed, it typically has lower vapor permeability than concrete.

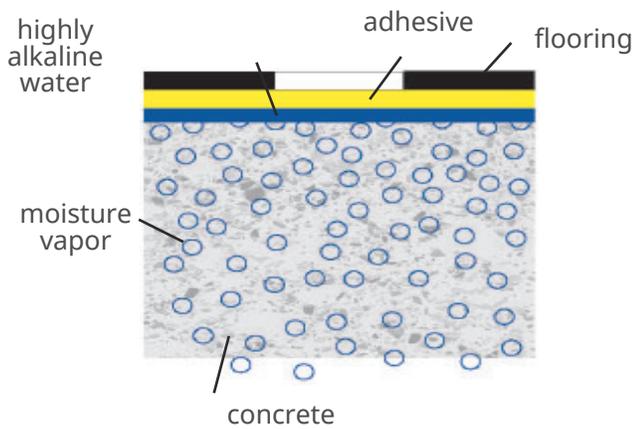
The water vapor can no longer evaporate from the surface of the concrete. As a result, the amount of water vapor that is present in the slab will slowly increase. This can be measured as an increase in the relative humidity in the concrete slab.

Many types of floor finishes can be damaged when exposed to high moisture over a longer period of time.

If concrete contains aggregate that is susceptible to Alkali Silica Reaction (ASR), the increased moisture now present in concrete can cause the reaction to start, leading to damage of the concrete.

Microbial growth can develop under floor coverings leading to health hazards for building occupants. Coatings and adhesives can debond when the moisture condition underneath the low permeable flooring becomes high enough.

## // How does Moisture Vapor Harm Flooring Systems?

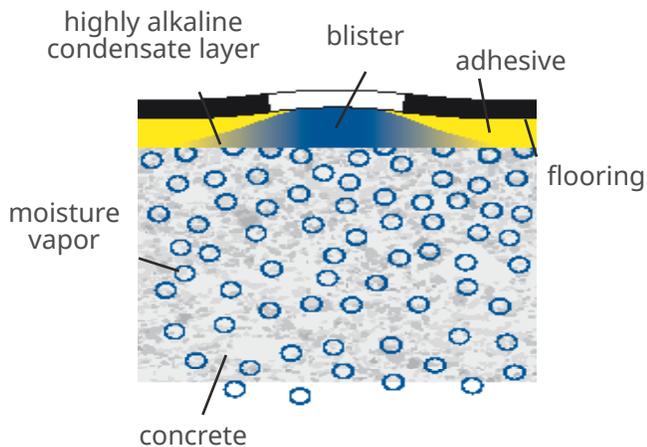


### 3. Development of high pH

Cured concrete contains soluble calcium, potassium and sodium hydroxides. Once dissolved in water, conditions develop with pH readings up to 14.

Adhesives that bond floor coverings to the concrete can degrade and fail as a result of the high pH and moisture present on the concrete.

The high pH that develops at the surface of the concrete due to moisture can also discolor floor coverings.



### 4. Development of blisters

Once high pH condensation has developed underneath the surface of adhered low permeable floor covering, the adhesive is directly exposed to the high pH conditions. Adhesive can then degrade due to the high pH and high moisture exposure.

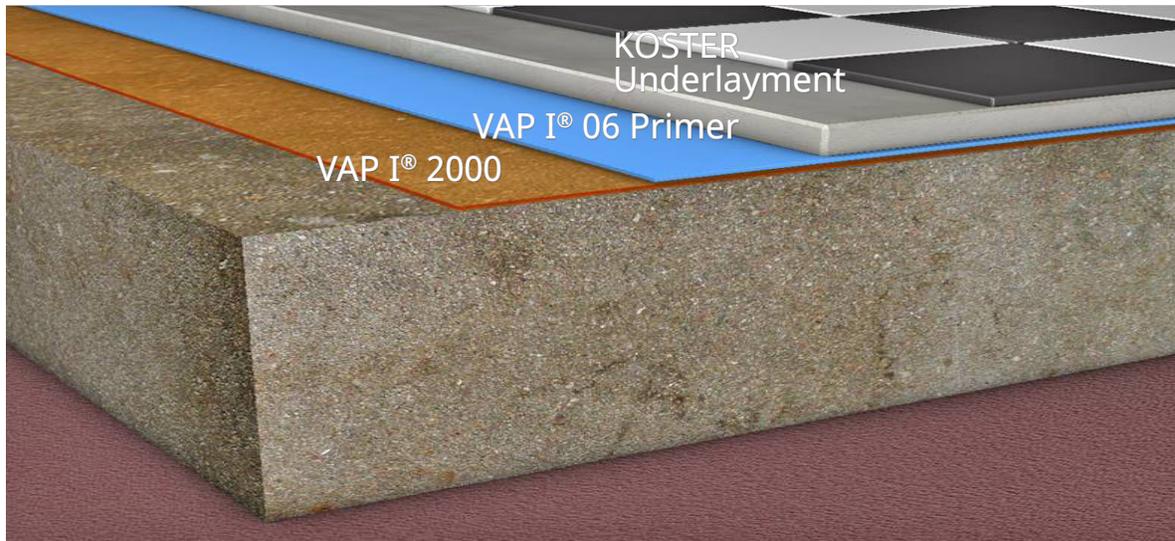
The time frame in which this distress takes place depends on vapor drive and the composition of the concrete. The liquid in blisters can have a pH of 14.

Typically, it takes 3 to 6 months for such moisture damage to appear.

## // How can moisture vapor problems be controlled?

If moisture tests indicate an elevated moisture vapor condition in the concrete, something needs to be done to be able to install the desired floor covering without producing a failure. Even if the concrete slab is not exposed to a constant source of moisture, drying of the slab may take many months or years.

Usually that is not an acceptable alternative. In most cases the installation of a moisture control system is the only solution. The moisture control system blocks rising moisture vapor, and prevents adhesive and flooring from coming in contact with the high pH that develops in the concrete.



## // KOSTER VAP I® 2000: Moisture Vapor Control Systems

Successfully introduced to the American flooring market in 2001, KOSTER VAP I® 2000 systems have an impressive track record with thousands of satisfied customers. KOSTER VAP I® 2000 systems have been developed for the sole purpose

of protecting flooring systems against moisture vapor damage. KOSTER VAP I® 2000 materials have been specially designed to provide successful long-term solutions even in difficult scenarios:

- KOSTER VAP I® 2000 Systems withstand a permanently elevated moisture condition up to 100% RH (ASTM F2170)
- KOSTER VAP I® 2000 systems withstand a permanently elevated moisture vapor emission rate up to 25 lb/1000sqft/day (ASTM F1869)
- KOSTER VAP I® 2000 systems resist a sustained exposure to pH 14.
- KOSTER VAP I® 2000 systems provide a high degree of user friendliness due to their ease of installation and one coat application.
- KOSTER American offers a 15 year warranty.

## // Choosing the right moisture control system

No two flooring projects are the same, and each has unique technical challenges. KOSTER American Corporation, the specialist in the field of moisture vapor control systems, has developed reliable systems that protect flooring from damage. These unique formulations are 100% solid epoxy, contain no fillers and are one coat systems. The materials can be applied to green concrete after 7 days, allowing for the fast tracking of flooring projects. KOSTER VAP I® 2000 systems have been formulated to withstand 100% relative humidity (RH) (ASTM F2170) and up to pH 14.

KOSTER VAP I® products have an outstanding vapor diffusion resistance. While all of KOSTER's VAP I® products have always been low VOC and low odor, KOSTER now has two vapor suppression products that are zero VOC: KOSTER VAP I® 2000 Zero VOC and KOSTER VAP I® 2000 FS. The test certificates that show LEED compliance are available upon request.

The available systems differ from each other mainly with regard to the curing times: KOSTER VAP I® 2000 Zero VOC (12 hours), KOSTER VAP I® 2000 FS (fast setting 4-5 hours), for overnight installations, KOSTER VAP I® 2000 UFS (ultra-fast setting, 3 hours) for very fast installations.

### KOSTER Moisture Control Systems



	VAP I® 2000 Zero VOC	VAP I® 2000 FS	VAP I® 2000 UFS
Time to proceed with flooring*	12 hours	4-5 hours	3 hours
Zero VOC's	Zero	Zero	Low
ASTM E 96 Water Method 73°F (at 100 sqft/gal) perms	0.056	0.047	0.060
ASTM F 1869, lb/1000 sqft/24 hr.		Warranted to 25 lb	
ASTM F 2170, % Relative humidity		Warranted to 100% RH	
Layers		True one coat system	
Material		100% solid epoxy, no fillers	
Withstands pH		up to pH 14	

#### Additional product Information

15 Year Warranty	Yes
Application Training Required	Yes

## // Why is the perm rating of a moisture control system important?

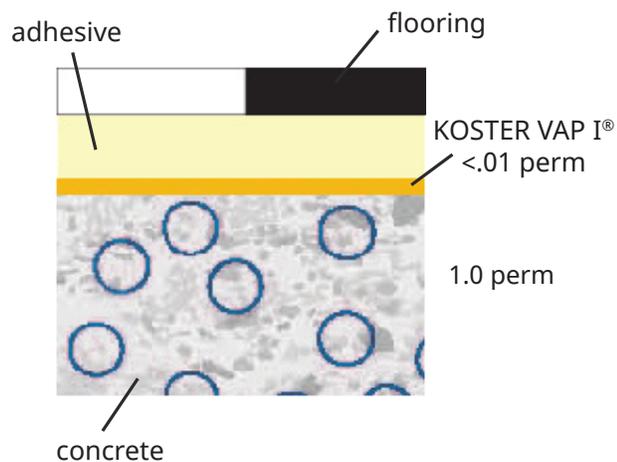
Materials have a moisture vapor transmission rate that is measured by a standardized test method. ASTM E96 Permeance is reported in perms, a measure of the rate of transfer of water vapor through a material.

Moisture suppression systems for use under resilient floor coverings must meet performance requirements of ASTM F 3010.

A moisture control system has to reduce  
the amount of moisture vapor to the level  
that the finish floor covering can tolerate.

Typical concrete has a permeability of 2-3 perms per inch. Many floor coverings have a much lower permeability to water vapor.

To prevent moisture damage from taking place, a moisture control system should be installed directly onto the concrete before the flooring is installed. This moisture control system has to bond to the concrete despite moisture and high pH. It also has to reduce the amount of moisture vapor that passes through it to a level that the flooring and adhesive can tolerate.



Because low permeability floor coverings and their adhesives are sensitive to high moisture and high pH, moisture control systems must meet the requirements of ASTM F 3010. All KOSTER VAP I®2000 products meet the requirement of this ASTM standard for low permeance and strong bond to concrete to resist the forces of moisture and pH.

Flooring manufacturers publish the maximum acceptable moisture levels for their products in their technical literature. In order to protect a flooring system, a vapor control product must reduce the amount of moisture vapor that it lets pass through it to meet the requirements of ASTM F 3010, not to exceed 0.1 perms.

## // Is my concrete slab dry enough to receive flooring?

28 days is often cited as the minimum length of time for concrete to “cure” and develop strength. This time period of 28 days is often incorrectly interpreted as the time necessary for the concrete to dry sufficiently to receive a flooring system.

As a rule of thumb: The drying time for a concrete slab in a climate controlled environment is approx. one month per inch of thickness. For a standard 4-in. – 6-in. slab, the drying time would be approx. 4 – 6 months.

Several factors can extend the drying time. To accurately determine a floor’s moisture condition, the flooring manufacturer’s guidelines and the industry standard ASTM F 710 should be adhered to, which state: “All concrete slabs shall be tested for moisture regardless of age or grade level”.

There are several tests that can be used to quantify how much moisture is in a floor slab. The relative humidity (RH) test is currently the most widely accepted test and has become the industry standard while the calcium chloride moisture vapor emission rate (CaCl<sub>2</sub>) test is being phased out. Relative humidity data is not comparable to calcium chloride test results.

### The relative humidity test



The RH probe test according to ASTM F 2170 is conducted as follows:

For slabs on ground, a hole with a depth of 40 % of the slab’s thickness is drilled. Probes are placed in the hole and the results are read after an equilibration time of at least 24 hours. The relative humidity test determines relative humidity in the slab. Three tests should be carried out for the first 1000 ft<sup>2</sup> with 1 per additional 1000 ft<sup>2</sup>. The test results according to ASTM F2170 should not exceed the RH specified by the flooring manufacturer. For links to current floor covering and adhesive RH limits, see [www.RHspec.com](http://www.RHspec.com).

### Advantages of using the Relative Humidity Test

- Less impact of ambient conditions due to measuring inside the concrete
- Becoming a more and more popular and required testing method, flooring industry accepts RH testing
- Easier to understand for project participants than calcium chloride ASTM F 1869
- Trained and certified testing technicians through International Concrete Repair Institute
- Moisture profile of concrete possible, when measuring at different depths
- Costs are comparable to calcium chloride ASTM F 1869
- CaCl<sub>2</sub> measures only top ½ inch of slab which is the driest, does not reveal deeper moisture conditions
- RH probes can quickly re-measure slab moisture conditions while CaCl<sub>2</sub> takes an additional 3 days per test

Moisture testing should be carried out by independent and certified experts. Proper testing requires background knowledge and experience, so that all project participants can be assured of the quality and objectivity of the test results. This is important, as elevated moisture levels in the concrete can cause delays in the construction schedule or require additional, often not budgeted expenses. Therefore moisture vapor problems should be anticipated during the planning phase and hence be part of the specifications. Flooring contractors should be especially aware of this topic and, if a moisture control system is not specified, talk about this topic as soon as possible with owners and planners - in everyone’s interest.

## // What can cause problems with flooring systems besides moisture?

When dealing with new concrete, sufficient reliable information is usually available. In new construction, usually the concrete mix design is available as well as information about curing compounds used. When dealing with older concrete, reliable and comprehensive information is usually not available. Substances that have a negative

effect on the bonding of the flooring system may have been introduced to the concrete over time. If such substances are present in the concrete that is to be coated they can be evaluated by analyzing a sample of that concrete.

New concrete	Old concrete
<ul style="list-style-type: none"><li>• Concrete placement and curing procedures can be reviewed and evaluated for problematic ingredients that can cause bonding problems for topically applied vapor suppression products.</li><li>• Topically applied curing compounds can act as bond breakers.</li><li>• Adequate drying time for the concrete should be built into the construction schedule and moisture testing should be carried out before any flooring is installed.</li></ul>	<ul style="list-style-type: none"><li>• Chemical Analysis can be used to determine if contaminants are present in the concrete.</li><li>• ASTM C856 Petrographic Analysis can be used to evaluate the concrete condition and assess if deleterious constituents may be present in concrete.</li></ul>

## // Reference: TJ Maxx, Springfield, MO



- TJ Maxx is an American department store chain. It has more than 1,000 stores in the United States, making it one of the largest clothing retailers in the country.
- The original plans did not call for a moisture control system. However, testing revealed 98% RH levels in the slab

# KOSTER provides reliable solutions even in difficult cases.

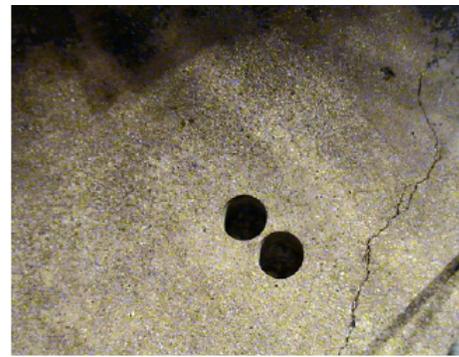
## Core testing

Core testing means that a piece of concrete is removed from the slab and sent to an accredited laboratory for analysis. KOSTER can provide a list of independent concrete testing laboratories in the US.

We strongly recommend core sample testing of slabs with existing floor failures to identify the cause of the failure.

Based on the results of the lab evaluation and analysis, KOSTER Technical Staff can recommend the right system for the specific project. KOSTER holds monthly training on moisture vapor control systems for professionals: applicators, engineers, architects, general contractors, facility managers, etc.

The ease of use and long term track record for a broad range of applications are the main success factors of KOSTER VAP I® 2000 systems. Even in difficult cases, KOSTER provides reliable solutions. Our customers benefit from our more than 20 years of experience in the field of moisture vapor control systems.



- Our technical department provides detailed pre-job checklists and helps to identify possible problems during the planning phase, recognize relevant conditions and evaluate test results.

- 4,000 sqft of glue down vinyl tile was already installed with an additional 16,000 sqft scheduled to be installed within the week.
- Local contractor (Champion Flooring, Pittsburg, KS) was able to reach out to KOSTER and get KOSTER VAP I® 2000 delivered to the jobsite in 2 days.
- The vinyl tile were removed and the entire 20,000 sqft was shotblast and KOSTER VAP I® 2000 was installed to get the job back on schedule!



# // Application of KOSTER VAP I® 2000 Systems

## Testing of the substrate (moisture testing / core samples):

KOSTER recommends testing to determine the moisture vapor condition in the concrete utilizing RH probe in situ tests (ASTM F2170), considered the industry standard. Calcium chloride tests (ASTM F1869) have been used for this purpose in the past but these are being used less.



## Substrate preparation:



Concrete substrates to receive KOSTER VAP I® 2000 systems must be structurally sound, solid, absorptive and meet acceptable industry standards as defined in ACI Committee 201 Report "Guide to Durable Concrete". Surfaces must be free of adhesives, coatings, curing compounds, concrete sealers, efflorescence, dust, grease, oils and other materials or contaminants that may act as a bond breaker. The concrete surface must be at least 5°F above the dew point temperature. Avoid application in a high dew point atmosphere, when the ambient relative humidity is above 95% or the concrete surface is wet.



(1) Mechanically prepare the substrate by shotblasting to an ICRI Concrete Surface Profile CSP 3. (2) Grinding is permitted only in areas inaccessible to shot blasting or for edging purposes. Upon completion of the grinding followed by shotblasting, the concrete slab must be vacuumed free of all dust, dirt and debris prior to the installation of KOSTER VAP I® 2000 systems. Do not use sweeping compounds as they may contain oil.

## Mixing:

(3) Pour the B component into the short-filled A component container while continually mixing .

(4) Mix using a slow speed electric mixer (<400 RPM) and mixing paddle for 3 minutes.





### Application:

(5) Pour the mixed KOSTER VAP I® 2000 onto the substrate immediately after mixing. Completely empty the mixing container.



(6) Spread KOSTER VAP I® 2000 using the appropriate notched squeegee. KOSTER VAP I® 2000 systems are applied in one coat.



(7) The material is then backrolled using a 3/8 inch epoxy rated nap roller, at a right angle (90 degrees) to the direction of the squeegee application. Thereby the product is evenly distributed with no missed areas.

### Coverage:

Minimum coverage at CSP 3: 150 ft<sup>2</sup>/gal

If standard concrete prepared to a CSP 3 is coated with KOSTER VAP I® 2000 at 150 ft<sup>2</sup>/gal, the cured coating can be expected to have a layer thickness of approximately 11 mils (0.011-in). A rougher surface profile and / or a porous or absorptive concrete will require the use of more material to obtain a sufficiently thick, continuous layer needed to achieve a sufficiently low permeability.

ASTM E96 water method testing shows the following relationship between coverage, layer thickness and permeability:

Spread Rate	Layer Thickness	KOSTER VAP I® 2000 Zero VOC	KOSTER VAP I® 2000 FS	KOSTER VAP I® 2000 UFS
		Perm Rating	Perm Rating	Perm Rating
100 ft <sup>2</sup> /gal	16 mils	0.056 perms	0.047 perms	0.060 perms
150 ft <sup>2</sup> /gal	11 mils	0.086 perms	0.070 perms	0.094 perms

### Next layers:

Prior to the installation of a subsequent flooring system, the cured KOSTER VAP I® 2000 systems must be clean and free of all dust, dirt and debris. Sanding is not required. KOSTER VAP I® 2000 products do not develop an amine blush and can be re-coated or covered with primer and underlayment at later ages as long as the KOSTER VAP I® 2000 coating surface is clean. KOSTER VAP I® 2000 coatings must not be exposed to direct sunlight for more than 48 hours after application on concrete. If installing MMA's or PMMA's, the recoat window is 48 hours after KOSTER VAP I® 2000 systems have cured. KOSTER VAP I® 2000 systems may only be applied by KOSTER trained and approved installers.

## // Treating Moving Cracks and Movement Joints

### KOSTER Joint Sealant FS-H



Moving cracks and expansion joints must be filled with a material that can follow the substrate movements elastically. A joint waterproofing must allow for movement in the construction without causing damage to the construction

itself. Moving joints up to a width of 1.4" can be waterproofed with KOSTER Joint Sealant FS-H, which is a self-leveling, rubbery-elastic sealing compound with high chemical resistance. Therefore, it is ideal material to waterproof horizontal joints in heavy construction, foundations, waste water treatment plants, garages, tunnels, etc.

The expansion joint must be installed so that the joint is honored vertically through the entire flooring system, including all final floor coatings. The prepared joint flanks are coated with KOSTER VAP I® 2000. Allow the KOSTER VAP I® 2000 moisture control system to cure for a minimum of 4-12 hours (depending on the product) before installing the backing rod and the joint sealant. Do not use FS primer 2C if the Joint Sealant is installed directly onto KOSTER VAP I®2000.

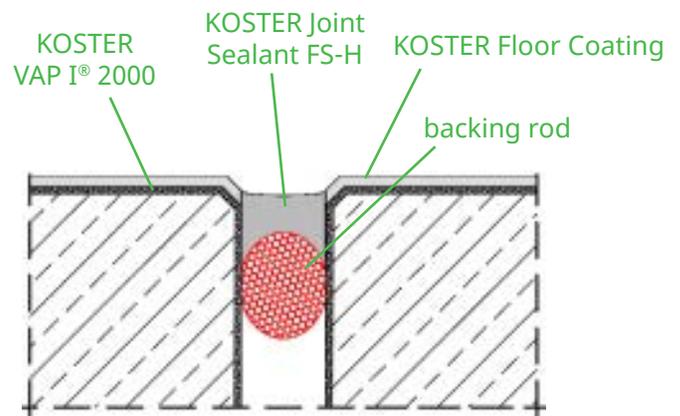
See also the KOSTER Brochure on "Waterproofing Construction Joints."

#### Benefits of KOSTER Joint Sealant FS-H:

- High mechanical load capacity
- Good chemical resistance

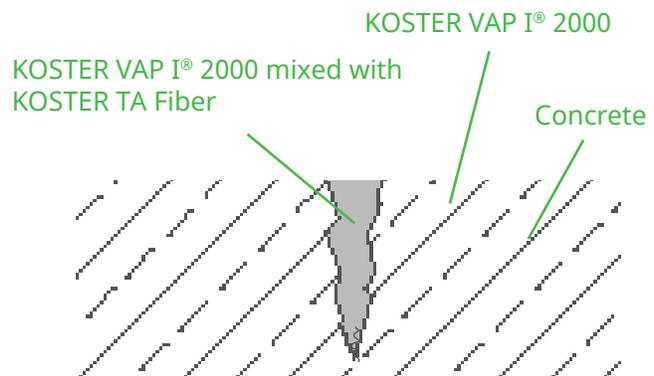
#### Technical data:

Max elongation at break:	approx. 15%
Shore A-hardness:	approx. 35
Consistency:	Castable, Self-leveling
Pot Life:	approx. 20 min
Curing Time:	approx. 24 hrs



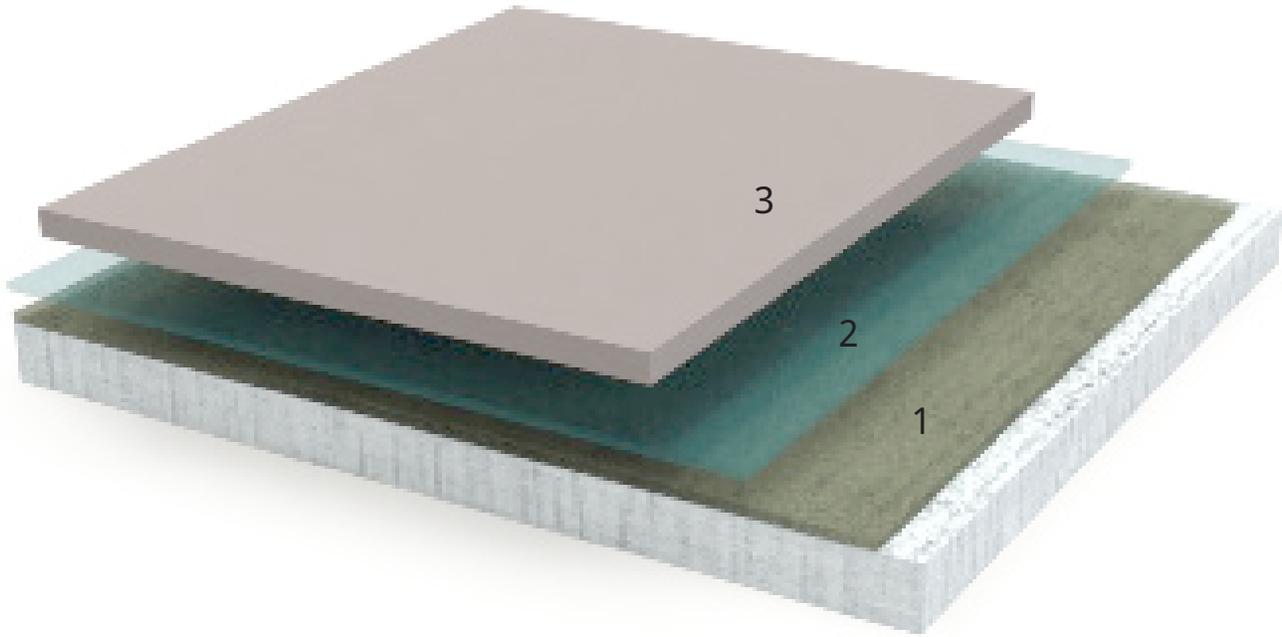
## // Treating Non-Moving Cracks

Repair non-movement cracks and control joints with a low viscosity, gravity fed crack mending resin, or by mixing the KOSTER VAP I® 2000 product with KOSTER TA Fiber at a 1:1 to 1:2 ratio (VAP:TA, by volume). Mix thickening agent and epoxy thoroughly to uniform consistency and apply by trowel. Do not fill designed movement joints with epoxy material.



# // KOSTER Moisture Control & Leveling System

#	Product	Packaging	Approx. ft <sup>2</sup> / Unit	Coverage Rate
3	KOSTER LevelStrong™	50 lb	25 at 1/4"	25 ft <sup>2</sup> /bag
2	KOSTER VAP I® 06 Primer	2.5 gal	1,625	650 ft <sup>2</sup> /gal
1	KOSTER VAP I® 2000 Zero VOC	3 gal	450	150 ft <sup>2</sup> /gal



	VAP I® 2000 Zero VOC	VAP I® 2000 FS	VAP I® 2000 UFS
Time to proceed with flooring*	12 hours	4-5 hours	3 hours
Zero VOC's	Zero	Zero	Low
ASTM E 96 Water Method 73°F (at 100 sqft/gal) perms	0.056	0.047	0.060
ASTM F 1869, lb/1000 sqft/24 hr.	Warranted to 25 lb		
ASTM F 2170, % Relative humidity	Warranted to 100% RH		
Layers	True one coat system		
Material	100% solid epoxy, no filters		
Withstands pH	up to pH 14		

Article Number	Packaging	Approx.ft <sup>2</sup> / Unit	Coverage Rate	Product Name
CT 230 003	3 gal	450	150 ft <sup>2</sup> /gal	KOSTER VAP I® 2000 Zero VOC
CT 233 003	3 gal	450	150 ft <sup>2</sup> /gal	KOSTER VAP I® 2000 FS
CT 234 003	3 gal	450	150 ft <sup>2</sup> /gal	KOSTER VAP I® 2000 UFS
CT 230 003- Pigmented	3 gal	450	150 ft <sup>2</sup> /gal	KOSTER VAP I® 2000 Zero VOC - Pigmented (Black, White, Grey)

## KOSTER VAP I® 06 Primer



KOSTER VAP I® 06 Primer is a water based, zero VOC, one component resin system for priming non-absorbent substrates such as KOSTER VAP I® 2000 moisture mitigation systems, terrazzo, marble, metal decking, ceramic, and quarry tile prior to installation of cementitious products.

**Pot Life:** Approx 3 hr at 70° F

**Drying Time:** Approx 1-2 hr at 70° F/50% RH

**Flash Point:** None. Non-flammable, non-explosive

**Color:** Blue. Dries transparent blue

Article Number	Packaging	Approx.ft <sup>2</sup> / Unit	Coverage Rate
SL 131 009	2.5 gal	1,250	500 ft <sup>2</sup> /gal

## KOSTER LevelStrong™ Skim Coat



KOSTER LevelStrong™ SC is a high quality, fast curing skimcoat underlayment that provides a smooth, level surface ready to receive flooring systems. It may be applied over KOSTER VAP I® 2000 coatings and concrete. KOSTER LevelStrong™ SC accepts all major floor coverings and is compatible with most adhesives. If the material is installed onto smooth, non-absorbent substrates such as KOSTER VAP I® 2000 coatings, the substrate must be primed with KOSTER VAP I® 06 Primer.

**Compressive Strength:** 3500 psi (ASTM C109)

**Flexural Strength:** 1500 psi (ASTM C348)

**Install Finish Flooring:** 30 min.

Article Number	Packaging	Approx.ft <sup>2</sup> / Unit	Coverage Rate
SL 282 022	10 lb	35	35 ft <sup>2</sup> /bag at 1/8"

## KOSTER LevelStrong™



KOSTER LevelStrong™ SLU is a high quality, self-leveling, fast setting, cementitious underlayment intended for interior use on concrete floors. It is easy to mix, pour, and spread, producing a smooth, level surface ready to receive flooring systems. It cures crack free in a few hours. KOSTER LevelStrong™ SLU may be applied onto a variety of substrates such as concrete, screed, and KOSTER VAP I® 2000 moisture control systems. KOSTER LevelStrong™ SLU accepts all major types of floor coverings and is compatible with most adhesives. It is not intended as a wearing surface.

**Thickness:** 1/8" to 1"

**Working Time:** 25-30 min at 70°F (ASTM C1708)

**Walkable:** Approx. 3-4 hr

**Install Finish Flooring:** Approx. 16 hr

**Compressive Strength:** > 5500 psi at 28 days (ASTM C109)

Article Number	Packaging	Coverage Rate
SL 292 022	50 lb	50 ft <sup>2</sup> /bag at 1/8" thickness

## KOSTER LevelStrong™ HS



KOSTER LevelStrong™ HS is a high quality, self-leveling, fast setting, cementitious underlayment intended for interior use on concrete floors. It is easy to mix, pour, and spread, producing a smooth, level surface ready to receive flooring systems. It cures crack free in a few hours. KOSTER LevelStrong™ HS may be applied onto a variety of substrates such as concrete, screed, and KOSTER VAP I® 2000 moisture control systems. KOSTER LevelStrong™ HS accepts all major types of floor coverings and is compatible with most adhesives. It is not intended as a wearing surface.

**Thickness:** 1/8" to 1-1/4" (neat)

**Working Time:** 25-30 min at 70°F (ASTM C1708)

**Walkable:** Approx. 3-4 hr

**Install Finish Flooring:** Approx. 16 hr

**Compressive Strength:** > 7500 psi at 28 days (ASTM C109)

Article Number	Packaging	Coverage Rate
SL 293 022	50 lb	50 ft <sup>2</sup> /bag at 1/8" thickness

## KOSTER SL Turbo



KOSTER SL Turbo is a special leveling compound with particularly fast hydration and high early strength. It creates a very smooth substrate for subsequent coating or flooring.

**Thickness:** 1/16" to 9/16"

**Working Time:** Approx. 20 min.

**Walkable:** Approx. 1-2 hr

**Install Finish Flooring:** Approx. 2-3 hr

**Compressive Strength:** 5800 psi

Article Number	Packaging	Coverage Rate
SL 595 025	55 lb	23 ft <sup>2</sup> /bag at 1/4" thickness

## KOSTER SL Protect



KOSTER SL Protect is a high-strength self-leveling underlayment with high resistance to chemical and mechanical stress. It is a wearable leveling layer for use over uneven or coarse concrete and cementitious materials. Due to its high chemical resistance, it can be used to protect against light and medium corrosion and serves as a slowly reacting sacrificial layer in areas of high chemical stress, such as agricultural, industrial, workshop, production facilities, commercial and private use buildings.

**Thickness:** 3/16" to 1 3/16"

**Working Time:** Approx. 30 min.

**Walkable:** Approx. 3 hr

**Install Finish Flooring:** 24-72 hr

**Compressive Strength:** >6500 psi

Article Number	Packaging	Coverage Rate
SL 286 025	55 lb	23 ft <sup>2</sup> /bag at 1/4" thickness

## KOSTER SL Flex



KOSTER SL Flex is a special flexible leveling compound. KOSTER SL Flex is designed for fast leveling of indoor surfaces. It is an excellent material for the repair and leveling of substrates before installation of tile, carpet, resilient flooring, and laminates. Wooden board floors on wooden joists can be carpeted or tiled after the installation of KOSTER SL Flex.

**Thickness:** 1/8" to 1 1/4"

**Working Time:** Approx. 60 min.

**Walkable:** Approx. 4 hr

**Install Finish Flooring:** Approx. 6 hr

**Compressive Strength:** 4350 psi

Article Number	Packaging	Coverage Rate
SL 284 025	55 lb	26 ft <sup>2</sup> /bag at 1/4" thickness

## KOSTER Joint Sealant FS-H



KOSTER Joint Sealant FS-H is an elastic, polysulphide- based, joint sealant used to seal joints in horizontal areas. When fully cured, KOSTER Joint Sealant FS-H is a rubber-elastic sealant with a high mechanical load capacity, good resistance to ground water, sea water, salt solutions, benzenes and mineral oils; it resists roots and does not rot.

**Working Time:** Approx 2 hr

**Drying Time:** Approx 24 hr

Article Number	Packaging	Approx.ft <sup>2</sup> / Unit	Coverage Rate
J 232 004	0.7 gal	See Data Sheet	See Data Sheet



Application of KOSTER SL Protect

## // KOSTER Additives

### KOSTER TA Fiber

Article Number	Packaging	Coverage Rate
CT 755 020	20 lb	Dependent on application
CT 755 044	44 lb	Dependent on application

KOSTER TA is a thickening agent made of cellulose fiber that is mixed with KOSTER epoxy resins to adjust the consistency of the resin.

### KOSTER TA Fumed Silica

Article Number	Packaging	Coverage Rate
CT 755 053	10 lb	Dependent on application

KOSTER TA Fumed Silica is a hydrophobic fumed silica based thickening agent that is mixed with KOSTER epoxy and urethane coatings to adjust the consistency of the coatings.

## // Accessories

### 30" Squeegee Blade

Article Number	Packaging	Coverage Rate
CT 910 001	each	10-20 mils wet
CT 910 002	each	15-25 mils wet
CT 910 007	each	Flat Edge
CT 910 008	each	1/2"



### 30" Squeegee Frame

Article Number	Packaging
CT 912 001	each



### 3/8" Nap Roller Covers

Product Name	Article Number	Packaging
9" 3/8" Nap Roller Cover	CT 925 004	each
18" 3/8" Nap Roller Cover	CT 925 003	each



### 12-18" Roller Frame

Article Number	Packaging
CT 930 001	each



### Spiked Shoes

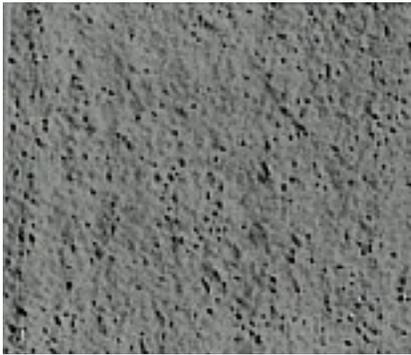
Article Number	Size	Packaging
X 999 904	M	each
X 999 905	L	each
X 999 906	XL	each



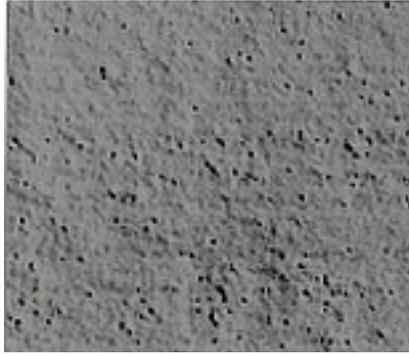
## // Concrete: Mechanical Surface Preparation: CSP Values

The International Concrete Repair Institute (ICRI) has created a technical guideline #03732, "Selecting and specifying concrete surface preparation for sealers, coatings, and polymer overlays." This guideline provides concrete surface profiles of CSP 3 to 9 which are used under the following conditions:

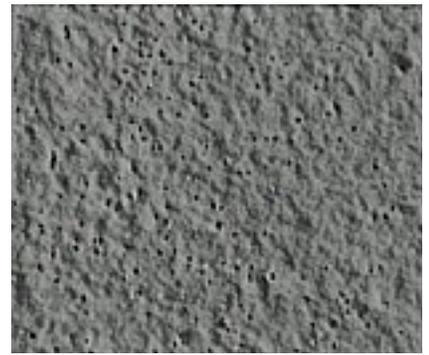
- For coating applications from 4-5 mils in thickness, the surface profile shall be a CSP 3. This is known as light shotblast
- For coating applications from 15-50 mils in thickness, the surface profile shall be a CSP 4 or 5. This is known as medium shotblast.
- For coating applications from 40 mils to 1/8" in thickness, the surface profile shall be a CSP 5 or 6. This is known as a medium heavy shotblast.
- For topping applications from 1/4" to 1/2", the surface profile shall be a CSP 6 or 7. This is known as a heavy shotblast.
- For concrete overlays greater than 1/2", the surface profile shall be a CSP 8 or 9. This is known as an extreme shotblast.



CSP 3



CSP 4



CSP 5



CSP 6



CSP 7



CSP 8

# // Certificate of Conformance to ASTM F 3010-13



KOSTER American Corporation certifies that the following products meet the requirements of ASTM F3010-13 Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings when installed according to the manufacturer's instructions on properly prepared concrete.

	Two-component resin based product	Water Vapor Permeance <sup>1,2</sup> ASTM E96 water method 73°F/50%RH grains•hr <sup>-1</sup> •ft <sup>2</sup> •in. Hg <sup>-1</sup>
Criteria:	Yes	Not exceed 0.1
Product		
KOSTER VAP I <sup>®</sup> 2000 Zero VOC	Yes	0.056
KOSTER VAP I <sup>®</sup> 2000 FS	Yes	0.047
KOSTER VAP I <sup>®</sup> 2000 UFS	Yes	0.060

## Notes

1. Products applied at 100 sqft/gal to ICRI CSP3 abrasively blasted concrete.
2. Net permeance of coating corrected for uncoated substrate concrete.

# Terms & Conditions

**Products:** The products sold by KOSTER American Corporation are the Products.

**Purchase Documents:** The terms and conditions of this contract shall apply to sales hereunder whether or not expressly referred to in each purchase order, invoice or other document of purchase or delivery issued by Seller or Buyer. Except as otherwise provided in this contract, no condition, understanding or agreement purporting to modify or vary the term of this contract shall be binding unless hereafter made in writing and signed by the party to be bound. No modification shall be effected by the acknowledgement or acceptance of purchase orders, invoices or shipping, instruction or other forms containing terms or conditions at variance with or in addition to those set forth herein. Any provisions contained in Buyer's purchase orders which are not consistent with these Standard Terms and Conditions are not accepted by Seller. Unless Buyer notifies Seller in writing to the contrary as soon as practical after receipt of this document by Buyer, the Buyer's acceptance of the Products or payment therefore shall be equivalent to Buyer's assent to the terms and conditions hereof.

**Shipments and Terms:** Buyer shall allow for adequate lead time and shall specify by purchase order or otherwise in writing to Seller the quantity and delivery dates desired for deliveries of the product during such period. Seller will endeavor to comply with the Buyer's wishes as so expressed; however, Seller shall not be liable for delay or short shipment caused by reasons beyond Seller's control. The customer assumes all risk of delay. Products are sold F.O.B. Virginia Beach, Virginia freight for the account of Buyer.

**Inspections:** Customer shall inspect all purchases immediately upon their arrival and shall, within five days thereafter, give written notice of any claims for any defects in the products.

**Cancellations:** Customer's order of the products is not subject to cancellation by Customer after acceptance by the Company. Under special circumstances on a case by case basis, agreements can be made for returns with a restocking fee. Invoices 0-30 days will pay a fee of 25%; 31-45 days will pay a fee of 30% of the cost of returned products plus all freight costs. There will be no returns after 46 days from the invoice date. All material(s) will be inspected for resalable condition, any items not deemed resalable will not be credited to the customer account and may result in additional disposal fee.

**Liability:** Upon the acceptance by Buyer's carrier, Buyer assumes all responsibility and liability for loss and damage to the product or resulting from the handling, storage or use of the Product, whether used singly or in combination with other products. Seller's liability with respect to the Product and under this contract shall be limited to the purchase price of the product supplied hereunder in respect of which damages are claimed. SELLER SHALL IN NO EVENT BE LIABLE FOR ANY DIRECT OR INDIRECT, SPECIAL, CONSEQUENTIAL, INCIDENTAL OR OTHER DAMAGES FROM ANY SOURCE WHATSOEVER.

**Specifications:** All specifications of the Products are subject to change without prior notice to the Customer.

**Force Majeure:** In the event of failure by the Company to manufacture, supply or ship any of the Products herein by reason of any fire, explosion, riot, strike, walk out, labor controversy, flood, shortage of water, power, labor, transportation facilities or necessary materials or supplies, default or failure of carriers, or any other cause beyond the reasonable control of the Company, then the Company shall not be liable to the Customer during the period and to the extent of such inability or failure. Deliveries omitted in whole or in part while such inability remains in effect shall be cancelled.

**Allocation:** If, due to any of the events specified in paragraph 8, Seller is unable to supply Buyer's total demands of Product specified in the contract, Seller may allocate its available supply among its customers and its own requirements on a pro rata basis if practical, but in any event in its sole discretion.

**Non Payment:** All Accounts that are not paid within their payment terms are subject to a 1.5% per month late fee (18% annually) to be invoiced monthly. In the event of nonpayment the buyer shall be liable for all reasonable and necessary fees associated with collections.

**Returned Checks:** If a Customer makes a payment by check and that check is not honored by the Customer's financial institution, then the Company will charge the Customer the amount which the Customer's financial institution charged the Company plus an additional \$50 returned check fee.

**Acceptance of the Terms:** Customer agrees to accept all terms set forth in these Terms and Conditions, and should the Customer not agree with any of the Terms and Conditions, Buyer shall give written notice to the Company within five days of receipt of Terms and Conditions and Shall Immediately return all Products to the Company.

**Governing Law:** This agreement shall be governed by and construed in Accordance with the laws of the Commonwealth of Virginia and all parties consent to jurisdictions in the courts located in the Cities of Norfolk and Virginia Beach, Virginia and agrees that no other courts shall be appropriate venue for any disputes arising out of the relationship between the customer and the Company.

THE PRODUCTS ARE SOLD WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE EXCEPT FOR THE SPECIFIC WRITTEN WARRANTY PROVIDED BY THE MANUFACTURER AND LISTED IN WRITING ON THE COMPANY'S PRINTED LITERATURE. FURTHER, CUSTOMER SHALL NOT BE ENTITLED TO RECOVER FROM THE SELLER ANY CONSEQUENTIAL DAMAGES, DAMAGES TO PROPERTY, AND DAMAGES FOR LOSS OF USE, LOSS PROFITS, OR ANY OTHER INCIDENTAL DAMAGE OTHER THAN AS EXPRESSLY SET FORTH UNDER THE WRITTEN WARRANTY FROM THE MANUFACTURER.



Find your local sales representative at: [www.kosterusa.com](http://www.kosterusa.com)

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**KOSTER**  
Waterproofing Systems