KOSTER VAP I® 2000

A system for the control of moisture and pH on concrete floors

Technical guideline / Article number 6.03
Issued: November 25, 2013

Description:

KOSTER VAP I® 2000 is a one-coat, membrane-forming, moisture vapor control system consisting of a unique combination of epoxy resins and other compounds formulated to prevent floor covering failures on concrete slabs with elevated levels of moisture. KOSTER VAP I® 2000 meets or exceeds the performance requirements in ASTM F3010-13 *Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings*.

KOSTER VAP I® 2000 has no upper limit for water vapor emission from concrete floor slabs. It can be applied to concrete slabs with relative humidity up to 100% RH and it provides protection from sustained exposure to pH 14. Due to its unique formulation, KOSTER VAP I® 2000 is extremely effective at blocking moisture. With a low permeance of 0.091 perms, KOSTER VAP I® 2000 is an excellent moisture blocker for virtually all types of flooring, including low permeance flooring such as sheet goods and rubber tile.

KOSTER VAP I® 2000 is compliant with all state and federal VOC regulations, having VOC content of <10 g/L, which allows installation in sensitive areas such as hospitals, schools, and grocery stores. LEED Indoor Environmental Quality Credits are available for EQ 4.2 (Low-Emitting Materials, Paints and Coatings).

Material Properties:

Pot Life:	approx. 12 min. (Apply material to floor immediately after mixing)
Cure Time:	approx. 12 h (depending on substrate and ambient temperatures)
Solids Content:	100%
VOC, mixed:	< 10 g/L
Flash Point:	>200° F
Tensile Bond to Concrete:	>200 psi (ASTM D7234)
Permeance:	0.091 perms (grains/h/ft^2/in. Hg, ASTM E96 water method 73°F/50%RH)

Appropriate Applications:

KOSTER VAP I® 2000 is formulated to treat new or existing concrete floors with high moisture and/or high pH to allow the installation of floor covering systems. KOSTER VAP I® 2000 may be installed on concrete with 100% RH. KOSTER VAP I® 2000 is unaffected even by a pH of 14. KOSTER VAP I® 2000 low permeability offers long term protection under VCT, sheet-vinyl, wood, rubber, epoxy, polymer-back carpet, and other finish floor coverings. KOSTER VAP I® 2000 has been applied on concrete slabs in offices, hospitals, schools, military facilities, super-markets, manufacturing facilities, airplane hangars, single- and multi-unit housing, retail stores, and many other applications. Contact a sales representative or the KOSTER technical team for other application information.

KOSTER VAP I® 2000 low odor and low VOC content allow application in occupied buildings with minimum disruption.

Underlayments/Leveling Compounds:

Cementitious underlayments, leveling compounds, or skim coatings are not required over KOSTER VAP I® 2000.

However, cementitious underlayments are commonly used to smooth or level the coated surface in preparation for subsequent floor coverings. KOSTER VAP I® 2000 is not a floor leveling product.

All underlayments, leveling compounds, or skim coats must be applied on top of cured KOSTER VAP I® 2000 unless otherwise specified by the KOSTER American technical team.

For proper adhesion always use an appropriate primer for non-porous surfaces, such as KOSTER VAP I® 06 Primer prior to the installation of cementitious underlayments.

Do not install KOSTER VAP I® 2000 over gypsum-based products or moisture-sensitive patching/leveling compounds.

Adhesives:

Flooring systems and adhesives may be applied directly to cured KOSTER VAP I® 2000 if the adhesives are specified for use over a *non-porous substrate***.** There is no absorption of fluid including water or solvents from the adhesive into the KOSTER VAP I® 2000 coated concrete.

Adhesives specified for use over a *porous substrate* require a cementitious underlayment with a minimum thickness of 1/8 inch installed over the KOSTER VAP I® 2000 coating.

Follow the adhesive manufacturer's recommendations for installation of their products over a porous or non-porous substrate.

Apply adhesives to a test area to check for compatibility and performance before proceeding with remaining flooring installation.

Moisture Testing:

Testing to determine the moisture condition of the substrate is recommended but not required by KOSTER. Two commonly used tests to determine water vapor condition of concrete floors are the anhydrous calcium chloride moisture vapor emission rate test (ASTM F1869) and the in-situ relative humidity probe test (RH probe test, ASTM F2170). The RH test is the test method preferred by most floor covering manufacturers.

Surface Preparation:

It is the responsibility of the owner or the owner's representative to examine the slab for contaminants. Testing for contaminants is not required but is strongly recommended by KOSTER. Contact the KOSTER American technical team for additional details and guidelines concerning pre-application concrete testing.

Concrete substrates to receive a KOSTER VAP I® 2000 product must be structurally sound, solid, and meet industry standards as defined in ACI Committee 201 Report "Guide to Durable Concrete." Surfaces to be coated with KOSTER VAP I® 2000 products must be free of moisture-sensitive patching and leveling materials, adhesives, coatings, curing compounds, concrete sealers, efflorescence, dust, grease, oils and any other materials or contaminants that can act as bond breakers.

Consult with KOSTER technical team prior to installing patching or leveling compounds that will be underneath KOSTER VAP I® 2000 products. Such compounds must be long term resistant to high moisture and high pH.

KOSTER VAP I® 2000

Concrete mix designs, finishing methods, flatness specifications, and curing procedures can be discussed with the KOSTER technical team to assist evaluation of bonding and other performance issues before installation of KOSTER VAP I® 2000 products.

Examining Concrete Substrates

KOSTER recommends taking and analyzing cores of older, existing concrete slabs, especially when the building's history is unknown. The cores should be analyzed by a qualified laboratory for various compounds that may cause floor failures such as soluble salts, ASR (Alkali Silica Reaction), unreacted water soluble silicates, organic substances etc. Water soluble silicates are found in some curing compounds, floor hardeners, and some manufacturers' vapor reduction products.

Concrete slabs with existing flooring failures

KOSTER strongly recommends identifying the cause of the failure. This usually requires cores to be taken and analyzed by a qualified laboratory. Contact the KOSTER American technical team to discuss details of taking cores and to discuss results of analysis of the cores and recommendations based on the findings.

It is the owner or the owner's representative's responsibility to examine the slab for contaminants. These tests are not required by KOSTER. Contact the KOSTER technical team for additional details and guidelines concerning testing.

Surface Profiling

All concrete surfaces that are going to be coated with a KOSTER VAP I® 2000 product must be mechanically prepared to an ICRI Concrete Surface Profile (CSP) of 3 (Ref 1). The preferred method to achieve this is shotblasting. Grinding is permitted only in areas inaccessible to shot blasting or for edging purposes. More aggressive surface profiling may be required to remove contaminants. Acid etching is not permitted. Upon completion of the shotblasting and grinding, the concrete slab must be vacuumed free of all dust, dirt and debris prior to the KOSTER VAP I® 2000 installation. Do not use sweeping compounds that may cause bonding issues as most contain oil.

Removing contaminants

Concrete slabs may be burdened with contaminants that inhibit bonding of a moisture control coating to the concrete. The previously described testing is intended to provide information about which contaminants are present, at what concentration and depth. Based on these findings, a more aggressive surface preparation, removal of concrete from the surface or removal of organic substances from the concrete may be required.

Mixing:

2.4 gallon unit: Using a long, slim, pointed tool such as a screwdriver, carefully puncture the rubber seal on top of the B component can as well as the metal bottom of the B component can. Allow sufficient time for the B component to drain into the A component. Remove the B component can.

Use a slow speed electrical mixer (<400 RPM) and "Jiffy-type" mixing paddle to mix the material for 3 minutes. Components A and B are mixed at a ratio of 2:1 by weight. Each unit of the material is packaged containing the components in the correct ratio. Pour the fully mixed material onto the substrate immediately after mixing, emptying the container completely.

6 gallon unit: Pre-mix the A component. Then pour the B component into the short-filled A component container while continually mixing. Mix for 3 minutes. Pour the fully mixed material onto the substrate immediately after mixing, emptying the container completely.

Application:

Apply KOSTER VAP I® 2000 at substrate and ambient temperatures between 50º to 90ºF. Do not apply KOSTER VAP I® 2000 to concrete less than 7 days old.

Provide ventilation during application and curing.

KOSTER VAP I® 2000 is applied in one coat using a notched squeegee and 3/8" nap epoxy rated roller Spread to the appropriate coverage rate using a notched squeegee. Immediately back roll with a 3/8" nap epoxy rated roller preferably at a right angle (90 degrees) to the direction of the squeegee application, evenly distributing the product across the entire area to be treated. Examine the work as you proceed to assure complete, uniform coverage with no missed or thin areas.

When KOSTER VAP I® 2000 is applied to the concrete surface, it may flow into voids that are connected to the surface. Air is displaced out of these voids as the coating flows in, resulting in "out gassing." If excessive surface voids, pin holes, or bubbles are encountered, contact the KOSTER American technical team before proceeding.

Do not allow KOSTER VAP I® 2000 to be exposed to sunlight more than 48 hours before applying cementitious underlayments or polymer coatings. KOSTER VAP I® 2000 does not develop an amine blush and cementitious underlayments can be applied at later ages as long as the surface has been protected from sunlight. Prior to installation of underlayments, coatings, or floor coverings, cured KOSTER VAP I® 2000 must be clean and free of dust, dirt, and debris. Sanding is not required.

If installing coatings over KOSTER VAP I® 2000 such as polymethyl methylacrylate, epoxy, or polyurethane, the maximum recoat window is 48 hours after KOSTER VAP I® 2000 has cured for 12 hours.

If the KOSTER VAP I® System is to remain uncovered for an extended period of time, contact the KOSTER American technical team prior to installing floor covering or coating systems.

To obtain KOSTER's 15 year warranty, KOSTER VAP I® 2000 products must be applied by a KOSTER trained applicator.

Coverage:

Spread rate on ICRI CSP 3 surface is not to exceed 100 sq ft/gal. If typical concrete prepared to CSP 3 is coated with KOSTER VAP I® 2000 at 100 sq ft / gal, the cured coating can be expected to have an average coating thickness of 16 mils (0.016 in.). A rougher surface profile and / or a porous or absorptive concrete will require the use of more material to achieve a sufficient coating thickness. KOSTER VAP I® 2000 moisture control coating must be installed at a minimum layer thickness of at least 16 mils (0.011 in.). Less layer thickness results in a higher permeance of the cured coating.

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

Spread rate at CSP 3	Average coating thickness	Perm rating VAP I® 2000
sq ft / gal	mils (0.001-in.)	perms (grains/hr/sqft/in.Hg)
100	16	0.091

Contact KOSTER technical team with any questions or concerns regarding product spread rates.

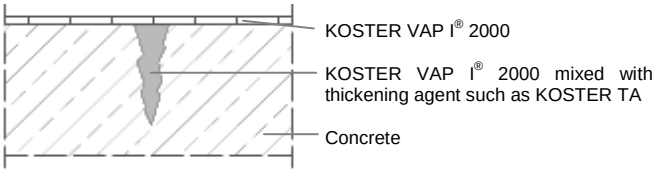
KOSTER VAP I® 2000

Treating Cracks and Expansion Joints:

Static, Non-Moving Voids and Cracks:

Cracks that are very narrow (less than approximatly 10 mils) may be directly flooded with KOSTER VAP I® 2000 during regular application

Wider voids and cracks can be treated after surface preparation has been completed. Clean cracks using a wire brush and then vacuum to remove debris. Cracks may be cut 1/8-in. wide x 1/8-in. deep inch using a thin, diamond-rimmed abrasive blade on an angle grinder. Brush and vacuum to remove dust. Prime the side walls with KOSTER VAP I® 2000 before filling with a mix of KOSTER VAP I® 2000 and an appropriate epoxy thickening agent such as KOSTER TA at a mixing ratio that results in a trowelable consistency.

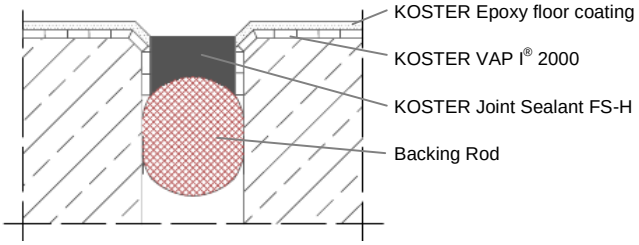


Large voids, spalls, and wide cracks must be treated before the entire surface area is prepared by shotblasting. Remove all debris, loose particles, dust, contaminants etc. Pre-wet the concrete surfaces to be repaired and fill the voids using KOSTER Repair Mortar or Repair Mortar Plus. Allow sufficient curing time before preparing the surface by shotblasting to CSP 3.

Dynamic, Moving Joints and Cracks:

All dynamic, moving joints and cracks must be honored through the entire flooring system and filled with an elastic material that is suited for the general conditions, the use of the facility, and the anticipated type and amount of movement.

If there is any doubt as to the integrity of any existing backing materials, it is always best to remove, clean and re-fill the joint. Clean the joint completely and remove all remnants of the old elastic material from the side walls. Joints or cracks in concrete slabs that have dirt, residue from previous coating, or other contaminants should be cut ¼ in. wide x ½ in. deep to remove the contaminants. Clean the joint or crack thoroughly until it is free of dust and debris. Coat the side walls of the joint with KOSTER VAP I® 2000 in the area where the joint sealant is intended to bond to the side of the joint. Do not flood the joint. The elastic joint must be installed so that the joint runs through the entire flooring system, including all final floor coverings such as KOSTER epoxy floor coating. Then the joint is fitted with a backing rod and a suitable elastic joint sealant is installed such as KOSTER Joint Sealant FS-H.



Packaging:

2.4 gal Combi-Pack, 6 gal kit, 0.7 gal kit

Storage:

Between 50º F - 90º F

Shelf Life:

1½ years in original sealed container

Clean Up:

Immediately with Xylene (or similar) after use

Disposal:

Dispose of in accordance with current local, state and federal regulations. Collect with absorbent material.

Safety Precautions:

See Koster American Safety Data Sheet for the product. Avoid skin and eye contact as well as prolonged exposure to vapors.

First Aid:

Eye Contact – Flush immediately with water and consult physician.
Skin Contact – Wash immediately with soap and water.

Warranties:

KOSTER warrants that its product shall be in accordance with the specifications published in the current revision of the products data sheet. KOSTER covenants that in the event any of its products fail to meet their published specifications, KOSTER shall replace those products proved to be defective. KOSTER shall not be responsible for any incidental or consequential damages due to the breach of its warranties. Notwithstanding the foregoing, KOSTER's sole liability hereunder shall not exceed the cost of the defective product originally purchased. EXCEPT AS SET FORTH ABOVE, KOSTER MAKES NO OTHER WARRANTIES EXPRESS OR IMPLIED AND MAKES NO WARRANTY AS TO THE MERCHANTABILITY OR FITNESS OF THE PRODUCT FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The user must determine if the product is suited for the intended use and the user must bear the risks and liabilities associated with it.

Reference 1. International Concrete Repair Institute Guideline 310.2-1997 (2002), *Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays*.