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If you would like to know more about the topics discussed in this issue, please copy the sheet and send it to us by fax or send an e-mail to info@koesterusa.com or info@koester.eu

Yes, I am interested in these topics:

- KÖSTER VAP 1® LEVEL-PRO: Self Levelling Underlayments and Primers
- KÖSTER VAP 1® O.R.S.: Revolutionary Oil Removal and Containment Process for Concrete
- KÖSTER Level G: High Grade Industrial Self Levelling Floor Screed
- Please send me the "Green Pages of Construction Chemicals":
The complete KÖSTER product range

Mr/Mrs _____

Company _____

Street _____

City _____

Phone _____ Fax _____

What you always wanted to know about waterproofing...

... you can, of course, ask us. If you prefer to quickly and specifically find and read up on a certain topic, have a look at our websites in the US or in Europe at:

www.koester.eu
www.koesterusa.com



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WATERPROOFING REPORT

3 | 2007



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Product Manager:
Köster ORS
Never Oil in the
Concrete again
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Saving Dollars and Sense

As a member of the international KÖSTER Group, KOESTER American Corp is in a leading position in the market for moisture mitigation in the US. This Waterproofing Report is primarily concerned with R&D, case studies and news about this area of work. Additionally, with the new, unique oil removal system (KÖSTER ORS) we have again launched a product line that sets standards for the market.



KOESTER American Corporation was founded in 1992. Already then, Johann Köster and me, the two founders, had the vision to make it the success story that it is today. Consequently we followed a strategy of quality and scientific solutions - all in the area of waterproofing. Especially for the US market, KÖSTER developed a system - KÖSTER VAP I® 2000 - to provide moisture remediation against water in the vapor phase in concrete floors. It was chemically engineered to resist high alkalinity indefinitely and cure in a moist, vapor driven environment. Today KOESTER American Corp. provides a range of products that meet the highest requirements. Located in Virginia Beach, Virginia, KOESTER American Corp. has successfully remediated millions of square feet of concrete against water both in the liquid and vapor phases, and will continue to offer expert technical assistance to the construction community.

Harald Muench



KOESTER American Corporation is headquartered in Virginia Beach, Virginia

Surface Preparation

Your Concrete Needs to Be Shot!!!

“Do I have to shot-blast the concrete prior to installing your product?” I hear this often from people looking for information on our products because they just found us in a national specification and want some information about the products.



National Sales Manager Mac Krauss “Our products only bond as well as the substrate is prepared.”

The simple answer of course is, “Yes!” and the follow up question I always hear is, “Why?”

When concrete cures, there are naturally occurring bleed-water tracks (or capillaries) forming, bringing water and unreacted calcium hydroxide to the surface. The calcium hydroxide reacts with atmospheric CO₂ and produce calcium carbonate. Calcium carbonate is weaker than reacted CaOH and therefore must be removed by mechanical means. When an adhesion test is performed on the calcium carbonate or in this case the upper cap of the concrete, a much lower number is

achieved than when the adhesion test is conducted on a properly prepared substrate. Shot-blasting removes laitance, thin film curing compounds, or other contaminants from the surface of the substrate that could act as bond breakers and cause delamination. Shot-blasting also opens up the capillaries and

allows our moisture mitigation system to penetrate, offering better adhesion and therefore reducing the risk of delamination. If you have a weak substrate you will have a weak bond. If there’s dirt and dust on the concrete, the flooring system can’t form a mechanical bond with the concrete and could delaminate, leading to costly repairs. Only substrates that remain sound, clean, and absorptive are acceptable to install KÖSTER products.

-By Dennis Turner-

Amine Blush: A Reason to Sand

Carbon dioxide seems not only to be an issue for politicians in discussions about the climate nowadays, but also for our industry.

It is a problem for certain epoxy systems. These epoxies react with the carbon dioxide in the air during the curing period to form “carbamat”, also called “amine blush” on the coating surface.

The amine blush, or reaction with CO₂, must be removed before anything will bond to the epoxy. If CO₂ has been worked into such epoxies, broadcasting sand to rejection becomes necessary.

Applying water-based materials over epoxies subjected to amine blush can be a serious problem because it may cause the amine blush to return and result in debonding the applied materials.

KÖSTER products are specifically engineered to perform specific tasks. Therefore, KÖSTER’s moisture mitigation systems do not experience the same problems.

Engineered means certain parameters were given to scientists to develop resinous systems that effectively reduce moisture related issues in concrete substrates.

A simple test can be performed on an epoxy to determine if amine blush is present. Apply a drop of water on the cured epoxy surface. Allow the water drop to dry. If a powdery residue is left, the epoxy is prone to amine blush.

Many companies rush into the market without fully understanding all the parameters required for successful moisture remediation.

Some are aware of the amine blush and require the first or second coat of epoxy be broadcasted with sand to rejection before any other flooring materials may be applied.



Finished VAP-I® 2000 Project

Osmotic Action in Concrete

A recent investigation into the causes and effects of moisture contained in the concrete substrate has revealed some interesting explanations.

This investigation was conducted by the very prestigious “Polymer Institute, by Dr. R Stenner, G.m.b.H.,” Germany. It covers coating failures due to osmotic action only. Hydrostatic pressure and capillary action were not part of the analysis because most coating – adhesion failures are clearly attributable to osmotic action.

Osmosis is defined as “the passage of a pure solvent into a solution through a semi-permeable membrane.” It is the result of different concentrations of soluble compounds on each side of a semi-permeable membrane due to water/moisture presence. Typical for this action on floors is that it usually takes 3 weeks to 6 months to delaminate coatings without surface/substrate residue

adhering to the coating adhesion side. The time frame in which this delamination takes place depends on the nature of the coating (composition) as well as that of the concrete.

The following is required to create osmotic action:

1. Presence of moisture
 2. Semi-permeable membrane
 3. Water soluble compounds
 4. Dense, adhered coating
- Osmotic action is due to moisture migration through the concrete originating from either underneath or from within the slab. This moisture penetrates to the underside (adhesion contact area) of coatings/membranes and creates a highly alkaline environment. Primarily responsible for this alkalinity are highly soluble metal ions that are usually contained in cement in various concentrations like potassium and sodium hydroxide. CaOH is also present in this solution but contributes to the alkalinity to a lesser extent. Given

this alkaline environment with a pH of 13-14, any material that comes in contact with it has to be totally unaffected by it long term to prevent chemical attack with subsequent debonding from the substrate.

Considering this, one has to avoid using material systems containing alkaline sensitive compounds that can leach out and greatly contribute to osmotic action by adding to the solution that causes osmosis underneath coatings. Analysis of water build up underneath coatings due to osmosis revealed solutions containing organic substances like solvents, plasticizers, non-reacted resins and amine compounds, etc. that leached out of these products.

In order to reduce osmotic action and fully resist this damaging condition the following material properties, amongst others, are a necessity.

1. Avoid products containing

water/alkaline soluble compounds.

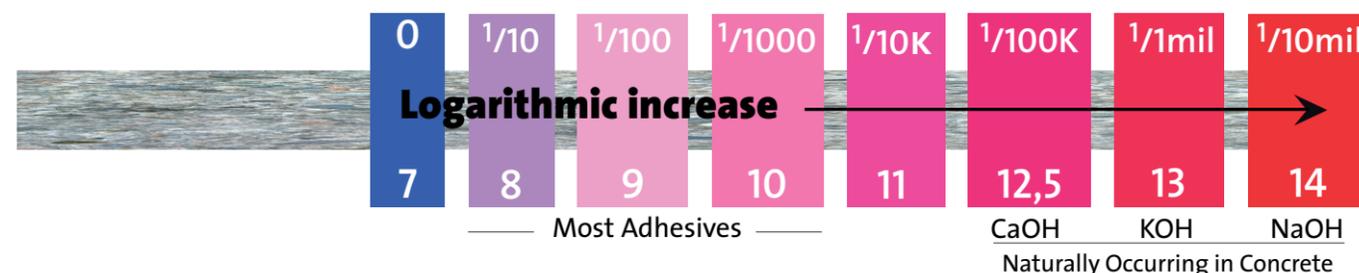
2. Use a fast cure primer with a drying time (tack free) of no more than 3 hours to avoid uptake of alkaline solutions/water.
3. Long term alkaline resistance to a pH 13-14 is most important.
4. Product must be capable of curing in a constant moist environment.
5. Product must be capable of rapid adhesion to the substrate in this environment without jeopardizing long term bonding perfor-

mance.

6. A sufficient density of the product is required to reduce water vapor transmission and avoid water vapor damage to other adhered systems.
 7. Resistance to most commonly encountered acids/solvents is important in case of topical exposure (spills, cleaning, etc.)
- In most cases water pressure does not cause adhesion failures due to “osmotic pressure” as often suspected. Even under extreme conditions rarely found in con-

struction (100% relative humidity with 100° F temperatures) the pressure would not reach 1 psi. Responsible for the delamination of coatings/membranes due to osmotic action is the chemical composition of these materials. This explains why coating/ membranes can debond completely or partially without any or very little surface residue adhering to the adhesion side, even though the initial adhesion after application was strong.

KOESTER American Corporation



Don't Be “PHOOLED” by pH Tests

Anyone familiar with flooring systems knows they are required to conduct a pH Test prior to installing the floor. But, why is such a test necessary?

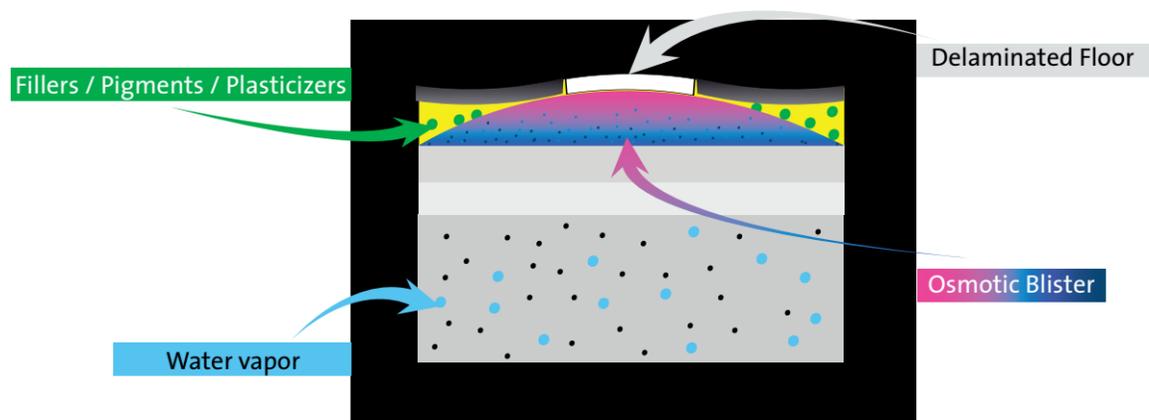
Most adhesive manufacturers advertise not to install their adhesive if the pH level of the substrate is greater than 9. Most water-based adhesives maybe less. Even top-of-the-line two compo-

nent epoxy based adhesives can only withstand a pH of 10, at maximum. Under moisture vapor levels greater than 3 lbs/1000 SF/24 hrs, soluble metal ions naturally occurring in concrete will come to the surface with the moisture vapor and increase the pH of the substrate from 12.5-14.0. Looking at the chart above you can see that if your adhesive can only withstand a pH of 10 and

alkalinity rises to a pH of 14, the pH level is 9,999 times greater than the adhesive can tolerate and this could cause the floor to fail.

Take this into account the next time you decide to roll the dice and install the floor without installing a vapor mitigation system.

“The pH level can be 9,999 times greater than the adhesive can tolerate”



KÖSTER VAP-1® o6 Primer

New Primer: Saving Dollars and Sense

Just ask any installer what their biggest complaint with non-porous substrate primers is and you will hear, "Time and money." Let's face it; most non-porous substrate primers worth using have always been the 2-component epoxy based systems.

**KÖSTER VAP-1® o6 Primer**

They are very good primers, but are often tedious to mix, requiring many mixing buckets and usually take more than 3-4 hours to cure. Not to mention the cost. Installers and especially their bosses want to get in and get out of a project as quickly as possible, because time is money. This is one of the major reasons KOESTER American developed the new KÖSTER VAP-1® o6 Primer. The o6 Primer is a single component modified acrylic primer for use over non-porous substrates, such as the KÖSTER VAP-1® moisture mitigation systems, prior to installing cementitious products, such as underlayments. It is a single component product so there is virtually no mixing

required. Just shake the can and roll, squeegee, or trowel it on the substrate. The KÖSTER VAP-1® o6 primer is applied at about 450-600 SF/Gallon and cures in about an hour. Clean up is a breeze using only water. If you don't use all the primer you can simply replace the lid and use it another day, eliminating unnecessary waste. The KÖSTER VAP-1® o6 Primer is sold in 2.5 Gallon units, is less expensive than other brands, and offers a tenacious bond to the substrate. "Guys using the o6 Primer here in Seattle absolutely love it!" – Bob Sallee, Salleeeco

-by Dennis Turner-

KÖSTER ORS

Oil No Longer Problem in Hub City

KOESTER American's ORS Division traveled to Hub City Ford in Lafayette, LA recently to provide on-the-job-training to the crew of Petra Coatings, Inc of Bowie, TX, the contracted installer for the system. The application was on approx. 30,000 SF of oil contaminated concrete. Originally there was to be a time lapse of days or weeks between two phases, but due to project delays the two were "tailed" together into one large phase to meet deadlines. The ORS personnel flexed with the

change in project plans to make ensure the Petra crew had full advantage of the ORS equipment and training. Operations progressed throughout the facility until the entire area was deep-cleaned and the primer coating applied with the sand broadcast. The ORS treatment went smoothly and as planned. The crew soon got into the rhythm of the ORS treatment. All efforts were made by the installation crew not to interfere with the everyday working of the automotive shop and to keep any

interference to a minimum. Hub City Ford was going through an extensive rebuilding plan during this application and all efforts were made by both the Koester rep and Petra Coatings to complete this project in a timely manner. Koester American wishes to thank the Hub City Ford personnel for their patience and assistance in this project and to Petra Coatings for allowing us the opportunity to work with their professional floor crew and participate in this project.

-Mac Krauss-

Koester American and W.F. Taylor Announce Alliance

and W.F. Taylor Co, Inc. announce an industry alliance and launch of a co-branded product to be provided through approved and certified W.F. Taylor distributor. The product TAYLOR-KOESTER 1410 Platinum MAC (Moisture Alkali Control System) is a two-part, VOC compliant system applied in a one coat application that will reduce moisture vapor transmission level from up to 10 lbs/1000 SF/24 Hrs and control high alkali conditions up to 14 pH for all flooring installations. W.F. Taylor will offer an adhesive bond warranty when approved Taylor products are used in conjunction with 1410 Platinum MAC. According to Charlie King, Director of KOESTER American Corp., "This alliance with W.F. Taylor allows Koester to expand its efforts and

channels through which our products reach the market." W.F. Taylor, which has two adhesive plants in the Eastern and Western United States, offers a well developed national network of distributors. Jack Raidy, president of W.F. Taylor, remarked, "The KOESTER-TAYLOR Co-Brand strengthens the approach to market for both companies. Koester has long

**1410 Platinum MAC System**

been recognized as the leader in moisture control and mitigation systems while Taylor has provided highly water resistant adhesives through its patented Meta-Tec cross linking technology." The 1410 Platinum MAC System will offer a 10 year limited warranty. "The ability to tie the two companies' products together to perform in high moisture environments provides a system that the commercial flooring contractor has been looking for to reliably install flooring in high moisture conditions," according to Barry Wright, W.F. Taylor's Executive Vice President.

New Installers Added this Month

KOESTER American welcomes Bill Deveney of Floor Coatings Etc., Luigi Cristofoli and Robert Centis of Centis Tile and Terrazzo, Inc. to the Koester Family.

Bill Deveney is the president of Floor Coatings Etc., and has had over 30 years of experience in the epoxy coating industry. FCEI is located in Delaware and manufactures and installs epoxy coatings primarily for auto dealerships

across the nation. Luigi Cristofoli is the site supervisor and Robert Centis is the president of Centis Tile and Terrazzo, located in Ontario, Canada. Both have over 20 years experience in the flooring industry and are 3rd generation operators of Centis Tile.

All three seasoned veterans attended our training session where they learned the causes of water

vapor in concrete, alkalinity and its causes, proper surface preparation, testing, and product installation requirements.

Bill Deveney said, "I've been doing this over 30 years and learned a lot from your training session." We welcome both companies to the Koester Family and look forward to providing our products and technical assistance for years to come.