Guidelines for Concrete Surface Preparation

Introduction

A. The following concrete surface preparation guidelines serves as an aide to owners, design professionals, specifiers, and contractors. Proper substrate preparation is an extremely important factor in the immediate and long-term successful performance of applied Laykold/Laykold Masters system. The contractor responsible for the installation of the Laykold/Laykold Masters system shall provide a substrate that is clean, durable, flat, pitched to specifications, and free of surface contaminants.

New concrete must be cured prior to coating. "Cured" is generally defined as, "concrete poured and aged at a suitable temperature for at least 28 days."

B. Court Construction: Refer to the American Sports Builders Association (ASBA) manual Tennis Courts: A Construction & Maintenance Manual for court construction details. This publication may be obtained by calling the ASBA at 443-640-1042 or visiting www.sportsbuilders.org.

Inspection of the Concrete Substrate

Prior to planning a job, the contractor should conduct a survey of the concrete substrate to determine it's general condition, soundness, presence of contaminants, presence of moisture vapor emissions, and the best methods to use in preparation of the substrate. If excessive laitance is present, this material must be removed down to solid concrete. The coatings will not bond properly to the weak layer on concrete. The surface should be checked for barriers such as existing sealers, curing materials, grease, oil, efflorescence, and dirt that must be removed. An evaluation will lead to the selection of the correct tools and equipment to properly surface.

Test the Concrete

A. Water Drop Test – A "water drop" test can be used to determine if the surface is clean. Water beads on surfaces contaminated with sealers, curing compounds, oil, and grease. Water beads on surfaces that are too dense to accept penetrating primer.

B. Contaminations Test – Decontamination of the concrete substrate requires the removal of oils, grease, wax fatty acids and other contaminants, and may be removed by the use of detergent scrubbing with a cleaner/degreaser (Laykold recommends Dawn dish soap), low pressure water cleaning (less than 5,000 psi), steam cleaning, or chemical cleaning. The success of these methods is dependent upon the depth of contaminant penetration, which is completely dependent upon the contaminant's viscosity, the concrete's permeability, and the duration of exposure.

C. pH Test – A simple method to ensure sound concrete is test the pH. The chemistry of concrete is alkaline in nature. Normal wet concrete pH should be in the range of 11 to 13. Most of the contaminants mentioned are neutral to acidic in nature. After preparation, test the substrate in multiple locations using distilled water and pH paper. Accepted pH for a concrete substrate is 7-8. Concrete Substrates with high pH can be neutralized using Muriatic Acid or Club Soda (preferred).

1. Spray the Club Soda on the surface of the concrete.
2. Remove the excess with a wet vacuum.
3. Immediately rinse the Club Soda (do not allow it to dry on the concrete) with clean neutral water.
4. Remove the excess water and allow it to dry 24 hours.
5. Test the surface to be sure the pH is neutralized.

D. Moisture Vapor Transmission (MVT) – This test can ONLY be conducted on indoor slab with controlled coniditions - Moisture Vapor Transmission (MVT), also referred to as "hydrostatic pressure", "capillarity" or "Vapor Pressure", is caused by moisture being present underneath the concrete slab. MVT can cause blisters, bubbles, and other effects in a non-porous system. As moisture rises, it dissolves salts in the concrete and becomes alkaline. This alkaline water attacks the coatings. All slabs should be tested for MVT.

Acceptable Test Methods for MVT

i. Calcium Chloride Test: Perform a quantitative anhydrous calcium chloride test in accordance with ASTM-F1869 Standard. The maximum acceptable result for this test method is 3 pounds per 1,000 sqft per 24 hours.

Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride Moisture Emissions Test – Originally developed by the Rubber Manufacturers Association. To determine the amount of moisture movement, the substrate and surrounding environment must in the anticipated service condition. The test must be conducted over raw exposed concrete, which has been exposed to the environment for at least 24 hours. A quantitative evaluation is conducted wherein the anhydrous calcium chloride container and contents are pre-weighed on a gram scale, allowed to remain in it's container with the lid removed, and the container placed under a sealed dome to prevent loss of moisture for a period of 60 to 72 hours.

Three tests are required for the first 1,000 sqft with one (1) additional test for every 1,000 sqft. The container is removed and again weighed on a gram scale to determine the weight gain of the anhydrous calcium chloride. A calculation is performed to determine the amount of moisture adsorbed. These results are quantified as the rate of moisture vapor transmission expressed as pounds per 1,000 square feet or surface area per 24 hours. Laykold has adopted a commonly accepted value for application of non-permeable coatings without a MTV Primer to be not more than 3 pounds of moisture per 1,0000 square feet per 24 hour.

ii. Relative Humidity Test: Perform a quantitative Relative Humidity test in accordance with ASTM-F2170 Standard. The maximum acceptable result for this test method is 75%.

Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes. The test method requires drilling holes at a diameter of 5/8" to a depth equal to 40% of the slab thickness. The hole is then lined with a plastic sleeve, capped, and allowed to acclimate for 72 hours. The probe is placed in the sleeve, allowed to equilibrate for 30 minutes, and then readings are recorded. Acceptable relative humidity readings for a substrate receiving a non-permeable system is 75% or lower. Testing should take place in an acclimated building and is required to equal 3 tests in the first 1,000 square feet with one (1) additional test per each additional 1,000 square feet of concrete slab surface. This test method is less subject to conditions occurring at the concrete surface that may influence calcium

chloride test results. This method only defines exiting moisture content of the sample and cannot address moisture vapor transmission.

Moisture content and moisture movement are merely snapshots in time of dynamic conditions within the concrete. Moisture vapor movement is dependent upon the relationship between temperature and humidity of the two adjacent environments. In this case, the internal environment of concrete and the external environment of the air surrounding the concrete. Any chance in temperature and/or moisture content of weather will result in a change in vapor pressure and the attempted movement of moisture vapor into and out of the concrete substrate.

Concrete Preparation Methods

A. **Etching (CSP1 Profile)** – Once a common practice, acid etching does not provide the proper surface profile for a non-permeable system. Acid etching can be used for neutralization of concrete with high pH. Resulting concrete surface profile (CSP) is 1.

   Note: Acceptable if concrete has a medium broom finish and will be coated with permeable coatings

B. **Shot Blasting (CSP3 Profile)** – Steel shot blasting involves steel shot being centrifugally propelled at high velocity onto the surface. This process is confined in an enclosed blast chamber that recovers and separates dust and reusable shot. This method can be used to remove coatings up to 10 mils thick, mastics, and brittle coatings up to 1/8 inch thick. Removal of thicker materials may require multiple passes. Shot blast systems produce little airborne dust or contamination. Most models can be fitted with a filter to further lower the level of airborne dust produced. Once shot blasting is complete, substrate should be inspected for steel shot that needs removed and swept and blown before coating. Resulting concrete surface profile (CSP) is 3.

C. **Hydro Blasting (CSP3 Profile)** – Hydro blasting is a technique for profiling or cleaning surfaces, which relies entirely on the energy of water striking a surface to achieve its desired effect. Abrasives are NOT used in hydro blasting systems. Consequently, the problems caused by dust pollution and by the disposal of spent abrasives are eliminated. Two different hydro blasting operating pressures are commonly encountered.

   High pressure hydro blasting, operating at pressures above 680 bar (10.000 psi)

   Ultra-high-pressure hydro blasting, operating at pressures above 1.700 bar (25.000 psi)

   This process is confined in an enclosed blast chamber that recovers 98-99% of the water and dust. Once hydro blasting is complete, substrate should be allowed to dry for 24-72 hours before coating. Resulting concrete surface profile (CSP) is 3.

Priming

Once the substrate is clean and prepared, the substrate is ready for priming. Prime with the appropriate Laykold/Laykold Masters Primer based on the system to be installed.

Please read all safety data sheets and technical data sheets before using any of the Laykold/Laykold Masters Primers.

Please read all safety data sheets and technical data sheets before using any of the Laykold/Laykold Masters Primers. For complete and latest warranty and product information, please visit advpolytech.com