SeamTek® Surface Preparation

Introduction

The following Guidelines for Concrete Surface Preparation should be used as a tool to help owners, specifiers, and contractors establish the best means possible to prepare concrete and achieve a good substrate for long term support of a quality sti floor installation. There are many acceptable methods to prepare concrete to receive a Seamless Resinous Floor. The choice of preparation method should be based on performance, consistency of prep, safety, speed, accessibility, power requirements and obviously cost.

Proper Surface Preparation

Surface preparation for all concrete slabs should meet four basic criteria before the installation of the Seamless Resinous Flooring:

1. Removal of Bond Inhibiting Contaminants shall include but not be limited to removal of oils, grease, wax; sealers, curing compounds and other hydrocarbon based materials. This will assure that a good chemical bond takes place between the resinous flooring and the concrete substrate.

2. Creation of Concrete Profile is required to achieve mechanical bond of the new resinous flooring. The ideal profile should be 5 to 10 mils (*.13 to .25 mm*) as defined by measuring the average distance from the peaks to the valleys in a cross section view of the concrete. For coating applications (defined as systems no greater than 60 mils (*1.52 mm*) thick) a milder profile is desirable. Rougher profiles with thin floors tend to mirror slab imperfections.

3. Repair of Surface Irregularities including but not limited to bugholes, cracks scaling, spalls, fins, and honeycombs is required to provide a consistent, uniform finish in the Seamless Resinous Flooring installation. If extensive scaling and surface deterioration exists, it may be necessary to level the entire area with a grout or level coat of epoxy, prior to the floor installation. Mortar systems are a little more forgiving than thinner systems; however, consult your sti contractor prior to installation to review irregularities to be repaired by others.

4. Replacement of Structurally Deteriorated Concrete shall be done in accordance with The International Concrete Repair Institute (ICRI) Bulletin ***Surface Preparation for the Repair of Deteriorated Concrete***.... Seamless Resinous Flooring cannot perform when applied over weak, deteriorated, punky concrete. Flash patch or gypsum based patching cements are not acceptable. Patching material shall be a quality; polymer modified cement repair mortar engineered for the type of concrete deficiency being repaired. Patching manufacturer shall specify minimum cure time before installation of resinous flooring. sti contractors are qualified to complete these repairs and should be contracted whenever possible to assure that a quality, timely, and compatible repair is done.

Methods of Surface Preparation

Vacuum-Grit Blasting or **Shotblasting** has become the preferred method of surface preparation for most installations of seamless resinous flooring. Centrifugal vacuum blasting utilizes recycled metal shot in a combined metal chamber. Shotblasters remove surface contamination, profile, and vacuum clean the concrete in one process. The size of shot and speed of the machine can be adjusted. Shotblasting is a dry preparation process allowing for the floor installation to begin immediately after completion of prep. The mechanical blasting will also identify weak areas in the surface of the concrete (i.e. concrete pours that were rained on, or poorly finished concrete...) Shotblasting will also remove curing compounds. Suggestion: Specify Shotblasting as a standard means of preparation on all projects to receive Seamless Resinous Flooring.

Acid Etching is process where the concrete surface is chemically etched using a mild solution of hydrochloric acid (also known as muriatic acid). Three or four parts water to one part acid should be used depending on the density of the substrate. The acid solution when applied to the floor reacts with the free lime and laitence in the concrete. This reaction will actually profile the concrete allowing for the mechanical bond of the resinous flooring. *Acid Etching* will not work properly over a film forming curing compound, sealer or a surface that is contaminated with oils, wax, or grease. These contaminants must be removed by other Mechanical Abrasive means. *Acid Etching* is a wet process, requiring a thorough rinsing and neutralization with clean water after the initial reaction is complete. *With the knowledge we have today regarding moisture problems in concrete, wet preps are not recommended.*

Mechanical Abrasion preparation consists of the use of mechanical tools and equipment that are designed to abrade or chip away the surface of the concrete. Common types available include Grinders, Planers, Scarifiers, Scabblers and Bush Hammers. These tools are typically electrically or pneumatically driven power tools that are noisy and create a lot of dust. Jack Hammers and scabblers are best suited for removal of concrete overlays, tile or other seamless floors. Be sure to address noise and dust control, if Mechanical Abrasive preparation is to be utilized.

Abrasive Blasting includes the use of sand or some other abrasive aggregate that is pneumatically shot at a surface. Abrasive blasting can be done dry or mixed with water, (Wet Abrasive Blasting). The water helps control the dust problem that is prevalent with any dry Abrasive Blasting. This process is ideal for removing heavy coatings or contaminants, especially from vertical and overhead surfaces. Dust control, safety, and clean up of debris restrict the use of this preparation technique from most occupied areas in a facility.

High Pressure Water Blasting with pressures up to 30,000 psi (*206.85 MPa*) are now available that will cut through 8" concrete slabs. **Hydrodemolition** preparation is becoming very popular in the exterior restoration market, where large areas of deteriorated concrete must be removed quickly. The major drawback to high pressure Water Blasting is handling the large volume of water and the clean up of the slurry waste. If not cleaned up quickly it can solidify and require blasting again.

Removal of Adhesives, Mastics and Membranes

In many retrofit projects, existing tile, VCT or sheet goods are being replaced with Seamless Resinous Flooring. Removal of the floor finish will often leave a layer of some type of mastic, adhesive or membrane. In thin applications these materials can often be totally cleaned up by shotblasting the concrete. In thicker applications, the steel shot will tend to bounce, requiring additional preparation with the use of scarifying equipment or possibly even the use of chemical strippers. Wherever possible, consult with your local sti representative or contractor and schedule a site visit to investigate the best removal methods. On bid projects it is often better to bid the demolition and removal of adhesives as a separate item. Identifying the quantity and location of these areas will help assure that proper surface preparation is performed.

Resurfacing Existing Seamless Floors

Existing seamless floors may be resealed or resurfaced from time to time due to excessive wear or the need to change the appearance or skid-resistance of the floor. The existing floor should first be cleaned and degreased with mild detergent. Next it is important that both a chemical and mechanical bond be achieved with the new material to the old. This will require some means of mechanical abrading and a solvent wipe to clean and tack up the surface. The contractor must pay particular attention to assure that water from previous end use applications have not migrated beneath the existing floor.

Resurfacing Quarry or Ceramic Tile

Quarry Tile and Ceramic Tile have been successfully resurfaced on many projects without removal of tile and setting bed. However, before any decision to go over tile is made, a site investigation along with several cores designed to expose the setting bed for examination are recommended. The cores will help identify the type of setting bed, the existence of any waterproofing membranes, additional toppings or other unusual existing conditions. If the setting bed was dry packed with sand and cement in a wet environment, sti recommends full removal down to the structural slab. Water trapped within a floor assembly will create long term performance and sanitation problems. If the tile is well bonded and placed over an unsaturated latex setting bed, the floor may be resurfaced, following the general guidelines for proper preparation. Consult with your local sti representative or contractor for these applications.

Testing For Moisture Content on Or Below Grade

The presence of excessive moisture in or below concrete slabs can lead to both short-term installation problems as well as long term adhesion problems with seamless resinous floors. We recommend reading the presentation on moisture problems located within this section of the catalog.

The following slab or site conditions should be thoroughly investigated by the owner and/or design professional prior to installing a seamless floor:

- slabs below grade
- slabs built into slopes
- building sites with a high water table or known water problems
- Slabs made of lightweight concrete

All slabs should be checked for moisture content prior to installation of seamless flooring. The preferred method is the calcium chloride test.

Calcium Chloride Crystal Test ASTM F 1869-98): This test was developed by the Rubber Manufacturers' Association to make a quantitative evaluation of vapor emissions from the concrete. The recommended frequency is one test per every 1000 square feet (*92.9 sq. meters*). Contact your STI contractor for details.

Unfortunately testing is not100% conclusive since they test a condition at a specific point in time. They are however indicative of the permeability of concrete which is the prime indicator of potential problems.

Testing For Chemical Contamination in Existing Concrete

The presence of chemical contamination in concrete can also lead to premature failure of Seamless Resinous Flooring.

Salt contaminated slabs that contain steel reinforcement are very susceptible to corrosion of the reinforcing steel. As this steel corrodes it expands causing cracking, delamination of concrete and any toppings bonded to it, and eventually structural failure of the slab. Obvious signs of chloride or salt contamination are spalled concrete with exposed, rusted reinforcing steel. Testing is recommended to determine the depth of contamination and the extent of corrosion activity. Testing available includes:

Litmus Test will determine pH of concrete indicating the presence of chloride or acid contamination if the pH is below 10.

Half-Cell Potential Test will determine the level of electrical/corrosion activity in the slab.

Petrographic Analysis will determine, through microscopic examination of actual cores from the slab, the make up of the concrete. This analysis can identify contaminants and measure in many cases the quantity of contamination at different levels within a core.

Acid contamination is concrete, like salt, lowers the pH increasing the potential for electrochemical corrosion activity. In addition, acids can attack and break down the cement paste that binds all aggregates in concrete. Contaminated slabs that are treated with Seamless Resinous Flooring often experience failure at the bond line due to residual acid attack. Moisture vapor transmission can activate residual acids at the interface of the seamless floor and concrete slab. The acid attack on the cement eventually weakens the bond line, causing premature delamination of the seamless flooring. The testing for acid contamination is the same as for Salts. A Titration Test can also be performed to determine the presence of specific contaminants.

Oil Based contaminants tend to migrate in concrete through the capillary channels. Oils and animal fats will inhibit the bond of any adhered surface treatment. A common household heat lamp can be used to determine the presence of oil based substances at or near the surface. The heat lamp should be focused on the concrete at a distance of 2 feet (*.61 meters*) for a period of 8 hours. The presence of these substances on the surface would indicate contamination.

Important Notice

This document has been prepared as general information to help owners, design professionals and construction managers design, specify and complete successful projects. While the information in this document is based on sources and procedures which ***sti*** *believes reliable, construction project results depend upon the specific circumstances of each project and cannot be guaranteed. This document is not intended to replace the knowledge and experience of construction professionals, nor does this document constitute an assumption by* ***sti*** *of responsibility for the design and preparation of concrete surfaces, nor any warranty or any other contract on* ***sti****'s part.* ***sti****'s product warranty is made solely on the* ***sti*** **Single Source Warranty for Labor and Material***, which is available from your* ***sti*** *Associate Contractor.*