



Substrate Preparation for Milamar's PM Flooring Systems

CONCRETE PREPARATION

ALWAYS REMOVE ALL SURFACE COATINGS, FINISHES, SEALERS, AND/OR CURING COMPOUNDS.

To obtain proper bonding all debris, dirt and dust must be thoroughly removed from the floor. Plaster, cement, paint or other foreign matter should be scraped off and oil, grease or wax must be removed.

SHOT BLASTING: The preferred method of concrete substrate preparation is usually a form of shot blasting. Shot blasting removes all unsound surface materials and forms a profile to which the coating or overlay can adequately adhere.

- **COATINGS:** Shot blasting for coatings of less than 125 mils (1/8") should be a feather or brush blast which leaves no blast pattern such as overcuts or blast lines. Any irregularity in the concrete will reflect through to the surface of the coating. Proper brush blasting can best be accomplished with a paddle wheel type shot blaster using very small (190-230) shot.
- **OVERLAYS:** The shot blast finish for an overlay of greater than 125 (1/8") mils is not nearly as critical. The fillers in the overlay should prevent any irregularities from showing on the finished surface of the overlay. Many times a heavy shot blast will actually smooth out the substrate surface to a certain degree and provide an excellent texture for adhesion.

ROUGH GRINDING: Also referred to as diamond grinding. This method reduces or smooths slight surface irregularities and removes mineral deposits, leaving a profile to which the coating or overlay will adhere. More detailed information and standards are available thru industry associations such as ICRI Technical Guideline No. 03732 and SSPC reference standards and publications.

ACID ETCHING: If for some reason shot blasting is not available, acid etching can be used to prepare a good, clean, uncoated concrete substrate (any previously used coatings, sealers, curing compounds, tile mastic, carpet glue, or any other surface finish must be completely removed). Similar to shot blasting, acid etching removes any surface concrete laitance and leaves a profile to which the coating or overlay will adhere.

Always clean the substrate of any debris, dirt, dust, grease and oil (see degreasing) before acid etching. The acid solution should produce a consistent bubbling of the concrete surface. If this does not occur, the surface is contaminated and that contamination must be removed and the area etched again. The surface texture should feel similar to 60 grit sand paper.

After acid etching, the floor should be neutralized with a solution of baking soda or household ammonia and water. The floor should then be rinsed thoroughly with free running, clean water. Any residual acid left in the concrete can cause an adhesion failure over time. A mild solution of potash, ammonia or baking soda mixed with water is the most common neutralizer. The floor should then be thoroughly rinsed again. Litmus paper should be used to insure that the concrete is neutral and then allowed to completely dry before the coating or overlay is applied. NOTE: The runoff of the acid, neutralizer and the rinse water may violate some local environmental or public sewer district restrictions.

SANDING: Sanding is not an acceptable form of concrete substrate preparation for coatings or overlays. It typically does not create a profile as good as shot blasting, grinding or acid etching since the residual dust is forced into the pores of the concrete surface by the process. If the substrate must be sanded or ground, the surface should be thoroughly scrubbed and power rinsed to remove embedded dust and then allowed to dry completely.

SCARIFYING: When a substrate surface is terribly contaminated, irregular or has an elastomeric coating, scarifying may be necessary. Scarifying is done by a machine which uses hardened steel wheels to break up the surface of the concrete substrate. Since it is based upon a gouging action, it leaves a very rough and uneven surface. The profile produced by a scarifier is adequate for an overlay but is far too rough for a coating. The scarified surface must be aggressively swept with a stiff bristled broom and vacuumed before application of the overlay.

SCABBLING: Although seldom used, there are times when a concrete substrate must be scabbled. A scabbler is a machine which uses a number of small, hardened steel pistons to break the surface of the concrete. Scabbling is more aggressive than scarifying and leaves an even rougher surface. Many times the surface will be so uneven that a concrete plainer or grinding must be used to somewhat smooth the surface. As with scarifying, coatings are not suggested for a scabbled floor and all dust and debris must be removed with a stiff bristle broom and a vacuum prior to installing an overlay.

DEGREASING: Any imbedded grease or oil in a concrete substrate can cause adhesion failure of a coating or overlay and therefore must be removed. There are many types of chemical degreasers on the market. Some products work well under certain conditions but we know of only one system which is universally reliable.

ALWAYS DEGREASE AFTER ANY MECHANICAL PREPARATION SUCH AS SHOT BLASTING HAS BEEN PERFORMED. Mechanical preparation creates heat which can wick embedded grease and oil to the surface.

Step 1. Mix a solution of free rinsing, caustic detergent (TSP) and hot water (>160° F) according to labeled instructions of the detergent and vigorously scrub the concrete, a mechanical power scrubber is suggested until the floor is uniform in color. A mechanical power scrubber is suggested. Thoroughly rinse with hot, running water and squeegee rinse water to drain or out of the building.

Step 2. Repeat scrubbing sequence of Step 1 but rinse with cold running water.

Step 3. Repeat scrubbing sequence of Step 1 and 2 but use cold water to scrub and follow with a second cold water rinse.

The three step procedure is necessary since it is virtually impossible to remove grease and oil from deep within the concrete. Step 1. removes all surface contamination but the hot rinse will cause the second layer of grease or oil to wick to the surface.

In Step 2, the scrubbing removes the residual grease and oil and the cold water rinse prevents further wicking. This prevents the heat created by the thermal reaction of the epoxy and hardener from wicking residual oil and grease to the surface and causing future adhesion failure.

Step 3. is an insurance policy and is recommended, but may not be absolutely necessary on time critical projects.

MECHANICAL BONDING: Installation of a polymer overlay can many times be accomplished over an otherwise unsuitable substrate by mechanically bonding the overlay. Frequently a substrate in a meat packing plant or machine shop is so contaminated by fat, grease or oil that the concrete floor can not be adequately cleaned. Other typical examples are where the surface layer of concrete may be somewhat soft due to improper curing techniques and where the substrate is unsound wood. When this is the situation, mechanical bonding is advised if an overlay is to be installed.

“Mechanical bonding” is the use of reinforcing wire mesh and mechanical anchors such as ring shank nails or powered concrete anchors. The anchors and the mesh connect the overlay to the substrate. The most common types of wire mesh used are plasterers lath, expanded metal, or hardware cloth. In extremely wet conditions such as the kill floor of a meat packing plant, galvanized metal is recommended.

After the substrate has been cleaned of all loose surface contamination, the floor should be covered with 40# roofers felt, overlapped 3” at each seam. Lay the reinforcing mesh over the felt with the seams running perpendicular to the felt seams. Butt edge of the mesh seams. Mechanically fasten the metal through the felt, securely into the substrate 6” on center. Keep reinforcing wire as flat as possible to avoid the use of additional overlay materials to cover any high spots.

Once the reinforcing wire is firmly anchored, trowel mortar into the reinforcing wire and finish as any epoxy mortar system. Normal thickness will be at least 3/8” to completely cover the reinforcing wire. There is no need to use a primer when roofers felts is used. The roofers felt acts as a slip sheet, which allows the substrate to move independently of the overlay, prevents contamination of the substrate from reaching the overlay and precludes the need for a primer.

The reinforced system virtually builds a new floor over the old floor and will add years use to a concrete floor without requiring the removal of the poor substrate.

FIBER REINFORCED CONCRETE: Installation of a polymer coatings over fiber reinforced concrete can produce an unsightly appearance in the finished coating. To reduce or eliminate this effect, the surface can be charred with a flame. This procedure may need to be repeated depending on the type, volume and orientation of the fibers in the concrete matrix. Note: Care should be taken when using an open flame.

Once the fibers are charred and brittle, use a razor type scraper blade to remove the stubble. This procedure may have to be repeated, depending upon the type of fiber used in the concrete.