T:(904) 268-4000 E:info-usa@corrocoat.com

USER DATA CONCRETE PREPARATION AND PRIMING: SP5

Valid From: 10 August 1992
Last Reviewed: August 2020

RECOMMENDED PROCEDURES FOR SURFACE PREPARATION AND PRIMING OF CONCRETE PRIOR TO APPLICATION OF CORROGLASS/POLYGLASS MATERIALS.

BACKGROUND

It is essential when coating concrete, brickwork or masonry, that surface preparation and priming is carried out correctly.

The difficulty in coating concrete is in obtaining a bond to the surface. This can be for several reasons, the main one being the presence of water. This can be difficult to remove where the concrete is below ground, particularly below the water table and osmotic pressure exists. Also, a poor quality concrete can present a dusty and frangible surface on which to adhere the coating.

A further problem may occur on freshly poured concrete, where the chemical reaction taking place within the concrete itself may affect attachment of the resin due to interaction with our product. Concrete density can also vary considerably and this may present further problems. It is therefore necessary to observe and use common sense when preparing these substrates. Providing these problems are understood, successful coating of concrete with Polyglass/ Corroglass materials is not difficult.

Where concrete is "green" this should be left to cure for a minimum period of 8 weeks and no attempt whatever should be made to coat concrete until this time has expired. Coating concrete younger than this will involve some element of risk in disbonding, becoming greater the younger the concrete is and this applies not only to Corrocoat products but to many other coatings as well.

Often the problem of a customer wanting to coat concrete immediately after it has been laid, in order to assist his production requirements, is unsolvable. However, sometimes it is not necessary for the customer to screed old concrete in the first instance and other avenues should be explored. For instance, it may be possible to screed using a resin sand grout material which, although relatively expensive compared with concrete screeding, may solve the time problem.

Moisture is the most prevalent problem in coating concrete. Although Polyglass/Corroglass is reasonably tolerant of moisture and some grades can take up to 2% of their own weight before problems occur, moisture will inhibit cure and can prevent penetration of the primer layer into the concrete resulting in poor bond. The surface should therefore be as dry as it is possible to achieve before application of the coating.

The drying of concrete can often be achieved in several ways. In good climatic conditions a tank, for instance, could be dried simply by achieving a good level of ventilation, otherwise heating might be used to dry out the immediate surface, as it is not necessary to obtain a dryness beyond the immediate 20 mils (500 microns) of the surface layer. Dehumidification equipment can be used, but the cost of operating this equipment is usually very high and the equipment expensive to hire. Generally, if the concrete is dry to the touch it can be coated. However, it is always advisable to be precise in determining dryness and we strongly recommend the use of a moisture meter graduated in percentage terms, so that the surface moisture levels can be measured accurately. Our recommendation is that (dependent up- on service conditions) a 6% moisture level is the maximum acceptable level and 3% moisture should be the norm. The moisture meter used by Corrocoat is a Sovereign Portable Electronic Moisture Master, but other equipment is available on the market and local availability could be ascertained.

Where higher levels of moisture than those recommended do occur, or are likely to occur, it is often possible to ameliorate the problem by the use of Polyglass WCP or Plasmet ECP primers, and their use should be considered.

Dust and weak surface layers in the concrete, to which the coating is to be adhered, present another problem. It is no use adhering a strong coating to a weak frangible surface because that will only result in the immediate surface layer of concrete disbonding with the coating. It is for this particular reason that the use of a penetrating primer, to strengthen the immediate substrate is recommended.

In order to remove weak and contaminated concrete surface, preparation is required. The normal way to do this would be by abrasive blasting. A high work rate can be achieved in this manner, and these methods are free from the inherent problems of acid etching, i.e. wetting out a surface which you ultimately wish to be dry. However, in certain circumstances acid etching should not be ruled out particularly where new concrete is involved. This can be carried out with a 5% phosphoric acid solution washed over the concrete and left for 24 hours, before neutralisation with a 2% solution of sodium hydroxide. Obviously, apart from wetting concrete, this process can produce hazards such as fume generation and the risk of skin burns to the operators. Further, before drying out, washing with copious amounts of water to the surface should take place to remove any acid residues.

Where abrasive blasting is carried out, dust residues can readily be removed and usually no drying is needed afterwards. Care should be taken when blasting to remove only the weak or contaminated concrete, or where concrete is in good condition, only the surface laitance to which coating will not readily adhere. Excessive blasting will result in uneven surface and a requirement for large amounts of filler.

Regardless of the method used to obtain a good surface condition for coating, it is essential that vacuum cleaning of the surface takes place immediately prior to coating. Failure to do this will often result in poor bond despite the initial surface preparation.

After vacuum cleaning has taken place, the surface dryness should be checked and the primer applied as soon as possible, as changes in humidity conditions and osmotic influences may raise the surface moisture level if too much time is allowed to elapse.

PROCEDURE

Surface Preparation 1:
Using mineral abrasive, grit blast the surface to remove all surface contaminants, surface laitance or weak frangible material. On completion of grit blasting the surface should be thoroughly vacuum cleaned until no loose dust is in evidence. Wet blasting may be used to reduce dust and water blasting with the addition of a suitable abrasive may also be used for preparation. However, in both instances the surface should be thoroughly dried before vacuum cleaning takes place.

Surface Preparation 2:
Observing normal precautions dilute Phosphoric Acid to a 5% concentration. Ensure proper ventilation and observe safety procedures for the handling of acids including the wearing of goggles and other suitable protective clothing. Ensure that any run off is accounted for or contained in accordance with current regulations. Wash the surface to be treated with copious amounts of diluted acid ensuring that all surfaces are well wetted and allow to react for a period of 24 hours. Wash down the surface with clean water, then using a 2% solution of Sodium Hydroxide wash the surface to neutralise any remaining acid residues, whilst scrubbing with a stiff bristled brush to ensure the loosening of surface particles. On completion of neutralization, the surface should be washed with fresh water and allowed to dry. The surface can be dried in enclosed areas using dehumidification or by the use of air dryers/heaters. After drying the surface should be vacuum cleaned to ensure removal of all dust particles.

PRIMING

Although diluted Polyglass PPV, Polyglass and 252 may be utilized for priming concrete in small areas, best results will be obtained with Polyglass PPA or specialist concrete primers Polyglass WCP and for epoxies Plasmet ECP, and the procedure is therefore based on the use of this material. Where it is necessary to use these materials listed above, Corrocoat USA technical staff should be consulted before proceeding.

Polyglass PPA should only be used where the concrete is dry and the maximum moisture content of 6% can be assured. If this moisture level is not possible or the surface has been prepared with Ultra High Pressure water jetting, acid etching, or has been decontaminated with emulsifying degreasers and water washing, then it is essential to use Polyglass WCP. This primer and subsequent build layers must be applied in accordance with the procedures detailed in the relevant Technical Data Sheets.

CONCRETE PREPARATION AND PRIMING

Dilute Polyglass PPA with between 5-10% styrene monomer by volume dependent upon surface conditions and temperature. (High temperatures and permeable substrates will require higher dilutions than low temperature and impervious substrates.) Catalyze the solution in the normal manner and brush, roller or spray the material in such a manner as to thoroughly wet out the whole surface. The areas to be coated should be gone over several times during the application, in order to obtain a wet surface and as much primer soaked into the substrate as possible. After one hour any puddling which has occurred on horizontal surfaces must be removed by mopping up the excess.

Any dehumidification which was used in initial drying should be removed in order to reduce the potential across the primed concrete veil unless there is serious risk of condensation occurring.

The second primer layer should now be made with the main material (Polyglass etc.) diluted with 5-10% styrene and this layer should be applied in accordance with normal procedure at a thickness not exceeding 13.5 mils (350 microns). It should be noted that wet film over thickness may result in high shrinkage and surface stress, a major cause of delamination on concrete.

Bonding on all primer layers can be improved regardless of the above method used by the addition of the correct silane adhesion promoter. It should be noted, however, that it is essential that the immediate surface layer is dried/ cured before application of the subsequent coating material (either Corroglass or Polyglass). It is also recommended that the final primer layer is not overcoated for 24 hours at 59°F (15°C), ensuring good ventilation occurs if surfaces coated are within an enclosed space. It should be noted that as temperature increases the overcoating time can be shortened and it is important, particularly in hot climates (in excess of 82°F or 28°C), that overcoating is notleft too long other-wise poor bonding of subsequent coats may arise.

After priming fill in pits, cavities etc with suitable materials such as resin, screed/filler or O2 grades.

After carrying out this procedure the specified thickness of coating can be built up using standard product, but it is essential that the first main coat is allowed to cure sufficiently to obtain a high mechanical strength before application of subsequent layers. Failure to allow sufficient time after application of the first main coat will invariably result in stressing in the immediate substrate and disbonding of the coating. Therefore at ambient temperatures of 68°F (20°C);

> At least 24 hours after the primer is applied before the first main coat and at least 16 hours after the first main coat has been applied, before any subsequent layers follow.

Of course, these times will vary dependent upon ambient conditions and care should be taken not to exceed over- coating times, particularly where there is strong ultra violet light, e.g. sunlight. This information only applies with Corroglass/Polyglass materials. Other materials which may be used for coating concrete do not necessarily have the same issues.

It should be noted that special attention should be paid to the floor to side wall joints, expansion joints and cracks. Where coating is terminated within wetted flow areas special attention should also be paid to this area (see separate data).

PRIMING OF TILES AND BRICKS ETC.

Certain surfaces such as ceramic tiles, bricks and acid resistant bricks, erosion resistant tiles etc. are difficult materials to prepare and bond onto. Corrocoat Silane Adhesion Enhancers are available for such surfaces. Please refer the Corrocoat Technical Services.

Reviewed: October 2001
Reviewed: August 2020