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PHS

Application Instructions

Product Description

PHS (Penetrating Hardening System) is an ultra low viscosity, solvent free liquid for re-strengthening and restoration of failed cement/sand screeds to ISCR Category A of BS 8204 (BRE Screed Tester).

PHS penetrates into the defective screed, filling voids and binding loose particles together to provide a high strength material.

Uses

To re-strengthen and refurbish failed cement/sand screeds to a better than new condition with the minimum of down time and disruption to the occupants in heavy use areas such as hospital corridors, operating theatres and commercial buildings.

PHS is suitable for re-bonding de-bonded cement/sand and granolithic screeds.

Material Requirements

PHS is available in 2.5 kg and 10 kg pack sizes. The use of the smaller 2.5 kg pack is recommended to minimise the risk of 'smoking' due to exothermic reactions (see **Mixing** section).

Listed below are the material consumptions which could be required based on average usage. Historical records show average consumption for large areas to be 2 – 3 kg/m^2. Weaker areas of screed may take as much as 5 kg/m^2 whereas stronger areas may require as little as 1 kg/m^2.

PHS for General Screed Strengthening

Allow for 1 – 5 kg/m^2 of PHS.

Commercial finish:
Sand: Dry Silica Sand/Quartz grade 1.0 - 2.0 mm blind @ 2.0 kg/m^2
Repairs: Isocrete 4000 (as required to repair local areas)
Finish: Isocrete 1500 @ 5.1 kg/m^2 (3 mm) to receive soft floor finishes

Industrial Finish:
Sand: Dry Silica Sand/Quartz grade 1.0 – 2.0 mm scatter @ 0.5 kg/m^2
Repairs: Flowtex F1 Mortar (as required to repair local areas)
Resin Finish: Flowshield SL @ 3.6 kg/m^2 at 2 mm (for example)

PHS for Stitch Pinning of Cracks or Hollow Sections

Allow for 1.5 kg per linear metre of PHS.

Note: The assessment of materials required should be determined from a site visit and preferably, from a test area, which should provide information that is more accurate.

Surface Preparation

To enable PHS to soak into the pores of a screed the preparation work has to be of a very high standard.

On most projects, it is necessary to remove finished floor coverings such as carpets, vinyl tiles, sheet vinyl and their adhesives. Any smoothing compounds present should also be removed.

Before starting work carefully cover all sensitive areas and equipment with polyethene sheet, tape up doors into areas not being treated and any perimeter areas not partitioned off. Open windows to allow good ventilation and air flow. Check if air extractors are installed and use them if allowed, mention to client that they will pull through small amounts of dust.

If not achieved during the removal of the existing finishes the pores of the weak screed should be exposed by mechanical preparation. The method of preparation must take into account the friability of the existing surface.

Brushing residues of screed and dust from the floor is not recommended. Therefore, after completion of surface preparation ensure the area for treatment is thoroughly vacuum cleaned to ensure total removal of dust residues from the pores in the screed.

Before applying PHS treatments inspect floor areas for:-

1. Joints/cracks/old repairs – ensure residues of old repair materials are removed.
2. Carefully fill voids around service pipes etc to ensure PHS does not drip through to areas below.
3. Protect skirting against material contamination.
4. Ensure sufficient depth gaps at door thresholds to accommodate PHS, repairs, underlayment and new floor finish material.
5. The adequate removal of dust, residues, loose chippings and underlayments.

Mixing

PHS is a solvent and nonylphenol free product, and practically odourless during application. For more information, please refer to the material safety data sheets (MSDS) for the individual components.

Ensure area is dry and watertight and store materials where temperatures of less than 5°C can be avoided.

Set up the mixing station as close as possible but not on the area to be treated. Ensure routes between mix station and treatment area are thoroughly protected with polythene sheets, boarding or both.

Keep a supply of dry sand available in case of spillage or exothermic ‘smoking’.

Practical measures should be implemented to minimise the risk of an exothermic reaction i.e. decant into smaller containers and **do not** leave containers with unused mixed resin to stand (e.g. at break times).

Ratio of components

3.6 parts of Base A are mixed with 1 part of Hardener B, by weight.
2.75 parts of Base A are mixed with 1 part of Hardener B, by volume.

Add all of Hardener B to Base A. Mix with slow speed drill and helical spinner, taking care not to entrain air.

Do not leave mixed product in the bucket because it will react quickly and an exothermic reaction will occur leading to black smoke being produced.

Application – General Screed Strengthening

The recommended substrate temperature is 15 - 25°C, but no less than 10°C. The temperature of the substrate should exceed the “dew point” by 3°C during application and hardening. Temperatures should not fall below 5°C in the 24 hrs after application.

Take mixed materials to furthest area of treatment and pour onto screed. The mixed product should be applied within 20 minutes at ambient temperature of 20°C.

Immediately after mixing completely pour out the mixture and apply using a double-lipped rubber squeegee and/or 38 cm (15 inch) synthetic roller. Roll away from walls not towards them to prevent splashing. Spread material generously but carefully around edges with 50 mm paint brush.

Where the screed is porous and weaker the PHS will soak in; where the screed is denser and stronger it will stay on the surface. Move the puddles/shiny areas of PHS to areas where it is obviously soaking in and continue until the dull areas are satisfied. Do not leave puddles in deep areas requiring repair infills later.

At all times monitor the coverage. A 10 kg unit of PHS should cover a minimum of 5 m² (at average 2 kg/m²).

Always try to apply a first coat at two thirds of total estimated material coverage. Then by inspection decide how to finish on the following basis:-

(A) If the bulk of the area has a slight shine, mix sufficient units and apply to dull areas only. Continue until the whole area has a thin shiny covering. Ignore very small and occasional dull areas provided that they have been consistently treated with PHS throughout the application.

(B) If the bulk of the areas being treated remain dull and the PHS is soaking in easily, continue as follows:-

1. Apply no more than two thirds of the estimated coverage to the whole area.

2. Dependant on size of area and temperature, either wait for material to start to cure, i.e. no more than one hour, or go straight back to the beginning of area applying PHS tightly over dull areas.

Note: Procedure **(B)** should achieve a minimum ISCR Category C test result.

Do not leave puddles on surface. Ideally, on completion of application the surface should have a slight shine indicating the thinnest of even coatings on the surface of the penetrated screed.

Should PHS remain on the surface use a new dry roller to spread excess evenly over the floor area or remove into a container.

In all cases whilst the PHS is still tacky, apply dry Silica Sand/Quartz grade 1.0 – 2.0 mm either, to a full blind @ 2.0 kg/m^2 to receive an underlayment such as Isocrete 1500 or, as a scatter @ 0.5 kg/m^2 to receive a resin finish.

PHS treated areas may be walked on after 8 hours and will be fully hardened after 12 hours at 20°C. High humidity, covering or washing during the cure period may create a white matt surface (bloom).

Surplus sand can be removed by industrial vacuum after either an overnight cure period or 8 hours dependant on temperatures.

ISCR screed tests can now be completed. Good results may be achieved after 8 to 12 hours and this enables the clients programme to progress more quickly to completion but the system is at its hardest after a 36 hour cure.

Note: Screed temperature affects the speed of cure, check if there are any heating pipes in or below screed. Temperature of rooms below will affect screed temperature.

Note: Do not leave your rollers lying or standing idle once wetted with PHS. Keep them moving even if there is no PHS to apply. If left standing for a few minutes they will start to harden, if they are left on the floor for more than 5 minutes they will harden and stick to the floor.

After completion of application immediately remove roller cartridge from frame and handle and place in polythene bag, remove used rollers and bags to skip area after use. Other tools may be cleaned with a solvent, e.g. Flowsolve Thinners.

Application – PHS for Stitch Pinning of Cracks or Hollow Sections

Open up the top surface of the cracks where necessary. A wall chase cutter set to cut a shallow/narrow rebate is suitable for this purpose. Rake out any loose material from the top of the crack with a pointed tool.

For de-bonded areas, drill 12 mm diameter holes through screed at no more than 100 mm centres or along line of cracks to full depth of screed.

In both cases vacuum clean to remove all dust and debris.

Pour the PHS hardener into the PHS base and mix together with an electric drill and mixer as described earlier. Only mix together the quantity required for immediate use. Decant the material into small pots to minimise any heat generated when the components start to react. An indoor metal watering can is a suitable method of introducing the resin into the cracks or holes

Apply the material to the cracks or drilled holes as soon as possible.

Top up the cracks as necessary with the PHS resin. Dry silica sand (60's or 90's mesh) can be used to bulk out the PHS by pouring it into cracks where the flow of resin cannot be stemmed. Ensure that all of the silica sand is wetted by the resin.

In the case of holes they should be initially filled and then topped up until no further material is absorbed. Cap the hole off with epoxy putty or similar and prepare the surface as required to receive subsequent floor finishes.

If the first pass of the resin will not fill the crack or hole return later to apply more resin. Remove surplus resin from the top of the crack or hole and trowel flush with the top of the screed.

Where deemed necessary diamond grind off any lipping/unevenness once the resin has cured.

Note:- PHS APPLICATION

When the PHS Base is mixed with the Hardener a very exothermic reaction starts (i.e. much heat is generated).
As with all epoxy resins, once mixed the PHS mix should always be used quickly to dissipate the heat of reaction.
If the PHS mix is not applied within 10 - 20 minutes, a lot of black smoke **will** be generated.

PREVENTATIVE MEASURES:-

Carry out job specific Risk and COSHH assessments

Practical measures should be implemented to prevent the mix smoking:-

- Decant into smaller containers.
- Use quickly once mixed.
- **DO NOT** leave containers with unused mixed resin to stand (e.g. at break times, end of job etc.).

- Have a supply of dry silica sand adjacent to mixing area to dampen reaction in the event of smoke generation.
- Add dry silica sand to any mixed PHS that is unused.
- Ensure the route to outside is known and clear of obstructions.

ACTION IN THE EVENT OF SMOKE GENERATION:-

Where or when safe to do so the following actions should be considered:-

- This reaction generates a large amount of heat but does not produce a fire unless in contact with combustible materials such as clothing, saw dust, etc.
- If possible pour dry silica sand into container to absorb resin and heat.
- **DO NOT ATTEMPT TO COOL WITH WATER**
    - Do not pour water into or onto the container
    - Do not immerse the container in a water bath.
- Move container out of the building and leave in an open area downwind of the building away from other workers and members of the public.
- Add more silica sand if possible to do so without inhaling smoke; use a charcoal filter or air fed mask.
- If necessary evacuate building until the exothermic reaction has been brought under control.
- Ventilate rooms affected by smoke.
- Call emergency services if anyone is affected by the smoke.

THE EFFECT OF SMOKE ON PERSONNEL:-

The prediction of by-products from this thermal decomposition is difficult as many factors are involved.

There will be a partial breakdown of the constituent materials resulting in some evolution of water vapour, ammonia, carbon monoxide, carbon dioxide, sulphur dioxide, nitrogen oxides, possibly some aldehydes and phenolics, as well as particulates of partly cured epoxy resin components.

The quantity of gases evolved may be minimal in comparison to the volume of the location (only the applicator can assess that) but given good ventilation we would not anticipate there being any dangerous concentrations the following day.

The smell after the incident has ceased comes from residual smoke particles and is similar to that experienced after a fire.

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