

TECH-DRY BUILDING PROTECTION SYSTEMS PTY. LTD.

ABN: 62 922 836 289

177-179 Coventry Street,

South Melbourne, Victoria, 3205, Australia

Telephone: 61 3 9699 8202 (all hours)

Facsimile: 61 3 9696 3362

Website: www.techdry.com.au

Email: info@techdry.com.au

USE SPECIFICATION FOR THE IMPREGNATION OF CONCRETE WITH SOLID SILANE

USE SPECIFICATION
SOLID SILANE

Page 1 of 3
updated: 01/12/2008

1. SCOPE

The aim of impregnating concrete with Solid Silane, a thixotropic silane cream, is to irreversibly change the water absorption characteristics of the external surfaces of the concrete. Concrete that has been impregnated with silane cream is protected from the damaging effects of the ingress of water and chloride ions.

2. MATERIAL

2.1 Properties

The material used for impregnation should be n-octyltriethoxysilane formulated as a colourless thixotropic cream. The formulation should contain a minimum 80% n-octyltriethoxysilane or otherwise as specified. Other properties are shown as follow:

Appearance:	thixotropic white cream
Density:	ca. 0.9 gm/ml
Value of pH:	8-9
Consistency:	≥5,000 cp (20°C, Brookfield DV-I, S64, 6RPM)
Solubility in water:	miscible

2.2 On-site quality control

Prior to each container of Solid Silane being used, the product should be in the form of a thixotropic cream with correct cream consistency according to the product specification. The product should be within its use by date on the label.

2.3 Storage

The material should be stored in a cool (5-25°C) dry place and protected away from direct sunlight or frost and any sources of fire or ignition. The containers should remain sealed until their contents are required for use. Do not put any contaminated product back into the remaining cream within the container. Do not store the contents once the container is opened. The product has a 6 month pot life under preferred storage conditions.

3. SURFACE CONDITIONS

3.1 Condition of surface

The surfaces to be impregnated should be sound and clean being free from curing compounds, release agents, laitance, coatings, sealers and dusts. Surface cracks of more than 0.3 mm should be filled with appropriate material. Fresh concrete or newly placed patches should be cured for enough time as specified before Solid Silane treatment. Most importantly, the surface should be allowed to thoroughly dry prior to application.

3.2 Cleaning

If required, the surfaces may be cleaned using a high-pressure water jet. A pH neutral and low residue detergent may be used. The detergent residue must be thoroughly removed from the surface by the water jet. Existence of detergent within the surface will adversely affect the drying of the concrete and the impregnation performance. The sand blasting method or other cleaning methods may be used to clean the concrete surface if the surface is too hard to clean with a high-pressure water jet.

3.3 Drying

After cleaning the concrete surface should be allowed to thoroughly dry before application. A minimum of 24 hours should be allowed for drying under good weather conditions at a temperature above 25°C after washing. A longer drying time is always preferable and will result in a better impregnation performance. If adverse weather conditions are present and/or atmospheric temperature is below 25°C, a longer drying time should be allowed. A moisture meter may be used to monitor the drying of the concrete.

3.4 Post application procedures

The treated surfaces should be left undisturbed for a minimum of 6 hours. If adverse weather conditions are predicted, the treated surface should be protected for a minimum of 24 hours. Early water repellency will be developed after 24 hours and full curing will take up to 7 days or longer.

4. APPLICATION

4.1 Application Method

The material is best applied using an airless paint sprayer. For a small application area, product may be applied by a paint brush or a roller.

For spraying application, it is preferable to use a large spray unit operated at low pressure but high flow rate with a large spray nozzle (e.g. Graco 5000 with 420 tip). The silane cream should be properly delivered onto the application area as a continuously **white thixotropic cream film (not liquid emulsion!)** of a desired thickness. Some practice should always be carried out for the applicator to ensure the application techniques.

All coated areas should remain covered with a uniform white thixotropic cream film after application. The cream will gradually turn into clear silane gel which is then slowly absorbed by the surface. However, the cream may take up to 2 hours or more to complete the absorption. The treated surface will remain dark for up to 7 days or more before it returns to normal appearance.

4.2 Application rate

The application rate depends on the density of concrete and depth of penetration required. One coat of 300ml/m² is recommended for general concrete impregnation. However, concrete with higher density may need two applications at a lower application rate for each application. As concrete and its surface condition vary significantly, a trial MUST be carried out to determine a suitable application rate to meet the job specification.

A recommended minimum of one application should be applied at a wet film thickness of 0.20mm (200ml/m²) up to a maximum wet film thickness of 0.5mm (500ml/m²). However, the application rate may vary as long as satisfactory depth of impregnation and other impregnation standards are achieved.

To ensure high penetration depth, enough cream should be delivered onto the surface. The maximum wet film thickness should be controlled so that the cream film can stay on the surface without run off until the silane cream is totally absorbed by the concrete.

If the concrete is of high density and lower permeability, no more than 200ml/m² of the cream may be applied at each application to avoid the cream running off. A second coat of Solid Silane may be required to ensure the depth of impregnation and other impregnation standards required. The second coat should be applied after 24 hours or more.

4.3 Atmospheric conditions

Application should be performed in dry conditions with a concrete surface temperature of between 5°C and 35°C. Impregnation MUST not be carried out in conditions of rain or exceedingly strong winds and/or low or high temperature.

4.4 Protection

All surfaces adjacent to the areas to be treated should be masked to protect from overspray. Any cream accidentally sprayed onto unwanted surface should be immediately removed by wiping with a cloth dipped in detergent solution followed by a water rinse.

4.5 Application safety

Refer to product data sheet and material safety data sheet for application safety information.

5. TESTING AND SAMPLING

5.1 Sample area

To ensure the impregnation performance before application, a sample area of up to 2 square metres should be selected to be representative of the project. The area should be cleaned as detailed in Clause 3. The area should be treated with silane cream as Clause 4. The trial application should be performed in the presence of the project manager who understands the product and the application. Testing on different areas should be allowed in order to represent variation of the concrete.

5.2 Sampling for testing

- 1) The sample area should be let cure for a period of at least 14 days.
- 2) Two or more cores of 50mm external diameter should be extracted from the test area. The cores should be taken to a depth of 40mm and be perpendicular to the treated surface. The position of the cores should be such as to be as representative as possible of the entire panel.
- 3) The core samples should be correctly labelled in sealed plastic bags and delivered to a NATA registered laboratory or other authorised laboratory.

5.3 Determination of depth of penetration

- 1) Cores should be obtained as outlined in 5.2 above.
- 2) The cores should be dried (the samples may be dried in an oven for up to 24 hours at 60°C).
- 3) Each core should be split down the centre, perpendicular to the original concrete surface.
- 4) A solution of dye in water should be applied to the freshly broken face of the cores. The area not coloured with the dye corresponds to the silane-impregnated area. The distance between the original concrete surface and the closed edge of the dyed surface should be deemed as the impregnation depth.
- 5) The minimum average impregnation depth acceptable is 4 mm or otherwise as specified.

5.4 Water and chloride ion absorption

Water and chloride ion absorption results should be conducted according to the job specification.

5.5 Quality control

On completion of the impregnation of every 1000 square metre section of concrete, the engineer should mark a position to be core sampled. A single core should be extracted as described in 5.2 above. The penetration depth should be determined by the aqueous dye method described in 5.3 above. The extraction of the core sample and the dye test should be performed on-site in the presence of the project manager. Testing on different areas of the selected section should be also allowed if there is variation of the concrete.

If the depth of penetration fails to meet the standard set in 5.3, the contractor should extract another core in a position designated by the project manager or the project engineer. If the testing of the second core results in failure to meet the standard set in 5.3, the entire section tested should be re-treated with silane cream followed the procedures outlined above at the contractor's expense. Water and chloride ion absorption tests should be conducted according to the job specification in an authorised laboratory.

6. OVER COATING

Over coating on Solid Silane treated concrete surface is not necessary for concrete protection. However, if concrete needs an anti-carbonation coating or decorative coating or other type of coating. A compatibility test should be performed to examine the adhesion between the silane treated surface and the topcoat. There is evidence that concrete recently treated with silanes negates the adhesion of water-based coatings but there is less effect with solvent-based coatings. If a water-based coating is used, it is recommended to use a solvent-based primer before final coating.

Trials should be allowed to select a proper top coating system. An adhesion test must be conducted to ensure the adhesion of the top coating over the silane treated concrete surface.

IMPORTANT NOTE:

The information given here is based on our experience and test results and is correct to the best of our knowledge. As the application of this material is beyond our control, we can only be responsible for the quality of our product at the time of dispatch. We reserve the right to alter certain product parameters and the use specification within the spectrum of properties in order to keep abreast of technical advances. It is the responsibility of the end user to determine the suitability of this material for any particular application, and the best application method for this product.