

# SECTION 07 19 16.01

## Silane Water Repellents

**SIKA SPECIFICATION NOTE:** This guide specification includes test methods, materials and installation procedures for **Sikagard 740 W**, a solvent-free, 40% silane which forms a vapor permeable water and chloride-ion resistive barrier specifically formulated to seal above grade concrete or cementitious substrates by Sika Corp. **Sikagard 740 W** is an ideal water repellent for vertical and horizontal applications on parking decks, stadiums, walkways, ramps, preplaced/precast concrete or masonry. This guide specification should be adapted to suit the needs and conditions of individual projects. It is prepared in CSI Master Format and should be included as a separate section under Division 7 - Thermal and Moisture Protection.

### PART 1 - GENERAL

#### 1.01 GENERAL REQUIREMENTS

- A. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work and coordinate overlapping Work.

#### 1.02 SYSTEM DESCRIPTION

- A. This specification describes the sealing of concrete substrates with hydrophobic impregnation to reduce water and chloride ion intrusion in relation to the relevant Principles (Principle 1, 2 or 8) of EN 1504-9.

#### 1.03 RELATED SECTIONS

- |    |                   |                  |
|----|-------------------|------------------|
| A. | Concrete:         | Section 03 30 00 |
| B. | Water Repellents: | Section 07 19 00 |
| C. | Sealants:         | Section 07 90 00 |
| D. | Roof Drains:      | Section 22 14 26 |

#### 1.04 REFERENCES

- A. The following standards are applicable to this section:
- (ASTM 672) Scaling Resistance Pass
  - (OHD L-34) Depth of Penetration <10mm
  - *NCHRP244 Report Series 2 Test*
    - Reduction in Water Weight Gain 85%
    - Reduction in Cl ion intrusion 96%
  - *NCHRP244 Report Series 4 Test*
    - Reduction in Cl ion intrusion 79%
  - UV Stability
  - Vapor Permeance

#### 1.05 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognised ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Store and apply materials in accordance with all safety requirements, taking into consideration weather conditions, as specified by manufacturer or as modified by applicable rules and regulations of authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material or untight pails must be removed from the site immediately.

- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Store and handle the specified product as recommended by the manufacturer.

1.07 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to packaging.

1.08 SUBMITTALS

- A. Submit two copies of manufacturer's actual literature including: Product Data Sheets and appropriate Material Safety Data Sheets (MSDS).

1.09 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project

**PART 2 - PRODUCTS**

2.01 MANUFACTURER

- A. Sikagard® 740 W, as proposed by Sika Corporation, is considered to conform to the requirements of this specification.

2.02 MATERIAL

- A. Silane Water Repellent shall be Sikagard 740W, a low VOC, UV stable, vapor permeable, silane penetrating sealer and water repellent manufactured by Sika Corp
- B. The material shall be a concentrated, solvent free Silane
- C. The material shall be a concentrated compound based on triethoxy (2,4,4-trimethylpentyl) Silane, ready to be used.
- D. The material shall not be diluted on site either by water or solvent
- E. The material shall not contain any silicates, fluor silicates, or stearates.

2.03 PERFORMANCE CRITERIA

- A. Typical Properties of the hydrophobic impregnation:
  - 1. Aspect: Liquid
  - 2. Colour: Colourless
  - 3. Solids: ~40% active content (ext. tested)
  - 4. VOC: ~350 g/l
  - 5. Comply with EN 1504-2 (Hydrophobic Impregnation)
    - a. Penetration Depth: Class I (<10 mm)
    - b. Water Absorption: <7.5%
    - c. Alkali Resistance: <10%
    - d. Drying Rate: Class I (>30%)
    - e. Freeze & Thaw cycles with de-icing salts: Pass
  - 6. On Site Penetration Depth: ≥5 mm

**PART 3 - EXECUTION**

3.01 SURFACE PREPARATION

- A. Substrate must be clean, sound, and free of surface contaminants. Remove dust, laitance, grease, oils, curing compounds, form release agents and all foreign particles by mechanical means. Substrate shall be in accordance with EN 1504-10 (site application and QC of works) for hydrophobic impregnation or with ICRI Guideline No. 03732 for sealers.
- B. Protect any areas not to be impregnated from spillage or splashing

3.02 APPLICATION

- A. Silane Water Repellent is delivered ready to be used and shall hence not be diluted on site

- B. Coverage is entirely dependent on the porosity of the substrate. Extremely non-porous substrates may only require 1 coat. To ensure proper penetration depth, a field mock up is recommended. Coverage rates are approximately 250-380 sq.ft./gal (~6 to 9.3 m<sup>2</sup>/l).
- C. Placement Procedure: The penetrating sealer shall be applied liberally and allowed to soak into the substrate. This shall be accomplished by the use of brushes, rollers, low pressure gun or airless spray equipment.
- D. Prepare the quantity of hydrophobic impregnation required for a given area based on the targeted consumption rate.
- E. On vertical surface, apply the product from top down in successive passes until the targeted consumption for the first coat is achieved.
- F. Successive passes are done when the concrete surface still has a matt appearance from the product, but no longer wet (e.g. when placing the bare hand on the surface and removing it, no wetness on the hand is observed). The concrete surface is assumed to be saturated with the Silane application when it remains "wet" in appearance for at least 5 seconds.
- G. The following coat can then be applied when the concrete is completely dry.
- H. On horizontal surface, saturate the substrate by continuous spray (airless or low pressure gun) or flooding technique and allow to have "wet" look for at least 5 seconds
- I. On soffit areas, apply the material with a continuous spray and saturate the substrate until surface keeps its "wet" look for at least 5 seconds.
- J. Adhere to all limitations and cautions for the Silane product as stated in the manufacturers printed literature.
- K. Do not apply the Silane in case of imminent rain (within the next few hours), strong wind exceeding 30 mph or in strong direct sun light.

### 3.03 CLEANING

- A. The Silane penetrating sealer can be cleaned from tools with appropriate solvent.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillages onto adjacent areas.

### 3.04 PRELIMINARY TESTS (PRE-TRIALS)

- A. To define appropriate material consumption, a few weeks before starting works, the Supervising Officer shall assign a typical concrete surface with a representative area of at least 100 ft<sup>2</sup>. The surface preparation shall be undertaken by the applicator in the same way as prescribed for the project. An experience supervisor of the manufacturer shall assist at the trial operation.
- B. Before application of the planned hydrophobic impregnation, 3 cores shall be taken from the test area to define the water absorption coefficient of the untreated concrete surface in accordance with NCHRP 244 series II or EN 1062-3.
- C. The application of Silane Water Repellent shall be carried out as recommended in the Method Statement provided – the consumption and site conditions (wind, temperature, humidity, etc...) shall be properly recorded.
- D. Two weeks after the trial application, 6 cores of diameters of 50 mm (depth in accordance with concrete cover but at least 50 mm) shall be taken from the area and the surface shall be restored thereafter with appropriate repair material from the same supplier.
- E. No later than 24 hours after removing the cores, 3 of them shall be cut into 2 parts and the penetration depth shall then be defined by spraying water on the cut portion. From the difference of water absorption, the penetration of the Silane can be visually recorded to the nearest mm. For each core, at least 6 points of measure shall be taken and the overall average calculated with the standard deviation.
- F. The other 3 cores shall be sent to an external laboratory to carry out the water absorption test as per NCHRP 244 series II or EN 1062-3. This test can also be done on depth profiles (extra cores are then needed - 3 for each depth profiles).
- G. If required, additional tests can be carried out (e.g. determination of active ingredients using FT-IR method in the depth profiles).

END OF SECTION

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