N°: 850 33 07
Author: M. Donadio
Date: February 2010

Construction

Method Statement
for
Application of Hydrophobic Impregnation

"Sika Services AG"

Scope: This method statement describes the step by step procedure for applying hydrophobic impregnation (cream or liquid type) on concrete structure.

Key Words: Hydrophobic impregnation, solvent, water based

Sika Services AG / Tüffenwies 16 / CH-8048 Zürich / Switzerland
Phone: +41 (0) 58 436 **23 65** / Fax: +41 (0) 58 436 23 77
E-mail: donadio.michel@fr.sika.com

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Sika Services AG / Tüffenwies 16 / CH-8048 Zürich / Switzerland
Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
E-mail: donadio.michel@fr.sika.com

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1. System Description

The following refers to hydrophobic impregnation applied onto concrete structures (building or civil engineering) (whether liquid as shown on the left picture or cream type as shown on the right picture).

1.1. References

This method statement has been written in accordance with the recommendations contained in European Standards EN 1504: Products and systems for the protection and repair of concrete structures, and the following relevant parts:

- EN 1504 Part 1: Definitions, requirements, quality control and evaluation of conformity
- EN 1504 Part 10: Site application of products and systems, and quality control of works

This method statement also makes references to the recommendation drawn in the Technical Guideline of ICRI No 03732 – 2002.

1.2. Limitations

- Products shall only be applied in accordance with their intended use.
- Local differences in product may result in performance variations. The most recent and relevant local Product Data Sheets (PDS) and Material Safety Data Sheets (MSDS) shall apply.
- For specific construction / build information refer to the Architect's, Engineer's or Specialist's details, drawings, specifications and risk assessments.
- All work shall be carried out as directed by a supervising officer or a qualified engineer.
- This method statement is only a guide and shall be adapted to suit local product and standards, legislation or other local requirements.

Sika Services AG / Tüffenwies 16 / CH-8048 Zürich / Switzerland
Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
E-mail: donadio.michel@fr.sika.com

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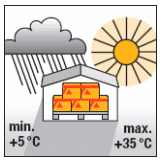
2. Products (not limited)

* Information to be adapted for local use (do not include technical or mechanical information)

Sika Product Names	Colour	Appearance	Type	Shelf life
Sikagard®-706 Thixo	Milky white	Cream	Water based	12 months
Sikagard®-705 L	Colourless	Water like	Solvent free	12 months
Sikagard®-740 W	Milky white	Water like	Water based	9 months
Sikagard®-704 S	Colourless	Water like	Solvent containing	12 months
Sikagard®-700 S	Colourless	Water like	Solvent containing	12 months

2.1. Material Storage



Materials shall be stored properly in undamaged original sealed packaging, in dry cooled conditions. Refers to specific informations available on the product data sheet regarding minimum and maximum storage temperatures.

3. Health and Safety

3.1. Risk Assessment

The risk to health and safety from falling objects or defects in the structure shall be properly assessed.

Where structures are considered to be unsafe appropriate action shall be carried out to make the working area safe.

3.2. Personal Protection

Work safely!

Handling or processing (especially during spray application) of hydrophobic impregnation products may generate mist which can cause chemical irritation to the eyes, skin, nose and throat.

Appropriate eye protection shall be worn at all times while handling and mixing products.

Approved chemical masks shall be worn to protect the nose and throat from pulverisation mists.

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Safety shoes, gloves and other appropriate skin protection shall be worn at all times.

Always wash hands with suitable soap after handling products and before food consumption.

FOR DETAILED INFORMATION REFER TO THE RELEVANT MATERIAL SAFETY DATA SHEET

3.3. First Aid

Seek immediate medical attention in the event of excessive inhalation, ingestion or eye contact causing irritation. Do not induce vomiting unless directed by medical personnel.

Flush eyes with plenty of clean water occasionally lifting upper and lower eyelids. Remove contact lenses immediately. Continue to rinse eye for 10 minutes and then seek medical attention.

Rinse contaminated skin with plenty of water. Remove contaminated clothing and continue to rinse for 10 minutes and seek medical attention.

FOR DETAILED INFORMATION REFER TO THE MATERIAL SAFETY DATA SHEET

4. Environment

4.1. Cleaning Tools / Equipment

Clean all tools and application equipment immediately after use, with water (for the water based products) or with an appropriate solvent e.g. Colma Cleaner (for solvent free, solvent containing or cream products).

Hardened material can only be mechanically removed.

4.2. Waste Disposal

Do not empty surplus material into drains; dispose responsibly through licensed waste disposal contractor in accordance with legislation and local / regional authority requirements. Avoid run off onto soil or into waterways, drains or sewers.

FOR DETAILED INFORMATION REFER TO THE MATERIAL SAFETY DATA SHEET

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Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
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5. Surface Preparation

The concrete shall be free of dust, dirt, oil, efflorescence and existing paint coatings.

Cracks in concrete more than 300 microns must be repaired first prior to carry out the hydrophobic treatment.

Cleaning is best done by light blastcleaning, steam cleaning, low pressure cleaning (less than 180 bars) etc.

Concrete surface profile shall fit to CSP 1, 2 or 3 as per ICRI 03732-7

CSP 1

CSP 2

CSP 3

The substrate shall look dry with no damp patches. Best results are obtained when applying on dry and very absorbent substrates.

6. Mixing

All hydrophobic impregnations mentioned above are ready to use and shall not be diluted.

Consult the respective data sheet to see if any dilution is allowed or required.

Liquid water based product shall be shaken prior use.

7. Application

7.1. Before Application

Working space shall be clean and tidy with no obstructions.

Record the substrate, ambient temperature and relative humidity.

External applications shall be adequately protected. Do not apply hydrophobic impregnation in windy or rainy conditions, or if there is a risk of frost within 24 hours.

Calculate the required volume for the targeted consumption (determined by the preliminary test) based on the surface to be treated.

Areas such as window frames which still need to be painted must be securely covered to avoid contact with the hydrophobic impregnations.

Areas not to be impregnated such as window panes need to be protected from being accidentally contaminated with the hydrophobic impregnations.

Generally, hydrophobic impregnation can damage some coatings and bituminous products.

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Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
E-mail: donadio.michel@fr.sika.com

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7.2. Application Method

7.2.1. Cream Type

For **large scale** application, cream type hydrophobic impregnation like Sikagard®-706 Thixo can be applied with airless spray.

Typical setting of the airless machine is:

Pressure:	70 to 100 bars
Nozzle:	0.23 to 0.43 mm
Filter:	100 to 200 mesh
Spray angle:	50 to 80°

When working with airless spray, attention is drawn not to exceed excessive pressure to avoid risk of phase separation of the cream emulsion – this pressure might vary according to the environment temperature – conduct preliminary test.

For **small scale** application the cream type hydrophobic impregnation can be applied using a professional brush.

Normally, cream type hydrophobic impregnations are applied in one coat of approximately 200 to 300 g/m².

In the case of dense concrete and/or deep penetration targeted, a second coat of the same consumption can be applied once the first one has dried and the concrete is also dry enough.

Tip: The concrete surface is ready to receive the second coat when placing the bare hand on the surface and removing it no wetness on the hand is observed.

Note: After application, the concrete surface shall be fully covered by the product and whitish. This whitish aspect will disappear once the product has penetrated the concrete.

7.2.2. Liquid Type

For **large scale** application, liquid type hydrophobic impregnation can be applied with airless spray or low pressure gun

Typical setting of the airless machine is:

Pressure:	50 to 80 bars
Nozzle:	0.18 to 0.28 mm
Filter:	200 mesh
Spray angle:	50 to 80°

When working with low pressure gun, make sure that the nozzle is well open so to generate adequate mist.

For **small scale** application, liquid type hydrophobic impregnation can be applied with professional brush or long hair roller.

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Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
E-mail: donadio.michel@fr.sika.com

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Liquid type hydrophobic impregnation needs to be applied in at least 2 layers. In some situations, depending on the consumption, a 3rd or 4th layers might need to be applied to achieve the targeted penetration depth.

Prepare the quantity of hydrophobic impregnation required for a given area based on the targeted consumption rate.

On vertical surface, apply the product from top down in successive passes until the targeted consumption for the first coat is achieved.

Tip: Successive passes are done when the concrete surface is still mat 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 following coat can be applied when the concrete is completely dry.

On horizontal surface, flooding technique can be used but care shall be taken to avoid excessive ponding of the material.

7.3. Curing

Hydrophobic impregnations do not require any special curing but must be protected from rain for few hours

Product	Minimum time before rain
Sikagard®-706 Thixo	~ 3 hours at 20° C
Sikagard®-705 L	~ 3 hours at 20° C
Sikagard®-704 S	~ 3 hours at 20° C
Sikagard®-740 W	~ 6 hours at 20° C
Sikagard®-700 S	~ 3 hours at 20° C

7.4. Over-coatability

Products mentioned in this method statement above can generally be overcoated with water and solvent based polymer paint such as Sikagard®-680 S BetonColor, Sikagard®-550 W Elastic, Sikagard®-675 W ElastoColor.

In general, these hydrophobic impregnation products can be used as a water repellent primer under many Sikagard® protective coatings. Penetration of water is thus prevented at possible weak spots or in the event of damage to the top coat. The risk of consequential damages such as paint flaking is therefore reduced.

Refer to the relevant data sheet for confirmation of over-coating possibility

Waiting time: minimum 5 hours, maximum 1 week

Above 1 week, additional surface preparation shall be carried out before to overcoat with a protective coating.

Note: When other coating need to be applied, contact the proposed paint manufacturer for recommendations.

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Phone: +41 58 436 **23 65** / Fax: +41 58 436 23 77
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7.5. Application Limits

- In general best results are achieved when hydrophobic impregnation is applied on 28 day old concrete. However, due to its high alkali resistance, it is still possible to apply it at a very early age – lower penetration might then be expected. – *refer to the relevant data sheet for specific information regarding the application age.*
- Hydrophobic impregnation cannot be overcoated with lime-wash or cement paint.
- It is recommended to apply the hydrophobic impregnation onto a sample area to confirm consumption rates versus penetration depth (refer to section 8.3).
- In some rare exception, hydrophobic impregnation can lead to darkening of concrete, apply sample areas first.

8. Inspection, Sampling, Quality Control

The following information follows the recommendations of EN 1504-10 Annex A and Technical Guideline of ICRI No 03732 – 2002. As part of established "Good Practice", the applicator shall also provide Site QC reports containing the following recommended site record details.

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8.1. Before and after the preparation works

Characteristic	References	Frequency	Parameters
Delamination	Hammer sounding	Once before application	Sound
Cleanliness of Concrete	Visual	After preparation & immediately before application	Free of dust, dirt, oil, efflorescence and existing paint coats.
Surface tensile strength of the prepared substrate (if required by the Engineer)	EN 1542	After preparation works	>1.0 N/mm²

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8.2. Before, during and after the material application

Characteristic	References	Frequency	Parameters
Substrate humidity		Before and throughout the application	No damp patches
Temperature (ambient & substrate)		Throughout the application	Within the data sheet limits
Ambient humidity		Throughout the application	Within the data sheet limits
Precipitation		daily	As recorded
Batch number		Each time new material is provided on site	As recorded

8.3. Performance Testing

The following can be used to check the adequacy of the application.

Characteristic	References	Frequency	Parameters
Penetration depth	EN 12504-1 ISO 2808	Once every 1'000 m² or as required by the site engineer	Within requirement
Water absorption	EN 12390-8 ISO 2808	Once every 1'000 m² or as required by the site engineer	Within requirement

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Sika is a globally active company in the speciality and construction chemicals business. It has subsidiary manufacturing, sales and technical support facilities in over 70 countries around the world. Sika is the global market and technology leader in waterproofing, sealing, bonding, dampening, strengthening and the protection of buildings and civil engineering structures. Sika has approx. 12'000 employees worldwide and is therefore ideally positioned to support the success of its customers.

Sika Services AG
Business Unit Contractors
Speckstrasse 22
8330 Pfäffikon
Switzerland
Phone: +41 58 436 23 80
Fax: +41 58 436 23 77
www.sika.com