

METHOD STATEMENT

SikaFuko[®] VT System

04.01.2022 / VERSION 5 / SIKA UK / STEVE ARMFIELD

WATERPROOFING

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1 SCOPE

This Method Statement describes the step by step procedure for injection and re-injection of SikaFuko® VT Injection Hose systems.

2 SYSTEM DESCRIPTION

This method statement describes assembly, installation and the injection, plus also the possibility of re-injection with the SikaFuko® System.

The system consists of different components which must be assembled before installation of the complete injection hose system. The injection hose system is cast into concrete and is ready for injection when the concrete reaches its final strength. It is typically used in construction joints and as a back-up system in combination with other joint sealing systems such as Sika Waterbar®.

SikaFuko® System		
Injection Hose	Injection Resin	
	«re-injectable»	«single injectable»
SikaFuko® VT-1 SikaFuko® VT-2 SikaFuko® Eco 1	Sika® Injection-307 Sika® Injection-306 Sika® Injection-190 GB	Sika® Injection-201 CE Sikadur® Injection Resin Sika® Injection-4xx

Table 1 SikaFuko® System

2.1 LIMITATIONS

- The SikaFuko® Injection Hose system products must only be applied in accordance with their intended use.
- Local product differences may result in performance variations. The most recent and relevant local Product Data Sheets (PDS) and Material Safety Data Sheets (MSDS) shall apply.
- All works must be carried out as directed by a qualified Supervising Officer or other qualified specialist.
- This Method Statement is intended as a guide and must be adapted to suit local products, standards, legislation or other local requirements.




2.2 REFERENCES

To ensure the correct application of all components of the *SikaFuko® System*, please also refer to the following documents for each system component:

- PDS (Product Data Sheet)
- MSDS (Material Safety Data Sheet)

3 PRODUCTS

- Table to be adapted for local use (do not include technical or mechanical information)

Sika Injection Hose		Description
SikaFuko® VT-1		Injectable hose with unique integral valves for sealing construction joints / back-up system in watertight structures against water ingress. Not injectable with Cement Lime
SikaFuko® VT-2		Injectable hose with unique integral valves for sealing construction joints / back-up system in watertight structures against water ingress. Injectable with Cement Lime
SikaFuko® Eco 1		Injectable hose to seal construction joints / back-up system in watertight structures against water ingress. Not injectable with Cement Lime

Sika Injection Material	Description
Sika® Injection-306/307	Acrylate-base, low viscosity, flexible, re-injection possible
Sika® Injection-190 GB	Cement suspension, force transmitting, rigid, re-injection possible
Sika® Injection-201 CE	PU-base, low viscosity, flexible, non-foaming resin, NOT re-injectable
Sika® Injection-458	Epoxy-base, low viscosity, rigid, NOT re-injectable

3.1 MATERIALS STORAGE



Materials must be stored properly in undamaged original sealed packaging, in cool, dry conditions. Refer to specific information contained in the product data sheet regarding minimum and maximum storage temperatures.

4 TOOLS AND EQUIPMENT

4.1 FABRICATION OF THE SIKAFUKO® HOSE SYSTEM

Hot air welding machine to heat the shrink-seal hose joint covers



Heavy duty cuter



4.2 INSTALLATION OF THE SIKAFUKO® HOSE SYSTEM

Drill and hand tools (Drill bit diameter of 6mm)



4.3 INJECTION EQUIPMENT

1-Component Injection pump
including a hose and ball valve

A piston pump is recommended



Vacuum/diaphragm pump with vacuum pot for use if
re-injection of the *SikaFuko*[®] hose system is possibly
required in the future



Mixing paddle
For mixing of *Sika*[®] Injection-306/-307



Colloidal mixing paddle
Only for cement based products
e.g. *Sika*[®] Injection-190 GB



Twisted bar paddle

For mixing *Sika*[®] Injection-201CE/-458, twisted bar type
paddles are recommended for optimum performance.



Sika® Packer tongs Type 1

Use with SikaFuko® VT-1 and SikaFuko® ECO 1

Standard delivery with flat head nipples



Sika® Packer tongs Type 2

Use with SikaFuko® VT-2

Standard delivery with flat head nipples



Spare Sliding Clutch for the injection pump.

The pump's Sliding Clutch control should be replaced periodically through normal use and wearing of the seal



Nipple-gripper for round-head nipples
(only necessary if you do not have a sliding clutch with injection-whip)



Round-head nipple for
Sika® Packer tongs Type 1
(only necessary if you do not have a sliding clutch with injection-whip)



Plenty of clean buckets



Up to 2 liter measuring jugs especially for use with *Sika® Injection-306/-307*



5 HEALTH AND SAFETY

5.1 PERSONAL PROTECTION EQUIPMENT (PPE)

Work Safely!



Handling or processing cement and resin based injection products can cause chemical irritation to the eyes, skin, nose and throat.

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

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

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

In addition to protective clothing and equipment, it is also recommended to use a barrier cream on the skin. If any injection resin or hardener component gets on clothing, remove the garment at once. The friction of resin-saturated fabric on the skin can cause serious chemical burns. Wash your exposed skin occasionally during the workday and immediately if any material gets on it. Avoid using solvents, since they can help material penetrate into the skin and solvents themselves are aggressive and harmful to the skin. Avoiding skin contact by keeping tools and equipment clean is one of the best ways to protect oneself. Remember, epoxies are very tacky which is partly why they work so well in construction, so it is important to keep them from sticking to your people on site. Despite safety precautions, with any instances of skin contact rinse immediately with clean warm water and use soap to thoroughly clean the skin.

FOR DETAILED INFORMATION REFER TO THE RESPECTIVE PRODUCT'S MATERIAL SAFETY DATA SHEET (MSDS)

5.2 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 RESPECTIVE PRODUCT'S MATERIAL SAFETY DATA SHEET (MSDS)

6 ENVIRONMENT

6.1 CLEANING TOOLS / EQUIPMENT

Tools and equipment used for mixing and applying SikaFuko® Injection Materials can be cleaned according to the Product Data Sheet (PDS) - Sika® Injection Cleaning Systems.

6.2 WASTE DISPOSAL



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

Hardened resins can be disposed of with other combustible waste in a waste incineration plant. Under no circumstances burn the resin in an open fire due to the potentially dangerous gases which could be released.

Uncured resin must be disposed of as hazardous waste. It is forbidden to mix it with conventional waste.

FOR DETAILED INFORMATION REFER TO THE RESPECTIVE PRODUCT'S MATERIAL SAFETY DATA SHEET (MSDS)

7 FABRICATION AND ASSEMBLY OF THE SIKAFUKO® SYSTEM

Accessories:

SikaFuko® injection hose

PVC vent ends – green & transparent

Shrink on sleeves

Connecting nozzles

Closure plugs

Insulating tape & super-glue



Secure the area of the *SikaFuko*® VT-1 or *SikaFuko*® VT-2 injection hose to be cut with insulating tape

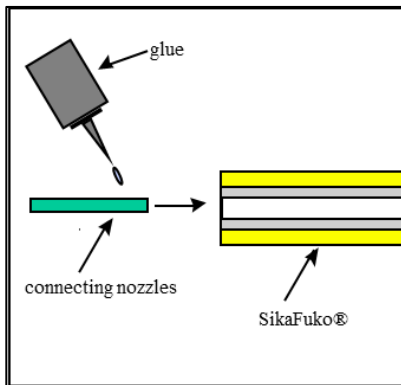
NOT NECESSARY with *SikaFuko*® Eco 1



Cut the *SikaFuko*® VT 1 *SikaFuko*® VT-2 or *SikaFuko*® Eco 1 injection hose to the desired length with heavy-duty cutters.

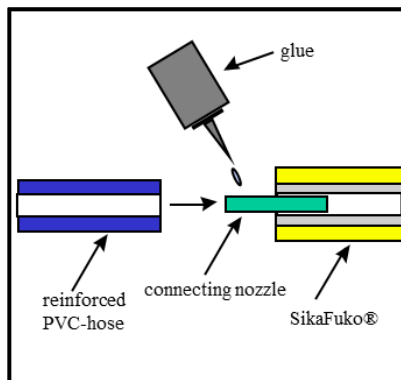


Cut the PVC installation and vent end hoses, green and transparent, to the desired lengths. Apply superglue to the connecting nozzles to ensure a secure connection.



Note: One / Two drop(s) of superglue is sufficient for secure connection.

Connect the *SikaFuko*® injection hose with the PVC vent ends.



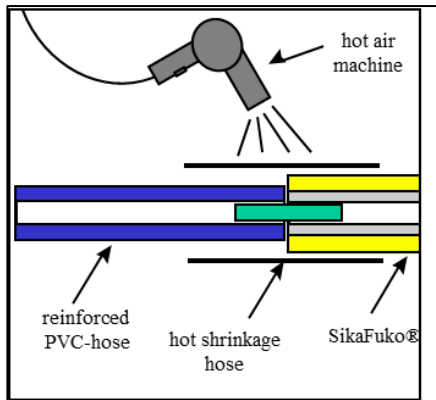
Slide the *SikaFuko*® injection hose over the *SikaFuko*® connecting nozzle and fit together so as to create a tight connection.



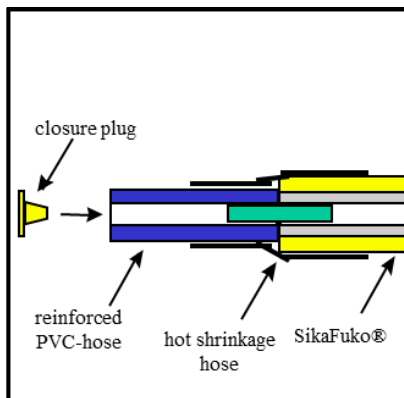
Install the *SikaFuko*[®] heat shrink-seal sleeve in the middle, covering the connection between the PVC-vent end and the *SikaFuko*[®] injection hose...



...and heat using a hot air machine.

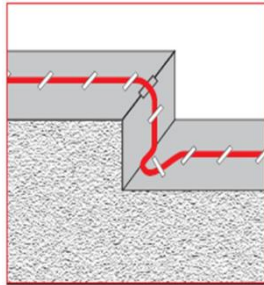


The *SikaFuko*[®] injection hose is ready for installation after closing the vent ends with the *SikaFuko*[®] closure plugs.



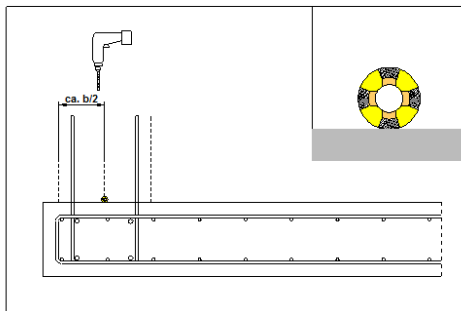
8 INTALLATION OF THE SIKAFUKO® SYSTEM

Standard placement of the *SikaFuko*® hose - continuously on to the concrete surface

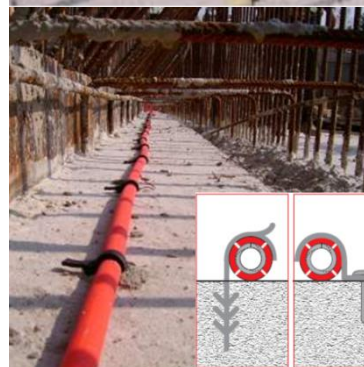
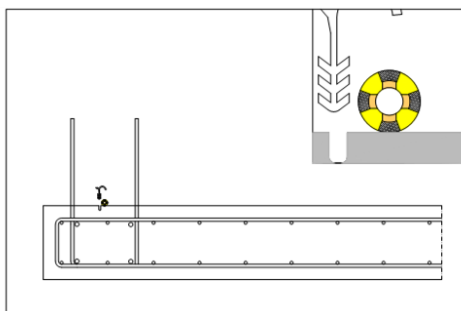
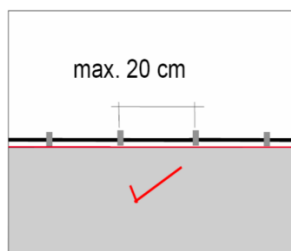


Drill holes for the *SikaFuko*® hose clips installation. Drill bit of diameter 6mm for the clips supplied in the Combi-Pack box are necessary.

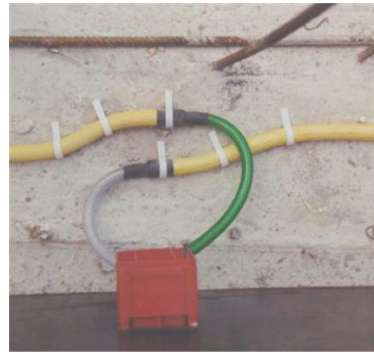
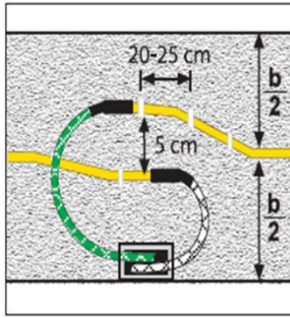
(Alternative shooting nails can be used)



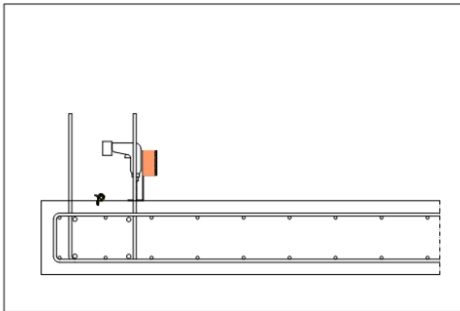
Detail of how the *SikaFuko*® hose is to be fixed



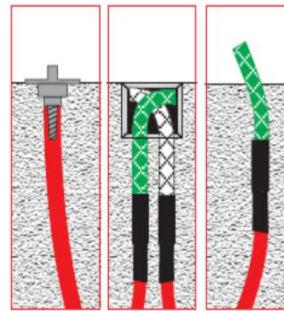
Method of overlapping the *SikaFuko*® vent ends



Line-up the *SikaFuko*® junction box with the foam material side facing the inside. This will be secured to the formwork later.



Install the bracket with two plugs into 6mm \varnothing drilled holes. Bend the box approximately 5mm outwards



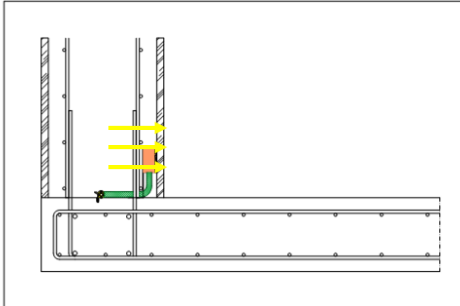
For storing the vent ends, drill a hole into the bottom of the junction box.

For *SikaFuko*® VT 1 injection hose $\varnothing = 14\text{mm}$, then insert the PVC vent ends into the openings in the box.

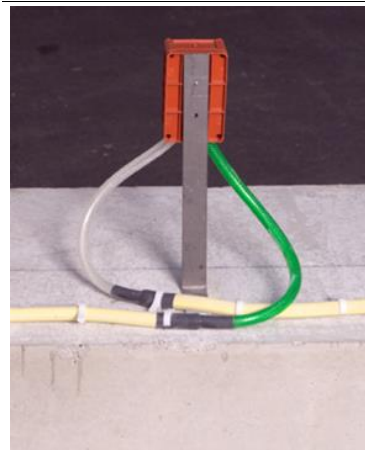


To avoid any movement or slippage, tie the vent ends with cable binders at the metal bracket. The installation of the assembled *SikaFuko*[®] system is now ready.

Note: Do not use wire.



Ready for additional steelwork, formwork and then careful placement of the concrete



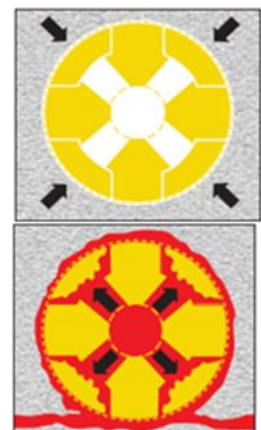
9 WORKING PROCEDURE OF SIKAFUKO[®] VT HOSE SYSTEM

9.1 CONCRETING

During the concrete placement, under the external concrete pressure, the neoprene strips in the SikaFuko[®] VT Injection hoses close the injection openings so that that no cement paste can enter the hose during the concreting work.

9.2 INJECTION

During injection, the internal injection material pressure compresses the neoprene strips and allows the injection material to flow out of the SikaFuko[®] VT hose from total of 8 x longitudinal slits around the hose. This enables uniform discharge of the material over the whole length of the hose and helps to ensure a high standard of injection sealing, with delivery to all of the potential voids / gaps / cracks etc.



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Note: The injection is only undertaken when the concrete has reached its final strength.

Areas adjacent to joints observed as having honeycombing or inadequate concrete consolidation must be patch repaired using cement or resin based repair materials as approved by the responsible Structural Engineer, in order to prevent any significant loss of injection material during the *SikaFuko*[®] injection sealing process.

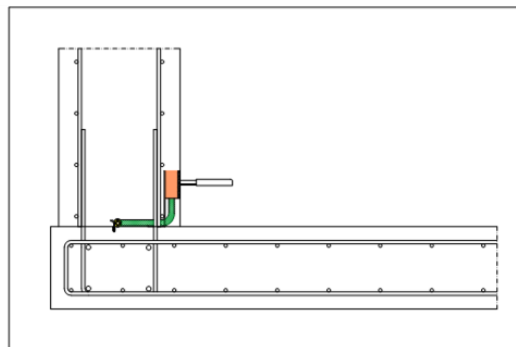
Also check and confirm that all of the necessary equipment and material is available on site before starting any injection works.

Visual inspection before starting



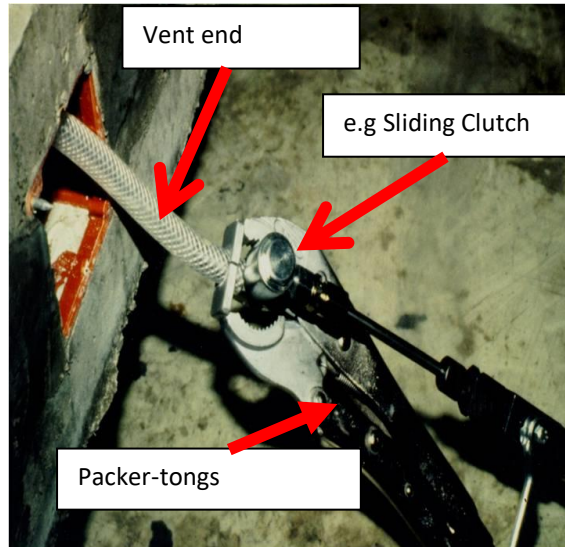
Locate the *SikaFuko*[®] system junction boxes and cut them to accommodate appropriate vent ends for each designated *SikaFuko*[®] hose segment. Release the closure plugs from the vent ends that will be injected. (If uncertain which vent ends to use, start with the injection of fresh water to check where the opposite vent end is. Additionally this test is also useful to check and confirm that the hose is free and ready for injection.)

Junction box

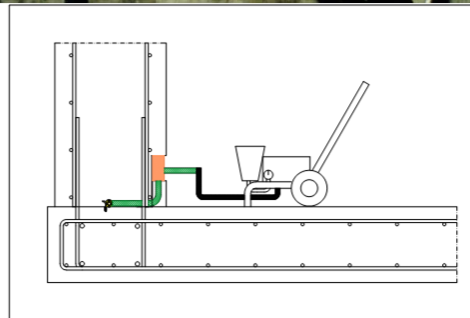


Insert the *SikaFuko*[®] *Packer-tongs* into the injection vent end and connect the pump to the Packer-tong. The pump hose assembly (injection whip) should be terminated with a Sliding Clutch (button head coupling). This Sliding Clutch will slide over the "button head" fitting on the Packer-tongs to connect the pump securely to the Packer-tongs.

Packer-tongs



Pump connection to the injection hose



Prepare the injection material (e.g. *Sika*[®] *Injection-307* which is typically recommended) according to the mixing requirements detailed on the respective PDS and then pour the mixed material into the injection hopper connected to the pump. (e.g. *Sika Injection-190 GB* cement suspension has to be mixed with a colloidal mixer for approx. 5min before use)

Injection Material



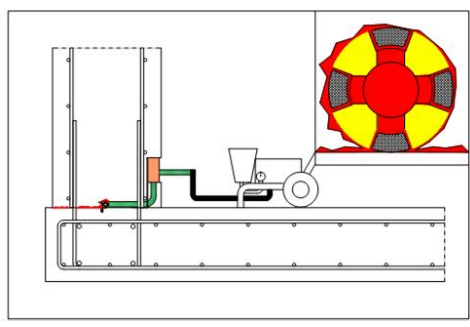
Start pumping

Once the connection is made and secure, start the pump and begin injecting the *SikaFuko*[®] hose until the injection material flows out of the opposite vent end.

Opposite vent end	When the injection material is observed flowing out of the opposite end of the hose, stop the pump (or close the ball valve on the pump assembly). Close off the vent end using Packer tongs.
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Pumping method	<p>Start pumping again and the filling and sealing of the joint will start. This form of injection is most successfully performed using the lowest possible injection pressures. The piston pump should be set to its lowest level, as this gives the material time to flow and penetrate into all of the voids.</p> <p>Slow, low-pressure injection is more effective than rapid, high-pressure injection. Successful completion of injection will be indicated by the pump's refusal of any more injection material (the piston will stop pumping), or by the sight of e.g. <i>Sika® Injection-307</i> seeping out along the full length of the joint. When this happens, hold the pressure for approximately 1-2 more minutes.</p>
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Note: Injection pressure and injection time will vary from project to project and hose to hose. The exact volume of injection material is difficult to estimate / predict, as it is never an "exact science". It depends on the degree of concrete consolidation, the concrete thickness and concrete cover over the *SikaFuko®* injection hose, in addition to any joint or void dimensions. Determining successful injection completion is therefore more a function of sight and sound (and from experience) for example the sight of injection material flowing out of the joint being injected, or the sound that the pump makes during the injection. The sight of injection material seeping from the joint throughout the entire length of the joint indicates successful injection. The pump can be stopped at this point and one can assume the successful injection of this *SikaFuko®* injection hose segment. However, a joint can also be successfully injected without seeing injection material seeping from the joint. In this situation, one must also listen to the sound of the pump, if the pump piston is not moving, indicating the joint is not accepting any more injection material, it simply means that the joint was better formed and the joint is "tight", so that the injection material cannot seep from the joint.



Stop pumping	After the injection is finished, stop the pump (or close the ball valve on the pump assembly). Disconnect the pump hose from the <i>Sika®</i> Packer tongs.
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Open the vent end	Remove both <i>Sika®</i> Packer tongs from the <i>SikaFuko®</i> hose segment.
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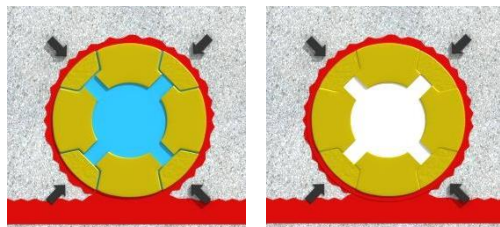
Finish	If the injection material used is based on Polyurethane or Epoxy resins the injection is now finished (no cleaning and re-injection is possible). The joint is sealed after the curing time of the injection resin material.
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Cleaning

Clean the pump and tools according to the PDS *Sika® Injection Cleaning System*

9.3 CLEANING BY VACUUM

When using injection materials based on acrylic resins, or suspensions of microfine cement, the *SikaFuko® VT 1*, *SikaFuko® VT-2* and *SikaFuko® Eco 1* hose segments can be flushed clean with water by applying a vacuum. The hose is then ready for a further injection process if this is ever necessary in the future, as and when required.



As outlined above in Section 9.2 we will now explain further the procedure after “open the vent end” process.

Stop pumping

After the injection is finished, stop the pump (or close the ball valve on the pump assembly). Disconnect the pump hose from the *SikaFuko® Packertongs*.

Open the vent end

Remove both *SikaFuko® Packertongs* from the *SikaFuko®* hose segment.

Bucket

Fill an empty bucket with fresh water.

Vacuum pump

Connect the vacuum/diaphragm pump on one of the vent ends of the injected *SikaFuko®* hose segment (if necessary using an additional length of clear PVC vent end hose and an additional connecting nozzle).

Vacuuming

Hold the opposite vent end, which is not connected to the vacuum pump, into the bucket below the level of the fresh water.

Vacuum process

Start the vacuum pump. Verify hose suction pressure by placing a finger over the vent end hose in the bucket of water, to confirm a “sucking” pressure.

During the vacuum process, any injection material which was left inside the core of the *SikaFuko®* hose segment will be vacuumed out of the interior, and the hose will be rinsed clean by the water from the bucket. The neoprene strips will be “sucked” back over the injection port holes in the hose, acting as a “one-way valve” and none of the previously injected material will be sucked back into the *SikaFuko®* hose segment by the vacuum pressure.

Finish

The entire length of the *SikaFuko®* hose segment must be rinsed clean. When the water flow observed at the vacuum pump end is clear, as seen by inspecting the material flowing through the clear vent hose. Take the vent end hose out of the bucket of water and suck any residual clean water out of the hose segment. Now the cleaning process is finished, stop the vacuum pump.

Finish vacuuming

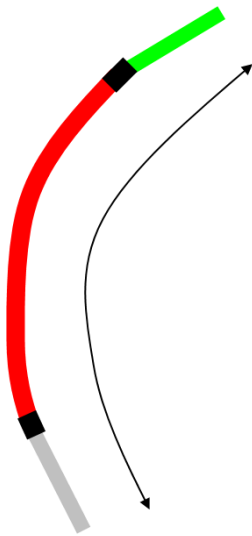
Disconnect the vacuum/diaphragm pump from the *SikaFuko®* hose and remove any additional PVC vent end hose and additional connecting nozzles connected to the vent ends of the *SikaFuko®* segment. Insert the yellow plastic closure plugs into each vent end of the *SikaFuko®* hose segment. Replace the vent ends neatly into each appropriate junction box, and

properly secure the junction box face plate flush with the wall / concrete surface.

Injection and clean-out of this length of SikaFuko® hose segment is now entirely complete! Further re-injection could also now start if necessary.

9.4 APPLICATION LIMITATIONS

- Always check the injection material's pot life and adjust for climate conditions. Do a test before injection.
- The length of the injection hose system including the vent ends should not generally exceed 10m with *SikaFuko® Eco 1* and 12 m for *SikaFuko® VT 1*.



Product	Standard length of a section
SikaFuko® VT 1	12 m*
SikaFuko® VT 2	16 m*
SikaFuko® Eco 1	10 m*

* Longer sections than the specified standard length are possible for special projects by agreement with Sika Technical Services.

Please contact your CPE for advice.

10 INSPECTION AND QUALITY CONTROL

As “Good Practice”, also known as “Demonstrated Best Practice” for injection works, the contractor should always follow an inspection procedure to check and confirm the quality of the completed *SikaFuko®* system. This should include checking and inspecting the:

- **Injection hose:**
 - Visual inspection: The mesh of *SikaFuko® VT 1* and *SikaFuko® VT 2* should not be damaged. Other heavy elements (e.g. steel reinforcement) should not be placed over the hose during storage or installation)



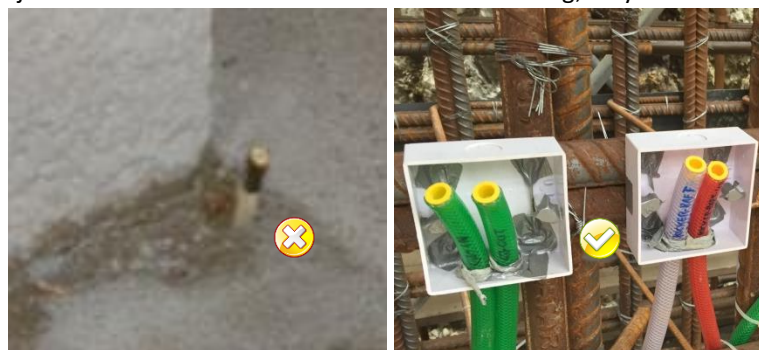
- Check if the injection hoses are crossing each other and not be connected:



- Check the placing and positioning of the *SikaFuko*[®] injection hose system. The injection hose part needs joint contact along its entire length.



- The injection hoses should not be visible after concreting; only the PVC vent ends are to be visible.



- Adhesion inspection after fabrication and assembly of the *SikaFuko*[®] hose system - pull the vent end and the *SikaFuko*[®] hose by hand to check and confirm the adhesion of the connection piece.
- Check if all connections of *SikaFuko*[®] system are applied correctly e.g. shrunken on slave.



- Check if wire is used for connection of the PVC vent ends to the rebars, if yes make sure that it won't block the injection hose or damage it, we recommend to use cable binder.



- Each SikaFuko® vent end must be closed using appropriate plug before concreting.



- Check if total system length of the *SikaFuko*® injection hose is correct and as defined in Section 9.4.
- **Injection material:**
 - Do a pre-test of the injection material:
 - Fill a small sample of the injection material into a cup and then measure the time it takes to cure. It is also useful to fill another cup of material with any in-situ water and again measure the time it takes to cure for comparison i.e. the temperature can affect the injection materials pot life / open time for injection and its cure time.
- **Complete system:**
 - Visual inspection
 - System working principle can be tested: Flush with water at low pressure after the injection and cleaning process. If water flows out of the joint, re-injection is necessary.

11 LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the products suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties

must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

12 KEY WORDS

SikaFuko[®], SikaFuko[®] VT 1, SikaFuko[®] VT 2, SikaFuko[®] Eco 1, Injection hose, Injectionhose, Sika[®] Injection-307, Sika[®] Injection-306, Sika[®] Injection-190 GB, Acrylate Injection, Polyurethane Injection, Hybrid Injection, Epoxy Injection, Re-Injectable Hose, Re-injection, SikaFuko, Valve Technique, powder.

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Method Statement
SikaFuko[®] VT System
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85002070701