

PVC WATERSTOP AND REINJECTABLE HOSE MASTER SPECIFICATION

Greenstreak



SUGGESTED MASTER SPECIFICATION

SECTION 03 15 13 WATERSTOPS

(PVC WATERSTOP AND REINJECTABLE WATERSTOP HOSE SYSTEMS)

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provision of waterstops embedded in concrete and spanning control, expansion, and/or construction joints to create a continuous diaphragm to prevent liquid migration.
- B. Provision of reinjectable waterstop hoses embedded in concrete, residing in control and/or construction joints and providing means of injecting grout/resin to create a continuous diaphragm to prevent fluid migration.
- C. Non-metallic waterstops for use in concrete joints subjected to chlorinated water, municipal wastewater, sea water, and many waterborne chemicals.

1.02 REFERENCES

- A. PVC WATERSTOP
 1. Corps of Engineers: CRD-C 572-74
 2. American Society for Testing Materials (ASTM)
 3. Bureau of Reclamation: C-902
 4. Canadian General Standards Board: 41-GP-35M Types 1 & 3

1.03 SUBMITTALS

- A. Manufacturer's Product Data, installation instructions for PVC waterstop and representative PVC waterstop samples for approval.
- B. Submit product data and shop and installation drawings. Show all hose runs, junction box locations, and details on the shop and installation drawings.
- C. Submit procedures for installation, inspection, grout injection, and vacuuming of hose.

1.04 QUALITY ASSURANCE

- A. Waterstop manufacturer shall demonstrate five (5) years minimum continuous, successful experience in production of PVC and injectable hose waterstops.
- B. Materials: Obtain all joint sealing and waterstop materials, including any primary sheet membrane waterproofing, from a single manufacturer. Manufacturer to provide waterproofing shop drawings and PVC waterstop welding training.

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1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store waterstops under a tarp to protect from oil, dirt, sunlight.

PART 2 PRODUCTS

2.01 PVC WATERSTOP

- A. Provide flexible PVC (polyvinyl chloride) waterstop, profile style number [PROFILE NUMBER], as manufactured by Sika Greenstreak, 3400 Tree Court Industrial Boulevard, St. Louis, MO 63122; Phone: 800-325-9504; Fax: 800-551-5145; usa.sika.com; Email: info@greenstreak.com.
- B. The PVC waterstop shall be extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride. The PVC compound shall not contain any scrapped or reclaimed material or pigment.
- C. Performance Requirements as follows:

Property	Test Method	Required Limits
Water absorption	ASTM D 570	0.15% max
Tear Resistance	ASTM D 624	300 lb/in min.
Ultimate Elongation	ASTM D 638	350% min.
Tensile Strength	ASTM D 638	2000 psi min.
Low Temperature Brittleness	ASTM D 746	Passes @ -35° F (-37° C)
Stiffness in Flexure	ASTM D 747	1000 psi min.
Specific Gravity	ASTM D 792	1.38 max.
Hardness, Shore A	ASTM D 2240	79 \pm 3
Tensile Strength after accelerated extraction	CRD-C 572	1600 psi min.
Elongation after accelerated extraction	CRD-C 572	300% min.
Effect of Alkalies after 7 days: Weight Change Hardness Change	CRD-C 572	between -0.10% / +0.25% \pm 5 points

2.02 REINJECTIBLE WATERSTOP HOSE

- A. Provide SikaFuko VT reinjectable waterstop hose system by Sika, 3400 Tree Court Industrial Boulevard, St. Louis, MO 63122; Phone: 800-325-9504; Fax: 800-551-5145; Email: info@greenstreak.com; usa.sika.com.
- B. Provide SikaFuko VT-1 injection hose system (standard size) and/or SikaFuko VT-2 injection hose system (larger size). Provide colored vent ends, junction boxes, anchor clips, closure plugs, and all other accessories for a complete reinjectable waterstop hose system.
- C. The injection hose shall have staggered discharge openings and a one-way valve arrangement for uniform discharge of the injection grout. The hose must be of appropriate size and construction for reinjection of

micro-fine cement or water-soluble hydrophilic acrylate ester resin. SikaFuko VT-2 hose will also allow for injection of regular Portland cement in addition to micro-fine cement and water soluble hydrophilic acrylate ester resin. The hose shall allow for vacuuming operations (hose cleanout) and repeated use. The construction of the hose shall permit free discharge of the specified injected grout into the concrete, without backwash, for the entire length of the hose (with the exception of the vent ends).

- D. The vent ends shall be reinforced, color-coded PVC and internally connected to the reinjectable waterstop hose with shrink-on sleeves.
- E. Junction boxes shall be heavy duty plastic made for embedment in concrete and of adequate size for housing and protection of the injection hose vent ends. Boxes shall be securely fitted with temporary knock-out covers to be used during concreting operations. Where exposed to view, boxes shall be fitted with covers mounted flush with the surrounding area.
- F. The hoses shall be cut and fitted with vent ends in lengths to suit field measured conditions, with a maximum of 40 linear feet for each hose, including vent ends. Longer lengths shall be fabricated in accordance with the manufacturer's recommendations.

2.03 INJECTION GROUTS

- A. Provide water soluble, hydrophilic, acrylate ester resin. In the uncured state, resin shall be water soluble, non-water reactive, and solvent free. Resin shall have viscosity of less than 20 mPas and be easily pumped, flushed, and vacuumed during the injection process with the reinjectable waterstop hose. All procedures shall be performed within the set time of the injected material. In the cured state, material shall be solid, hydrophilic, and flexible with reversible swelling action in excess of its initially installed volume. Cured material shall be resistant to common ground water contaminants, stable in the presence of acids, alkaline solutions, solvents and fuels, and resistant to permanent water pressure and salt-water environments. Acceptable products include:
 - 1. Sika Injection-306 by Sika.
 - 2. Sika Inject 215 by Sika.
- B. Provide micro-fine cement grout consisting of a 2-component, injection grout mix of ultra-fine slag and Portland cement particles, mixed with a dispersant to form a grout for low pressure injection methods. Acceptable products include:
 - 1. Tricodur-SI by Sika.
- C. Provide Portland cement grout mixture comprised of Portland cement, water, high range water reducer, and other additives as recommended by the reinjectable waterstop hose manufacturer. Portland cement grout mixture ONLY to be used with SikaFuko VT- 2 injection hose system.

2.04 ACCESSORIES

- A. PVC Waterstops
 - 1. Provide manufacturer supplied waterstop fabrications for all changes of direction, intersections, and transitions leaving only straight butt joint splices for the field.
 - 2. Provide grommets, pre-punched holes, or hog rings (Installed by others) spaced at 12 inches on center at the outermost edges, or ribs, along length of waterstop.
 - 3. Provide Teflon coated thermostatically controlled waterstop splicing irons for field butt splices.

PART 3 EXECUTION

3.01 PVC WATERSTOP INSTALLATION

- D. Field butt splices shall be heat fused welded using a Teflon covered thermostatically controlled waterstop splicing iron at approximately 380 degrees F. Follow approved manufacturer recommendations.
- E. Lapping of waterstop, use of adhesives or solvents, shall not be allowed.
- F. Center waterstop in joint and secure waterstop in correct position using grommets, pre-punched holes, or hog rings (installed by others) at 12" on center at the outermost edges, or ribs, along the length of the waterstop and wire tie to adjacent reinforcing steel.

3.02 REINJECTIBLE WATERSTOP HOSE INSTALLATION

- A. All installation, inspection, injection, and vacuuming operations shall be in strict accordance with the reinjectable hose system manufacturer's instructions and shall be done by an approved applicator of the reinjectable hose system manufacturer or under the direct supervision of the reinjectable hose system manufacturer's representative.
- B. Protect all reinjectable hoses from flame, sparks, oil, dirt, concrete splatter and damage prior to concrete pour.
- C. Concrete surfaces where reinjectable hoses are to be installed are to be clean, dry, smooth, and free from dirt and debris.
- D. Hoses must be located with at least 4 inches of concrete cover. Install as close as possible to centerline of wall or slab, with only the vent ends crossing over the reinjectable hose. Only vent ends should leave the joint.
- E. Do not fasten reinjectable hoses to reinforcing steel.
- F. Visible honeycombs at the surface should be patched directly after dismantling formwork to avoid loss of injection material during the injection operation.

3.03 INJECTION

- A. If any leakage is evident at construction joints, inject approved injection material as a remedial measure to stop such leaks and seal the joint area.
- B. Prepare injection material and perform actual injection in strict accordance with the manufacturer's printed instructions and specifications regarding mixing, injection procedures, application pot-life, and equipment requirements.
- C. Initial injection pressure should be approximately 200-300 psi. Once the injection material has filled the joint area and is no longer flowing, gradually increase the pressure to 500-600 psi. Maintain this pressure for 3-5 minutes, allowing for the injection material to thoroughly penetrate the joint area.
- D. Once maximum pressure is maintained for the allotted time frame, disconnect the pump and follow connection procedures to inject hose from opposite end. Both injection procedures and vacuuming operation must be completed within the gel time of the injection material and in accordance with the manufacturer's specifications.
- E. If injection material penetrates wall surface, wipe clean with water.
- F. Immediately after injection, vacuum the hose system by means of the manufacturer's recommended procedures with clear water, leaving the hose system clean and available for reinjection. Repeat injection

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if the leaks have not been stopped. Reinjection should only occur after previous injected material has had sufficient time to cure.

- G. Piston type pumps (not diaphragm) shall be used with hydrophilic resin injections.
- H. Allow concrete to cure for 28 days prior to injection work.

3.04 HOSE EVACUATION

- A. Hose evacuation to be performed in strict accordance with manufacturer's printed instructions and specifications.
- B. Connect a vacuum pump to the end of either PVC vent end. Place the other vent end into a bucket filled with clean water and draw water through the hose by applying vacuum.
- C. When water flow is clear on the vacuum side, disconnect water supply by removing the vent end from the bucket of water.

END OF SECTION

Sika Corporation - US
201 Polito Avenue
Lyndhurst, NJ 07071
United States
Usa.Sika.com

For More Information Contact
Sika - St. Louis Sales Office
3400 Tree Court Industrial Blvd.
63122, St. Louis, MO
United States
www.USA.Sika.com
Phone: 1-800-325-9504
Fax: 800-551-5145