



SUGGESTED MASTER SPECIFICATION SECTION 03 15 13 REINJECTABLE WATERSTOP HOSE SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. 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.
- B. Non-metallic waterstops for use in concrete joints subjected to chlorinated water, seawater, and many waterborne chemicals.

1.02 SUBMITTALS

- A. Submit product data and shop and installation drawings. Show all hose runs, junction box locations, and details on the shop and installation drawings.
- B. Submit procedures for installation, inspection, grout injection, and vacuuming of hose.

1.02 QUALITY ASSURANCE

- A. Waterstop manufacturer shall demonstrate five years (minimum) continuous, successful experience in production of reinjectable hose waterstops.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Store waterstops under tarps to protect from oil, dirt, and sunlight.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Provide FUKO reinjectable waterstop hose system by Greenstreak Group / BBZ, USA, 3400 Treecourt Industrial Blvd, St. Louis, MO 63122 – 1-800-325-9504.
- B. Provide FUKO type 1 injection hose system (regular size) and/or FUKO type 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 ultra-fine micro-cement and/or water-soluble hydrophilic acrylate ester resin. FUKO Type 2 hose shall also allow for injection of regular Portland cement in addition to ultra-fine micro-cement and water soluble hydrophilic acrylate ester resin. The hose shall allow for vacuuming operations 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.
- 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.

2.02 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 40 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. MultiGel 850 by Greenstreak / BBZ-USA, Inc, 3400 Treecourt Industrial Blvd, St. Louis, MO 63122 – 1-800-325-9504.
 - 2. Duroseal Inject 215 or Inject 2060 by Greenstreak / BBZ-USA, Inc, 3400 Treecourt Industrial Blvd, St. Louis, MO 63122 – 1-800-325-9504.
 - 3. Or equal, as recommended by reinjectable waterstop hose manufacturer.
- B. Provide ultra-fine micro-fine cement grout consisting of a one component, injection grout mix of ultra-fine slag and Portland cement particles, mixed with water and dispersant to form grout for low pressure injection methods. Acceptable products include:
 - 1. Tricodur Micro-cement by BBZ-USA, Inc.
 - 2. Or equal, as recommended by reinjectable waterstop hose manufacturer.
- 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 FUKO 2 injection hose system.

PART 3 EXECUTION

3.01 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.

3.02 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 75-150 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 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.

3.03 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