**SECTION 07 XX XX**

**GTI-1000**

**Poly-Rubber Gel Injection Restorative Membrane System**

NOTES TO THE DESIGNER

THIS SPECIFICATION SHALL BE USED FOR THE USE OF POLY-RUBBER GEL TO SEAL WATER LEAKS WITHIN STRUCTURES AND PERFORM PREVENTATIVE SEALING THROUGH THE ESTABLISHMENT OF A RESTORATIVE WATERPROOF MEMBRANE ON THE POSITIVE SIDE OF A STRUCTURE.

PART 1 GENERAL REQUIREMENTS.

1.01 SCOPE OF WORK

1. Furnish all labor, materials, tools, equipment and services necessary for the installation of a pressure injected GTI-1000 Polymer Rubber Gel waterproofing work, in strict accordance with the Contract Drawings and as specified herein.
2. Work consists of the injection of GTI-1000 Polymer Rubber Gel at areas of active water leakage through concrete cracks, joints or voids located in roofs, sidewalls, floors, beams and other locations as shown on the Contract Drawings and in other areas designated by the Engineer.

1.02 REFERENCES

ASTM D 36 – Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus).

## ASTM D 56 – Standard Test Method for Flash Point by Tag Closed Cup Tester

ASTM D 2196-05 – Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield type) Viscometer.

ASTM D 1353 – Standard Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products.

1.03 SUBMITTALS

1. The submittals required for the Engineer’s approval shall be as set forth in the Specifications and may also be indicated in a separate submittal table provided to the Contractor. Other items and/or submittals required to indicate conformance with the Contract Documents shall be available for Engineer’s inspection.
2. Submit Product Data for the type of material specified, including manufacturer’s printed technical data, and tested physical and performance properties.
3. Submit manufacturer’s materials Application Guidelines for Installation manual.
4. Submit a project plan that describes where materials are intended for use and how the materials will be adapted to the existing conditions. Include injection treatment plan that describes the grid pattern to be used as well as the typical treatment plan for specific leak repairs.
5. Submit an equipment plan and a detailed procedure for installation.
6. Submit names and qualifications of installer and manufacturer’s field representative.

Certificates:

Installer Certificates – Submit certificates signed by manufacturer certifying that Installers comply with requirements under the “Quality Assurance” Article.

1. Samples – Submit representative samples of the following for approval:
	1. GTI-1000 Poly-Rubber Gel
2. Submit documentation that demonstrates that the specified GTI-1000 Poly-Rubber Gel has been successfully installed as by the same manufacturer for a minimum of 5 years on projects of similar complexity.

1.04 QUALITY ASSURANCE

1. Installer Qualifications: The Installer shall have a minimum of five years of recent experience in performing grouting work under similar conditions. Installer shall be licensed, certified in writing, trained and approved by the material manufacturer.
2. Waterproofing material manufacturer shall have available an in-house technical staff to assist the Contractor, when necessary, in application of the products and final inspection of the work.
3. Pre-Installation Meeting(s): Contractor shall convene at least one pre-installation meeting at the job site with the manufacturer of the waterproofing system and the Engineer to discuss project conditions as they relate to the application of the material.
4. There shall be no deviations or changes from this specification without prior written approval by the Engineer

1.05 MANUFACTURER’S FIELD REPRESENTATIVE

a. The Contractor shall arrange with the material manufacturer to have the services of one (1) competent field representative at the work site prior to start of grouting work to assure proper application procedures. The representative shall remain at the job site after work commences and continue to instruct until the representative, the Contractor, and the Engineer are satisfied that the crew is installing the system successfully. The representative shall make periodic visits (at the start of work, at an intermediate time during which work is being done, and after all work has been completed or at any time the Contractor, Engineer or manufacturer deems necessary) to the project as the work progresses and shall confer on each visit with the Contractor and Engineer. The cost of any/all expenses associated with the manufacturer’s field representative shall be borne by the Contractor.

1.06 DELIVERY, STORAGE, AND HANDLING

1. The materials shall be delivered in original, unopened containers or packaging clearly labeled with manufacturer’s name and location, brand name, size, manufacturing date, instructions for use and all identifying numbers.
2. Store materials in a clean, dry area protected from water and direct sunlight in accordance with manufacturer's instructions. Materials shall be stored in a neat and safe manner, and the total weight of the materials shall not exceed the allowable structural capacity of the storage area.
3. Protect materials during handling and application to prevent damage or contamination. Materials damaged in handling or storage shall not be used in the Work. Damaged materials shall be removed from the site.

1.07 CONDITIONS AND PRECAUTIONS

* 1. Poly-Rubber Gel shall not be exposed to a constant temperature in excess of 140ᵒ degrees Fahrenheit. (i.e. hot pipes and vents or direct steam venting, etc.)
	2. Hazardous soil contamination shall not come in contact with the Poly-Rubber Gel. Any exposures to foreign materials or chemical discharges must be presented to manufacturer for evaluation to determine any impact on the material.

PART 2 PRODUCTS

2.01 MATERIAL

1. GTI-1000 Waterproofing restoration system shall consist of a single component, elastomeric Poly-Rubber Gel formulated for injection through concrete to behind slab (backside grouting) to stop active leaks and for preventative sealing through the creation of a positive side restorative waterproofing membrane as manufactured by RE-Systems Group Americas Inc.([www.re-systemsgroup.com](http://www.re-systemsgroup.com))
2. Waterproofing system shall have the following performance properties:
	1. Non-hydro active
	2. Chemically resistant
	3. Self healing
	4. Non-curing
	5. Non-toxic
	6. Non-flammable
	7. Single component
	8. Adhesive to heterogeneous materials
3. The Poly-Rubber Gel shall have the following physical properties:

**Poly-Rubber Gel**

**Property                                       Standards                                  Results**

Solids Content                              ASTM D1353                               75% min

Viscosity                                       ASTM D2196 at 72F                    2,500,000 CPS min

Softening                                      ASTM D36                                   90ᵒ F min

Flash Point (PM)                          ASTM D56                                   200ᵒ F min

PART 3 EXECUTION

3.01 GENERAL

1. The injection work shall be performed with the skill and expertise typical of a specialty Contractor experienced in waterproofing grouting of concrete cracks and joints. The planning of the Work and direction of the grouting crews shall be managed by the Contractor so as to timely accomplish the Work.
2. Access to Work Areas: Provide safe and efficient access to drilling and grouting areas for workers, supervisors, and inspectors, which may involve the erection of scaffolding, installation of guard rails, and any other means required for personnel and equipment to enter, work in, and leave the treatment areas. This requirement shall also include adequate lighting for inspection and performance of the Work. Provide all temporary power within the work area and plan for installation of any outlets, connection boxes, transformers, cables, switches, generators to adequately supply the work crews with electrical power. All Contractor-installed electrical devices shall be installed by qualified personnel and removed at the completion of Work.
3. It is anticipated that if a particular leak is stopped, the leak may migrate to another location. It is expected that it may not be feasible to stop all the leaks completely. The extent to which the leaks are to be stopped is to be determined by the Engineer. In general, the criteria to be used in making this judgment are as follows:
	1. Where the leakage cannot be completely stopped, the water flow shall be reduced to an acceptable minimum as determined by the Engineer.
	2. Leakage shall be stopped completely where the water affects the public, personnel and/or operations.
	3. Leakage shall be diverted from metal surfaces susceptible to corrosion.
	4. Leakage shall be diverted from equipment susceptible to water damage.

3.02 EXAMINATION

a. Prior to the start of Work, the Contractor shall make a joint inspection of the affected areas with the Engineer and manufacturer’s representative to (i) verify the location of the leaks shown on the Contract Drawings and (ii) locate new leaks requiring the injection of grout. The Contractor shall provide measurements of each individual item. Written reports and/or drawings indicating the inspection results shall be submitted for approval by the Engineer.

* 1. EQUIPMENT
1. The Contractor shall supply all equipment, including pumps, containers, hoses, gauges, packers, drills, bits, scaffolds, compressors, generators, vacuums, accessories and all other items required to perform the work.
2. Pumping units: The equipment (rotor stator pump) used to inject the Poly-Rubber Gel shall be acceptable to the Poly-Rubber Gel manufacturer and shall conform to all of the following:
	1. Capacity to mix and circulate the Poly-Rubber Gel material.
	2. Capacity to inject the Poly-Rubber Gel under controlled, variable pressures.
	3. Capacity to keep GTI-1000 Poly-Rubber Gel material and injection hose at a temperature above freezing, so as to enable the optimal injection flow rate.
3. Packers:
	1. Packers shall be specifically designed for the grouting operation and capable of safely sealing and packing grout holes drilled into concrete and shall be installed in the manner recommended by the manufacturer of the grout. Packers shall be of the removable type such that the drilled hole can be cleaned and patched to at least 3 inches deep.

3.04 SURFACE PREPARATION

1. Before commencing work, examine all areas to ensure that other related work is complete and the surface is ready to receive GTI-1000 Poly-Rubber Gel. Report in writing to the Engineer any conditions which will adversely affect the waterproofing installation and/or performance. Do not proceed with the membrane installation until these conditions have been corrected.
2. Protect adjacent surfaces not designated for waterproofing application. Mask adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.

3.05 APPLICATION

1. Injection Procedures: All grouting work shall be done in accordance with the Contract Documents. The steps for sealing leaks in concrete cracks and joints shall include the following:
2. Cleaning of Injection Areas: Injection areas covered by mud, rust, and/or water shall be cleaned prior to injection of grout.
3. Surface seal cracks or joints to prevent material from leaking.
4. Determine the thickness of the concrete element (walls, floor slabs, inverts, roof slabs /decks)
5. Drill grout holes through the concrete:
	1. Determine thickness of the concrete and drill or core through substrate perpendicular to the face of the concrete.
	2. Select in consultation with the grout manufacturer, a coring grid pattern that will provide consistent grout coverage across the entire affect area. The grid pattern will likely not be less than two feet each way and not more than three feet each way.
6. Cleaning Grout Holes: All grout holes shall be confirmed to be clean and free from dust, debris and obstructions prior to grouting. Grout holes drilled by rotary-percussion, or by rotary means without water flushing shall be cleaned of all cuttings, dust and debris prior to placing the packer. Cleaning shall consist of water flushing, vacuuming, or other means, and shall be performed such that grit and debris are not clogging the crack and are shown to be effective in permitting free flow of GTI-1000 Poly-Rubber Gel into the crack or joint.
7. Install injection packers: A packer shall be installed in the grout hole just prior to injection and fixed in place in such a way that a tight seal is accomplished.
8. Injection of the GTI-1000 Poly-Rubber Gel through concrete, unless permitted by the Engineer, begin first at the entry port of lowest elevation and continue until uncontaminated Poly-Rubber Gel flows out of the adjacent port. Injection pressure shall be kept as low as practical and shall generally be between 50 psi and 100 psi plus any hydrostatic head. The connection between the entry port and the head of the injection nozzle must be sufficiently tight to prevent Poly-Rubber Gel from running out on the concrete surfaces.
9. After injection at a given port is complete, this port shall be plugged and injection started at the next adjacent port. This procedure shall be repeated until the affected area is completely filled. Upon completion, surface to be left as noted on the drawings. Post Injection Procedures: After removal of the packer the grout hole shall be cleaned to a depth of at least 3 inches and plugged with non-woven cloth and moist-pack non-shrink mortar. If high pressure conditions exist or the specified drill-hole is larger than 5/8”, wood dowels or alternative material can be used to fill injection holes as recommended by the manufacturer. Repeat process as necessary.
10. Provide temporary waterproof coverings necessary to protect structure, walls, floors, equipment and finishes from leaking grout that may drip or flow away from the injection points.

3.06 SAFETY PRECAUTIONS

1. Responsibility for all aspects of the safety of this Work is vested entirely in the Contractor. Exercise all control over operations, materials, employees, and all other factors respecting safety.
2. Provide any additional safety measures required by the Poly-Rubber Gel manufacturer.
3. Empty containers, bags, drums and the like, shall be promptly removed from the Work Site at the end of each work period or shift and disposed of in a safe, orderly and legal manner.
4. Handle materials in the manner prescribed by the manufacturer, with additional precautions as required by applicable public laws and jurisdictive controls. Applicators shall wear protective gear as necessary to provide adequate protection from transferring Poly-Rubber Gel from the work area. Tyvek suits, rubber boots, and rubber latex gloves are suggested.
5. Provide adequate local ventilation in the Work Areas.

3.07 JOB COMPLETION

a. The overall quality of the work shall be judged by the Contractor’s ability to achieve water tightness of the area of injection.

b. If feasible, water tests shall be performed to test the adequacy of the repair.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR GTI-1000 POLY-RUBBER GEL

a. Measurement for GTI-1000 Poly-Rubber Gel will be made on the basis of gallons injected.

END OF SECTION