

**GUIDELINE FOR WRITING SPECIFICATIONS WHEN USING
CSP Injection Grouts
SECTION 04 03 00 – INJECTION GROUTING**

**** Specifier can combine the Work of this Section into one comprehensive body of Work including testing and sampling, assembly dismantling, repair, replacement, stain removal and cleaning either concrete or masonry assemblies.*

**** Specified grout materials are suitable for use and will not cause adverse effects degrading the integrity of Period or Listed National Register Historic Properties.*

1. PART 1 – GENERAL

1.1. EXISTING CONDITIONS

1.1.1. Period building *** The five wythe thick fired brick and lime-cement-sand mortared bearing wall assemblies have suffered from decades of deferred maintenance, allowing minor deterioration to worsen over time. Erosive forces exploited small cracks and caused them to grow, precipitated erosion in the assembly interior, leading to disintegration and crumbling of some units; evidenced by destabilizing cavities and voids in the assembly; scheduled for partial reconstruction, consolidation, and stabilization employing specified cementitious inject grout materials and methods specified in this Section.

1.1.2. Work of this Section has the potential to produce adverse effects on the period building that was placed in service at a time when archaic materials and other technologies were commonly incorporated in building construction, to the degree that they may behave differently from successor materials reformulated over time.

**** Period Properties are generally fifty years old or older, but are not presently listed on the National Register of Historic Places; but the decision has been made not to foreclose the possibility of future listing; hence the elevated level of caution in executing the Work.*

**** Properties that have been listed, or are determined eligible for listing on the National Register of Historic Places should be specified with reference to special considerations defined by the National Historic Preservation Act and its implementing regulations, affording protection to historic properties under federal law, and in some instances, state law and/or local ordinances. Material producer can offer specific guidance in regard to that scenario. ****

1.1.2.1. Care shall be exercised during the performance of this Work to avoid collateral damages to the building and surrounding area, which may also include other period and/or historic properties listed on the National Register of Historic Places.

1.2. WORK OF THIS SECTION

1.2.1. Furnish labor, materials, tools, and equipment needed to repair cracks and stabilize masonry assemblies, including injection of grouts into wall cavities to consolidate voids, as depicted on Drawings and as specified in this Section.

1.2.2. Material Substitution Proposals shall be supported by independent laboratory tests, paid for by the submitting party; submitted to the Architect in writing; prior to the receipt of bids;

complete with independent laboratory certified test results that establish equivalent or better performance levels, including critical material composition.

- 1.2.2.1. Do not substitute specified materials or methods without written authorization by the Architect.
- 1.2.3. Provide qualified supervision with relevant experience needed to manage delivery of projects governed by codes and treatment standards regulating the treatment of period properties, including provision of skilled labor force in sufficient number who are trained and certified in the proper use of specified materials, methods, tools, and equipment.
- 1.2.4. Architect's Drawings and Schedules *** (Sheet and Identifier) *** locate and depict the extent of the Work of this Section.
 - 1.2.4.1. Contractor shall inspect, confirm to his satisfaction and state in writing that the Work and building conditions as represented in the documents are acceptable; submitted for Architect approval; or, alternatively, prepare a written and illustrated inspection report noting discrepancies and seeking clarification, submitted for review by the Architect; who shall provide his written and illustrated response.
- 1.2.5. Protect building features not scheduled for treatment in this Work.
 - 1.2.5.1. Secure draped material with edges sealed as needed to protect building features located near or adjacent to the Work but not identified for treatment; including primary building features, landscape and planted areas adjacent to Work.
 - 1.2.5.2. Prevent unintended exposure to treatment materials reaching other buildings, cars, finishes, and improvements not scheduled for treatment under this Section.
 - 1.2.5.3. Draping material shall be clean 6-mil minimum thickness polyethylene sheet; or better; minimizing joints.
- 1.2.6. Organize Work as series of discrete treatment areas, sized to permit easy completion of treatment operations from start to finish in a single Workday.
- 1.2.7. After grout crack repair has reached thumbprint firmness (without unyielding hardness characteristic of final set), clean grout stains and other residue with water and sponges, removing all traces from wall; taking care not to disturb repair finish.
- 1.2.8. Do not allow excess grouts to reach final hardness before removing all traces from wall surfaces. Otherwise, removal may become very difficult or impossible.

1.3. RELATED WORK

- 1.3.1. Delivery and acceptance of the Work of this Section is governed by provisions in other documents comprising integral parts of this Agreement, including the Construction Agreement, General and Special Conditions, General Requirements, Drawings, Specifications, and cited Standards fully incorporated into the Agreement by reference; and defining the Project as a whole.
- 1.3.2. Coordinate the delivery of the complementary Work specified under other Sections.

*** (Related Sections noted here as complementary can be incorporated into a single Section 02 03 00 Conservation Treatment for Existing Period Conditions or specified individually.) ***

- 1.3.2.1. Section 00 43 25 Substitution Request Form (During Procurement

- 1.3.2.2. Section 00 63 25 Substitution Request Form (During Construction)
- 1.3.2.3. Section 01 00 00 Contractor Quality Control
- 1.3.2.4. Section 01 56 39 Temporary Protection of Site and Plantings
- 1.3.2.5. Section 01 35 91 Rehabilitation Treatment Procedures
- 1.3.2.6. Section 01 54 23 Hoists and Scaffolding
- 1.3.2.7. Section 01 74 19 Construction Debris Management and Disposal
- 1.3.2.8. Section 02 42 96 Removal and Dismantling (Selective Demolition)
- 1.3.2.9. Section 04 03 10 Masonry Cleaning (Soiling, Biological, Paint Removal)
- 1.3.2.10. Section 04 03 22 Brick Unit Repair (Repair, Patch, Replace)
- 1.3.2.11. Section 04 03 23 Masonry Repointing

1.4. REFERENCE STANDARDS

- 1.4.1. Material manufacturer’s written specifications and instructions.
- 1.4.2. National Park Service Advisory Publication - Guidelines for the Treatment of Historic Properties, offers preservation strategies and technical advice for adoption in planning and executing Work on historic properties where no federal (or applicable state) stakeholder interests will be granted in the form of permits, funding, or other federal assistance. Where no government authority has jurisdiction over this Work, adoption of and compliance with these standards shall be incorporated by reference and enforced as stated requirements of this Construction Agreement.

1.5. QUALITY MANAGEMENT

1.5.1. Quality Assurance

- 1.5.1.1. Contractor management assumes full responsibility to formulate and implement Quality Assurance practices that focus on ensuring quality requirements can be met before the Work is performed.
 - 1.5.1.1.A. Demonstrate relevant experience, including minimum of five years' documented history of successfully managing comparable period masonry projects before the Contractor will be deemed eligible to Bid and then Work on the project.
 - 1.5.1.1.B. Employ adequate numbers of skilled Workmen trained to install and Work with the specified materials.

1.5.2. Quality Control

- 1.5.2.1. Contractor management shall form and implement proactive Quality Control practices that focus on ensuring quality requirements are met during performance of the Work.
 - 1.5.2.1.A. Implementation of Quality Controls shall conform with other project management objectives: deliver Work in accordance with the Contract Documents, applicable codes, regulations, and governing authorities.
- 1.5.2.2. Conform to applicable provisions of Section 01 40 00 – Contractor Quality Control; supplemented by the following minimum requirements.
 - 1.5.2.2.A. Take appropriate precautions to avoid harm to building occupants, pedestrians and nearby property.
 - 1.5.2.2.A.i. Temporarily cordon off active Work areas to prevent public entry.

- 1.5.2.2.A.ii. Employ warning signage.
- 1.5.2.2.A.iii. Train Workers to politely but firmly warn others away from Work area.
- 1.5.2.2.A.iv. Terminate Work at times when wind drift may expose passersby to risk, or cause damage to vehicles and adjacent property.
- 1.5.2.2.B. Protect adjacent site and building areas, surfaces, materials, and assemblies not scheduled for treatment under this Section, avoiding chemical, mechanical impact, and other damage resulting from delivery of this Work.

1.6. SUBMITTALS

1.6.1. Related Section 01 33 00 – Submittal Procedures shall govern Work of this Section.

1.6.1.1. Submittal Procedures obligate Contractor to submit certifications, shop drawings, product data, material samples, and mockups to the design team for review and approval, to verify that the contractor's understanding and planned execution of the design complies with due regard for specified materials, methods, and the Designer's intentions, for approval by Architect.

1.6.2. Submittals

1.6.2.1. Contractor's (written and illustrated) Work Plan shall include intended sub-division of Work into manageable Sections identifying estimated dates of delivery, estimated schedule of accumulating payment values, and other administrative items.

1.6.2.2. Copies of Qualification Certificates evidencing each field supervisor and Worker has successfully completed relevant training programs, evidencing demonstrated ability to properly install the specified materials.

1.6.2.3. Contractor's Request for Payment shall be accompanied by copies of related purchase orders, shipping tickets, receipts, materials tracking cards, etc. as evidence that the specified materials for the Work of this Section were ordered, received, and stored at the job site, annotated with date related items were incorporated into the Work.

1.6.2.3.A. Falsified certification will be interpreted as fraud and will be prosecuted accordingly.

1.6.2.4. Permit accepting offsite legal disposal of waste rinse water and other construction debris.

1.6.2.5. Product Data: Manufacturer's specifications and information about materials, products, and systems.

1.6.2.6. Samples: Physical examples of materials, finishes, or colors submitted for Owner approval before installation.

1.6.2.7. Material Safety Data Sheets (MSDS) Material manufacturer's written instructions confirming that the Contractor has received instructions for the proper handling of the specified materials.

1.6.2.8. Shop Drawings: Detailed drawings showing how specific project elements will be fabricated and installed, when noted as a project requirement; for Architect approval.

1.6.2.8.A. Scaffolding

1.6.2.8.B. Safety plan including barrier placement for mobile hoist operations.

1.6.2.8.C. Rinse Water Effluent Containment System

1.7. DELIVERY, STORAGE, HANDLING

1.7.1. Deliver the product in original factory packaging with product listing label and manufacturing label.

1.7.1.1. Comply with the Manufacturer's written specifications and recommendations.

1.7.1.2. Handle and store all products with appropriate precautions as outlined in the Manufacturer's product literature and Material Safety Data Sheets (MSDS).

1.7.1.3. Organize material inventory storage to clearly distinguish between different material formulations and any differences with respect to areas of intended application; organized to prevent damage and deterioration.p[

2. PART 2 – PRODUCTS

2.1. DESIGN STANDARD MATERIALS

2.1.1. JAHN Mineral-Based Injection Grouts

- 2.1.1.1. JAHN M30 Hairline Crack Injection Grout
Cathedral Stone Products' Injection Grout for repair of hairline cracks up to 3/16" / 5.0 mm width: Premixed cementitious injection grout containing no corrosive constituents; achieves extraordinary flow capacity, high penetration, and strong adhesion.
- 2.1.1.2. JAHN M35 Crack and Void Injection Grout
For cracks or voids approximately 1/8" / 3.0 mm or greater in width: Premixed cementitious injection grout that contains a small amount of synthetic materials to enhance flow, penetration and bonding; activated on site by mixing clean water with dry grout, curing to produce vapor permeable, frost and salt resistant, shrink resistant, and is physically compatible consolidation of concrete and masonry substrates.
- 2.1.1.3. JAHN M40 Crack and Void Injection Grout
For cracks approximately 3/16" to 3/8" / 5.0 mm to 10.0 mm wide: Premixed cementitious injection grout that contains NO acrylic, latex, or other synthetic polymer bonding agents or additives; activated on site by mixing clean water into dry cementitious grout, curing to produce vapor permeable, frost and salt resistant, shrink resistant, and physically compatible consolidation of concrete and masonry substrates.

2.1.2. Materials are available through:
Cathedral Stone Products, Inc.
7266 Park Circle Drive
Hanover, MD 21076
Telephone (410) 782-9150
Fax: (410) 782-9155
Email info@cathedralstone.com
Order online: cathedralstone.com

2.2. ACCESSORIES

2.2.1. Other Materials

- 2.2.1.1. Clean potable water and hose.
- 2.2.1.2. Heavy duty packaging tape, clear
- 2.2.1.3. Painter's canvas, drop cloth
- 2.2.1.4. Polyethylene sheeting, 6-mil thickness, heavy duty, clear or black.

2.2.2. Personnel Protection

- 2.2.2.1. Eye and skin protection
- 2.2.2.2. Rubber gloves

2.2.3. Equipment

2.2.3.1. Standard Pressure Washers (Clean up)

- 2.2.3.1.A. Controllable pressure, 600 psi minimum to no greater than 1200 psi at tip.
- 2.2.3.1.B. Fan Tip size 0.19-inch diameter or larger, with chemical resistant packings.

2.2.4. Provide other equipment and materials not specifically described but required for a complete and proper installation, selected by the Contractor, subject to the approval of the Architect.

3. PART 3 - EXECUTION

3.1. OBSERVERS

3.1.1. Architect will periodically observe progress of the Work and issue timely supplemental instructions, answers to questions, and approvals as needed; facilitating the orderly and efficient delivery of the Work by the Contractor.

- 3.1.1.1. Contractor shall allow qualified observers access to and assisted use of lift devices and scaffolding, as needed, to monitor progress and review completed Work.

3.2. SITE CONDITIONS

3.2.1. Cold Weather Requirements: Do not perform specified work in air temperatures below 40° F, if substrate temperature is below 40° F, or if conditions are to be such within a 24-hour period.

3.2.2. Hot Weather Requirements: Do not install material in temperatures exceeding 90° F. When needed, protect work area from direct sunlight, to prevent repair from drying out prematurely.

3.2.3. Examine the areas and conditions under which Work of this Section will be performed to establish extent of Work, adequacy of access, and extent to which protection will be needed by adjacent improvements.

3.2.4. Inspect existing conditions considering the Work and confirm that conditions in the field conform to information provided in these Contract Documents.

- 3.2.4.1. If conditions are not as expected, notify the Architect immediately seeking supplemental instructions.

- 3.2.4.2. Do not proceed with Work until unsatisfactory conditions are corrected or acceptable supplemental instructions are issued by Architect.

3.3. PERSONNEL AND PUBLIC SAFETY

- 3.3.1. Contractor shall provide for the safety of his Workers and for the public at all times.
- 3.3.2. Erect temporary protective covers over walkways and at points where pedestrian and vehicular entrance and exit that must remain in service during course of Work.
- 3.3.3. Specified materials are not intended for internal consumption and shall be kept out of reach of children and animals.

3.4. PROPERTY PROTECTION

- 3.4.1. Protect public and private property, including motor vehicles, adjacent surfaces of building, mechanical equipment, building site, plants, and other properties from harm resulting from Work.
- 3.4.2. Cover or otherwise protect adjacent areas from grout material contact when area is not scheduled for treatment under this Section.
 - 3.4.2.1. Heavy-duty plastic (polyethylene) sheets often provide adequate protection from material risks of this type.
 - 3.4.2.2. Special care shall be paid to placement and sealing protective sheeting applied to windows and glass, concrete mosaic tile ornamentation, and historic materials not scheduled for Work under this Section.
 - 3.4.2.3. Cost of repair and restoration of adjacent surfaces, materials, and assemblies damaged by the Work of this Section shall be borne by the Contractor with no added cost to the Owner.
 - 3.4.2.3.A. Remediation Work to correct collateral damage shall be performed by tradesmen skilled that that type of work.

3.5. MATERIAL HANDLING

- 3.5.1. General Requirements
 - 3.5.1.1. Read and consider the Safety Data Sheet for important health/safety information.
 - 3.5.1.2. Industry practices suggest that it would be prudent to wear safety goggles, gloves, and a dust mask when handling these products.
 - 3.5.1.3. Complete preparations for grouting, including ports and cleaning, before mixing.
 - 3.5.1.4. Add clean water to dry grout and mix as prescribed.
 - 3.5.1.5. Mixed grout has approximately 30-minute pot life and cannot be retempered.
 - 3.5.1.6. Prepare only so much grout as can be injected within 30 minutes.
 - 3.5.1.7. Discard mixed grout that has hardened or been unused for 30 minutes or more.
 - 3.5.1.8. Only use these materials for approved applications.
 - 3.5.1.9. Never add bonding agents, accelerators, or retarders to the grout materials.
 - 3.5.1.10. Never allow these materials to freeze.
 - 3.5.1.11. Test surface temperatures before commencing grouting; confirming substrate surface temperature between 40° F and 95° F (5° C to 32° C).

- 3.5.1.12. Discarded grout shall be placed in clearly labeled containers identifying content as unusable; segregated from useable material stock, it shall be removed from staging area as soon as practical.

3.6. SUBSTRATE PREPARATION

- 3.6.1. Transverse Cracks aligned across the face of masonry units, drill a series of injection ports in the center of the crack, sloped downward into masonry.
 - 3.6.1.1. Between these ports, seal the crack; either temporarily with removable, non-staining clay; or permanently with JAHN Repair Mortar.
- 3.6.2. Lateral Cracks (Delaminating Layers) or Voids, drill a series of injection ports located to form a square “drill frame” on the surface, with ports drilled in a downward sloping direction.
- 3.6.3. For larger, open voids, drill an access port hole large enough for a hose or funnel.
- 3.6.4. After completing port drilling, wash with hose and clean water flushing the interior of the crack-void system to remove all dust, or loose or deleterious material that could prevent proper grout flow and/or compromising the adhesion between injected grout and substrate interior.
 - 3.6.4.1. Assuming some time will pass between port preparation and grout injection operations, re-wet prepared substrates as needed to ensure substrate materials are damp when grout injection operations commence; using clean water, sprayed by hose or low-pressure tank.

3.7. MIXING

- 3.7.1. JAHN M30 Cementitious Injection Grout
 - 3.7.1.1. ADD clean water to mineral-based powder, mixing mechanically until homogenous; using a high-speed drill (3,000 RPM or higher) equipped with a Jiffler-type mixing paddle. Mixing 3000+ RPM is crucial to achieve homogenous mix.
 - 3.7.1.1.A. Remix as needed to maintain liquidity
- 3.7.2. JAHN M35 Cementitious Injection Grout
 - 3.7.2.1. ADD clean water to mineral-based powder, mixing until homogenous, either manually or mechanically with a slow speed drill (400-600 RPM) equipped with a Jiffler-type mixing paddle.
 - 3.7.2.1.A. Remix as needed to maintain liquidity.
- 3.7.3. JAHN M40 Cementitious Injection Grout
 - 3.7.3.1. ADD clean water to mineral-based powder until homogenous, either manually or mechanically with a slow speed drill (400-600 RPM) equipped with a Jiffler-type mixing paddle.
 - 3.7.3.1.A. Remix as needed to maintain liquidity

3.8. INJECTION

- 3.8.1. Provide sufficient manpower to perform the various stages of the Work and monitor its progress, record and confirm that appropriate treatment protocol will be used.
 - 3.8.2. Substrate repairs performed under other Sections shall have achieved initial set prior to commencing these operations.
 - 3.8.3. Transverse Cracks
 - 3.8.3.1. Inject grout into lowest port and continue until it flows freely back out from this port and other ports at the same level.
 - 3.8.3.2. Seal ports using non-staining clay or JAHN Mortar, and proceed in identical fashion at next higher open ports, repeating steps until the crack is filled.
 - 3.8.3.3. Clean up overflow immediately.
 - 3.8.4. Lateral Cracks (Delaminating Layers) or Voids
 - 3.8.4.1. The order of injection is lower left, lower right, upper left, then upper right.
 - 3.8.4.2. Inject grout into lower left port and proceed until it flows back out freely from this and other ports at the same level.
 - 3.8.4.3. Seal ports using non-staining clay or JAHN Mortar.
 - 3.8.4.4. Inject grout into lower right port and proceed in identical fashion.
 - 3.8.4.5. Clean up overflow immediately.
 - 3.8.5. LARGER VOIDS
 - 3.8.5.1. Insert a hose or funnel into the pre-drilled port hole. Pour Injection Grout into hose or funnel until and proceed until it flows back out freely from this and other ports at the same level.
 - 3.8.5.2. Because of internal pressure typical in larger voids, work in horizontal lifts.
 - 3.8.5.3. Clean up overflow immediately.
 - 3.8.6. When injection is wholly or partially resisted, free blockage and resume grout injection until port is full and grout flows freely from other ports at the same level.
 - 3.8.7. Finishing
 - 3.8.8. Remove plugs after 24 to 48 hours and permanently repair the ports and the crack surface, if not previously performed, using an appropriate Jahn Mortar to match color and type of existing masonry.
- 3.9. CLEAN UP
- 3.9.1. Remove uncured mortar from substrate before it dries using clean water and a rubber sponge. Cured mortar may only be removed chemically or mechanically. Remove uncured mortar from tools and equipment with water as soon as possible. Cured material may only be removed chemically or mechanically.
- 3.10. CORRECT UNACCEPTABLE WORK

- 3.10.1. Remediate unacceptable repairs when Architect determines that the quality of the finished Work has been degraded by inappropriate installation techniques.
- 3.10.2. Submit written remediation plan detailing methods and materials to be employed when addressing unacceptable Work; for Architect's review and approval.

3.11. JOB SITE CLEANING

- 3.11.1. As the Work progresses, remove construction debris and discarded packaging, rubbish, cans, sponges, and rags at the end of each Workday.
- 3.11.2. Upon completion of Work, remove all construction debris, including scaffolding, temporary construction, material overage, containers and product packaging, and selectively demolished building materials; and dispose legally off-site at Contractor's expense.

END OF SECTION 05/20/2025

**Cathedral Stone Products
Technical Support
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