

**MANUFACTURER'S SPECIFICATIONS
SECTION 04925 – GROUT INJECTION**

ST. ASTIER NATURAL HYDRAULIC LIME

PART I - GENERAL

1.1 General

- A. This is a manufacturer's short form specification. Contact Lime Works.US for additional information.

1.2 Materials

- A. Ingredients for injectable grout shall be natural hydraulic lime, sand , admixtures, and water, as required to fulfill project objectives. Mix formulations shall be developed for the specific combination of materials present, taking into account material absorption, void size, and structural requirement.
- B. All grout materials, including sand, admixtures, and water, shall be non-chloride and non-corrosive.
- C. Material is to be stored in a covered location, protected from environmental moisture.

1.3 Grout Performance Criteria

- A. Grout mixed according to the proportions and mix procedures determined by the injection engineer shall have demonstrated properties suitable for masonry injection.
- B. The contractor shall provide all necessary equipment for completing grout injection, including mixers, pumps, and quality control equipment.

1.4 Qualifications

- A. Qualification data shall be submitted 14 days prior to start of injection grouting operations.

- B. Injection grouting of masonry walls is a specialized technique. The applicator for this work shall have a minimum of three years successful experiences with projects of similar scope and size using the techniques described herein.

PART 2 - PRODUCTS

- 2.1 Acceptable Manufacturer: Lime Works.US products: St. Astier Natural Hydraulic Lime.
- 2.2 Material: St. Astier Natural Hydraulic Lime.

PART 3 - EXECUTION

- 3.1 Pre-Injection Evaluation
 - A. A visual assessment of masonry material condition should be conducted [and throughout each area to be injected, mapping the extent and size of any visible surface cracks, mortar blockages, mortar joint delaminations, cracked or spalled units, or other visible surface damage which may have an effect on grout confinement or the injection process itself.] [Note any situations requiring special treatment before grout injection, such as wall penetrations, expansion joints, flashing, weepholes, and parapets.]
- 3.2 Preparation
 - A. Surface Repairs
 - 1. Do not allow grout to flow into existing expansion joints. Seal around all wall penetrations (including electrical outlets, watercocks, doors, windows, etc.), flashing, and beam seats to prevent leakage such that all grout will be contained within the wall.
 - 2. Masonry walls containing significant interior voids such as empty or partially empty collar joints must have sufficient connection between wythes to resist injection pressure. Deficient areas shall be strengthened by installation of remedial dry-fix wall ties at a spacing not to exceed one tie equivalent per 2 square feet of wall area.
 - B. Injection Holes

1. Injection holes are to be drilled in the mortar joints. Holes for collar joint injection must be drilled through the exterior wythe to intercept the collar joint but not into the backup wythe. The diameter and spacing of injection holes shall be determined during the initial site investigation, but in no case should the hole diameter exceed inch nor the hole spacing exceed 16 inches vertical spacing and 48inches horizontal spacing.

3.3 Grout Mixing

- A. Mix all grout materials according to supplier's recommendations. Monitor flow times of grout using appropriate quality control procedures to verify proper formulation and mixing.

3.4 Grout Injection

- A. Grout injection will proceed within specific repair areas, delineated horizontally by control joints, corners, or returns, and vertically by story levels or flashing locations.

B. Water Flushing

1. Flush all injection holes within the designated repair area with water before grout injection. [When operating outside in hot weather conditions, with temperatures greater than 90 F, additional water should be sprayed into each injection hole to cool and partially saturate the masonry.]
2. During the flushing procedure, check that water flows freely into each injection hole. If a hole is partially or totally blocked, drill a new injection hole approximately 4-inches (along the same row) to each side of the blocked hole. Do not allow pressure buildup in excess of 10 psi during flushing.
3. Immediately prior to grout injection (within 10 minutes) spray the masonry surface lightly with water, if necessary, to prevent grout adhesion. Keep a water hose and brush on hand during injection for cleaning any grout spills from the masonry surface.

C. Grout Injection

1. Injection shall proceed from the base of the repair area to the top, moving first across the wall horizontally and then upward, in lifts of 5 feet or less.

2. Injection begins at the lower-most injection hole at one edge of the injection area. Holes must be plugged when grout flows from them. A small quantity of standing water may be present at the base course from the flushing procedure; do not plug holes along the base course until un-diluted grout flows from each hole.
3. Allow in-place grout to stiffen before proceeding to the next lift. Proceed with injection of the next lift as described above until all holes in the designated repair area have either been injected or plugged.

3.5 Wall Cleanup

- A. Surface cleaning shall be conducted during injection by immediately flushing any grout from the masonry surface with water. Immediately following completion of the injection process, remove any remaining surface stains using water and a stiff, non-metallic bristle brush.
- B. Allow grout to stiffen but not set before removing dowels from injection holes. All injection holes left in mortar joints must be repointed. The injection hole should be flushed with water and should be wet, but not saturated, prior to repointing. Point a mortar similar in color and composition to the original mortar firmly into injection holes and tool to match the surrounding mortar.

3.6 Quality Verification

- A. [Nondestructive verification of grout penetration shall be conducted by a qualified engineer. Verification shall consist of pulse-echo, infrared thermography, or through-wall pulse velocity nondestructive measurements conducted throughout the injected area. The number and location of such tests shall be determined by a random statistical process based upon a required confidence level of 80 percent or as dictated by the injection engineer.]
- B. [At each specified verification area the presence of grout shall be determined using nondestructive measurements. Such measurements shall be taken on a grid pattern with maximum spacing of not more than 8 inches.]
- C. Nondestructive measurements shall confirm the presence of grout in the wall and adhesion of grout to existing masonry. Locations where grout is not present over an area greater than four inches square shall be re-injected.

3.7 Schedules

END OF SECTION