

MANUFACTURER'S SPECIFICATIONS
Section 04900– MASONRY REPOINTING AND RECONSTRUCTION

ST. ASTIER NATURAL HYDRAULIC LIME MORTAR

PART 1 – GENERAL

1.1 Summary

A. Section Includes

1. [Removal of joint sealant in all exterior masonry joints.]
2. [Removal of all prior Portland cement replacement mortar, including pointing and reconstruction.]
3. [Careful salvaging and cleaning of historic materials.]
4. Raking out of all unsound mortar from all exterior stone and brick joints.
5. Removal of mortar excess from [brick] and [stone] faces.
6. Repointing of all exterior stone and brick joints.

1.2 References

A. American Society for Testing and Materials

1. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM C141 – Standard Specification for Hydraulic Lime for Structural Purposes.
3. ASTM C144 – Standard Specification - Aggregate for Masonry Mortar.

B. European Standard

1. EN 459-1 Building Lime – Part 1: Definitions, Specifications and Conformity Criteria
2. EN 459-2 Building Lime – Part 2: Test Methods
3. EN 459-3 Building Lime – Part 3: Conformity Evaluation

1.3 Submittals

A. Product Data:

1. Natural Hydraulic Lime: Product Data Sheets.
2. Aggregate: Sieve Analysis

B. Samples

1. Submit one cup (8 oz.) sample of aggregate.
2. Submit 4" x 4" x _" dried mortar sample.

1.4 Quality Assurance

- A. Installer: Work must be performed by a firm having not less than 5 years successful experience in comparable masonry restoration projects and employing personnel skilled in the restoration process and operations indicated.

B. Masons:

1. [Raking, repointing, removal, material salvage, and finishing operations shall be performed by craftspersons who are familiar with historic lime mortar formulations, curing conditions and performance characteristics. Contractor shall provide proof of such knowledge.]
2. [Only skilled journeymen masons who are familiar and experienced with the materials and methods specified and are familiar with the design requirements shall be used for masonry restoration.]

1.5 Qualifications

- A. Manufacturer: All St. Astier NHL shall be obtained from:
Lime Works.US
PO Box 151
Milford Square, PA 18935-0151
215-536-6706
215-536-2281 Fax
www.limeworks.us
begreen@limeworks.us

or its authorized distributors.

1.6 Mock-up

- A. Construct mock-ups of the following:
1. Repair and replacement of brick bond courses with shallow (up to 1 -1/2" deep) repointing or deep (exceeding 1 -1/2" or multiple lifts) repointing.
 2. Retain approved mock-ups in undisturbed condition, suitable identified, during restoration as a standard for judging

- completed work.
- B. Approvals
 - 1. [Approved samples and mock-ups shall remain as part of a permanent work.]
 - 2. Obtain approval of raking out and surface preparation before finishing joints.

1.7 Delivery, Storage and Handling

- A. Deliver materials to site and store in manufacturer's original unopened containers and packaging.
- B. Protect restoration materials during storage and construction from adverse conditions.

1.8 Project Conditions

- A. Do not perform any masonry application unless air temperatures are between 40 degrees Fahrenheit and 85 degrees Fahrenheit and will remain so for at least 48 hours after completion of work or provide proper protection.
- B. Provide sun, wind and rain protection.

PART 2 – PRODUCTS

2.1 Mortar Materials

- A. Manufacturer: All St. Astier NHL shall be obtained from:
Lime Works. US
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Milford Square, PA 18935-0151
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2.2 Components

- A. Mortar Materials
 - 1. Binder: St. Astier Natural Hydraulic Lime NHL [2] [3.5] [5].
 - 2. Aggregate: Natural or Manufactured Sharp Sand with at

least 4 grades forming a substantial part of the sand and no more than 3% of particles smaller than grade #200 (0.075mm).

3. [Casein for Lime Mortar Grouts: Casein powder additive; American Casein Company, Burlington, New Jersey, USA.]
4. [Premix: [Ecomortar G] [Ecomortar F] [Ecologic G] [Ecologic F].]

2.3 Tools and Accessories

- A. [Shims: Hard Plastic; removable; size and shape as required for temporary support of stone.]
- B. [Chisels: Carbide-tipped stone carving chisels.
 1. Hand Chisels
 2. Barre _" type B short stroke pneumatic carving tool.]
- C. [Pointing Irons: Width slightly less than joint width. Various widths required to suit project conditions.]
- D. Brushes of various sizes for cleaning raked-out joints.
- E. Garden sprayer, water hose, and shop-type vacuum for cleaning raked-out joints.
- F. Hand water mister bottle and garden sprayer for curing, cleaning, and finishing pointed joints.
- G. [Grinders:
 1. Blade width limited to 1/16" .
 2. Equip grinders with source extraction vacuum units to contain dust]
- H. [Mortar Injectors: For full-depth pointing, if Contractor so elects, Contractor will be permitted to use powered injection equipment of suitable design, providing that Contractor demonstrates that joints can be completely filled and compacted to the same degree as accomplished by hand placement of mortar by conventional methods. Where mortar injectors are employed, the final 5/8" shall be placed by hand.]
- I. Mixing Equipment: Standard paddle mixer for mixing mortar.

J. Other tools as necessary for the Work.

2.4 Mortar Mixes

A. NHL [2] [3.5] [5] Mix Design

1. 1 part NHL [2] [3.5] [5] and [1.5] [2] [2.5] [3] parts of sand, proportioned by volume. Mortar should be mixed for at least 10 minutes. Greater workability and better mortar performance is achieved with less water and longer mixing. (Mortars can be left to stand and fatten up for up to 1-3 hours depending on the mix; and tempered before use.) Mortar can be reworked for up to 8 hours after mixing.
2. [Premix: [Ecomortar G] [Ecomortar F] [Ecologic G] [Ecologic F].]

B. Casein Lime Grout:

1. Mix NHL Mortar as described in 2.4 A.1.
2. [Add 1% by weight casein powder until desired consistency.]

PART 3 – EXECUTION

3.1 Examination

- A. Examine conditions, with installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.
- B. Do not proceed until unsatisfactory conditions have been corrected.
- C. Before removing any deteriorated work, establish bonding patterns, levels, and coursings.

3.2 Protection

- A. Prevent repointing mortar from staining the face of masonry or other surfaces to be left exposed. Remove repointing mortar that comes in contact with such surfaces.
- B. Cover partially completed work when work is not in progress.
- C. Protect sills, ledges and projections from droppings.

3.03 Temporary Support

- A. Provide temporary support where necessary to prevent displacement of stone during repointing and until mortar has achieved sufficient strength.

3.04 Removing Anchors

- A. [Remove and discard anchors, nails, pins, and similar devices.]
- B. [Remove ferrous material completely. Do not allow portions to remain embedded.]
- C. Point hole with mortar.

3.05 [Removing Joint Sealant from Joints

- A. Cut out joint sealant with a caulking cutter (Fein tool) assisted by hand tools.
- B. Trim joint sealant from joint faces.
- C. Grind remaining sealant from joint faces without appreciably widening joint width or altering appearance of units. Leave edges of units square and perpendicular to exposed face of unit. Do not round off edges of units.
- D. Vigorously scrub joint faces with a stiff brush to remove embedded dust and debris from joint faces, followed by vacuuming, working from top to bottom of wall.
- E. Remove existing underlying mortar to the depth specified prior to repointing.]

3.06 Removing Existing Mortar

- A. [Existing horizontal mortar joints (bed joints) that are pointed with a Portland cement mortar may be raked out by a skilled mason by carefully scoring the center of the mortar joint with a rotary grinder to relieve the stress on the joint. The remaining mortar in head and bed joints shall be removed to the required depth using hard or pneumatic stone carving chisels or by hand. Do not grind the mortar from the face of the joints.]
- B. [Vertical joints (head joints) shall not be raked out using a grinder.

All vertical head joints must be removed by hand in brickwork.]

- C. [All joints shall be raked back to sound, solid, back up material. Raking out shall leave a clean, square face at the back of the joint to provide for maximum contact of pointing mortar with the masonry back up mortar. Shallow or feather edging will not be permitted.]
- D. [Existing historic lime-based mortar shall be removed using only small-headed hand or pneumatic stone carving chisels that are no wider than half the width of the existing masonry joints.]
- E. [Do not widen the existing masonry joints. Do not spall or chip the surrounding masonry edges in the process of mortar removal. Damage to surrounding brick or stone resulting from rotary blade over running shall not be permitted. Contractor shall replace brick or stone damaged during mortar removal with replacement units that match the original as determined by the Architect.]
- F. Brush joint faces and vacuum debris from joint to remove dirt and loose debris, working from top to bottom of wall.

3.07 Mortar Removal Depth

- A. Existing mortar joints shall be raked out to a whichever depth is greatest:
 - 1. [5/8 inch.]
 - 2. [2-1/2 times the width of the existing mortar joint.]
 - 3. [The depth necessary to remove previously pointed Portland cement mortar.]
 - 4. [Until bonded, cohesive existing lime mortar is encountered.]

3.08 Full Depth Pointing

- A. Provide temporary support where necessary to prevent displacement of brick or stone during repointing and until mortar has achieved sufficient strength.
- B. Where required to maintain support of units, rake out and repoint each unit in stages, allowing freshly repointed portions to cure sufficiently before raking out and repointing remaining portion of joints supporting the unit.
- C. Remove temporary shims and supports when no longer necessary, and repoint voids left by temporary shims and supports.

3.09 Prewetting

- A. Brush joint faces and flush out joints with water to remove dirt and loose debris, working from top to bottom of wall. Rinse stone joints with water to remove dust and mortar particles. Thoroughly wet wall below to avoid soiling. Joint surfaces should be damp but free from standing water.
- B. Prior wetting is necessary to achieve the proper absorption rate before masonry repair commences and is essential to good masonry practice. Presoak walls and joints with water as required by project and weather conditions. During hot or windy weather, wet walls and joints several times in advance of pointing. Re-wet walls and joints yet to be pointed if masonry dries out before pointing. Masonry units shall be damp but without standing water at the time of pointing.
- C. Maintain hand mister bottles or a garden sprayer with clean, clear, potable water immediately available to masons at all times during the repointing process. A very low pressure spray (garden hose with nozzle adjusted to a fine, low-volume mist) may be used over large areas providing erosion of joints is prevented.
- D. Exposed surface of masonry adjacent to joint shall be wet prior to repointing.

3.10 Repointing of Mortar Joints

- A. Joints shall be pointed in layers or "lifts" where the joints are deeper than 3/4 inch.
 - 1. Joints greater than 3/4 inches deep shall be pointed with an initial lift to bring the joint depth to a uniform 3/4 inches deep.
 - 2. Compact each layer at the time it is placed in the joint by applying firm pressure with the pointing tool.
 - 3. Allow each lift to become thumbprint hard before applying the next lift.
- B. Finish joints uniformly. Do not overwork. Leave the surface of the masonry clean.

3.11 [Grouting with Casein Lime Mortar

- A. Control of absorption rate is critical for flowing material. Thoroughly pre-wet cavity with water.
- B. Casein mortar can be injected with a grout pump or poured in place as project conditions permit.

- C. Form a dam with either pointing mortar at the face of the joint or cavity, or use a backer rod to be removed after the casein mortar firms up. Insure that area of grout is contained.
- D. Inject or pour mortar and, if backer rod used, remove backer rod when mortar is firm. Proceed with repointing if necessary.]

3.12 Cleaning

- A. Maintain clean surfaces on the face, sills, ledges, and projections of masonry on a daily basis.
- B. With a trowel, strike off minor dabs of adherent mortar from face of masonry.
- C. Remove minor mortar marks from masonry by misting with water and brushing with a small, stiff-bristle brush.

3.13 Curing

- A. Keep mortar from drying out too quickly.
- B. Mist walls with water as required by project and weather conditions to insure slow curing of the lime mortar.
- C. Shield from direct sun and drying winds for the first 48 hours after installation.

4.14 Schedules

END OF SECTION