MANUFACTURER'S SPECIFICATIONS
Section 041000– MORTARS FOR REPOINTING AND REPAIRS

PART 1 – GENERAL

1.1 Summary

A. Section includes:

1. All labor, materials, equipment and services necessary for supplying mortars for:
   a. Bedding brick mortar
   b. Repointing of brick joints.

B. Related Sections:

2. Division 04 Section "Repointing Brick Masonry" for procedures of repointing brick.

1.2 References

A. American Society for Testing and Materials (ASTM), 100 Barr Drive, West Conshohocken, PA 19428, (610) 832-9585 or FAX (610) 832-9555

1.3 Submittals

A. General: Submit the following in compliance with the requirements of the Contract Documents. Revise and resubmit each item as required to obtain [Architect] [Engineer] of Record's approval.

B. Materials Testing: Submit representative mortar samples to the Architect and to [Lancaster Lime Works] to obtain:

a. Sieve Analysis of the original sand.
b. Aggregate Void Space Ratio Test.
c. Determination of original binder.
d. Sample of the original sand, cleaned and separated into its sieve sizes.
e. Prescribed mortar formula for replacement, including ratios and pigments to match color.

C. Qualification Data: Qualification data for firm and personnel specified in "Quality Assurance" Article that demonstrates that both firm and personnel have capabilities and experience complying with requirements specified. For firm and foreman, provide a list of at least three completed projects similar in size and scope to the work required on this Project. For each project, list project name, address, Engineer/Architect, conservator, supervising preservation agency, scope of contractor's work, and other relevant information.

D. Product Data: submit product data to the Architect in accordance with the mortar formulation prescribed by Lancaster Lime Works, as follows:

1. Lime Putty Mortar, premixed: Product data sheets
2. Lime Putty Butter Joint Mortar, premixed: Product data sheets.
3. If premixed mortar is not used provide the following:
    a. Sieve Analysis or the aggregate showing weight retained, with results graphed
    b. Aggregate Void-Space Ratio for chosen aggregate
    c. Pigment: data sheet(s).
    d. If mixing a custom formula, submit method of mixing, including make and type of mixer, mixing time and method, mortar formula, and method of storage.

E. Samples
1. Submit one cup sample of aggregate.
2. Submit 4" x 4" x ½ " dried mortar sample, dated when sample was made.
3. Submit 16 oz. uncured sample of mixed mortar in sealed container, surface covered with water.
4. Prep and install a 2' x 2' mockup on the building for architects review. Insure the preparation of the joints is approved before installation of the mortar in the mockup.

F. Description of Work: Submit a detailed description of work, which shall include methods of safety and protection, mortar mixing/knocking-up, mortar storage, and mortar tinting etc.

1.4 Quality Assurance

A. It is required that work in this section is conducted by an experienced contractor.

B. Masonry Restoration Specialist: Work must be performed by a firm that:
1. Is regularly engaged in the preparation of lime mortars to match historic lime mortars and to repair historic masonry; and
2. Can demonstrate that, within the previous five years, it has successfully performed and completed in a timely manner at least three projects similar in scope and type to work required on this Project; and

3. Employs personnel skilled in the formulation and use of lime putty mortar and operations indicated.

C. Mortar mixing, installation, and handling shall be performed by persons who have been trained and certified by Lancaster Lime Works in historic lime mortar installation, curing conditions and methods, lime putty safety, and all performance characteristics. Familiar with the Installation Guide for Lime Mortar Products. Contractor shall provide proof of certification for each person employed to handle mortar.

D. Source of Materials
1. Obtain each type of material from a single source to ensure a match in quality, performance, and appearance.

2. Lime putty, lime putty mortar and lime putty butter joint mortar shall be obtained from:

Lancaster Lime Works
1251 Beaver Valley Pike
Willow Street, PA 17584
717.207.7014
www.lancasterlimeworks.com

or one of its authorized distributors.

E. Knowledge of Site and Project Conditions: Before submitting bid, Bidders shall make themselves thoroughly familiar with the Drawings and Specifications, with the scope of this Project, and with all conditions at the Project site relating to requirements of this Section and limitations under which the work will be performed and shall determine or verify dimensions and quantities. Submission of a bid shall be considered conclusive evidence that Contractor is thoroughly familiar with Project requirements and site conditions and limitations.

1.5 Project Conditions

A. Safety: Protect all persons, whether or not involved in the work of this Section, from harm caused by or resulting from work of this Section.
1. Use all means necessary to protect workers and other persons from contact with hazardous materials. Mix areas and work areas shall be sufficiently posted to warn the public and other personnel of the dangers of hazardous materials and shall be arranged to protect persons from splashing and dropping of hazardous materials.
2. Silica: Overexposure to respirable crystalline silica may lead to silicosis, which is a disabling, nonreversible, and sometimes fatal lung disease. Provide all

protections required to prevent workers from exposure to respirable crystalline silica.

3. Calcium Hydroxide: Lime putty is calcium hydroxide and water, and is very caustic to the skin. Provide all protections for skin and eyes for those mixing and handling lime putty and mortar. Fresh water for flushing of eyes shall be available at all times when mixing and installing mortar. White vinegar or equivalent mild acid shall be available for neutralizing spills.

B. Building protection: Protect areas below the work area to prevent staining or damage from falling or spilled mortar. Repair all materials and finishes damaged as a result of work of this Section to Architect's satisfaction at no additional cost to Owner.

C. Dedicated work area: A pre-arranged mixing and work area will be determined and, once mixing and installation is underway, these areas of the site are for contractor's personnel to use and control for the installation of the repointing. Mixing personnel will be held solely responsible for any migration of the mortar products away from the mixing area, including spills, rinse water, and splashing.

D. Any water used in the mixing of mortar or wall wetting shall be chlorine-, sediment-, and pollutant-free. Water used from municipal sources shall be filtered using a **double cartridge charcoal filter** or allowed to stand for 24 hours before use to allow chlorine to escape.

1.6 Environmental 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 14 days after completion of work. If at any time temperatures are not within this range for the installation (and 14 days after), provide protection by covering and heating (or cooling) the installation (force drying of mortar is not allowed). Temperatures and moisture levels must be monitored daily throughout the area of installation for the full 14 days.

B. Wet Weather: Do not apply or mix mortar on outside surfaces with standing water or outside if there is a chance of rain eroding the installed mortar from the building. Masonry receiving mortar should be thoroughly damp but not wet. Provide protection from rain for 72 hours after completion of work, or until surface has hardened sufficiently to repel rain.

C. Cold Weather: Cold weather construction is not allowed when surface temperature of masonry is below 40 degrees F., unless air temperature is expected to be predominately above 40 degrees over the next 14 days. (The properties of water

change below 39 degrees, which will impact working properties and curing, even above freezing.)

Damage Caused by Freezing: Lime Putty Mortar will be damaged by freezing after application and before initial curing (14 – 28 days depending on temperatures and humidity). Mortar shall not be installed during freezing temperatures. Installation of mortar shall be completed before all danger of frost. Repair all materials and finishes damaged as a result of freezing in this Section to Architect's satisfaction at no additional cost to Owner.

D. Hot Weather: Mixing should be done in the shade. Cover the mix in hot weather to reduce evaporation. Wherever possible, follow the sun rather than be followed by it throughout the day so that the fresh work shall be shielded from direct sunlight to reduce evaporation. Work shall not be done in full sun at temperatures over 80 F., unless shading is provided.

E. Relative humidity shall be monitored to prevent flash drying, which can occur in hot, dry conditions without occasional misting of installed mortar.

F. Wind: More rapid drying can occur at building corners. Hydration of corners must be attended to vigilantly, and some conditions require the corners to be protected from strong winds.

1.7 Deliveries, Storage and Handling

A. Deliver materials to site and store in manufacturer's original unopened containers and packaging bearing labels as to type and names of products and manufacturer, and which shall show grade, batch, and production data.

B. Deliver, store, and handle products and materials to prevent damage, dilution, deterioration, or degradation and intrusion of foreign materials. Protect lime products from frost (temperatures below 32 degrees Fahrenheit for more than 24 hours).

C. Persons handling lime products must be trained in lime safety and comply with all personal protective requirements of Section 1.8 and as recommended by manufacturer.

D. Storage and Protection: All materials must be protected from rainwater and ground moisture, and from staining or intermixture with earth or other types of materials.
   1. Sand:

      a. Maintain sand at constant moisture content.
      b. Cover pile when not in use.
      c. Arrange pile for free drainage.
      d. Do not use the bottom portion of the pile (wet or in contact with earth) in mortar.

e. At Contractor's option and with approval of the architect, use bagged, kiln-dried sand.

2. Lime Products:

Maintain products covered in water in their original lidded containers and protect containers from damage.

a. Do not use material from broken containers.

PART 2 – PRODUCTS

2.1 Mortar Materials

A. Manufacturer: All [lime mortar] [lime putty] [lime stucco] [limewash] products shall be obtained from:

Lancaster Lime Works
1630 Millersville Pike
Lancaster, PA 17603
717.207.7014
www.lancasterlimeworks.com

or its authorized distributors.

B. Prohibited Materials: the following materials are strictly prohibited in all mortar specified in this section:
1. Antifreeze compounds or any other admixtures.
2. Air entraining agents.
3. Type S hydrated lime, natural hydraulic lime, or any other lime product.
4. Portland cement of any type.
5. Any pigments or sands or aggregates not approved as submitted.

C. Components
1. Binder: Lancaster Lime Works Lime Putty or related products, as specified by the mortar analysis results and approved by the manufacturer and architect.
2. Aggregate: Natural (not manufactured) Sharp Sand that conforms to Lancaster Lime Works requirements for use in lime putty mortar.
3. Lancaster Lime Works Lime Putty Mortar: Repointing/Bedding Mortar and Fine Sand Butter Joint Mortar].
4. Pigments: pigments shall be alkali-stable and synthetic, and approved by the manufacturer for use with its products.
5. Clean, potable water: if transported or stored in a container, the container must not impart any chemicals to the water. Water used from municipal sources shall be filtered using a **double cartridge charcoal filter** or stand 24 hours in

open containers before use for wall wetting or mixing. Water shall not be added to pre-mixed mortar, except as recommended by the manufacturer.

2.2 Tools and Accessories

A. Mixing Equipment: Vertical shaft mixer, Imer or equivalent for knocking up multiple buckets at once, OR a beater attachment on a heavy duty drill for knocking up a single bucket at a time..

B. Other tools as necessary for the Work.

2.3 Mortar Mixes

A. Bedding and Pointing Mortar

1. 1 part Lime Putty and sand, proportioned by volume according to the results of the Aggregate Void Space Ratio test, with pigments as specified by the manufacturer. Mix as specified in "Mixing" Article.

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2. Premix: Bedding/Pointing Mortar and Fine Sand Butter Joint Mortar.

2.4 Mixing

A. All ingredients shall be measured by volume using pre-established uniform measure. Shovel measuring is not permitted.

B. Mix mortars in an approved vertical-shaft mixer, Imer or equivalent.

C. Begin by adding ½ the sand to a clean, dry mixer. Next, add the putty and the pre-wetted pigments prescribed in the mortar formula. Lastly, add the remaining sand.

D. When mixing lime putty mortar from putty and sand (not premixed from the factory) - it should be mixed for at least 20 minutes, and shall be mixed at least 5 days prior to installation. Place mixed mortar with no air pockets in plastic buckets or plastic barrels with four cups of water covering the top surface (to prevent premature carbonation) and lids. Greater workability and better mortar performance is achieved with less water added during mixing and with longer mixing times.

E. Re-mixing without adding water improves the workability of lime mortar. Mortar should be knocked-up, drill-mixed with an egg beater-style mix attachment, or re-mixed in the vertical shaft mixer for at least 3-5 minutes just prior to installation. Mortar that has stood in a pan or bucket for more than an hour should be re-mixed/knocked-up in this way to improve workability. Mortar so re-mixed, when "set" on a trowel, should stick to the trowel when turned upside down. Mortar can be re-worked indefinitely, without adding water, however in hot dry weather a

minimum of water can be added as long as the original water content is not increased. Mortar should be replaced into buckets and covered with water when not using.

END OF SECTION