



City of Phoenix
Historic Preservation Office

Masonry Repointing Procedures for Historic Buildings

Hiring a Mason:

All repointing work should be performed by a firm with not less than five years satisfactory experience performing masonry work, and at least three (3) prior projects performing repointing work on historic buildings or structures. Require the contractor to provide a list of completed projects, and written agreement to follow these specifications.

Project Conditions:

Do not repoint mortar joints or repair masonry unless air temperatures are between 40 to 80 degrees Fahrenheit and will remain so for at least 48 hours after completion of work.

Prevent mortar used in repointing and repair work from staining surface of surrounding masonry and other surfaces. Immediately remove mortar in contact with exposed masonry and other surfaces.

Protect sills, ledges and projections from mortar droppings.

Sequencing/Scheduling:

Perform masonry restoration in the following sequence:

1. Rake out existing mortar from joints indicated to be repointed. Remove mortar using hand tools only. Do NOT use electric or pneumatic chisels. Do not spall or chip masonry. Any damaged masonry must be repaired.
2. Clean joints with water rise with maximum 100-psi pressure. Masonry joint should be damp but without standing water.
3. Perform field test of new repointing work on masonry (a 3' x 3' area on the least visible masonry facade). Contact City Historic Preservation Office for approval of field test prior to continuing with work. This field visit should occur at least 72 hours after the field test is performed to ensure that the repointing areas have cured. See additional information below.
4. Repoint existing mortar joints for remainder of structure or building, or as specified by project. See additional information below.
5. Clean existing masonry surfaces after repointing work is completed. Clean mortar from masonry face promptly to prevent staining. After 24 hours of set time, scrub and wash surface to remove laitance. Do not use muriatic, hydrochloric or hydrofluoric acid for cleaning. Do not use wire brushes.

Mortar Materials:

CEMENT: ASTM C 150, Type II, white.

For stonework and other masonry indicated, provide non-staining white cement complying with staining requirement of ASTM C91 for not more than 0.03% water-soluble alkali.

HYDRATED LIME: ASTM C 207, Type S, high plasticity, (not air entrained).

AGGREGATE: ASTM C 144, unless otherwise indicated.

SAND: Use **natural** sand, clean, sound and washed. Provide sands that will produce final mortar color and texture to match the existing, and with aggregate type and grading similar to existing mortar. The color of the sand shall be the primary factor used to make mortars which match original.

WATER: Clean, free of oils, acids, alkalis and organic matter. No antifreeze compounds or other admixture shall be used.

Mortar Mixes:

MEASUREMENT AND MIXING: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel, use known measure. mix materials in a clean mechanical batch mixer.

MIXING POINTING MORTAR: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar of desired consistency is reached. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

ADMIXTURES: Do not use admixtures of any kind in mortar.

TOOLS: Use a pointing tool sized and shaped to the proper width for the joint being pointed.. Match the profile and tooling of the existing joints exactly. Apply mortar using wooden trowel to simulate the original mortar coating.

Mortar Proportions:

SPECIFICATIONS: NEW MORTAR MUST MATCH ORIGINAL IN COLOR, COMPOSITION, TEXTURE AND TOOLING. The original mortar should be carefully analyzed by a person trained in this field.

MIX PROPORTIONS BELOW ARE EXAMPLES ONLY AND MUST BE REVISED TO SUIT PROJECT REQUIREMENTS ONCE EXISTING MORTAR HAS BEEN ANALYZED.

THE FINAL MORTAR MIX SHALL HAVE NO MORE THAN 20% OF THE TOTAL VOLUME OF THE LIME AND PORTLAND CEMENT - COMBINED – OF PORTLAND CEMENT UNLESS TESTING OF HISTORIC MORTAR DEMONSTRATES A HIGHER PORTLAND CEMENT CONTENT.

RANGE OF ACCEPTABLE POINTING MORTAR:

1/10 part white Portland cement	TO	1 part white Portland cement
3 parts lime		4 parts lime
12 parts natural sand		15 parts natural sand
water		water

Test Sample:

Prepare one test sample at inconspicuous location. Test sample shall be approximately nine square feet in size, and let cure at least 72 hours. Protect test sample from dirt and moisture. Contact the City Historic Preservation Office to review the test sample once sample has cured, and only proceed with project once City Historic Preservation Office approval is obtained.



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Masonry Cleaning Procedures for Historic Buildings

Cleaning Materials and Products:

Water: Clean, free of oils, acids, alkalis and organic matter.

Brushes: Densely packed natural fiber bristle only.

Spray Equipment: Fan type nozzle with 15 to 40 degrees Fahrenheit fan range. Water pressure not to exceed 400-600 psi.

Detergent: Neutral pH non-ionic detergent or light bleach solution only.

Cleaning Existing Masonry, General

Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

Use only those cleaning methods indicated for each masonry material and location.

Perform cleaning method indicated in a manner, which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.

Removal of Plant Growth: Remove plant, moss, and shrub growth completely from masonry surfaces. Carefully remove plants, creepers and vegetation by cutting at roots and allowing to dry as long as possible prior to removal. Remove loose soil or debris from open masonry joints to whatever depth it occurs. Apply ammonium sulfamate or other acceptable root killing material to plant roots, in accordance with manufacturer's instructions. Do not apply materials to plants or vegetation to remain.

Water Application Method

Clean masonry surfaces using lowest water pressure possible to remove dirt and fungal growth, not to exceed 400 psi.

Rinse

Protect flashings, windows, doors and other vulnerable points from water penetration using appropriate pressure and angle of application.

Remove dirt, fungal growth and other discoloration using a natural bristle brush and neutral pH non-ionic detergent and/or bleach mixed to manufacturer's specifications.

Rinse surfaces thoroughly with clean water to insure that all chemicals have been removed.