Edison Coatings, Inc.

SPEC-JOINT 46

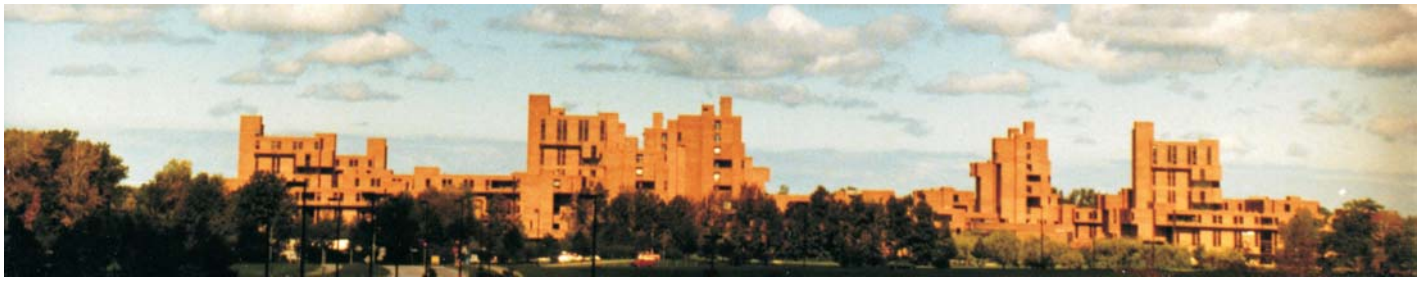
Custom Specification-Grade Masonry Mortars

Historic Mortar Replication

Repointing of the Historic Union Station in St. Louis was performed using a custom formulated Spec Joint 46 to match appearance and composition of the original 1896 mortar.

Custom-Matched Repointing Mortars

Custom matched mortars were produced to meet exacting project specifications for repointing of the Washington Monument in 2013.



Mortars for Compliance with Engineering Performance & Proportion Specifications

Over 1.5 million sq. ft. of repointing were completed at the State University of New York at Buffalo using ***Spec Joint 46*** Type N, Custom Color #963. Consistent results were achieved, even though work was performed over a three year period, by two different masonry contractors.

SPEC-JOINT 46

DESCRIPTION:

SPEC JOINT 46 *is a series of custom matched, prepackaged, cement-lime and lime mortars for use in new construction and restoration. Five of the available types (M, S, N, O, K) are formulated in accordance with ASTM C-270 specifications to provide consistent, reliable results in both performance and appearance. The sixth type (Type L) is an all-lime mortar formulated to comply with the guidelines in National Park Service Preservation Briefs #2 on Repointing Historic Masonry.*

TYPE	MIN. COMP. STRENGTH AT 28 DAYS, PSI (MPa)
M	2500 (17.2)
S	1800 (12.4)
N	750 (5.2)
O	350 (2.4)
K, L	High Lime Mortars

SPEC JOINT 46 *is simply mixed with water prior to use, and is applied in accordance with standard practices for use of masonry mortar.*

COVERAGE:

Each 50 pound bag of ***SPEC JOINT 46*** produces approximately ½ cubic foot of mortar. For repointing work, this will fill approximately 250 lin. ft. of 3/8" wide joints at ½ " depth.

WHY USE LIME IN MORTAR?

Lime-based mortars are designed for long-term durability and compatibility with masonry buildings and structures. They provide benefits not equaled by masonry cement or plasticized cement mortars.

Properly designed lime mortars:

- ❒ Bond tenaciously to masonry without added plasticizers or bonding agents
- ❒ Maintain high moisture vapor permeability, allowing masonry to "breathe"
- ❒ Relieve the stresses of expanding and contracting masonry units

HYDRATED LIME OR LIME PUTTY?

SPEC-JOINT 46 mortars utilize hydrated dolomitic lime meeting the requirements of ASTM C207 Type S, assuring that proper mortar performance is achieved. Type SA air-entraining lime or high calcium limes are also available when specified.

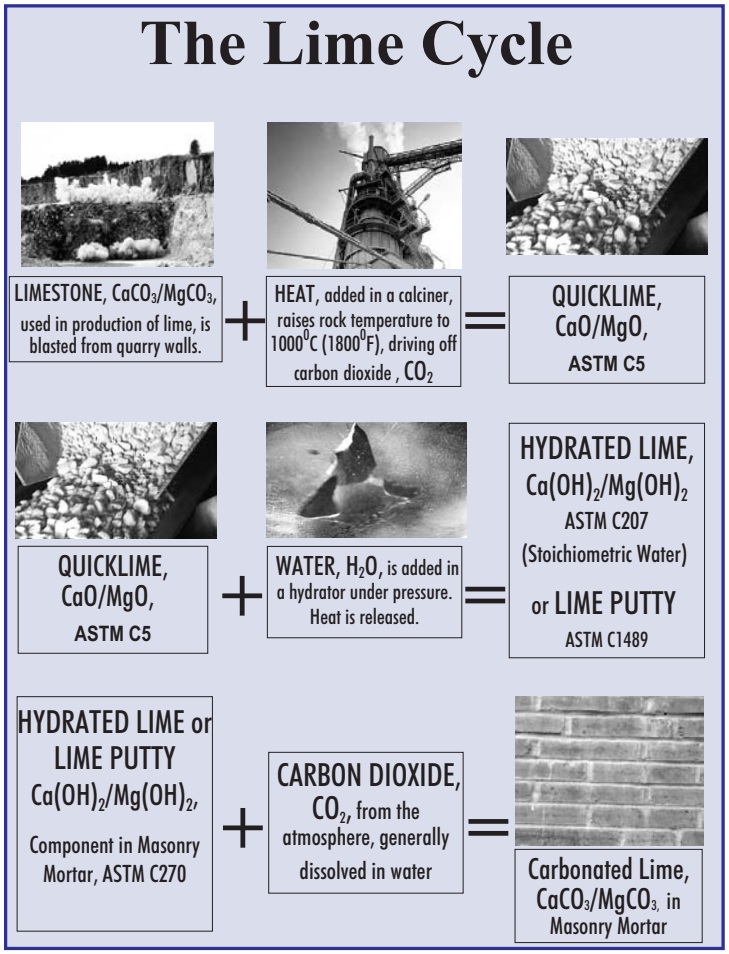
Today hydrated lime is efficiently and economically produced without the need for excess water, and ASTM C207 Type S lime does not require aging in putty form.

In the pre-industrial era, the machinery to produce hydrated lime was not readily available. Though hydrated lime was known to provide lower shrinkage and higher strength than lime putty, excess water was added as a convenience. Lime putty is hydrated lime with excess water. Dolomitic lime does not require aging in putty form to develop plasticity and water retention.

LP-20M ready-to-use lime putty masonry mortars are also available from Edison Coatings. They are particularly prized for their exceptional workability in decorative plaster work.

Hydrated lime can be used as the solitary binder in historic mortar, or can be blended with natural or portland cements to achieve mortars of different strengths for different uses. 19th Century mortars commonly incorporated natural cement rather than portland, and are available as Edison ***Rosendale 12M*** masonry mortars.

The Lime Cycle



MORTAR SELECTION:

The following is a general guide for selection of mortar for various applications. It is recommended that specifiers also consider building codes, engineering requirements, skill of the installer and type of masonry units to be used. See ASTM C-270, *Standard Specification for Mortar for Unit Masonry*, for further information.

LOCATION	Building Segment	Rec. Type	Rec. Alternate
Exterior, above grade	Load-bearing wall	N	S or M
	Non-load bearing wall	O*	N or S
	Parapet wall	N	N or S
Exterior, at or below grade	Foundation wall, retaining wall, manholes, sewers, pavements, walks, patios	S**	M or N
Interior	Load bearing wall	N	S or M
Exterior, Special Use	Historic***	N, O, K, or L****	N, O, K, L

MORTAR SELECTION NOTES:

*Type O mortar is recommended where masonry is unlikely to be frozen when saturated or unlikely to be subjected to high winds or other significant lateral loads. Type N or S should be used otherwise.

**Masonry exposed to weather in a nominally horizontal surface is extremely vulnerable to weathering. Select mortar with due caution.

***Provision is made within ASTM C270 for reproducing historic mortars which have performed satisfactorily, and for repointing with softer mortars than the original mortar type.

****Mortar selection for use in historic repointing is based on a number of competing criteria, including composition of the original mortar, the type of masonry units used, the skill of the installer and how well or poorly the original mortar has performed.

COMMENT: Modern cements are much stronger than the cements of the late 19th and early 20th Centuries, so mix proportion replication is not always advisable. Consult Edison Coatings for expert mortar selection assistance .

NOTE: This table does not provide for specialized mortar uses, such as chimneys, reinforced masonry, and acid resistant mortar.

APPLICATION

Masonry Repointing Guidelines

1. Joint Preparation

A. Remove old mortar to a depth of 2 to 2¼ times the width of the joint - typically ½ to 1 inch.

B. Remove additional mortar below this depth if loose or disintegrated.

C. Avoid damage to masonry units through use of proper tools and use of experienced, skilled workmen.

D. Rinse joints with clean water to remove dust and debris. Joints should be damp but free of standing water when filled. Pre-dampen extremely porous substrates for up to several hours, if necessary, to avoid rapid drying.

2. Mortar Preparation

A. Use only ***SPEC JOINT 46*** and water, unless otherwise instructed. Mix with clean water, free of oils. acids, alkali, salts, organic materials, or any other substance that may be deleterious to mortar or metal in the masonry assembly. Admixtures such as coloring pigments, air entraining agents, accelerators, retarders, water repellents, anti-freeze compounds and other admixtures should not be added to mortar unless specified and approved by Edison Coatings, Inc. Do not add cement, bonding agents, plasticizers or other materials unless specifically authorized.

B. Add approximately half the volume of mixing water required to a mechanical mortar mixer, and mix for 5 minutes. Add the remaining water, a little at a time, until the desired working consistency is reached. Total water may vary slightly from batch to batch, depending on weather conditions. Use only the amount of water required to produce the desired workability, in order to minimize shrinkage and facilitate placement.

C. Use all mixes within 30 minutes of final mixing, and discard unused portion at that time. Do not re-temper (Do not add more water).

3. Filling & Tooling Joints

A. Fill in 1/4 inch “lifts”. Start by filling deeper sections, compacting each layer, packing it into the rear and corners of the joint. Mechanical auger-type pointing guns can also be used without addition of special admixtures. Filling should still be performed in lifts, however.

B. As soon as the mortar reaches “thumbprint” hardness, apply the next layer at ¼" thickness. Several layers may be required.

C. Allow each layer time to harden before proceeding to the next. Most of the shrinkage in mortar occurs during this hardening stage, and proper timing will minimize overall shrinkage and cracking.

D. When the final lift is thumbprint hard, tool to specified profile. For localized repointing, match to adjacent, existing profile, or as instructed.

E. Proper tooling and timing is important for uniform color. If the mortar is tooled when too soft, colors may tend to dry lighter, and hairline cracks may occur. If tooled when too hard, dark streaks or “tool burns" may occur, and good bond with the masonry may not be achieved.

F. To avoid changing the appearance of the building, it may be necessary to slightly recess the mortar from the masonry surface, as flush filling of joints in worn masonry may result in a visually wider joint than the original.

G. After tooling, new joints may be lightly brushed to provide a rougher, more weathered appearance. Use nylon or natural bristle brushes, never metal brushes.

4. Curing

A. The higher the lime content of the mortar, the more critical the curing. Rapid drying may cause chalking, poor adhesion, low strength and poor durability. Joints must be repeatedly dampened in order for the lime to carbonate effectively.

B. When necessary, tooled joints should be misted periodically for at least a day or two after tooling. The frequency of misting will depend on weather conditions and substrate moisture retention, but may initially be required every hour or so, gradually reducing this to every three or four hours. Alternatively, walls may be tented or covered with wet burlap. Do not place plastic sheeting in direct contact with new mortar.

5. Cleaning

A. Remove excess mortar and smears using a stiff natural bristle brush and water before it has set

PHOTO: Repointing of Chicago’s Historic Landmark Fisher Building with ***SPEC-JOINT 46*** continued through severe winter conditions with the use of a proprietary non-chloride admixture approved by Edison Coatings, Inc.

PHOTO: ***SPEC-JOINT 46*** can be used in electric pointing guns without special admixtures or mix modification.

(typically within 1 - 2 hours).

B. Do not use chemical cleaning agents unless specifically instructed, carefully tested and controlled. Improper use of cleaning agents may result in chemical attack on mortar and/or masonry, smearing of mortar, and efflorescence. Masonry should always be pre-soaked with water prior to use of chemical cleaning agents, and thoroughly flushed with clean water afterwards. Some acidic cleaning agents may require neutralization with an alkaline detergent solution, particularly if masonry coatings are to be installed subsequently. Carefully follow the cleaning agent manufacturer's instructions for dilution and use. Many cleaning products are hazardous materials and must be handled in accordance with the manufacturer's published safety guidelines.

C. Allow mortar to fully cure before cleaning masonry walls. Usually 28 days will be sufficient, depending on temperature. Longer cure time is required in colder weather. Only low pressures should be used to avoid damaging newly repointed joints.

6. STORAGE & HANDLING:

A. Store in a dry location, off the floor or ground. Product is a cement based material and should be stored in the manner required to prevent deterioration or moisture infiltration.

B. **CAUTION:** Product contains cement and lime. May be injurious to eyes and skin. Avoid eye and skin.

C. WARNING! Product contains silica sand. Though many ***SPEC-JOINT 46*** formulations utilize aggregates which have been screened to remove silica particles in the "toxic" size range (<270 mesh), all should be treated as if they contain normal levels of toxic dust, as a precaution. Avoid breathing dust, and always use a NIOSH-approved particle mask rated for silica exposure whenever mixing, handling or cleaning up dry powder product. Observe all safety and handling guidelines as detailed in the Safety Data Sheets for this product.

7. Winter Admixtures

NON-Chloride Admixtures: In laboratory testing of several non-chloride accelerating admixtures, ***SPEC JOINT 46 Type N*** was found to reach proper strength at temperatures of 20^0F (-6^0 C) without the use of admixtures. Based on this evaluation, Edison Coatings, Inc. recommends that ***SPEC JOINT 46 Type N*** can be used without winter admixtures, under the conditions detailed below.

To assure proper strength development using Type N mortar under freezing conditions, carefully observe all of the following:

1. Work at temperatures of at least 25^0 F and rising, and stop work at least 2 hours before temperatures drop back to 25 degrees.

2. Store all mortar in a heated, warm area until just before use.

3. Use warm water for mixing and for pre-dampening of the masonry prior to mortar installation.

4. Accelerators: If necessary to prevent freezing, some proprietary non-chloride products have proven effective without affecting ***SPEC-JOINT 46*** color or performance. Consult your Edison Coatings Technical Representative.

8. Color, Consistency & Efflorescence

All batches of ***SPEC JOINT 46*** are carefully proportioned and checked for close tolerance to standard color before leaving the factory. This has resulted in highly consistent color, even over the course of extended projects involving many different production batches. Some slight batch to batch variations may occur, however, and these should be considered normal and acceptable.

Some factors beyond the control of the Manufacturer may also influence color and consistency. Weather may be one source of variability, as shading differences may occur under widely divergent conditions. Hot, dry weather, for example, may produce a slightly different intensity than cool, overcast conditions. Certain colors will be more affected by such variations, while others will be relatively unaffected. The quantity of mixing water also affects color, with higher quantities of water producing lighter shades. Efflorescence, a white or tan deposit on the face of joints or masonry, may originate from a number of sources. These include mixing water, the masonry units or backing, or the free lime in the mortar itself. To minimize efflorescence, we suggest:

1. Use only clean water, free of salts or other additives or contaminants.

2. Observe mixing and curing requirements, and be consistent from mix to mix. Do not re-temper.

3. If efflorescence does occur shortly after mortar installation, it will generally be of a soft and soluble nature. It may be removed by light scrubbing or pressure washing, or allowed to weather away naturally, in most cases.

4. If efflorescence is hard, crusty or persistent, it is an indication of other sources or contaminants, and potential moisture infiltration points should be sought out and corrected.

5. While some water repellents effectively suppress efflorescence, there may be reason for concern that subflorescence may alternatively occur, which can result in damage to masonry. Choose and apply water repellents only under the guidance of a knowledgeable professional.

For more information or assistance, contact your Edison Coatings, Inc.

FOR COMMERCIAL AND INDUSTRIAL USE.

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