

# ROSENDALE



NATURAL CEMENT PRODUCTS

## Injection Grout 11G

Natural Cement-Based Grout for Filling Cracks and Voids in Historic Concrete & Masonry

### DESCRIPTION

**ROSENDALE 11G** is a series of pre-packaged natural cement-based grouts for filling of cracks and voids in historic concrete and masonry. Grouts based on natural cement have endured for more than 135 years, even under severe coastal and seawater immersion service exposures, and feature high vapor permeability, tenacious adhesion and low modulus of elasticity.

**ROSENDALE 11G** grouts may be custom designed and produced to meet the special requirements of each project. Natural color or custom color-matching are available to provide aesthetic compatibility with original materials as well as long-term mechanical performance.

### FEATURES

**ROSENDALE 11G** offers long-term performance features which are unique to natural cement products, including:

- **Controlled Initial Set:** Typical initial set time is 30-90 minutes, providing adequate flow time without the risk of delayed oozing or streaking. Setting time is prolonged at low temperatures and in mixtures containing higher proportions of hydrated lime.
- **Moderate Strength:** Compressive strength is controlled in formulation and may be selected within a range of available strengths. Typically, strengths may be set from 600 to 3200 psi, depending on the specific proportions of each formulation. Unlike lime products, which set only at the surface and then require long periods of time for deeper reaction with atmospheric carbon dioxide, natural cement is a true hydraulic cement, achieving full-depth set within minutes or hours.
- **High Flow:** Grouts are formulated to achieve high flow at moderate water addition levels, and ultra-fine particle size permits efficient flow into cracks down to 1.5 mm (1/16") in width.
- **Water Resistance:** Natural cement grouts withstand severe wind-driven rain exposures within a short time of application, facilitating installation. They are also suitable for water immersion when unmodified with lime.

- **Early Freeze Resistance:** Natural cement products require only a relatively short period of protection from freezing, facilitating installation over the course of a much-extended working season in northern climates, as compared with lime and hydraulic lime products.
- **Low Modulus:** Unlike Portland cement and cement-lime grouts which tend to embrittle with time, natural cements continue to relieve stress and remain mechanically compatible with masonry substrates, even after more than a century of performance. **Rosendale 11G** grouts provide long service life without cracking or delamination from masonry units.
- **High Permeability:** **Rosendale 11G** provides high rates of moisture vapor transmission, assuring that buildings and structures will “breathe”, and avoiding moisture entrapment.
- **Customization:** **Rosendale 11G** grouts are produced on a made-to-order basis for each project, to meet the optimum performance levels of each application.

### LIMITATIONS:

Cementitious grouts are not intended for use on dynamic cracks caused by structural behaviors such as ongoing settling, structural instability, thermal expansion or corrosion of embedded metals. Grouts are best selected and applied under the direction of an experienced grouting engineer.

### APPLICATIONS:

- **Rosendale 11G** grouts may be used for filling voids and cracks in historic concrete, stucco, masonry and stone.
- **Rosendale 11G** grouts may be used for repair of structural damages under the direction of a licensed professional engineer.

### FORMULATION:

- **Rosendale Natural Cement** is authentic natural cement produced from argillaceous limestone mined in the Rosendale Historic Cement District. The cement district is the source of more than 50% of all the natural cement produced in North America. Natural cement was produced to meet the requirements of ASTM C10 specifications, withdrawn in 1976 when natural cement was no longer commercially available.
- **Lime**, in cases where it is incorporated in **Rosendale 11G** grouts, can be customized to meet individual project requirements. Historically, hydrated dolomitic lime was the most commonly used building lime in North America, and is faithfully reproduced using a fully hydrated dolomitic building lime meeting the specifications of ASTM C207 Type S. High calcium limes may alternatively be incorporated, or lime can be omitted in order to allow on-site addition of lime paste (putty) or field-hydrated quicklime.
- **Mineral Fillers** incorporated in **Rosendale 11G** grouts may also be customized to meet individual project requirements. Fillers are selected to match original materials as closely as possible in color and composition.

### INSTALLATION:

Grouting procedures can vary considerably from one application to another. The following are some general guidelines:

1. Loose materials, such as unbonded masonry mortar, loose bricks or delaminated concrete must be removed and

replaced prior to crack injection.

2. Injection holes should be drilled to enable delivery of grout to the full length and depth of the cavity to be filled. For transverse (perpendicular to surface) crack-filling and for void injection, injection holes are typically drilled into the face of the crack at a downward angle to a depth of ½ the masonry thickness. For filling of lateral cracks (parallel to surface, e.g., delaminating layers of sandstone or stucco), holes are generally drilled near the top and bottom of the area to be filled, beginning at the upper and lower corners and then every 3 to 9 inches along the upper and lower edges of the cavity. The lower row may be drilled square with the surface (at 90<sup>0</sup> to the wall surface). The upper row of holes should be drilled at a downward angle.

For filling of voids with **Rosendale 11G**, diameter of the holes drilled may vary with the intended method of grout delivery. For typical delivery by grout pump through ½” pressure hose, a ¾” hole is required.

For crack injection smaller holes may be drilled. ¼” diameter holes are sufficient for grout delivery through 1/8” diameter tubing.

3. Seal the face of the crack with temporary non-staining clay, sealant or mortar.

4. All crack and void cavities must be thoroughly flushed with clean water to remove as much dirt, debris and contaminants as possible and to pre-saturate the areas to be grouted. Continue flushing until clean water runs from the lowest port. A minimum of 20 minutes of pre-wetting should be performed prior to grouting. Repeat pre-wetting if either drying occurs prior to injection or if more than two hours elapse from the time of pre-wetting.

5. Some methods of grouting involve injecting from the lowest port, followed by plugging of the injection port once grout flows from the port above. Other methods involve injection from the upper port, plugging the lower port once grout begins to flow from the port. **Rosendale 11G** products are compatible with a variety of good grouting practices and equipment.

Thoroughly mix the **Rosendale 11G** product selected using a mortar mixer or slow speed drill. (250-450 rpm, “Jiffy” type mixing tool). Mixed mortar must be used before initial set, so mix only as much material as will be used within 10 to 30 minutes. Once material has begun to set, it should not be re-tempered or adjusted with additional water, but should be discarded.

Once the surface has been repaired, it must be maintained in a damp condition throughout its curing period. Generally, this period of wet curing will be from 1-7 days, depending on formulation and conditions. Consult Edison Coatings for curing guidelines for your specific project conditions.

## PERFORMANCE

While individual custom formulations will vary in their properties, the following are typical for **Rosendale 11G** natural cement grouts.

PROPERTY	TYPICAL VALUES
SET TIME	Initial: 30-90 minutes
COMPRESSIVE STRENGTH	Typically 600-3200 psi @ 90 days
MODULUS OF ELASTICITY	535,000 to 640,000 psi
TENSILE STRENGTH	35-75 psi at 90 days
MODULUS OF RUPTURE	400 - 600
FLOW TIME	10-30 minutes



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