

# PUMP-X53, 53i, 53iE, 53iL

## PUMPABLE INJECTION GROUTS & FILLERS



**PHOTO:** Over 100,000 lbs. of PUMP-X53 were pumped into wall cavities between terra cotta and rubble masonry back-up on this building on Wall Street in New York City as part of a masonry stabilization project.

### DESCRIPTION:

**PUMP-X53-Series** products are prepackaged specialty grouts used for a wide variety of construction, restoration and masonry stabilization applications.

**PUMP-X53** is a multi-purpose, low modulus, moderate strength filler used for filling cavities, voids and cracks from a minimum of 1/4" width up to approximately 18 inches. It is a two-component, latex-modified, super-plasticized lime-cement mortar designed for broad compatibility with masonry structures.

**PUMP-X53i** is an ultra-fine, moderate strength micro-injection grout which achieves high flow for efficient filling of small cracks and voids from a minimum width of approximately 1 mm to as much as several inches in thickness. It is a single component, polymer-modified mortar which is mixed with water to achieve fluid working consistencies without separation or bleeding.

**PUMP-X 53iE** is an ultra-fine, expanding, non-polymer cementitious injection grout designed for filling small cracks and voids in sound concrete and masonry construction. Slight expansion after placement and before final set enables the material to force itself into close, positive contact with internal crack surfaces, where desired.

**PUMP-X-53iL** is a low-strength, non-polymer, hydraulic lime grout, for use in Historic masonry restorations requiring repairs to low strength brick and soft stone elements.

### CUSTOMIZATION:

**PUMP-X53-Series** products can be customized for specific project requirements. Typical customizations may include color-match, strength adjustment, addition/deletion or change in concentration of polymers, acceleration or slowing of set time, increase or reduction in expansion properties or alteration of other performance properties.

### TYPICAL PERFORMANCE PROPERTIES:

PERFORMANCE				
Property	53	53i	53iE	53iL
Compressive Strength, psi, ASTM C109	1300-1800	1500-2000	1500-2000	750-1500*
Tensile Strength, psi	250-300	300-400	300-400	≈200-300
Flow, ASTM C230-modified (No Vibration)	116 mm			
Direct Tensile Bond Strength	>100 psi			
Drying Shrinkage	Approx 0.13%	Approx 0.08%	2.4% Expansion	≈0.35%
Moisture Vapor Permeance	>30 perms @ 1/2" Thickness			
Mix Ratios, Powder/Liquid	50 lbs Pt. B to 1 gallon Pt. A (RL-2)	Add 16 lb Pail of Powder to 1/2 gallon clean water		

\* Hydraulic Lime properties develop over longer periods of time

## APPLICATION:

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  $\frac{1}{2}$  the masonry thickness. For filling of lateral cracks (parallel to surface, e.g., delaminating layers of sandstone), 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  $90^\circ$  to the wall surface). The upper row of holes should be drilled at a downward angle.

For filling of voids with **PUMP-X53**, diameter of the holes drilled may vary with the intended method of grout delivery. For typical delivery by grout pump through  $\frac{1}{2}$ " pressure hose, a  $\frac{3}{4}$ " hole is required.

For crack injection with any of the **53i** series products, smaller holes may be drilled.  $\frac{1}{2}$ " 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



**PHOTO:** Airless sprayer, adapted for pumping of **PUMP-X53i**. Spray gun was removed and replaced with a ball valve and adaptor, bushed down to  $1/8$ " diameter tubing. A rubber seal, set 2-3" above end of tubing, prevents grout from running out of injection port.

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. **PUMP-X53-Series** products are compatible with a variety of good grouting practices and equipment.

Thoroughly mix the **PUMP-X53-Series** product selected using a mortar mixer or slow speed drill. (250-450 rpm, "Jiffy" type mixing tool). Approximate mix ratios are as follows:

Grouting for structural repair should always be performed under the supervision of a licensed structural engineer and an experienced grouting engineer.

6. For aesthetic repair after grouting, refer to product data for **Custom System 45**, **Spec Joint 46** and/or **Flexi-Fill 530**.

## LIMITATIONS:

Expanding grouts require sound substrates to restrain the grout as it expands. They should not be used on low strength materials, such as exfoliating sandstone. Thorough testing under the supervision of an experienced grouting engineer should be performed on a small scale in an insensitive area, prior to large-scale application.

## SAFETY:

Products contain Portland cement and/or lime. Avoid skin and eye contact. Avoid breathing of dust. When handling dry powders, use NIOSH-approved respirator. Read and observe the safety and handling guidelines as detailed in the Material Safety Data Sheets supplied with these products. **KEEP LIQUID COMPONENTS FROM FREEZING.**

**FOR COMMERCIAL AND INDUSTRIAL USE.**

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