



**WEAVER GENERAL CONSTRUCTION COMPANY**  
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**SUBMITTAL TRANSMITTAL**

July 22, 2011

**WGC Submittal No: 03600-002.A**

**PROJECT:** **Harold Thompson Regional WRF**  
 Birdsall Rd.  
 Fountain, CO 80817  
 Job No. 2908

**ENGINEER:** **GMS, Inc.**  
 611 No. Weber St., #300  
 Colorado Springs, CO 80903  
 719-475-2935 Roger Sams

**OWNER:** **Lower Fountain Metropolitan  
 Sewage Disposal District**  
 901 S. Santa Fe Ave.  
 Fountain, CO 80817  
 719-382-5303 James Heckman

**CONTRACTOR:** **Baker Concrete Construction**  
 1904 Jasper Street  
 Aurora, CO 80011  
 937-536-9000 Nick Dewald

**SUBJECT:** Resubmittal - Injectable Grout - Mountain Grout Ultra

**SPEC SECTION:** 03600: Grout

**PREVIOUS SUBMISSION DATES:** 7/6/11

**DEVIATIONS FROM SPEC:** \_\_\_ YES X NO

**CONTRACTOR'S STAMP:** This submittal has been reviewed by Weaver General Construction and approved with respect to the means, methods, techniques, & safety precautions & programs incidental thereto. Weaver General Construction also warrants that this submittal complies with contracted documents and comprises on deviations thereto:

**Contractor's Stamp:**

Date: 7/22/11  
 Reviewed by: H.C. Myers  
 ( X ) Reviewed Without Comments  
 ( ) Reviewed With Comments

**ENGINEER'S  
 COMMENTS:** \_\_\_\_\_

**Engineer's Stamp:**



**Dewald, Nick**

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**From:** Dennis [dennis@mountaingrout.com]  
**Sent:** Friday, July 22, 2011 12:30 PM  
**To:** Dewald, Nick  
**Cc:** Bill Phillips  
**Subject:** Re: Submittal Items  
**Attachments:** Specification-crackinjection.pdf; packers; MG-Electric pumps.doc; MG-Large Pumps.doc; MG-packers.doc; MG-Bucket Pump.doc; Reactivity of Mountain Grout HL.doc

Nick,

I have attached pictures of packers and pumps. Also attached is a copy of a general crack injection specification. In response to the questions raised by Mr. David Frisch:

1. Hydrophobic grouts have limited water solubility and will react with a minimal amount of water (2-3 %) to fully cure. Excess water is pushed away by the expanding grout and does not get absorbed into the foam. (This is in contrast to hydrophilic grouts that are very water soluble and can absorb water that can cause shrinkage if permitted to evaporate.) Cracks up to 1/4 inch can easily be sealed with hydrophobic grout. For larger cracks, it may be necessary to use grout soaked oakum or open cell foam stuffed into cracks or joints before injecting the grout for a complete seal.
2. As indicated in the specification, holes are drilled at a 45 degree angle from alternating sides of the crack to intersect the crack at the midpoint of the wall thickness. After curing, the packers and excess grout are removed. The holes can be patched with cement grout.
3. Hydrophobic grout will react with water in the absence of accelerator. Accelerator is used to increase the reactivity (make it react faster) to reduce grout seepage and to stop flowing water. For hairline cracks, lower levels of accelerator are used to allow time for travel throughout the crack. I have attached a table showing relative reaction times for Mountain Grout HL-100. Due to the limited solubility of water in hydrophobic grout, the reaction profile will exhibit minimal difference when larger amounts of water are encountered. With larger cracks and high water flows it is sometimes necessary to use a fast reacting two-component grout (10 seconds) to slow the water flow and then inject the slower grout to obtain a more complete seal.

Sincerely,  
Dennis Galbreath  
Technical Director  
Green Mountain International

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**From:** Dewald, Nick [mailto:DewaldN@bakerconcrete.com]  
**Sent:** Friday, July 22, 2011 9:14 AM  
**To:** Bill Phillips  
**Cc:** Eynon, Daniel  
**Subject:** Submittal Items

Bill,

I need you help with revising my submittal to the EOR for you product. I have attached the returned submittal from the EOR with there specific questions. Let me know if you have any questions. Also can you send me contact info for Dennis Galbreath?

Thanks,

Nick Dewald  
Project Engineer  
**Baker Concrete Construction, Inc.**  
1904 Jasper Street, Aurora, CO 80011  
Phone: 303.367.8111 | Fax: 303.367.8004  
Mobile: 937.536.9000 | [dewaldn@bakerconcrete.com](mailto:dewaldn@bakerconcrete.com)  
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## **POLYURETHANE CRACK INJECTION**

### **PART I – GENERAL**

This specification is to detail the process of sealing cracks and/or joints with Hydrophobic Polyurethane Chemical Grout (HPCG).

#### **A. Work Included:**

Include all materials, labor, tools, and equipment to perform repair of cracks/joints in concrete.

#### **B. Delivery, Storage and Handling:**

1. Deliver the specified product in original, unopened containers with the supplier's name, product labels, product identification, MSDS, and batch numbers.
2. Store and condition the specified product as recommended by the supplier.

#### **C. Job conditions:**

Precautions should be taken to avoid damage to any surface near the work zone due to mixing, handling, and/or placement of the specified materials.

### **PART II – PREPARATION**

The surfaces of floors, walls, etc. to be treated shall be cleared of all debris and attachments to allow free and clear access to the work, and also open access for monitoring of grout travel.

### **PART III – APPLICATION**

#### **A. Material**

- a. Hydrophobic Polyurethane Chemical Grout shall be Mountain Grout Flexible as supplied by Green Mountain International, Inc, 235 Pigeon St., Waynesville, NC 28786 (800-942-5151) or equal.
- b. HPCG must be shipped as non-hazardous and contain no solvents or VOC's.
- c. HPCG must have been tested for potential leachate of heavy metals (soil contamination) under TCLP Extraction method 1311, Metals Method 6010 and Manual Cold Vapor Technique, Method 7470. Methods supplied by the USEPA office of Solid Waste and Emergency Response.
- d. HPCG pump cleaner/flush must be solvent free and non-flammable.

#### **B. Application:**

1. All cracks and/or joints shall be sealed with the HPCG.
  - a. Preparation: Holes shall be drilled at an approximate 45 degree angle, offset to intersect the joint/crack at approximate mid-depth or to a maximum of 18". In thin concrete sections holes may be drilled directly into the joint/crack.
  - b. Application: Holes and Packer Devices: 2 styles of packers are

acceptable, both available from Green Mountain International, Inc.

- i. 5/8" diameter holes shall be drilled for Mechanical Type Packers, which are inserted into the drilled hole and secured into place by an expandable rubber section as the packer is tightened.
  - ii. 3/8" diameter holes shall be drilled for "bang-in" type packers, which are hammered into the drilled hole.
- c. Hole Spacing: Holes shall be placed at appropriate intervals typically 12" apart to ensure full infiltration of the joint/crack with the HPCG. In narrow (hairline) cracks holes will be closer together. In wide cracks they may be farther apart. Visually monitor grout flow from outside of crack.
- d. Mixing Procedure: HPCG shall be mixed by very gradually pouring component "B", accelerator, into component "A" while carefully stirring so as to not entrain air into the mixture.
- e. Placement: HPCG shall be pumped through a piston pump capable of producing discharge pressures of >250 psi.
- f. Crack may be actively leaking at time of application. This is, in fact, preferred.

Pumping shall proceed from packer to packer, with multiple passes on each hole until either stall pressure is achieved or raw grout flow is observed from the crack/joint subsequent to pumping upon that hole.

## 2. Cleaning

All excess HPCG shall be cleaned from the area and properly disposed. Leave finished work and work area in a neat, clean condition.

**(To be used as a general guideline. All projects are unique.)**

# **Reactivity of Mountain Grout HL-100**

**(Initiation time/expansion time)**

<b>Temperature</b>	<b>With 1.0% Accelerator</b>	<b>With 2.5 % Accelerator</b>
<b>77 F</b>	<b>2:00/7:30</b>	<b>30"/2:00</b>
<b>60 F</b>	<b>4:20/15:00</b>	<b>1:05/4:30</b>
<b>45 F</b>	<b>not recommended</b>	<b>2:30/9:00</b>

# Manual Pump



Lincoln, Alamite are manufacturers of manual pumps. This is a Lincoln Model 1292.

Note: These are grease pumps. Be careful not to buy a pump with a pressure relief or high pressure by-pass valve.

# A packer is placed into the drilled hole

Here are some examples of packers and a coupler.



Hydraulic  
Coupler