

# **Strong-Seal® Systems**

<p><b>STRONG-SEAL® GROUT 250 AND GROUT 1000 SPECIFICATIONS</b> <i>for Void Filling And Leak Stoppage.</i></p>
---

**INTENT: To provide an economical cementitious product line for filling voids behind substrates for leak and subsidence control, and for filling abandoned lines with formulations that are environmentally friendly.**

## **1.0 GENERAL**

This specification shall govern all work, materials and equipment required for filling voids behind substrates to stop active leaks and subsidence control and filling of abandoned lines and structures with a volume stable cement mixture using machinery specially designed for the application and per the following specification:

## **2.0 GROUTING MATERIAL**

2.1 Strong -Seal® Grout 250, a cementitious grout, shall be used for stopping very active infiltration and filling voids and shall be mixed and applied according to manufacturers' recommendations. The cementitious grout shall be volume stable, and have a minimum 28 day compressive strength of 250 psi.

2.2 Strong-Seal® Grout 1000, a cementitious grout, shall be used for same application as Grout 250, but is designed for special soil conditions, and shall be used per manufacturers' recommendations. The cementitious grout shall be volume stable and have a minimum 28 day compressive strength of 1000 psi.

### **2.3 WATER**

Water used to mix product shall be clean and potable. Questionable water shall be tested by a laboratory in accordance with ASTM C-94 procedure. Potable water need not be tested.

### **2.4 OTHER MATERIALS**

No material, other than water, shall be used with or added to Strong-Seal® Grouts without prior approval of manufacturer.

### 3.0 EQUIPMENT

- 3.1 Applicator must use approved equipment designed and manufactured by the material supplier specifically for the application of cementitious liners in sanitary systems.
- 3.2 Specifically designed machines consisting of a progressive cavity pump and an air system for low velocity spray application of product, shall be used for applying Strong-Seal® Systems products. Equipment is complete with water storage and metering system. Spray Mate® models 35C and 35D are approved machines for applying Strong-Seal® Systems products. Other models may be approved after review by Strong-Seal® personnel.

### 4.0 PROPERTIES

#### 4.1 PHYSICAL PROPERTIES

TEST	METHOD	GROUT 250	GROUT 1000
Compressive Strength, 28 days	ASTM C109	>250 psi	>1000 psi
Dry Bulk Density		35 pcf, ± 3 lbs	68 pcf, ± 3 lbs
Wet Density		70 pcf, ± 5 lbs	105 pcf, ± 5 lbs
Shrinkage, 28 days	ASTM-C490	0% @90% RH	0% @90% RH

#### 4.2 CHEMICAL PROPERTIES:

Binder: Strong-Seal® grouts are formulated using ASTM C-150 Type I Portland Cement.

### 5.0 CONDITIONS

- 5.1 Strong-Seal® Grout 250 shall be used to fill voids in porous soils and abandoned lines. Fine sand soils or soils with fine pore space require Strong-Seal® Grout 1000. When conditions are such that the choice of which grout shall be used is not clear, consult the manufacturer for recommendations.
- 5.2 Substrates without active infiltration but with voids behind substrate:  
Grouting behind these substrates shall be considered when excessive voids exist as indicated by soil subsidence resulting in settling or cave-ins. When strength of substrate is questionable, Strong-Seal® liner products shall be

used to restore structural integrity. Wait 24 hours after liner application before grouting.

- 5.3 Substrate with active flow: Grouting will stop infiltration; however, minor leaks may first be controlled by use of Strong-Seal<sup>®</sup> Strong-Plug<sup>®</sup>, a fast-setting hydraulic cement. Application shall be per manufacturer's specifications. Weep holes may be used as necessary to relieve outside water pressure. If substrate strength is questionable, apply Strong-Seal<sup>®</sup> liner products to restore structural integrity prior to grouting. Liner products shall be applied per manufacturers' specifications.
- 5.4 Concrete Substrates: Concrete substrates of sufficient strength can be grouted immediately in all areas where there is active infiltration or where indication that active infiltration has occurred.

## **6.0 APPLICATION**

### **6.1 PREPARATION**

#### **6.1.1 Stopping Leaks**

Identify all areas of infiltration, paying close attention to entries into the substrate of service lines, intersections, lifting holes and joints. It may be necessary to soak the soil outside substrate to verify leaks.

#### **6.1.2 Filling Abandoned Lines**

Riser pipes shall be cast into each end of pipe to be filled at each manhole. The pipes shall turn 90 degrees and extend into the pipe through a concrete bulkhead cast at each end of pipe to allow non-interrupted flow of grout into pipe. Both filler pipes shall extend out of manhole for accessibility.

#### **6.1.3 Sealing**

Large voids, cracks and areas around incoming lines shall be filled with Strong-Seal<sup>®</sup> QSR to prevent grout from escaping. Strong-Plug<sup>®</sup>, a fast-setting hydraulic cement, may be used to seal minor cracks as necessary.

#### **6.1.4 Access Holes**

##### **6.1.4.1 Void Filling**

Drill holes through substrate using a pattern as recommended by manufacturer. Drill pattern may vary from application to application.

#### 6.1.4.2 Filling Abandoned Lines

The inlet riser pipe as described per paragraph 6.1.2 shall be adapted to accept pump hose used to convey materials from approved mixing and pumping equipment as described per paragraph 3.0. The outlet riser pipe as described per paragraph 6.1.2 shall include a 90° elbow at top of outlet riser and a horizontal pipe extending from elbow past manhole of such length to prevent debris pushed out of line while filling from falling into manhole.

## 6.2 MIXING

### 6.2.1 Grout 250

Mix two bags at a time using approximately 8 gallons of water per bag. Mix using approved equipment as described per paragraph 3.0. Mixing shall be done at such a rate as to allow continuous pumping.

### 6.2.2 Grout 1000

Mix 2-4 bags at a time using approximately 4 gallons of water per bag. Mix using approved equipment as described per paragraph 3.0. Mixing shall be done at such a rate as to allow continuous pumping.

## 6.3 PUMPING

### 6.3.1 Filling Voids

#### 6.3.1.1 Creating a channel for grout to flow:

Water shall be pumped through grout nozzle and packers as described per paragraph 6.3.1.2, until channel develops from hole to hole as indicated by a discharge of water. Should a 10 psi pressure rise occur above normal pumping pressure, discontinue pumping and proceed to the next hole. Procedure shall be repeated until flow has been established at all holes. Once flow is established through one hole, it shall be necessary to plug that hole with a plug or cloth in order to divert a flow to form an open path or channel to next hole. Repeat process until flow is established at all holes.

#### 6.3.1.2 Grout Injection

Grout shall be pumped using approved equipment (3.0). It shall be pumped through a specially designed grout nozzle. The nozzle shall be attached to a specially prepared packer which has been placed into hole drilled in the substrate of a predetermined size and tightened until it fits snugly in the hole. The grout nozzle shall have a flow control valve and pressure block to register injection (pumping) pressure at the injection point. Flow at the nozzle shall be discontinued if the

pressure rise is greater than 10 psi. Contact manufacturer for grout nozzle and packers.

6.3.1.3 If flow stops or pressure rise exceeds maximum allowed pressure (6.3.1.1), it shall be stopped, packer closed and grout nozzle moved to next hole. This procedure shall be repeated until all holes have been grouted to preceding limitations. Should flow discharge at another hole, it shall be plugged either by closing packer valve or plugging hole with oakum or cloth until flow has ceased. Packers or cloth shall be removed 3 hours after grouting holes are to be plugged using Strong-Seal<sup>®</sup> QSR or Strong-Seal<sup>®</sup> liner products.

#### 6.3.2 Filling Abandoned Lines

Grout shall be pumped using approved equipment as described per 3.0. It shall be pumped through hose pressure tested at a minimum of 400 psi and pumped through a flow-through packer which has been air expanded to "seat" against the walls of the riser pipe. Pumping shall continue until clean grout is being discharged at the outlet pipe.

**6.4 PUMPING SHALL BE DISCONTINUED IF DISCHARGE PRESSURE AT OUTLET CEASES OR PUMPING PRESSURE REGISTERS A 25 PSI RISE ABOVE THE NORMAL PRESSURE REQUIRED WHEN FLOW IS UNINHIBITED.**

### **7.0 WEATHER**

No application shall be made if ambient temperature is below 40 degrees F.

### **8.0 PRODUCT TESTING**

Four 2-inch cubes may be cast each day or from every pallet of product used and shall be properly marked and packaged and returned to the manufacturer for testing in accordance with the owner's or manufacturers' directions for compressive strength per ASTM C-109 procedure.

### **9.0 FINAL ACCEPTANCE TESTING**

At the direction of the owner or his assignee, the structure shall be visually inspected to verify that:

- A. There are no visible leaks.
- B. That clean grout is being discharged when filling abandoned lines.

## 10.0 LIMITED WARRANTY

The Strong Company, Inc. warrants that this product was produced in conformity with its standard specification or formulations within recognized tolerances, free of adulteration or contamination, and that the product will perform in accordance with representations in Strong-Seal® Systems literature and Technical Data Sheets when properly applied in strict conformance with the printed instructions on container and prescribed in technical data instructions and when applied to a properly prepared surface. The sole remedy of the purchaser shall be replacement of the product or refund of the purchase price of the product if any defect in material or variance in the product beyond recognized tolerances in the specifications in specifications are found to exist.

No other remedy including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss shall be available to the purchaser.

### DISCLAIMER

THE WARRANTY DESCRIBED IN THE ABOVE PARAGRAPHS SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF.

**The Strong Company**  
4505 Emmett Sanders Road  
Pine Bluff, AR 71601  
(800) 892-8009 Fax (870) 850-6933  
[www.strongseal.com](http://www.strongseal.com) Email: [info@strongseal.com](mailto:info@strongseal.com)