

# Standard Specification for Installing a Certified Cement Material in Sewer Manholes Providing Structural Bench Repair, Bench Creation or Adjustment

(As Provided by Standard Cement Materials)

## GENERAL

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### 1.1 GENERAL INFORMATION

This specification describes the material, equipment and procedure for the purpose of repairing an existing bench, adjusting the height, or creating a new bench section in a concrete, brick or Fiberglas sewer manhole and other underground structures. Repair or renewal with specified materials is considered a structural repair.

An approved contractor shall furnish the complete installation of the cement material. All of the cleaning, preparation and application procedures shall be in accordance with the manufacturer's recommendation.

### 1.2 SEWER MANHOLE BENCH REPAIR

Clean the repair area and apply a high-strength cementitious material containing Portland cement, finely divided pozzolanic ingredients, graded sand, and chemical admixtures. Apply in one layer from the top of the existing bench area to adjust the height of an existing bench area. This specification addresses: bench renewal, a partial reconstruction, the creation of a bench and the sealing of the bench section in a concrete, brick or Fiberglas manhole.

### 1.3 REFERENCES

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| A. ASTM C33   | Standard Specification for Concrete Aggregates.  |
| B. ASTM C39   | Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens                          |
| C. ASTM C109  | Standard Test Method for Compressive Strength of Hydraulic Cement Mortar (Using 2 inch or 50 mm cubes).  |
| D. ASTM C150  | Standard Specification for Portland Cement.  |
| E. ASTM C321  | Standard Test Method for Bond Strength of Chemical Resistant Mortars.                                    |
| F. ASTM C1107 | Standard Specification for Packaged Dry, Hydraulic Cement Grout.   |
| G. ASTM C1090 | Standard Test Method for Measuring Change in Height of Cylindrical Specimens for Hydraulic Cement Grout. |

## 1.4 SUBMITTALS

Submit the following information to the engineer.

1. Product data, including manufacturer and brand name.
2. Laboratory tests results to verify 28-day compressive strength in accordance with Test Method ASTM C39/M.
3. The manufacturer shall provide a list of similar sewer manhole projects with a five-year history. Include the Owner's name, the contact name, the project description and date put into service.

## 1.5 WORKER SAFETY

Worker safety is of the utmost importance. Sewer manholes are permit required confined spaces as defined by OSHA 29 CFR 1910.146. The following equipment is required as a minimum by OSHA. Testing and monitoring equipment, ventilation personal protective equipment, tripod, harness, wench, ladders, and any other equipment necessary for safe entry into and rescue from permit spaces. OSHA also requires an attendant to be present at all times to monitor the entrant. For help with obtaining proper safety equipment and procedures that meet OSHA guidelines, contact a Standard Cement Materials representative.

## 1.6 DELIVERY, STORAGE AND HANDLING

Store the cement materials under normal, cool, dry conditions. No modification should be made to the manufacturer's recommendations for handling, mixing, placing and finishing of this product.

## PART 2 - MATERIAL SECTION

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### 2.1 REPAIR MATERIALS

Fill or repair all voids and irregularities with a fast set cement material.

1. Use the Fast Set Bench Repair™ Cement (FSR), a dry factory blended, fast setting, and shrink compensating material to build the bench. The high-strength FSR cement material must be resistant to temperature fluctuations, have a minimum of 8,000 psi compressive strength (28 days), and a volume change of less than 0.02 percent, while containing no calcium chloride, gypsum, or high lime. The set time must be between 8 to 15 minutes (final set in 30 minutes).

For the best results, use a mechanical mixer with a Jiffy™ mixing blade. Pre-mix the FSR cement material thoroughly (in the original container for one minute). Place approximately 3 quarts of clean potable water into the container and mix the dry cement material on low RPM, 3-5 minutes or until a uniform consistency is achieved. Mix only enough material that can be placed within the working time. For placements greater than 3 inches in depth, the FSR may be extended up to 30%, by weight, with clean dry 3/8 inch pea gravel. Do not blend excess water into the mixture as this will cause bleeding and segregation. Apply the FSR cement material by hand or with a trowel, level and smooth. Repair the bench area to the required pipe diameter by

adjusting, reforming, or creating the height required. This specification applies to bench installation, bench renewal, for partial reconstruction, and to seal the invert section in a concrete, brick or Fiberglas manhole. Keep the cement damp with water or cover with damp cloth. Protect from freezing, hot temperatures and wind extremes. Follow the manufacturer's application instructions.

Physical Property requirements:

1. Compressive strength, (1 day)	ASTM C39	2,700 psi
(28 day)	ASTM C39	8,000 psi
2. Bond strength	ASTM C321	150 psi
3. Percent expansion	ASTM C1090	0.02%

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## 2.2 INFILTRATION CONTROL MATERIAL

Stop all active leaks with a Standard Plug™ Cement, a single component, dry, factory blended, fast setting hydraulic cement material specifically formulated for stopping water and minor infiltration. The Standard Plug™ Cement sets in 60-90 seconds. No modification should be made to the manufacturer's written recommendations for handling, mixing, placing and finishing of this product.

2.3 Water shall be clean and potable.

2.4 Do not use other materials or add any admixtures to this product.

## PART 3 - PREPARATION SECTION

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### 3.1 CLEANING PROCEDURE

1. All surfaces shall be free of dirt, oil, grease, laitance and other contaminants. Remove all unsound concrete. Use a high-pressure washer to remove all foreign materials from the sewer manhole bench area prior to applying the cement material. Use a minimum of 3500-psi at 2-½ gallons per minute. Wash the bench area thoroughly over the repair or damaged area.

## PART 4 - EXECUTION SECTION

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### 4.1 APPLICATION

1. The volume of material needed to build spring line and full pipe benches varies greatly. See Diagram One for volume calculations.  
Dampen the manhole bench surface area, allow no noticeable free water droplets or running water to remain. Set form boards if required. Begin at the top edge of the bench, apply the cement material in one layer up and around to the wall. Place the cement material along the wall to include the top edge of the bench area. Apply the cement material in such a manner so as to produce a gradual slope to the bottom of the wall. Build the bench up to a uniform height at the circumference. Insure that the thickness of the bench shall increase by no less than 1 inch per foot from the top of the invert and continues in the direction of the wall so as to provide

the required slope. Follow the slope up and along the entire length of the wall. Use a stainless steel trowel to compact the cement material into all the voids, level and smooth the surface.

Allow the cement material to set approximately 60 minutes; and then provide 4 to 6 hours cure time before being subjected to active flow. Prevent direct impingement of water up to 24 hours. Contact a Standard Cement Materials representative for help with this product selection and information.

## PART 5 - CURING SECTION

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### 5.1 HOT WEATHER PLACEMENT

1. Follow ACI 302 "Guide for Concrete Floors and Slab Construction" and ACI 308 "Standard Practice for Curing Concrete" to ensure that problems due to decreased bleeding, shrinkage cracking, is minimized. Protect the cement material from dry, hot, severe weather extremes and freezing. If the ambient temperature is over 90 degrees F, then take precautions to keep the mixing water cool. Cool the water to a temperature equal to or below 70 degrees F. Use block ice if necessary. No application shall be made when ambient temperatures are less than 40 degrees F and when freezing temperature is expected within 24 hours. Protect the finished cement material. Wet cure immediately, cover with plastic sheets or use an acceptable liquid membrane-forming curing compound, ASTM C 309. The curing compound shall contain a minimum of 25% solids and prevent a maximum loss of water up to 0.4-kg per cubic meters in 72 hours. Spray, roll or brush the curing compound while the cement is still in a soft workable state. Apply in accordance with the manufacturer's recommendation.
2. Allow the cement material to cure approximately 24 hours. Ambient conditions will govern specific cases. All washed out areas should be cleaned and repaired again.

## PART 6 - WARRANTY

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All of the work shall be guaranteed to be free of defects for a period of one year after the completion of the work. The contractor at no additional cost to the owner will repair any defects discovered within the 1-year period.

END OF SECTION

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