

Milliken®  
**GeoSpray™**  
 Geopolymer Mortar

**Technical Data Sheet**  
 Version - July, 2014

GeoSpray™ geopolymer is a high performance fiber reinforced mortar specifically designed for structural rehabilitation. This high strength, ultra-low porosity material is made from natural mineral polymers and recycled industrial waste streams. GeoSpray is designed for use through multiple application techniques including pouring, placing, trowelling, spraying, or centrifugal casting.

GeoSpray can be used for rehabilitation of pipes and structures in Civil Infrastructure, Gas & Oil and Chemical industries. In addition, it is used to repair tunnels, bridges, and roads as well as to rehabilitate buildings and containment areas.



Test Method	Duration	GeoSpray	Conventional Repair Mortar
Compressive Strength ASTM C-39/C-39M-09a/C-109	1 Day 28 Days	Min. 2,500 psi / 17 MPa Min. 8,000 psi / 55 MPa	5000 psi / 34 MPa
Flexural Strength ASTM C-78	7 Day 28 Days	1200 psi / 8.3 MPa (C-78) 1300 psi / 9 MPa (C-78)	500 psi / 3.4 MPa
Modulus of Elasticity ASTM C-469 - 02	1 Day 28 Days	3,000,000 psi / 20700 MPa 6,500,000 psi / 46500 MPa	3,000,000 psi / 20700 MPa
Bond Strength to Concrete ASTM C-882/C-882M-05	1 Day 28 Days	Min 1,300 psi / 9 MPa Min. 2,500psi / 11 MPa	N/A
Set Time ASTM C-807 - 08 Initial Cure Time	Initial Set Final Set	60 - 75 Minutes 90 - 110 Minutes	120 Minutes 300 minutes
Freeze Thaw Durability ASTM C-666	300 Cycles	100% Zero loss	80% to 90% 10% to 20% degradation
Sulfate Resistance (% expansion) ASTM C-1012-04	6 Weeks	0.011 % Expansion	0.038% to 0.044% Expansion
Shrinkage ASTM C-1090	28 Days	0.07%	0.35% to 0.50%
Tensile Strength ASTM C-496	28 Days	Min. 750 psi / 5.2 MPa	400 psi / 2.7 MPa
Abrasion Resistance ASTM C-1138	6 Cycles @ 28 Day Maturity	0.67% Loss	5.60% Loss
Chloride Ion Penetration by Ponding ASTM C-1543	90 days ponding	0.014 % wt Cl at 55-65 mm	N/A



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## Composition

A proprietary micro-fiber reinforced ultra - dense geopolymer mortar designed for mechanical pumping and spraying. GeoSpray is an inorganic polymeric system that adheres strongly to cement surfaces and itself.

## Characteristics

A dark grey mortar with near-zero porosity. Wet density of ~127 lbs/ft<sup>3</sup>, or 2035 kg/m<sup>3</sup>.

Largest particle size: 0.3 mm.

## Yield and Coverage

Yields 0.43 ft<sup>3</sup> (0.012 m<sup>3</sup>) per 50 lbs. For one 50lb bag, coverage is 10.3 ft<sup>2</sup> at 0.5" depth (0.96m<sup>2</sup> per 12mm depth)

## Packaging

GeoSpray is available in 50lb (22.7kg) sealed bags or in 2,000lb (908kg) super sacks.

## Cleaning and Preparation

The surface shall be thoroughly cleaned. Use high-pressure water blasting with a minimum of 2500 psi (or as required by local provisions) to clean and free all foreign material, including dirt, grit, roots, grease, sludge or other material that may be attached to the existing surface. All loose or defective brick, grout, or surface irregularities should be removed to provide an even surface prior to application of GeoSpray. When grease and oil are present, an approved detergent or muriatic acid shall be used integrally with the high pressure cleaning water. All materials resulting from the cleaning of the pipe shall be removed prior to application of GeoSpray.

## Mixing

Do not exceed a 0.20 w/c ratio. Always add GeoSpray to the water. Follow normal industry standards for batching and mixing.

## Work Time

Work time is 60 - 90 minutes at 80°F (27°C).



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## Application

Once mixed to proper consistency and homogeneity, GeoSpray can be hand troweled as a repair mortar for crack repair prior to spraying.

GeoSpray should be pumped from a horizontal mix auger cavity via an adjustable rotor stator pump through a hose for delivery to the appropriate application device (spray nozzle or spinner head), and shall be applied to a damp surface.

GeoSpray has an ultra-low abrasion rate on hoses and equipment; they will last much longer, with fewer interruptions and remobilizations.

## Finishing

If necessary, troweling of materials can begin following the spray application. Initial troweling shall be in an upward motion, to compress the material into voids and solidify the pipe wall. Take precautions not to over trowel.

GeoSpray can be finished using a steel trowel, wood float, sponge float, broom or brush, depending on the surface texture desired.

## Curing

Optimum curing occurs in a moist and moderate environment. General underground conditions are usually adequate to meet this requirement. If dry and/or hot conditions are present, the use of a wind barrier and fogging spray will be required.

During hot weather conditions, chilled water may be used to mix GeoSpray geopolymer. GeoSpray geopolymer cement should be maintained at a temperature lower than 90°F (32°C). Standard industry practices may be used to maintain proper temperature. Alternatively, GeoSpray should not be placed when the temperature in the curing environment is below 37°F (3°C). During cold weather conditions, heaters, thermal breaks, and other methods may be used to maintain temperature above that threshold.

## Storage & Handling

GeoSpray shall be stored in a cool, dry location. Stored under proper conditions, shelf life is one year.

## Quality Control & Material Testing

For each section length designated by the owner in the contract documents or purchase order, GeoSpray will be collected at the end of the hose near the discharge point. Use 4" by 8" cylinders in accordance with Test Method ASTM C 39/39M or sprayed panels in accordance with ASTM C1140.

## Health & Safety

GeoSpray, is a cementitious powder, is alkaline and may cause significant skin and eye irritation. Adequate health and safety precautions should be observed during all storage, handling, use and drying periods. For safety and health precautions, reference the current version of the Safety Data Sheet for GeoSpray. When using GeoSpray in a confined space or closed area, consult the current OSHA or ANSI bulletins on safety requirements. Do not take internally. If swallowed, call a physician immediately.

## Warranty

Milliken Infrastructure Solutions, LLC warrants this product to be free of defects in material and manufacturing. Should the product prove to be defective, the liability to Milliken Infrastructure Solutions shall be limited to replacement of the product, ex-factory. Milliken Infrastructure Solutions makes no warranties as to merchantability or fitness for a particular purpose. This warranty is in lieu of all other warranties expressed or implied. Users should determine the suitability of the product for the intended use and assume all risk and liability in connection therewith.



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