



# TECHNICAL BULLETIN

## WET SPRAYING MEADOW-CRETE® GPS

In certain circumstances, and particularly where relatively large volumes or areas of repair mortar are required, MEADOW-CRETE GPS may be applied by the wet spray process. The technique offers the following advantages over hand or trowel applied mortars.

- a) Excellent bond to the substrate concrete.
- b) Excellent compaction of the mortar.
- c) High build
- d) Rapid placement of material.
- e) Prevention of some of the operator-induced defects.

### PRINCIPLES OF OPERATION

For the wet spray process, the MEADOW-CRETE GPS repair mortar is mixed in a forced-action mixer to produce a material with the correct consistency for pumping. When thoroughly mixed, the material is placed into a hopper containing a feed screw which moves the material to the pump.

The pump which is commonly a helical screw in a static jacket, but may in some cases be a positive displacement piston pump, forces the material along suitable pressure rated delivery hoses to the application nozzle. A jet of compressed air is introduced to the mortar just prior to the end of the nozzle, causing the mortar to be broken into small particles and projected at relatively high speed to the repair area. Much of the equipment currently available combines the mixer, hopper, feed screw, pump and air compressor in one electrically or diesel-powered unit.

Wet spraying of mortars is a skilled process and requires experienced operatives to achieve good results. The operatives controlling the nozzle and the mixing of the mortar have a significant influence on the quality of the completed job. It is, therefore, strongly recommended that experienced applicators should be employed who are familiar with the process. Where such experience is not available, the applicators should demonstrate their capability through monitored trials.

### MATERIALS

It is possible to use the wet spray process for the MEADOW-CRETE GPS mortar which can be hand or

trowel applied also. The factor controlling the water content is the stiffness of the mortar. It needs to be both 'soft' enough to drop into the feed screw of the pump and pass along the hoses, yet 'Stiff' enough to enable a reasonable build to be achieved on vertical and overhead surfaces.

The variable water addition for the MEADOW-CRETE GPS is 3.5 –3.75 quarts per 50 lb. bag. The water addition can be reduced to achieve a thicker consistency if desired.

### PRIMING

Any exposed steel reinforcement should be primed in accordance with the recommendations of the project license design professional. This will generally involve application of Zinc-Based Primer.

If the concrete can be maintained in a saturated surface dry condition immediately prior to the application of the sprayed mortar, no bonding aids are required. The impact of the mortar from the spray nozzle causes good wetting of the mortar on to the concrete surface and results in excellent bond strengths.

### THICKNESS OF APPLICATION

MEADOW-CRETE GPS mortars should not be applied at a thickness below the minimum specified on the relevant data sheet. The mortar should be built up to the required thickness by applying wet on semi-cured material, without allowing the previous layer to fully dry out. This is due to the excellent compaction and bond. The practical thicknesses achievable on site will depend on the orientation of the substrate, the consistency of the material, the temperature of the substrate and mixed material, the application method and equipment and the geometry of the repair area.

### AREA OF APPLICATION

The area which may be sprayed during one application will be dependent on a number of factors.

- a) The temperature and prevailing environmental conditions control -



**W. R. MEADOWS, INC.** | P.O. Box 338 | HAMPSHIRE, IL 60140-0338  
Phone: 847/214-2100 | Fax: 847/683-4544 | [www.wrmeadows.com](http://www.wrmeadows.com)



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i) The drying time of the mortar will limit the time which may elapse between successive passes of the nozzle.

ii) The setting time, which will determine whether application and finishing can proceed simultaneously.

b) The number of operatives will determine whether application and finishing can occur simultaneously.

### FINISHING

MEADOW-CRETE GPS mortars are finished by cutting to the required profile and closing with a steel float. Wooden or plastic floats, or damp sponges, may be used to achieve the desired surface texture.

The surface should not be overworked. The surface will normally be finished immediately after spray application.

### CURING

MEADOW-CRETE GPS mortars are cement based. Common with all cementitious materials, MEADOW-CRETE GPS products must be cured immediately after finishing in accordance with good concrete practice. Recommended curing procedures are described on the relevant MEADOW-CRETE GPS data sheet.

### EQUIPMENT PUMPS

MEADOW-CRETE GPS mortars have been sprayed successfully through a number of screw pump plaster spray machines. Any similar type of equipment should also be suitable. However, it is recommended that a trial with the material and the proposed pump should be performed prior to commencing a job. The type of equipment selected for a Job will depend on its availability, the amount of material to be applied and the location. Although many of the pumps have a compressor built in, this is frequently not adequate to ensure sufficient dispersion of the material and compaction on to the substrate. In general, a separate compressor is recommended.

### MIXERS

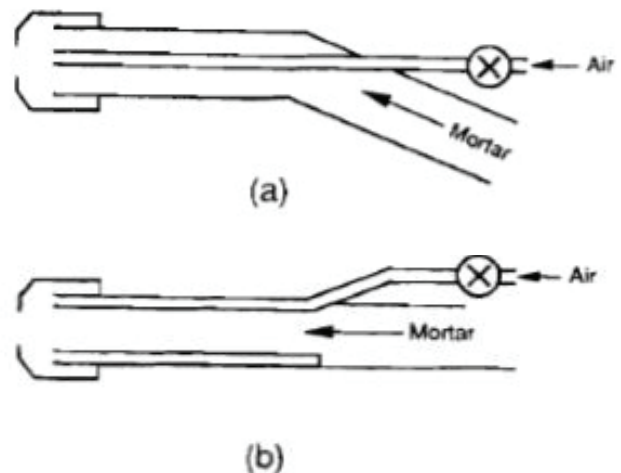
MEADOW-CRETE GPS mortars must be mixed in forced-action type mixers, and not in free-fall mixers. Many of the pumps have forced-action mixers built into the single powered unit, which perform quite satisfactorily. Continuous mixers where the powder and water are metered into a mixing screw at a controlled rate are generally not suitable due to their short mixing time.

### HOSES

The hoses for conveying the mortar should be pressure rated to at least twice the pressure capability of the pump. Typically, the hose should have a minimum 1 inch (25.4mm) internal diameter. Mortars have successfully been pumped through 50 ft. (15.25 m) of hose. Care must be taken to ensure all the hose fittings are properly attached to the hose and are in good condition.

### NOZZLES

Various designs of nozzle can be used for spraying MEADOW-CRETE GPS mortars. The compressed air for dispersing and projecting the mortar on to the substrate is introduced either through a central pipe or down an annulus - figures (a) and (b) respectively. The quality of the application is affected by the diameter of the exit aperture (this controls the size of the cone of sprayed mortar, the rate of flow and the degree of atomization). Apertures from 3/8" (9.52 mm) to 5/8" (15.8 mm) in steel and rubber caps are typically effective.





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### GENERAL INFORMATION

In the wet spray process, the mortar is batched and mixed prior to being pumped along suitable hoses to the discharge nozzle. High velocity air is introduced at the nozzle to disperse the mortar and propel it into position.

Wherever possible, it is important to keep the pump unit close to the work area to prevent high pressures in the delivery hoses. Under good conditions, the mortar can be applied at a rate up to 5 gallons/minute (18.9 liters per minute).

The spraying technique employed for each job will depend on the nature of the work and the materials used. Wherever possible, it is recommended that trials are performed with the material and equipment on elements which exhibit the same features as the job to ensure the spraying technique employed is appropriate. The general guidelines presented here offer a starting point for these trials.

### EQUIPMENT

The mixer, pump and spray equipment should be specifically designed for spraying mortars or plasters and should be capable of delivering a continuous, even flow of material to the nozzle. The equipment should be inspected and cleaned at least twice a day. The compressor should be capable of supplying a continuous supply of clean, oil-free compressed air to the nozzle, sufficient to disperse the mortar and ensure an even spray distribution of material on to the substrate. It is highly recommended that an independent 100 cfm (2,831 liter/min) compressor is employed for wet spraying MEADOW-CRETE GPS mortar.

Delivery hoses should be inspected to ensure they are clean and undamaged, with particular attention paid to the couplings. The couplings and seals should be clean and in a good condition. If damaged, they must be replaced prior to proceeding. The delivery hoses should be laid out before work starts and all kinks and constrictions should be eliminated. The airline and couplings should be inspected for damage and laid out alongside the delivery hose without kinks or constrictions. In the work area, the air line should be

attached to the delivery hose at regular intervals. The pump delivery pressure should be tested by attaching a suitable pressure gauge to the outlet and operating the pump with clean water as the control material. If the pressure reading is too low, the pressure must be adjusted or, if necessary, the pump stator jacket replaced. When satisfactory, water must be pumped through the hoses followed by a slurry of Portland cement and water, introduced into the hoses to act as a lubricant. Do not use slurry of the MEADOW-CRETE GPS material.

### FOR APPLICATION BEST PERFORMANCE

Prepare concrete substrate in accordance with ICRI Technical Guideline #310.2R-2013: Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays. Also, prepare concrete repair area in accordance with ICRI Technical Guideline 310.1R-2008: Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

Mechanically roughen or high pressure water-jet the existing concrete substrate to a minimum concrete surface profile of CSP-6 or higher, depending on substrate condition. Remove all unsound concrete and provide a profiled, porous surface. The substrate must be structurally sound, dust-free, and free of grease, oil, dirt, curing compounds, release agents, or any other surface or penetrated contaminants that will adversely affect bond. Sanding or wire-brushing are not approved surface preparation methods. Saw cut perimeter of repair zone to a depth of ¼" (6.35 mm) Completely expose all reinforcing steel, ensuring a minimum clearance of ¾" (10.05 mm) behind the reinforcing steel. Substrate must be saturated surface dry (SSD) and free of standing water.

Spray application should commence at the bottom of vertical or near vertical surfaces and the mortar built up to the required thickness by making several passes of the nozzle over the work area.

The nozzle should at all times be held perpendicular to the work surface. In general, the distance of the nozzle from the application spray surface should be





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between 0.5 ft. (0.14 m) to 2 ft. (0.61 m), dependent on the structure, air supply, and mortar flow rate and application geometry. Care must be taken when spray applying material around reinforcement and into corners. The nozzle should be held at an angle to the surface to ensure complete encapsulation of the reinforcement or complete filling of the corner.

The mortar should emerge from the nozzle in a steady flow, free from pulsation. With wet spray application of mortars, the amount of rebound should be minimal. However, care must be taken to prevent the incorporation of rebound, or other wastage, into the finished work. Where thick layers are required, care must be taken to ensure the material does not slump or sag, as this can result in the breaking of the bond. If slumping does occur, the affected area must be cut out and replaced. Greater thicknesses can be achieved by allowing the initial layer of mortar to stiffen before further layers are applied. The stiffening time will vary with the prevailing environmental conditions. Prior to the application of additional layers, any loose material or overspray must be removed.

The applied material may be troweled smooth to achieve a specified surface finish. Care must be taken to ensure the bond line is not disturbed during troweling.

MEADOW-CRETE GPS is recommended for concrete repairs only. Not intended to be used as a self-leveling underlayment or topping. Do not apply when concrete surface and air temperatures are below 40° F (4° C), above 90° F (32° C), or when rain is imminent. Protect from freezing for a minimum of 48 hours. Do not bridge moving cracks. Extend existing control and expansion joints through MEADOW-CRETE GPS.

For large areas with no control, expansion, or construction joints, refer to ACI guidelines. Do not exceed a length-to-width ratio of 2:1 for the repair area. Do not add any admixtures. Follow ACI 305R-10: Standard on Hot Weather Concreting or ACI 306R-10: Standard on Cold Weather Concreting when applicable.

Realize that set time will decrease as the product, air, substrate, and mixing liquid temperature increases and will increase as the temperature decreases. Repair areas should be saw cut and slightly undercut to a minimum depth of 1/4" Do not featheredge. Protect from conditions that may cause early water loss: high winds, low humidity, high temperature, direct sunlight. Early water loss is exaggerated in thin applications.

Failure to follow industry standard practices may result in decreased material performance. Proper application is the responsibility of the user. Field visits by W. R. MEADOWS' personnel are for the purpose of making technical recommendations only and are not to supervise or provide quality control on the jobsite.

### CURING

MEADOW-CRETE GPS mortars are cement-based. In common with all cementitious materials, they must be cured immediately after finishing in accordance with good concrete practice. Cure MEADOW-CRETE GPS immediately following application using a suitable water-based curing compound from W. R. MEADOWS, or in accordance with ACI 308. W. R. MEADOWS recommends 2200-WHITE or 1100 series for curing. (Do not use solvent-based curing compounds.) When environmental conditions exist for rapid early water loss, the use of EVAPRE<sup>™</sup>, an evaporation retarder from W. R. MEADOWS, is also recommended.

If used in cold conditions, the finished repair must be protected from freezing.

Application of protective and/or decorative finishes MEADOW-CRETE GPS mortars are extremely durable and will provide excellent protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will generally benefit from the application of a barrier / decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repair itself. W. R. MEADOWS recommends the use of CEM-KOTE FLEX ST and CEM-KOTE FLEX CR protective coatings. These prod-



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ucts provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment.

### HEALTH & SAFETY

Avoid inhalation of dust. Avoid direct contact with this product. Utilize gloves and safety glasses to minimize direct contact. If contact occurs, wash affected areas with mild soap and water. Keep product out of reach of children. For industrial use only. All necessary measures should be adopted in accordance with the requirements of all Health & Safety law. Limits, OSHA and all other applicable local, state and federal regulations. Before work commences, refer to the product Safety Data Sheet (SDS).

### EQUIPMENT MANUFACTURERS

Graco/Machine Technologies, P-25 Mortar Pump and D-25 Continuous Mixer, 5.25 HP, 220V

Quikspray 15020TBM-3-GAM with Trigon (pneumatic power requires a minimum of 125CFM) Carousel pump, 2+ HP variable speed pneumatic motor and controls, and an easy clean parabolic shaped hopper.

Putzmeister S5 Rotor/Stator

In some instances, the mortars have been placed using the compressors built into the pump units. Experience has shown these to be generally insufficient to achieve good dispersion and compaction of the material. It is highly recommended that an independent 100 cfm compressor is employed for wet spraying MEADOW-CRETE GPS mortar.

### LIMITED WARRANTY

"W. R. MEADOWS, INC. warrants at the time and place we make shipment, our material will be of good quality and will conform with our published specifications in force on the date of acceptance of the order." Read complete warranty. Copy furnished upon request.

### DISCLAIMER

The information contained herein is included for illustrative purposes only, and to the best of our knowledge, is accurate and reliable. W. R. MEADOWS,

INC. cannot however under any circumstances make any guarantee of results or assume any obligation or liability in connection with the use of this information. As W. R. MEADOWS, INC. has no control over the use to which others may put its product, it is recommended that the products be tested to determine if suitable for specific application and/or our information is valid in a particular circumstance. Responsibility remains with the architect or engineer, contractor and owner for the design, application and proper installation of each product. Specifier and user shall determine the suitability of products for specific application and assume all responsibilities in connection therewith.



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