Gunning Guidelines for R-MAX G

This guide is designed for applications where R-Max G will be used as a single component lining, or in two-component linings where the back-up lining has a density over 60 pcf.

Recommended Equipment:

1) Minimum 750 cfm, 100 psi air compressor (dedicated)
2) Paddle mixer (Anchor Manufacturing type mixer or equivalent)
3) Double chamber, pressure tank gunite machine (Allentown N type) is preferred but a rotary (REED type) gunite machine can be used.
4) 16 hole water ring with a double bubble nozzle. An 18" nozzle extension is desirable.
5) Water pump, able to achieve a minimum 100 psi water pressure (150 psi water pressure is desirable)

Recommended Gunning Parameters:

1) Dry Material Temperature: 60°F to 85°F
2) Air Temperature: 60°F to 85°F
3) Suggested air pressure at gun: 40 to 45 psi for the first 100 ft of hose; add 15 psi for each additional 100 ft of hose*
4) Suggested feed wheel pressure at gun: 25 to 35 psi *
5) Suggested pre-dampening level is approx. 2%; age predampened material as needed

(*) = Air and material feed wheel pressures may vary for individual gunite equipment

1. Use clean tools and equipment. Contamination can affect setting and strength of gun mixes.
2. Gunning surfaces should be clean, free of foreign matter, and at room temperature (60°F to 85°F). A cold gunning surface would increase rebounds and reduce adherence. For best results, material and ambient temperatures should be 60-85^{o}F (16-29^{o}C) during mixing, gunning, and curing.
3. For pre-dampening and gunning, use only clean water suitable for drinking.
4. A continuous feed at the gunning nozzle is important to allow for uniform mixing of water and material. An extension between the water ring and the nozzle will improve the mixing of material and water. A continuous supply of water to the nozzle at a constant pressure is also important. An 18" long pipe can also be used as a nozzle.

PRE-DAMPENING:

1. Pre-dampen in a paddle-type mixer prior to loading gun. This will minimize dusting at nozzle.
2. Too much pre-damp water will result in lumping which can cause blockage in the hoses between the gun and nozzle.
3. If required, sift stainless steel fibers into the material during mixing.
4. For pre-dampening, mix for approximately 2 minutes. After mixing, the pre-dampen material can be dumped onto a piece of dampened plywood prior to loading into the gun. Do not allow the material to dry out prior to loading into the gun, as determined by a hand squeeze test.

GUNNING:

1. The gun operator and nozzleman adjust the air and material feed pressures for proper application and minimum rebound.
2. Once the parameters are set and the material is flowing smoothly, the nozzleman will start at the bottom of the wall and work the nozzle in a circular motion covering an area 2-3 ft (60-90 cm) wide and 1-2 ft (30-60 cm) high. Gradually build up to full thickness from the bottom up. This will support the material and prevent rebound entrapment at the base of the wall
3. Rebound is that material that does not adhere to the wall during the gunning process. It normally falls to the floor and collects at the base of the wall. Discard this material as hydration of the cement has already started. Trimming should be completed before the material takes its initial set and not reused.
4. On larger applications where it may not be practical to continuously gun the full area, construction joints are necessary. These are made by cutting the already applied material at a 90^{o} angle to the wall through the full thickness of the material. The construction joints are usually made midway between anchors. When gunning is continued, the existing material at the joint should be wet down with water or cut back to fresh material.

CURING:

1. After finishing, cover all exposed surfaces with a polyethylene film, or spray with a commercial curing compound containing a colored dye. This procedure will prevent water evaporation, thus the material will have the required water for proper hydration and maximum properties.
2. During the first 24 hour period after gunning, do not disturb the gunned surface.

EXTREME WEATHER PRECAUTIONS

1. Extreme Cold Weather:
   - Keep the material, and installation area above 60^{o}F (16^{o}C) during installation and 24 hour curing period.
   - Do not allow lining to freeze during 24 hour curing period. After the curing period, the lining may be subjected to freezing conditions, however, the castable should be at least 60^{o}F (16^{o}C) before dry out is started. Freezing may cause steam explosion during dry out.
2. Extreme Hot Weather:
   - Keep the material, and installation area below 85^{o}F (29^{o}C) during installation and 24 hour curing period. Elevated temperatures may reduce working time, and cause cracking due to surface dryout.
   - Store the dry castable in a cool area prior to mixing.
   - Use cold water, less than 45^{o}F (7^{o}C) during mixing.
   - Shade or water spray the exterior surface of the unit.

MCL 4-21-06