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# Prepacked Shotcrete Admixture : Spray-Con WS

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## PREPACKED SHOTCRETE ADMIXTURE : SPRAY-CON WS

### THE NEED

Over the past 10 years, the wet shotcrete method has become increasingly used in the repair of vertical and overhead concrete surfaces. This is due, in part, to advances in materials such as the introduction of silica fume (microsilica), fibers and superplasticizers, which not only make shotcrete easier to place, but also improve its durability. Batching all these materials in the right proportions with sand and cement can be difficult, so many manufacturers have developed pre-packed shotcrete repair mortars to which contractors add only water. The pre-packed materials simplify batching and provide more consistent quality. But packaging all the dry materials increases their cost. Gemite Products Inc. Amherst, NY developed pre-packed products (called "concentrates"), which include all the admixtures but require contractors to provide their own sand and cement. The material costs of concentrates mixed with sand and cement are considerably lower when compared with complete packaged systems, while maintaining the same quality.



FIGURE 1 PREPACKED SHOTCRETE ADMIXTURE : SPRAY-CON WS

### THE TECHNOLOGY

The wet shotcrete admixture products, Spray-Con, are mixed on-site with locally supplied sand and Portland cement. Spray-Con's silica fume enhanced and fiber reinforced formulations make it easy to control air entertainment in shotcrete - an important requirement for freeze/thaw durability and salt-scaling resistance. Its compressive strength (ASTM C109) is between 41.4 and 45 MPa and Young's modulus is approximately 27.6 - 31 GPa. Applied to clean, sound concrete, Spray-Con's bond strength exceeds the tensile strength of the substrate concrete. The high bond and reinforced composition make it an ideal material for restoration of bridges, subways,



tunnels and other areas subject to vibration during application. For rock and soil stabilization Spray-Con's admixtures and fiber reinforcement may allow its use without mechanically placed reinforcing mesh and anchors. The low permeability of micro-silica concrete is essential in new construction and restoration of concrete bridges and parking decks, where resistance to chloride penetration is essential. It endures northern climates and can be used in most applications where extreme freeze/thaw cycles prevail.

## **THE BENEFITS**

- Applies up to 30 cm (12 inches) thick in a continuous overhead build-up
- Minimizes down-time for application
- Allows thin to thick application
- Forms a durable, high bond surface
- Protects the substrate
- Fiber-reinforced, may eliminate the use of meshes
- Reduces labor requirements
- Low water/cement ratio
- Resists water intrusion and salt-scaling
- Resists drying shrinkage cracking
- High economy

## **STATUS**

After its first large application in Chicago's Grant Park garage in 1988, Spray-Con has been successfully applied to the Van Buren Street bridge in Chicago, IL, Harrington Water-cooling tower, Amarillo, TX, the foundations of the Manufacturer's Life Building, Ottawa, and many concrete restoration projects in Canada, USA, Europe and Asia.

## **BARRIERS**

Protect from freezing for 48 hours after application.



## **POINTS OF CONTACT**

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## **REVIEWERS**

Peer reviewed as an emerging construction technology

## **DISCLAIMER**

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## **PUBLISHER**

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