



# **STRONGWARN SWADA**

## **Installation Procedures**

### **Fluid Applied Detectable Warning System**

The STRONGWARN SWADA System is a seamless, fluid applied, cast-in-place detectable warning system. The system is suitable for new construction, precast components and various types of retrofit applications. The installation does not require fasteners, adhesives or milling to undercut the platform. The installation maintains excellent skid resistance and provides an anti-slip surface in both wet and dry conditions. STRONGWARN is sustainable, easy to install, cost effective and requires minimal maintenance.

**JOB SITE SURVEY:**

- Evaluate the existing substrate for signs of efflorescence.
- Testing may be required for chlorides content, depth of carbonation, ASR, AAR and to determine if there are any deleterious aggregate or unacceptably high levels of potassium, sulfate, alkali, hydrostatic pressure or MVER within the concrete substrate. For on grade, exterior and non-controlled environments adhesion tests may be required.

**ENVIRONMENTAL CONDITIONS:**

All materials are mixed, installed and cured at the job site. These environmental conditions are required to facilitate proper curing and performance of the system. Do not proceed if outside of these environmental conditions.

<b>Ambient</b>	<b>Minimum</b>	<b>Maximum</b>
Temperature	45°F and rising	90°F
Relative Humidity	20% rh	85% rh
Wind	N/A	30 mph
<b>Substrate</b>		
Temperature	50°F and rising	85°F
Relative Humidity	N/A	75% rh
MVER	N/A	6 lbs.

Measure and record these temperatures daily.  
 Do not install components if rain or freezing conditions are anticipated.  
 Substrate temperature must be at least 5°F above measured dew point.  
 Substrate is not frost laden.

**SUBSTRATE PREPARATION GUIDELINES:**

- Inspect the existing substrate to determine its general condition including previously applied products, concrete defects, soundness, chemical damage, presence of contaminants and excess moisture.
- Remove or replace areas with penetrating and migrating contaminants, silicone coated surfaces, concrete curing compounds and form release agents, sealers, dirt, adhesives, oil, grease, wax, fatty acids, hydraulic fluid, cutting oils, paint, films, existing coating, laitance, glaze, efflorescence and all contaminants that will inhibit or prevent formation of a penetrating bond within the substrate.
- Restore all non-durable, unsound, damaged, deteriorated, delaminated, cracked, weak, loose, spalled and rust stained concrete. Eliminate and restore all surface irregularities, air voids, fins, honeycombs, bug holes, spalls, cracks and deteriorated joints. Leave no voids. Perform all structural repairs using the Strongwall repair mortars. Mechanically profile all repairs.
- All crack treatment detailing is required to be fully embedded and not translate through the FIELD.
- New and restored concrete is required to be thoroughly cured, flat in line and grade and slope to drain. No ponding water conditions. The mold sections are required to lay flush with the substrate.
- Determine the best method or combination of methods of mechanical surface preparation to obtain an exposed aggregate profile and open the concrete pore structure.
- For new, cast-in-place, precast concrete elements and existing concrete substrates, prepare the surface to an ICRI concrete surface profile of 3 - 5. Refer to the ICRI Technical Guideline # 310.2R-2013 for "Selecting and Specifying Concrete Surface Preparation."
- For assessment of decontamination, surface preparation and profile, perform a Tensile Adhesion Test per ASTM C-1583.
- A dedicated power wash at up to 4,000 psi to remove all contaminants is required prior to commencing installation.

## **SYSTEM INSTALLATION:**

The proper installation of the STRONGWARN SWADA System is the sole responsibility of the end-user.

The supervision and quality control of the project is the sole responsibility of the user.

Job site visits by SWI representatives are only for the purpose of making recommendations.

- Conduct a pre-installation conference with all parties in attendance at the project site to review the mechanical surface preparation, structural repair procedures, crack isolation, transitions, joint location, mold placement and any other conditions prior to staging work.
- Install a single 2' x 4' mold field mock-up of the system using the same equipment as in the construction procedures for owner approval of the following: restoration procedures and pertinent details, mechanical surface preparation, system installation and compliance prior to commencing work.
- Use the mock-up as a guideline for cure times specific to the environmental conditions at the time of installation.
- Plan mold placement according to existing joint locations on site. For new construction, designing joint placement that most easily accommodates the mold dimensions is recommended.
- Expansion, pour and control joints are continued up through the underlayment and template to the original joint.
- Precondition properly stored material to 65°F - 75°F prior to mixing.
- Maintain dust free conditions throughout the installation as all contaminants will inhibit bond formation.
- Work according to the approved field mock-up.
- Follow all environmental conditions to achieve optimal performance and a full and continuous cure.

## **COMPONENTS:**

### **#82 TRUNCATED DOME:**

**Packaging:** 5 gallon pail of # 82 liquid

Eight 32.5 lbs. bags of # 82 powder

**Unit Yield:** 400 ft<sup>2</sup> of dome array

### **Mixing:**

Follow unit mix ratio.

Pre-mix the liquid prior to each batch.

Mix only what can be placed in 10 minutes.

- Pre-mix liquid at 400 rpm for 2 minutes.
- Pour into a clean container.
- Use a drill with a mounted Jiffy mixer.
- Place the paddle at ¾ depth of the pail.
- Do not create a vortex or aerate the material.
- Gradually add the powder to the liquid.
- Never reverse this step.
- Scrape sides of the container.
- Mix for 2 minutes until there are not dry pockets of powder.

### **Placement:**

Substrate is SSD.

Achieve a dull concrete finish.

No ponding conditions or standing water in holes and voids.

Maintain this status during placement of the mold section as well as the entire #82 installation

- Identify all joints and address how to honor them.
- Outline the field area with heavy-duty duct tape as per the specification.
- Mist with potable water beneath the mold sections to maintain these conditions throughout the installation
- Immediately place each mold segment along the platform edge.
- All mold sections must be flush with the substrate.
- Evenly pour a thin ribbon of the #82 mixture onto the exposed surface of the mold.
- Using a rounded steel finishing trowel, work mixture into mold cavities.
- Work towards mold perimeter.
- Trowel material in both directions until exposed dome surfaces are smooth.
- Constantly remove all excess material from the surface.
- Mold must remain flexible during curing process.
- When the material starts to pull from the orifice, it is no longer workable.

### **Curing:**

Do not touch or move the mold sections during curing as it may break the bond.

- When the domes have sufficiently cured, lift one mold corner to evaluate.
- Dome should be firm to the touch inside mold section.
- Carefully with a peeling action, lift the entire mold section on a diagonal.
- All domes should be well bonded to the substrate.
- Domes must be fully cured prior to #32 FIELD application.

**Minimum Curing Time Guidelines:**

**55°F:** 12 to 24 hours

**Above 55°F:** 6 to 12 hours

**75°F:** 6 to 8 hours

**Mold Sections:**

- Clean both sides of the mold section immediately after being removed.
- Power wash at 2,000 psi using a turbo tip.
- Remove all cured material without damaging the mold configuration.
- Store flat and indoors for reuse.

**#32 FIELD:**

**Packaging:** 5 gallon pail of liquid

Two 55 pounds bags of powder

**Coverage:** 100 ft<sup>2</sup> at 60 mils

**Mixing:**

Follow unit mix ratio.

Pre-mix the liquid prior to each batch.

Mix only what can be placed in 20 minutes.

**Mixing Ratio:** 2 ½ gallons : 55 lbs.

- Pre-mix liquid at 400 rpm for 2 minutes.
- Use a drill with a mounted Jiffy mixer.
- Place at ¾ depth of the pail.
- Do not create a vortex or aerate the material.
- Pre-measure pigmented liquid (hold back ½ gallon) into a clean mixing container.
- Gradually add the powder to the liquid.
- Never reverse this step.
- Scrape sides of container.
- Mix for 3 minutes until mixture is free of pockets of dry powder.
- Add in the remaining ½ gallon of pigmented liquid.
- Mix for 1 minute.

**Procedures:**

Substrate is SSD.

Allow moisture to penetrate into the substrate.

Achieve a dull concrete finish.

Leave no ponding water.

Maintain this status during installation of the first coat of #32.

Ensure good, intimate contact with the substrate while it remains damp.

- Apply each coat in a continuous and uniform direction.
- Regularly check wet mil thickness and coverage rates.
- Apply evenly, keep a wet edge and back roll.
- Avoid causing shadows or roller marks.
- Install in small sections.
- Do not allow the mixture to well at the base of the domes.
- Scrub in to achieve optimal adhesion and fill pores.
- Allow first coat to cure.
- Do not dampen between coats.
- Apply second coat.
- Roll and brush well mixed material in a crosshatch direction.
- Remove excesses welled at the base of the domes.
- Do not let mix settle, remix during use. It will affect coverage and mil thicknesses.
- Discard mix once it begins to set up.
- Finish as per approved field mock-up.
- Allow to fully cure.

**Curing at 75°F:**

6 - 8 hours or until fully cured.

#### **#4 SEALER:**

5 gallon pail of pre-pigmented #4 SEALER

**Coverage:** 400 ft<sup>2</sup> at 10 mils

#### **Mixing:**

- Pre-mix at 400 rpm for 2 minutes.
- Use a drill with a mounted Jiffy mixer.
- Place at ¾ depth of the pail.
- Do not create a vortex or aerate the material.
- Re-disperse the pigment to eliminate settlement.

#### **Placement:**

Decant material into a paint tray.

Application is by dip and roll.

Mix material prior to each application as pigments settle.

- Apply directly from pail to a dry and fully cured #32 FIELD surface.
- Install using a medium or hard nap roller.
- Work from the center of the field to the perimeter in both directions.
- Do not allow any material to collect at the base of the domes.
- Apply evenly, keep a wet edge and back roll.
- Regularly check wet mil thickness and coverage rates.
- Avoid causing shadows, streaks or discoloration.
- Thoroughly scrub the first coat into the installed #32.
- Install in thin coats to reduce pin holing, achieve optimal adhesion and weatherproofing.
- Use a crosshatch method.
- Leave no puddles or excess material.
- Allow first coat to cure overnight.
- Apply the second coat.
- Discard topping once it begins to set up.
- Finish as per approved field mock-up.
- Allow to fully cure and remain dry between coats.
- Open to pedestrian traffic 24 hours after the sealer is installed or when the entire system is fully cured.

#### **Curing at 75°F:**

6 - 8 hours or when fully cured.

#### **EQUIPMENT AND TOOLS:**

Clean all tools and equipment with water while still wet immediately after use. If cured, mechanical means will be necessary.

Mold segments

Power washer

Air blower

Scale

Mister

Volumetric graduated containers

Mixing pails

Variable speed industrial drill

Jiffy mixer Model PS-1

Heavy-duty 2" duct tape

8" - 12" rounded steel trowel

8" - 12" medium to hard nap rollers with handle

Thin width flexible brush with synthetic bristles

#### **PRECAUTIONS AND LIMITATIONS:**

Refer to corresponding Product Data Sheets, Installation Procedures and Safety Data Sheets of all components of the SWADA systems prior to installation.

Refer to [www.strongwall.com](http://www.strongwall.com) for the most recent information and updates.

- Product is temperature sensitive regarding cure and set time.
- Discard any material that starts to set up in the container.
- #32 FIELD is required to be totally dry and fully cured prior to the installation of #4 SEALER to ensure proper adhesion.
- Minor shade variations, staining, streaking or efflorescence may occur due to cure rate and site conditions or when a fresh material is exposed to water, heavy dew or excessive moisture prior to curing.
- Do not bridge any joints including expansion joints, control joints or moving joints with the system.
- Prevent any contact with Aluminum, as with all Portland cement based products, to prevent adverse chemical reactions and possible product failure. Follow specifications for potential areas of contact by insulating or coating aluminum bars, rails and posts.

**NEW CONCRETE:**

New concrete pours, as an industry standard, are required to cure for 28 days. Mechanical surface preparation may begin at 21 days or if the concrete has achieved at least 80% of its design strength. The surface preparation will open the pores and eliminate the excess moisture within the slab that is not part of the hydration process. Concrete, unless at approximately 8% moisture via a moisture meter, if coated too soon, may have elements of their internal chemistry migrate to the surface, which acts as a de-bonder. ASTM F-2170 is an In situ Relative Humidity (RH) Test and is the most accurate as it provides, not only the surface, but also a picture of the overall moisture condition of the slab. This test is affected by the dew point, outside elements and is dependent upon the surface temperature of the concrete. New concrete is required to have attained enough strength to support itself and has to be dried sufficiently.

**SITE, STORAGE AND TRANSPORTATION CONDITIONS:**

Materials should be delivered in their original packaging in containers with seals unbroken and bearing the manufacturers' labels indicating brand name, directions for storage and mixing with other components. Check materials upon receipt to make sure all is accounted for and has arrived in good condition. Store materials indoors, off the ground and in a dry location at temperatures not exceeding 80°F or lower than 65°F. Always keep the material out of direct sunlight and freezing temperatures in a protected environment. The liquid components must not freeze.

**FIRST AID:**

Contains Portland cement CAS # 65997-15-1. Freshly mixed cement products may cause skin injury. Avoid contact with skin where possible and wash exposed areas promptly with water.

Contains sand CAS # 14808-60-7. Avoid breathing dust. Prolonged exposure to dust may cause delayed lung injury (silicosis) or cancer IARC Class 2A. Wear NIOSH approved mask for silica dust.

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes. If ingested, do not induce vomiting and get prompt medical attention. For respiratory problems, remove person to fresh air. Contact a physician.

**HEALTH AND SAFETY:**

Users must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300. For further information and advice regarding transportation, handling, storage and disposal of chemical products, the user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data.