

# CELCORE S-1 DECK PREPARATION

**CELCORE S-1** (Slurry 1) is a cementitious deck preparation designed to condition the surface of galvanized steel decking intended to receive a placement of **Celcore Cellular Insulating Concrete**. **CELCORE S-1** can also be used upon all other common parent deck types and/or placement surfaces for bond enhancement.

Steel decking used in roof constructions, that are intended to receive a placement of insulating concrete, are required to be galvanized. Upon placement of the cellular insulating concrete and thereafter as the concrete sets, the **hydrated** portland cement component of the fill gradually begins to bond with the galvanized surface of the parent deck. In this practice, the term **hydration** is defined as being the reactions caused by mixing anhydrous portland cement with water. The primary **hydration** product produced by reaction within the fill is **Calcium Silicate Hydrate [C-S-H]**. **Calcium Silicate Hydrate** or **C-S-H**, may in a sense, be considered the glue developed during **hydration** that binds all of the particles comprising the plastic concrete together, thus transforming the material to its hardened form. **C-S-H** is also that which causes the fill to develop its bond to the parent steel deck. Notably, **hydration** is a process that can continue for extended periods of time when moisture is present. The results of continuing **hydration** are continued increases in the hardened strength of the fill and its interface bond with the parent deck. Moisture is notably consumed by the portland cement during **hydration** and it becomes chemically bound as part of the growing **C-S-H** structure.

For insulating concrete fill to adequately bond as intended to its parent deck interface, the surface of the decking at the time of placement must be free of any substance that could interfere with the bonding properties of the **C-S-H** to the galvanized. Sometimes at issue, mill fresh decking may arrive at a jobsite having manufacturing contaminate residue(s) on the galvanized surface. Roll forming lubricant residue for example, may be considered a contaminate. Additionally, during mill manufacturing, steel coil producers may intentionally apply substances upon the decking having non-skid or corrosion passivation properties. The use of passivation compounds have become increasingly common and are used by the galvanized steel coil producers to minimize wet storage staining. Wet storage staining is an unsightly but un-harmful phenomena which may occur upon galvanized steel decking during jobsite storage. It can occur in situations where rain water is able to enter and dwell between the stacked deck panels. It is important to consider, many of the aforementioned compounds used have **hydrophobic** properties which can interfere with bonding. Once the deck panels are removed from bundled storage and installed, open air environmental exposure is thought to deteriorate the **hydrophobic** properties of these treatments. However, issues such as the required amount of exposure, conditions during exposure and the extent to which total deterioration will ultimately occur during the open period, can be difficult at best to predict. A surface exhibiting any amount of **hydrophobicity** can be considered less than ideal for material bonding. The development of a strong **hydration** bond between the insulating concrete fill and its parent deck is essential for a cast-in-place roof deck construction to exhibit adequate windstorm uplift resistance.



Mill Fresh Steel Deck

**CELCORE S-1** deck preparation is a modified cement compound designed to disrupt the **hydrophobic** properties of manufacturing contaminates and/or mill applied substances, assuring a proper bond of the cement **hydrate** to the galvanized surface of the deck. The **S-1** compound is placed upon the steel deck as a fluid slurry that is then broom or brush applied to the deck in a film thickness. The **S-1** compound contains some mild abrasives which mechanically scour the decking during this application. Thereafter, the applied **S-1** layer undergoes a two phase bonding process. The first phase occurs immediately following application. Partial to full air drying of the **S-1** film allows the compound to uniformly bind to the surface of the galvanized by consolidating its modified cement component uniformly and tightly upon the deck surface. In its phase one state, the applied film is **hydrophilic**. Accordingly, the film's second phase becomes activated when the subsequent cellular concrete deck fill layer of an assembly is placed. The **S-1** film re-wets through contact with the deck fill placement. This prolonged re-wetting causes the consolidated cement component of the film to **hydrate** and begin developing a tenacious bond with the parent deck. Likewise, the cellular insulating concrete fill layer strongly bonds to the opposing side of the applied **S-1** film. **CELCORE S-1** deck preparation should be considered useful for all applications where maximum parent deck interface bonding is intended.



Celcore S-1 Layer Applied

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## MANUFACTURERS INSTALLATION INSTRUCTIONS

**SCOPE:** The placement contractor shall be Approved by Celcore Incorporated. The Approved contractor shall furnish all equipment, materials, labor and supervision required for the complete installation of the roof deck system.

### MATERIALS:

**1) Foam Concentrate** shall be that manufactured by Celcore Incorporated. The foam concentrate shall be used at the jobsite from original manufacturers containers and shall be clearly identifiable by product labeling. Each container shall bear the manufacturer's name and required approval marks such as FM and UL.

**2) S-1 Deck Preparation** shall be that manufactured by Celcore Incorporated. Celcore S-1 is packaged in 74 pound bags and shall be used at a rate of 1 bag Celcore S-1 per 550 pounds of cement.

**2) Cement** may be bagged or bulk, Type(s) I, I/II, II or III portland meeting ASTM C150. Delivery slips or product packaging shall indicate ASTM compliance.

**3) Water** shall be clean, fresh and free of injurious quantities of impurities. Supply source shall be adequate to allow uninterrupted operation of the insulating concrete batch plant.

**4) Admixtures** when used, shall only be those supplied or approved by Celcore Incorporated. Admixture(s) shall not contain chlorides.

### MIXING:

**1) Mix Proportions** shall be combined in accordance with manufacturers requirements to yield proper application rheology.

**2) Celcore S-1 Deck Preparation** shall be mixed and pumped into place using properly configured equipment. It shall be the responsibility of the Approved applicator to maintain the foam generating, batching and pumping equipment in good condition and in a configuration acceptable to the foam manufacturer.

**3) Water, Admixture (Celcore HS Rheology Modifying Admixture , optional), Celcore S-1 and cement** shall first be added to the mixer in proper proportions, followed by the Celcore preformed foam. Mix water shall be the minimum required to make an flowable slurry. The rheology of the S-1 deck preparation slurry shall be such to provide a material that can be brush tool applied to the parent deck as a thin, full coverage film.

### PLACEMENT:

**1) Celcore S-1 Deck Preparation** slurry is spatter applied upon the parent deck in sufficient quantity to allow a full coating of compound when spread. The spattering shall be promptly broom/brush distributed upon the surface, fully coating the parent deck with a film of slurry. Thickness uniformity is not required providing a full coating of the parent deck accomplished. The following placement of cellular concrete for bonding an EPS holey board insulation layer or the placement of cellular concrete topping where EPS is not used, may occur at any time following the S-1 application. Partial to full drying of the applied S-1 slurry shall be considered an acceptable condition for receiving subsequent cellular concrete fill.

**2) Insulating Concrete** fill placed upon the applied S-1 surface shall be done in accordance with standard manufacturers installation instructions. The S-1 layer shall re-wet during fill placement, allowing its cement component to fully hydrate for set and bonding to the parent deck.

### END OF SECTION

(Rev. 05/16)