SafeLane®
surface overlay

CA-48 TECHNICAL SPECIFICATION

Cargill®

A Cargill Deicing Technology Product

Providing customers with deicing solutions that save lives and enhance commerce.

Helping to Save Lives and Protect Infrastructure.

SAFETY:

The aggregate used in SafeLane® surface overlay has the unique ability to soak up and store liquid anti-icing chemicals and release them when they are needed. When temperatures drop and humidity levels rise, SafeLane® surface overlay will help prevent black ice formation and the precipitation from bonding to the road surface. Prevention is important. Preventing accidents helps save money. The US Federal Highway Administration estimates that a driving fatality costs $3.15 million (USD). Preventing that accident not only saves a life, but prevents unnecessary strain on the local economy.

PRESERVATION:

The proprietary aggregate used in the SafeLane® system is bound to the surface through the use of a two-part epoxy system. This epoxy not only provides a superior bond, it also is impermeable, preventing water and chloride intrusion into the subsurface, helping extend the life of the structure it is installed on.

COST SAVINGS:

The passive anti-icing nature of SafeLane® surface overlay helps reduce your costs by not requiring treatment before every storm. When coupled with preventing premature wear on your structures, you have saved money that can be used on other projects.

SafeLane®
surface overlay

Providing customers with deicing solutions that save lives and enhance commerce.

DESCRIPTION

This work shall consist of furnishing and applying epoxy and aggregate as an anti-icing pavement overlay on surfaces such as parking lots, decks, garages, or ramps, pedestrian walkways and sidewalks in accordance with this specification, and in close conformity with the lines, grades, and details shown on the plans.

MATERIALS

SafeLane® CA-48 anti-icing pavement overlay is a patented system and is protected by US patent laws. The overlay system must be installed by a contractor with an appropriate license from Cargill, Incorporated ("Cargill") and the Licensed Contractor MUST purchase materials for the overlay system from or through Cargill.

The epoxy used in the SafeLane® CA-48 system is a modified Type III. Properties are shown in the table below.

Table 1

PROPERTY	REQUIREMENT	TEST METHOD
Pot Life	15 to 45 min @75°F (24°C)	ASTM C881 (50 ml sample in paper cup)
Tensile Strength	2,000 to 5,000 psi @ 7 days	ASTM D638
Tensile Elongation	40% to 80% @ 7 days	ASTM D638
Viscosity	7 to 25 poises	ASTM D2393
Minimum Compressive Strength @ 2 hrs	1,000 psi at 75°F (24°C)	ASTM C579
Minimum Compressive Strength @ 24 hrs	5,000 psi @ 75°F	ASTM C579
Minimum Adhesive Strength @ 24 hrs	250 psi @ 75°F (24°C)	ACI 503R

The SafeLane® CA-48 system aggregate supplied by Cargill shall have a dry surface area, free of dirt, clay, asphalt, and other foreign or organic materials. Typical SafeLane® CA-48 system aggregate gradation specifications are shown in Table 2.

Table 2

GRADUATION	% PASSING
#4 (4.75mm)	90
#8 (2.36mm)	5-15
#16 (1.18mm)	0-5

Once properly installed, SafeLane® CA-48 overlay will be a minimum of 3/16 of an inch(4.8 mm) thick with an in- place weight of approximately 2 pounds per square foot (0.98 kg/ sq meter). Proper installation should result in a minimum adhesive strength (bondability) of 250 psi (1.7 Mpa) at 24 hours and can be verified by a pull test as detailed in ACI 503R at the discretion of the owner.

INSTALLATION

Licensed Contractor Selection

A Licensed Contractor must perform all installations of SafeLane® CA-48 overlay system. These contractors will have the license necessary to install the patented overlay system and the requisite training to do so.

Parties interested in becoming a Licensed Contractor should contact Cargill at 866-900-7258.

INSTALLATION - CONTINUED

Certain work such as shot blasting, sand blasting, surface preparation, cleaning, and crack repair, may be provided by the party purchasing the system or sub-contracted but must be directed and approved by the Licensed Contractor.

SAFETY PROVISIONS

Personnel shall be thoroughly trained in the safe handling of materials in accordance with manufacturer's recommendations as well as be familiar and comply with the owner's safety rules and regulations. Typically these guidelines will be explained in a pre-work meeting.

STORAGE OF MATERIALS

The epoxy shall be stored according to manufacturer's specifications.

The SafeLane® CA-48 system aggregate shall be shipped in mini-bulk bags, which may have a plastic inner lining or an outer shroud cover, which keeps the aggregate free of precipitation and atmospheric moisture. Once a bag has been opened, the aggregate must be stored in a way to prevent any moisture or precipitation from entering the bag.

SURFACE PREPARATION

Prior to the installation of the overlay on any pavement section, the owner (which may be the owner's department in charge of the project) must inspect the entire surface. This inspection should be made with the Licensed Contractor present.

The inspection is designed to identify any areas of pavement that are in need of repair before applying the epoxy. These areas include any de-laminations in the concrete or asphalt, potholes, large cracks, and breakouts. These areas should be properly marked and must be repaired before the overlay installation can begin. It is the responsibility of the owner to decide the best means for surface repair prior to installation.

PREPARATION OF CONCRETE SURFACES

Before placement of the epoxy overlay, the entire parking deck, sidewalk, or road surface shall be thoroughly cleaned by steel shot blasting to ensure proper bonding between the epoxy and concrete substrate. In general, proper bondability can be obtained when the profile of the pavement surface matches the International Concrete Repair Levels 5 through 7. Proper epoxy bond is tested by methods described in ACI 503R, of the ACI Manual of Concrete Practice, or VTM 92. Shot blasting, is meant to expose the coarse aggregate and to remove asphalt material, oil, dirt, rubber, curing compounds, paint carbonation, laitance, weak surface mortar and other potentially detrimental materials, which may interfere with the bonding or curing of the overlay. This is usually achieved by significantly changing the color of the concrete and mortar and beginning to expose coarse aggregate particles. Mortar, which is sound and soundly bonded to the coarse aggregate, must have open pores due to cleaning to be considered adequate for bond. Areas of asphalt or cement larger than one inch in diameter, or smaller areas spaced less than six inches apart, shall be removed. Traffic paint lines shall be considered clean when the concrete or asphalt has exposed aggregate showing through the paint stripe. Moisture and oil-free compressed air shall be used to remove all dust and other loose material. Mechanical brooms, without water, may be used in certain applications to remove any residual dust that adheres to the prepared surface after it has been blown off with compressed air. The surface must then be blown again with compressed air after brooming to remove all residual fine dust.

If the owner determines that an approved cleaning method has changed prior to the completion of the job, the Licensed Contractor must return to the approved cleaning methods and re-clean the suspect areas or verify through tests at no additional cost to the owner that the method is acceptable.

Epoxy overlay shall not be placed on hydraulic cement concrete that is less than 28 days old.

PREPARATION OF ASPHALT SURFACES

Asphalt surfaces may be prepared either by sandblasting or by being planed and textured to a depth approved by both the owner and the Licensed Contractor. Very similar to a proper shot blast on concrete, sandblasting asphalt surfaces acts to clean the surface of any oil, dirt, rubber, curing compounds, paint carbonation, weak If the cleaning method, materials and installation procedure do not achieve the required results as described in VTM92 or ACI 503R, the Licensed Contractor must remove failed test patches and make the necessary adjustments, and test all test areas at no additional cost to the owner until satisfactory test results are obtained. surface mortar and other potentially detrimental materials, which may interfere with the bonding or curing of the overlay. Since asphalt is typically more open graded than concrete, extra care must be taken to remove all small particles and dust with moisture and oil-free compressed air. Again, mechanical brooms, without water, may be used in certain applications and conditions to remove any adhering dust during the surface preparation step followed by a final blowing of the surface with oil free compressed air.

SafeLane® CA-48 surface overlay shall not be placed on asphalt that is less than 6 months old.

Patching and cleaning operations shall be inspected and approved prior to placing of the overlay. Any contamination of the surface, after initial cleaning, shall be removed. The epoxy course shall be applied within 24 hours following the final cleaning and prior to opening the area to traffic. After cleaning, the road surface will not be opened up to traffic until after the epoxy overlay has cured appropriately (see Tables 4 and 5 below).

The surface shall be dry and there shall be no visible moisture present on the surface at the time of application of the epoxy overlay. Water vapor rising from the surface is a potential problem as well. A sheet of transparent plastic affixed to the concrete surface will reveal the presence of moisture after 6 to 24 hours, depending on the temperature, cloud cover and other conditions (ASTM D4263) To ensure epoxy and surface preparation will result in adequate bond strength between overlay and substrate see ACI 503R or VTM 92 as mentioned above. Moisture-free and oil-free compressed air may be used to dry the surface.

OVERLAY APPLICATIONS

Handling and mixing of the epoxy resin and hardening agent shall be performed in a safe manner to achieve the desired results in accordance with these specifications and with the manufacturer's recommendations as approved or directed by the owner. SafeLane® CA-48 surface overlay materials shall not be placed when weather or surface conditions are such that the material cannot be properly handled, placed and cured within the specified requirements of traffic control or when rain is forecasted within manufacturer's recommended cure times.

SafeLane® CA-48 overlay can be applied successfully using a single pass method. The single pass method calls for applying the epoxy and aggregate in a single pass at the application rates shown in Table 3 below. Total epoxy application rates should be no less than 4 gallons per 100 square feet and typically range from 4 to 5 gallons per 100 square feet.

Table 3

SINGLE PASS METHOD	EPOXY RATE Gal/100 sq. ft.* (ltrs/sq meter)	AGGREGATE lbs/sq. ft.* (Kg/sq meter)
1 course	4 to 5 (1.6 - 2.0)	2 to 3 (9.75 - 14.6)
* Application of aggregate shall be of sufficient quantity to completely cover the epoxy		

In some cases there may be above average wear conditions that exist, such as turning radiuses on parking garage ramps and it may be desired that the SafeLane® CA-48 overlay provide a thicker wear course. In these situations SafeLane® CA-48 overlay shall be installed using a double pass method. The double pass method calls for applying the epoxy and aggregate in two separate layers at the corresponding application rates shown in Table 4 below. Total epoxy volumes should be no less than 6 gallons per 100 sq. ft. and typically range from 7- 8 gallons per 100 sq. ft.

Table 4

DOUBLE PASS METHOD	EPOXY RATE Gal/100 sq. ft.* (ltrs/sq meter)	AGGREGATE lbs/sq. ft.** (Kg/sq meter)
1st course	2 - 3 0.8 - 1.2)	1 - 2 (4.9 - 9.75)
2nd course	4 - 6 (1.6 - 2.4)	2 - 3 (9.75 - 14.6)
*Quantity varies based on original surface texture and temperatures of surface, air, and epoxy. Total epoxy application rateshall be no less than 6 gal/100 sq. ft. (2.4 ltrs/sq meter) and typically not more than 9 gal/100 sq. ft. (3.7 ltrs/100 sq meters).		
** Application of aggregate shall be of sufficient quantity to completely cover the epoxy		

In both the single or double pass methods the epoxy must be mixed at a volume ratio of 1 Part A: 1 Part B and mechanically stirred by a paddle type mixer for 3 minutes or according to the epoxy manufacturer's recommendations. After the epoxy mixture has been properly mixed, it shall be immediately and uniformly applied to the surface of the surface with a V-notched squeegee with the height of each notch measuring 3/16 inch (4.8 mm). Once the epoxy is uniformly applied, aggregate is spread on top of the epoxy in a way to sufficiently cover all visible wet spots caused by epoxy bleed-through. Traffic, equipment, or weighted traffic control equipment or barrels shall not be permitted on the overlay surface during the curing period. The minimum curing periods shall be as follows:

Table 5

AVERAGE TEMPERATURE OF DECK, EPOXY, AND AGGREGATE COMPONENT						
°F	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	*85+
°C	16 - 18	18 - 21	21 - 23	24 - 26	27 - 29	29+
* Refer to manufacturer's recommendations						

After curing, all loose stone will be removed from the surface either by oil and moisture free compressed air, vacuum truck or mechanical broom. If during the aggregate distribution process there are areas where the surface of the aggregate is coated with epoxy, a light shot or sand blast can be used to re-expose the surface of the aggregate. In no case shall traffic be permitted on the overlay until it has been cured sufficiently to prevent damage from wheel loads. In situations where early opening to traffic is not an issue, epoxy may be placed at a lower temperature with the approval of the engineer.

SURFACE WARNING

Applications of SafeLane® CA-48 surface overlay on concrete or asphalt bridge decks, road surfaces, parking decks, sidewalks or parking lot structures that are not elevated may be subject to premature delamanation due to excessive moisture that may be present in those environments. In addition, the epoxy may not bond properly to surfaces where there has been a history of or there is the potential of sub-surface moisture, which creates pore pressure on the surface. The epoxy manufacturer cannot warranty a complete bond or proper performance for such sites. The Licensed Contractor can provide detailed information.

GENERAL NOTES

Prior to construction of SafeLane® CA-48 overlay, the Licensed Contractor shall submit to the engineer for approval a work plan for constructing the overlay. The work plan shall include, but not be limited to, the materials, equipment, procedures and minimum and maximum air and deck surface temperatures; anticipated schedule for traffic control, patching, crack repair, surface preparation, and placement of the overlay; and test reports, documentation, explanation, and justification to support the proposed work plan. The work plan shall also meet the approval of the manufacturer of the epoxy materials. Any deviations from the application prescribed by this specification shall be explained to, and approved by, the engineer before such deviation.

The Licensed Contractor shall plan and prosecute the work to provide the minimum curing periods as specified herein, or other longer minimum curing periods as prescribed by the manufacturer prior to opening to public or construction traffic.

Unless otherwise specified by the owner's project engineer, the epoxy overlay shall be applied over the expansion joints of a bridge deck. The expansion joints shall be provided with a bond breaker or can be taped to adequately seal the joints from the epoxy. Within 12 hours of application and prior to opening to traffic, the overlay shall be removed over each expansion joint by removal of the bond breakers. Epoxy may also be removed by scoring the overlay prior to gelling or by saw cutting after cure.

In the event the Licensed Contractor's operation damages or mars the epoxy overlay, the Licensed Contractor shall remove the damaged areas by saw cutting in rectangular sections to the top of the deck surface and replacing the course in accordance this specification.

For each batch provided, the Licensed Contractor shall maintain and provide to the owner, records including but not limited to, the following:

- Batch numbers and sizes
- Location of batches as placed on deck, referenced by stations
- Batch time
- Gel Time (50 ml sample)
- Temperature of the air, deck surface, epoxy components, including aggregates
- Loose aggregate removal time
- Time open to traffic

MEASUREMENT AND PAYMENT

The owner is responsible for contracting the installation of a SafeLane® CA-48 overlay system with a Licensed Contractor on a square foot basis. The owner must verify the area for coverage. The area should be specifically marked out by the owner and the square footage verified before the installation starts. The owner is responsible for those items not covered in a typical SafeLane® CA-48 overlay system, such as surface repair, traffic control, testing, etc., as outlined above.

FOR ADDITIONAL INFORMATION CONTACT

Cargill Deicing Technology
24950 Country Blvd., Ste. 450
North Olmsted, OH 44070
Phone: 866-900-7258
Web: www.cargillsafelane.com

Cargill®
A Cargill Deicing Technology Product

SafeLane®

surface overlay

Cargill®

Cargill Deicing Technology
24950 Country Club Blvd. Suite 450
North Olmsted, OH 44070
phone: 866-900-SALT (7258)

www.cargilldeicing.com

deice-1073 6/7/2010