Corrosion Solutions

ElectroTechCP™ CAS Coating

Impressed Current Cathodic Protection Anode system

Product Datasheet

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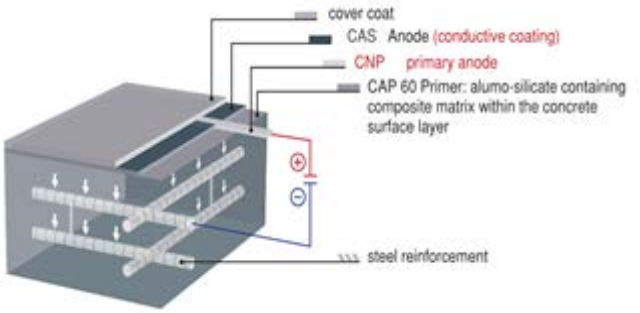
Description

The CAS "Composite Anode System" Coating is an impressed current cathodic protection anode system. The anode system consists of the electrically conductive coating forming a durable composite matrix with the concrete subsurface. The CAS coating system is formed by applying the CAS coating on the concrete surface.

The CAS coating is a two-component aqueous alkaline alumo-silicate/polymer composite coating for use in impressed current cathodic protection systems of reinforcing steel in concrete. The alumo-silicate component impregnates the surface layer of the concrete cover (80–200 mils) and hardens within the conductive paint and within the pore structure of the concrete overlay forming the proprietary micro capillary matrix that assures high adhesion to the concrete at current densities of up to 35 mA/m^2 (3.5mA/ft^2).The polymer component, a pure polyacrylate, assures high weathering resistance and in combination with the alumo-silicate component, high adhesion (290–580 PSI) and high durability. The CAS coating system is the 3rd generation of the composite coating systems exhibiting high durability, high weathering resistance (UV-resistance, frost resistance, freeze-thaw salt resistance*) and compatibility with most acrylic, PU and epoxy based paint and coating systems. The CAS composite coating is applied on concrete surfaces impregnated with the CAP60 primer. The CAP60 primer is especially designed for the CAS coating, enhancing adhesion to the concrete surface and promoting ionic transport across the concrete overlay.



Features and Benefits

- No intrusion into the structure of the concrete member
- High durability, solidification of the concrete surface, strong adhesion to the concrete surface
- High current output of up to 35 mA/m^2 (3.5mA/ft^2) due to the formation of an inorganic alumo-silicate composite matrix between the conductive coating and the concrete overlay
- High resistance against weathering
- High adhesion strength due to the formation of the composite matrix
- High durability in wet environments
- High chemical resistance against weak acids and alkalis (pH 4 to pH 14)
- High electrolytic conductivity due to the micro capillarity of the composite matrix
- High electrical conductivity due the high performance electrically conductive fillers
- Compatible with any water-vapor permeable and alkali-resistant polymer coating

Fields of Application

Cathodic protection of steel reinforced concrete members and structures that are endangered or damaged by the corrosion of the steel reinforcement induced by the ingress of de-icing salts, by exposure to sea water and/or by the carbonation of the concrete overlay.

- Bridges: bridge decks, columns, beams, supporting walls, abutments
- Parking garages: parking decks, pavements, columns, walls, soffits
- Apartment buildings: facades, balconies, columns, beams
- Tunnels: columns in street galleries, portals
- Pools: walls, concrete basin underside,
- Water Storage tanks e.g. waste water, sea water
- Seaside Concrete Structures: jetties, decks, columns
- Concrete structures erected with salt contaminated concrete

*Freeze thaw salt resistant only if the concrete base is freeze-thaw resistance.
**Patent US 7851022 and US8394193

Application Instructions

Concrete Surface Preparation

The concrete surface is to be free of loose or sandy parts. Surface contaminations are to be thoroughly removed, especially oil, fats, wax. The pull-off strength of the concrete should be > 145 PSI, preferentially > 200 PSI. Optimum adhesion of the coating will be obtained by preparing the concrete surface with sandblasting, water jetting, steel-ball blasting or grinding. The temperature of the concrete surface is to be above 45°F and the relative humidity of the ambient air should allow drying of the composite paint within 6–8 hours – this is usually achieved if 45 °F < T < 80 °F, 75% < RH < 85%. Reprofiled surfaces shall be hardened for at least 3 days and cleaned with a rotating steel brush before applying the CAS coating.

For an optimum performance (adhesion, electrical and electrolytic conductivity and durability) of the CAS coating, especially at high protection current densities, optimum conditions for the formation of the microcapillary composite matrix is to be assured and maintained. Free or dissolved calcium hydroxide may interfere with the formation of the composite matrix. For the CAS Coating anode system design specifications (primary anode installation, cover coats, etc.) please consult with Structural Technologies.

Application Method/Tools

The CAS Coating system may be applied like a conventional paint either with rollers (short hair) or with airless spray technique.

- Application with Paint Rollers
  The CAS Anode Coating System is applied, undiluted, in minimum two layers. The application shall be rich but not wet. Not more than 0.1lbs./ft^2 shall be applied per layer to prevent formation of surface microcracking. Subsequent coatings shall be applied on dry paint, preferentially on the next day but not later than 24 hours after application of the previous layer. Formation of micro cracks in the surface indicates a too thick coat. It is strongly recommended to apply the CAS Anode on a concrete surface that has been impregnated with the CAP 60 primer.
- Application with the Airless Spray Guns
  With the airless spray guns, 0.13 – 0.175 lbs/ft^2 of CAS coating may be applied in a single operation. About up to 10000 ft^2/day may be applied with one airless spray gun.

Primer CAP60

The CAP 60 primer is a two-component aqueous alkaline (pH 13.2) alumo-silicate/polymer composite primer for the solidification and for the enhancement of the ionic conductivity of concrete surfaces. The CAP60 primer is designed specifically for the CAS anode system, enhancing the adhesion to the concrete surface and promoting ionic transport across the concrete overlay. See CAP60 Primer Datasheet for more details.

Mixing of components

After homogenizing component A with an mechanical stirrer, Component B is added while stirring (high speed), then mixing is continued for about 2 min at low speed (air should not be mixed in while stirring). The mixed material shall be transferred to another container to prevent mixing errors and to control the homogeneous mixing of the coating and primer.

Mixing Ratio.

Component A: Component B = 55:1

Cleaning advices

- Not hardened material may be washed off with water, shortly after hardening with hot water.
- Dried and hardened material may only be removed mechanically.

Potlife
Approximately two (2) hours (70 °F).
Start Hardening 3.5 hours
Hardened after 4 hours

Top Coat
For optimum performance the hardened binder is recommended to be coated with a suitable polymeric coating, e.g. epoxy resin, poly urethane, etc. with a low water vapor permeability to prevent drying out of the concrete substrate.

MATERIAL DATA

Colour and Consistency

Component A	*Component B*
Anthracite	Transparent liquid

Packaging

Component A	*Component B*
5.5 Gallon PP pails	10 Oz PP Bottles

Storage and Shelf Life
Stored in the original packaging in dry conditions, protected from freezing, this product will keep for at least

Component A	Component B
one (1) year	one (1) year

Material Specification of Solidified CAS Anode System

Formation of the Composite Matrix ..... 1 to 3 weeks after application of CAS Anode
Electric resistance after formation of the composite matrix ..... 0.6 to 1.0 ohm.cm
Sheet resistance after formation of the composite matrix..... 15 to 34 ohm/square
Standard Current Densities ..... 3 to 10 mA/m^2 (0.3 to 1mA/ft^2)
Maximum Current Density* ..... 35mA/m^2 (3.5mA/ft^2)
Standard Operating Voltage..... 1.5 to 5 Volts.
Adhesive Tensile Strength after 3 days ..... 1.5 to 3 MPa
Adhesive Tensile Strength after 28 days..... 2 to 4 MPa
Water Absorption Coefficient W_{20}..... 0.04 kg/m^2.$h^{0.5}$
Water Vapor Diffusion resistance u_{H20}..... 1.120
Minimum Service Life ..... 15 Years

Application Conditions/Limitations

Substrate Temperature ..... +45ºF min./ +95ºF max
Ambient Temperature..... +45ºF min./ +95ºF max
Relative Air Humidity ..... <80%

Consumption

Coating per application..... 250 to 400 g/m^2 (0.05 to 0.08 lbs./ft^2)
Total Consumption ..... 850 g/m^2 ±15% (0.18 lbs./ft^2 ±15%)
Wet film thickness ..... 350 to 500 um (12 to 20mils)
Dry film thickness ..... 250 to 350 um (10 to 14mils)

*If current densities above 15mA/m^2 are expected consult Structural Technologies.

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Drying and Solidifying Behavior

Temperature	Relative Humidity	Dry After	Rainproof After	Overcoat after
50 °F	75%	12h	24h	21d
65 °F	75%	8h	12h	7d
75 °F	50%	6h	8h	7d

Health and Safety Information

Safety and disposal instructions in the MSDS (material safety data sheets) and on the container labels must be observed and followed. The MSDS for the both components is also valid for the CAP 60 primer (component A mixed with component B).

Legal Notes

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control. The purpose of this product data sheet is the description of the properties and applications of the CAS Anode System. The described properties and reported values may vary depending on the solicitude and processing on which we do not have any direct influence. Structural Technologies reserves the right to change the properties of its products. Users must always refer to the most recent issue of the Product Data Sheet. The product data sheet does not contain a complete manual of use and application. Our advice and consultancy is required for the use of the CAS Anode system. The information above is believed to be accurate and represents the best information currently available to us.