



THE BEST CORROSION CONTROL PERFORMANCE, GUARANTEED!

## **Painting Specification**

# **TERMARUST® TR2100 HRCSA (HIGH RATIO CO-POLYMERIZED CALCIUM SULFONATE) PRIMER/TOPCOAT, RUST MITIGATION COATING**

## **1. SCOPE**

- 1.1 This specification covers a proprietary, non-environmentally hazardous, High Ratio Co-Polymerized Calcium Sulfonate ("HRCSA") Primer/ Topcoat for steel **known as "Termarust® TR2100 HRCSA Primer/Topcoat"**. This proprietary single component Primer/Topcoat contains no leaded or chromate pigments. It derives its corrosion resistance from the complex's strong affinity for steel. It has outstanding wetting properties, even on non-blast cleaned steel.
- 1.2 Termarust® TR2100 HRCSA Primer/Topcoat is suitable for use on all structural steel and provides a firm, tack free, corrosion resistant, tightly adherent film which remains flexible under the stress of expansion and contraction cycles caused by temperature variations. Termarust® TR2100 HRCSA that is exposed to salt spray for extended periods (ASTM B117) and ASTM D5894 with Freeze Thaw will show no under-film creep age around a damaged area (scribe). Termarust® TR2100 HRCSA Primer/Topcoat is suitable for maintenance or repainting of in place structures and not as a shop applied coating. Optimal long term protection will be achieved when the steel surface is prepared to an SSPC-SP6 or SSPCSPWJ3 (L to M) Surface Preparation, excellent performance can be obtained with an SSPC-SP2, SSPC-SP3 or SSPC- SPWJ4 (L to M) High Pressure Water Cleaning (HPWC) Surface Preparation.

**The Termarust® TR2100 HRCSA Primer/Topcoat is not intended for application on metal surfaces in areas exposed to friction and abrasion from pedestrian circulation or rolling equipment (ex.: running rails, pedestrian crosswalks, handrails, access ramps, ladders, etc.)**

## **2. DESCRIPTION**

- 2.1 Termarust® TR2100 HRCSA Primer/Topcoat contains approximately 63.5% by volume of film-forming solids (pigment and binder) and 2.3 pds per US gal./240-270 grams per liter VOC. The theoretical spreading rate for 10 mils (250 micron) DFT is 107 square feet/US gallon (10.7 sq meters /3.78L) at 100% transfer efficiency. Actual spreading rates can be significantly lower.

## **3. REFERENCE STANDARDS**

- 3.1 The standards referenced in this specification are listed in SECTION 3.4, 3.5 and 3.6 and form a part of this specification.

- 3.2 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern unless otherwise specified.
- 3.3 If there is a conflict between the requirements of the cited reference standards and this specification, the requirements of this specification shall prevail.
- 3.4 **Steel Structures Painting Council Specifications:**  
 SSPC-PA Guide 10 A Guide to Safety in Paint Application  
 SSPC SP11 Power Tool Cleaning to Bare Metal  
 SSPC-SP7 Brush Off Blast Cleaning  
 SSPC-SP6 Commercial Blasting  
 SSPC-SP3 Power Tool Cleaning  
 SSPC-SP2 Hand Tool Cleaning  
 SSPC-SP1 Solvent Cleaning  
 SSPC-SPWJ-1 Waterjet Cleaning of Metals – Clean to Bare Substrate  
 SSPC-SPWJ-2 Waterjet Cleaning of Metals – Very Thorough Cleaning  
 SSPC-SPWJ-3 Waterjet Cleaning of Metals – Thorough Cleaning  
 SSPC-SPWJ-4 Waterjet Cleaning of Metals – Light Cleaning

3.5 **American Society for Testing and Material (ASTM) Standards:**

3.5.1 Test Methods for Properties:

- B117 Salt Spray (Fog) Testing
- D562 Consistency of Paints Using the Stormer Viscometer
- D1210 Fineness of Dispersion of Pigment-Vehicle Systems by Hegman gage
- D5125 Viscosity of paints, Varnishes and Lacquers by Ford Viscosity Cup
- D1475 Density of Paint, Varnish, Lacquer and Related Products
- D2196 Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer.
- D2369 Volatile Content of Coatings
- D2801 Leveling Characteristics of Paint by Drawdown Method
- DG53 QUV Weatherometer – Accelerated testing
- D3363 Ultimate Film Hardness by pencil test
- D3828 Flash Point of Liquids by Small Scale Closed Cup Tester
- D5894 Cyclic Corrosion Testing for Industrial Coating with Freeze Thaw Cycle

**4. PROPERTIES**

4.1 **TERMARUST®TR2100 HRCSA (High Ratio Co-Polymerized Calcium Sulfonate) Primer/Topcoat** meets the requirements of Section 3.5, and SECTIONS 4.2 through 4.7

% Total Solids, min.	72% to 79% depending on color
Viscosity, Brookfield #6 at 10 RPM	7,000 to 15,000 CPS
Viscosity Could be increased under special request	
Weight per US Gallon, Pounds,	8.80 pds - 9.95 pds depending on color
Volatile Organic Content, Pounds/Gal.	2.25 to 2.85 depending on color
SAG Resistance	Min: 24
Drying Time Hrs.:	12 to 24 hours, depending on film thickness and temperature
Flash Point degrees	50°C (122°F)
Salt Fog Performance at 4 mils DFT,	5,000 hours
Cyclic Corrosion Testing at 10 mils DFT	6840 hours with no failure

4.2 **ODOR:** Shall be normal for the materials permitted (ASTM D1296)

4.3 **COLOR:** The color may be pigmented to customers specification

- 4.4 **COMPATIBILITY:** There shall be no evidence of incompatibility of any of the ingredients of the coating when two (2) volumes of coating are mixed with one (1) volume of mineral spirits (Federal Standards No. 141, Method 4203):
- 4.5 **PIGMENT SETTLEMENT:** The coating shall show perfect suspension when tested as specified in ASTM D869, when stored for six (6) months.
- 4.6 **WORKING PROPERTIES:** The coating shall be easily spray applied when tested in accordance with Federal Standard No.: 141, Method 4331. The coating shall show no streaking, running or sagging after drying.
- 4.7 **CONDITION IN CONTAINER:** The coating shall show no thickening, curdling, gelling, or hard caking when tested as specified in Federal Standard No. 141, Method 3011 after storage for six (6) months from date of delivery in tightly covered containers at a temperature of 50-110°F (12-38°C). A semi-cured coating skin may form on the surface of coating stored in a partially filled container or on the surface of coating when the container is exposed to prolonged periods of heat and direct sunlight. Care should be taken to minimize skinning by storing containers indoors and by transferring paint from partially filled containers to smaller sized containers (allowing little airspace above the liquid surface). All skins should be manually removed before application is attempted. The coating shall be filtered before application.

## 5. LABELING

- 5.1 **MARKING OF CONTAINER:** Container shall be marked with the following information:
- Name;
  - Color;
  - Lot Number;
  - Date of Manufacture;
  - Quantity of Paint in Container;
  - Manufacturer's Name and Address.
- 6.A **SURFACE PREPARATION ("recoat" - total removal of existing coating system)**
- 6.A1 **PRE-SURFACE PREPARATION** - Before the actual removal of old paint and/or rust commences, all organic material such as bird nests, bird droppings, insect nests and all other non-metallic obstructions or pollutants attached to the steel structures are to be removed.
6. A2 **SSPC-SP1 SOLVENT CLEANING** - The entire steel structure to be coated shall be inspected to determine the degree of chemical contamination. All oil and grease shall be manually removed from the steel with proper solvent cleaning as per SSPC-SP1. Areas that appear contaminated with road salts should be cleaned with specialized chloride removal chemistry, Chlor-Rid (or Termaclean TC7101) before sandblasting. Chlorides should be removed during cleaning when water washing by adding Chlor-Rid or Termaclean TC7101 soluble salt remover. No coating should be done until salt testing determines that the surface meets the salt levels indicated in the coating specification.
6. A3 **SSPC-SP6: COMMERCIAL BLAST CLEANING - SSPC-SPWJ3 (L to M): ULTRA PRESSURE WATERJET CLEANING**  
The thick, porous and highly salt contaminated black oxides present must be removed by sandblasting to an SSPC-SP6 or by Ultra-Pressure Water Jetting to a SSPC-SPWJ3 NVC 3. NVN 10, NVS 10 (LtoM) specification. This will also remove all old, tightly adherent coating to yield a smooth, clean surface. No tightly adhered Black oxides shall be allowed to remain on the steel surface. This black oxide is highly contaminated with Chloride, Nitrate and Sulfate Salts, and if allowed to remain, will result in accelerated, catastrophic coating

failure. The cleaning process shall be performed in such a manner as to not contaminate freshly coated sections. Freshly prepared steel shall be kept free of contamination. If the freshly prepared steel is allowed to flash rust, and the flash rust does not exceed a light to medium flash rust as per SSPC-VIS 4 coating may be applied. If the steel is heavily flash rusted or is contaminated the loose flash rust and contaminant, this must be removed. In cases where exposed, freshly prepared steel may be exposed to direct contact with aqueous solutions of (Highway salts, the steel must be coated immediately after surface preparation, and the steel must be protected from, highway runoff). The final SSPC-SP6 or SSPC-SPWJ3 NVC3, NVN10, NVS10, (LtoM) prepared steel must be inspected by a representative of the coating supplier or responsible inspection authority before painting begins.

6. A4 **CHEMICAL ANALYSIS OF BLASTED STEEL** - The Chloride, Nitrates and Sulfate Ion content of the prepared steel must be analyzed before the SSPC-SP6 or SSPC-SPWJ3 NVC3, NVN10, NVS10 (LtoM) spec. is approved, and before painting begins. A Chlor-Test or CSN analysis kit can be purchased from CHLOR\*RID International. [www.chlor-rid.com](http://www.chlor-rid.com) 1-800-442-3217 (USA) or 1-888-279-5497 (CDN). The allowable upper limit for all surface preparation other than that covered by SSPC on Chloride Ion NVC3 is 3 micrograms/sq. cm., NVN10 Nitrate Ion 10 micrograms/sq. cm. and NVS10 Sulfate Ion 10 micrograms/sq. cm. Testing shall be done in areas where salt contamination has most likely occurred. Directions for analysis are contained in the kit.
- 6. B SURFACE PREPARATION ("overcoat"- spot cleaning and complete encapsulation of the existing coating system).**
- 6.B1 **PRE-SURFACE PREPARATION** - Before the actual spot cleaning of old paint and/or rust commences, all organic material such as bird nests, bird droppings, insect nests and all other non-metallic obstructions or pollutants attached to the steel structures are to be removed.
6. B2 **SSPC-SP1 SOLVENT CLEANING** - The entire steel structure to be painted shall be inspected to determine the degree of chemical contamination. All oil and grease shall be manually removed from the steel with proper solvent cleaning as per SSPC-SP1.
6. B3 **SSPC-SP2 HAND TOOL CLEAN, SSPC-SP3 POWER TOOL CLEAN or SSPC- SPWJ4 NVC3, NVN10, NVS10 (L to M)** - The thick, porous and highly salt contaminated black oxide present must be removed by hand tool cleaning, power tool cleaning to a SSPC-SP11 specification, or by using a SSPC-SP2 or SP3 and SSPC-SPWJ4 (L to M) at 7000 PSI 6 Gallons (41.3 Mpa 22.7 L) per minute using a zero degree rotating tip and a four inch standoff. No loose rust, black oxide or loose paint shall be allowed to remain on the surface. The black oxide is highly contaminated with Chloride, Nitrates and Sulfate Ions and if allowed to remain, will result in accelerated, catastrophic coating failure. The cleaning shall be performed in such a manner as to not contaminate freshly painted sections. Freshly prepared contaminant free bare metal and tightly adhering rusted surfaces shall be spot primed, then coated. If the freshly prepared surface is allowed to stand, the steel must be free of contaminants which may have accumulated on the surface before coating. In cases where exposed, freshly prepared steel may be exposed to direct contact with aqueous solutions of high way salts, the steel must be coated immediately after cleaning, and the surface must be protected from high way runoff. The final SP2, SP3, SSPC-SPWJ4 NVC3, NVN10, NVS10 (L to M) (High Pressure Water Cleaned) HPWC, prepared surface must be inspected by a representative of the coating supplier or responsible inspection authority before coating begins. (Note: Excellent results in reduction of chlorides, nitrates and sulfates have been achieved using a 1% solution of Chlor-Rid or Termaclean TC7101 in the wash water.
6. B4 **CHEMICAL ANALYSIS OF CLEANED STEEL** - The Chlorides, Nitrates and Sulfate Ion content of the prepared surface must be analyzed before the SSPC-SP2, SSPC-SP3, SSPC-

SP6 or SSPCSPWJ1 to SPWJ4-NVC3, NVN10, NVS10 cleaning specification is approved, and painting begins. A Chlor-Test or CSN analysis kit can be purchased from CHLOR\*RID International. [www.chlor-rid.com](http://www.chlor-rid.com) or 1-800-442-3217 in USA or 1-888-279-5497 in Cda. The allowable upper limits for all surface preparation other than that covered by SSPC-SPWJ1, SPWJ2, SPWJ3 or SPWJ4 are:

- NVC3 for Chloride Ions 3 micrograms/sq.cm;
- NVN10 for Nitrate Ions 10 micrograms/sq.cm;
- NVS10 for Sulfate Ions 10 micrograms/sq.cm.

Several areas shall be tested, preferably in areas where salt contamination has most likely occurred. Directions for analysis are contained in the kit.

## 7. **TERMARUST® TR2100 HRCSA (HIGH RATIO CO-POLYMERIZED CALCIUM SULFONATE) PRIMER/ TOPCOAT APPLICATION**

7.1 **THINNING:** The coating may be thinned up to 10% by volume with Termarust® Thinner TRT01 if necessary i.e.: cold temperatures, however airless spray application normally requires no solvent reduction.

**NOTE:** When used as a spot primer if product is too viscose during overcoating operations Termarust® TR2100 HRCSA (High Ratio Co-Polymerized Calcium Sulfonate) Primer/Topcoat may be thinned up to 25% with Termarust® thinner TRT01 depending on the condition of the steel if required.

7.2 **SPRAY EQUIPMENT:** The TR2100 HRCSA Primer/Topcoats may be applied by airless, air assisted airless, electrostatic, HVLP, LVLP, or conventional air atomize spray equipment.

7.2.A Manual application: The Primer/Topcoats may be brushed, daubed, rolled, or paint mitt applied where necessary.

7.3 **FILM THICKNESS: Wet Film Thickness (“WFT”) and Dry Film Thickness (“DFT”):** The Termarust® TR2100 HRCSA Primer/Topcoat shall be applied to prepared steel at 15-18 mils (375-450 microns) wet, 10-12 mils (250-300 microns) dry film thickness. There shall be no areas of steel that receive less than 15 mils (375 microns) wet coverage. Extreme care shall be taken to thoroughly coat all joints, flange edges, sharp angles, rivets, bolt heads, nuts, threads and flange bottoms. Wet film thickness shall be confirmed by the contractor at regular and frequent intervals and is a key to proper fulfillment of this specification. Wet film thickness over the specified level to a maximum of 25 mils (675 microns) wet will be acceptable; however, film thickness below 15 mils (375 microns) wet will not be accepted.

When **overcoating**, all areas of bare metal or contaminant free tightly adhered iron oxide shall be spot primed at 5-7 mils (125-175 microns) DFT with a spray or brush coat of Termarust® TR2100 HRCSA Primer/Topcoat. When spot priming, if the product is too viscose the Termarust® TR2100 HRCSA Primer/Topcoat may be reduced to a maximum of 25% with Termarust® Thinner TRT01, depending on surface conditions and temperature. The spot primer may be sprayed and worked in by brush. All paint termination points must be brushed in. All pack rusted joints must be treated with **Termarust® TR2200HS HRCSA Penetrant/Sealer**. An additional caulk coat of 15 to 18 wet mils (375 to 450 microns) of Termarust® TR2100 HRCSA Primer/Topcoat shall be applied to the joints treated with the Termarust® TR2200HS HRCSA Penetrant/Sealer.

After the spot prime is complete, the topcoat may be applied to all surfaces, wet on wet, at 7 to 9 mils (175 to 225 microns) WFT or 5 mils (125 microns) DFT. The total film thickness over the spot primed steel should be a minimum 10 mils (250 microns) DFT, the pack rusted

joints with TR2200HS penetrant, caulk coat and topcoat 20 mils (500 microns) DFT, areas of tightly adhering paint only require 5 mils (125 microns) DFT.

7.4 **APPLICATION TEMPERATURE:**

The Termarust® TR2100 HRCSA Primer/Topcoat should not be applied at temperatures below 2°C or 35.6°F. No Coatings should be applied unless the steel surface temperature is 3°C or 5°F above the dew point. Temperature must be maintained during curing. To apply the coating the relative humidity should be no greater than 99% and the steel should be free of surface moisture.

**NOTE:** Termarust® TR2100 HRCSA Primer/Topcoat may be applied below freezing during touch ups (-18°C or 0°F). This is not recommended unless steps are taken to control ice crystals before application i.e.: spot heating. The cold temperatures will also slow the coating's cure.

7.5 **INSPECTION - Wet Film Thickness (“WFT”) and Dry Film Thickness (“DFT”):**

- Total WFT: 30-36 mils (750 to 900 microns) on crevice, corroded joints and connections.
- Total WFT: 15-18 mils (375 to 450 microns) wet over bare steel or contaminant free tightly adhered iron oxide;
- Total WFT: 7-9 mils (175 to 225 microns) wet over existing coatings shall be checked at time of application.
- Total DFT: 20-24 mils (500 to 600 microns) on crevice, corroded joints and connections
- Total DFT: 10 mils (250 microns) dry on bare steel or contaminant free tightly adhered iron oxide;
- Total DFT: 5 mils (125 Micron) dry on existing coatings shall be confirmed when film has cured by the on-site inspector using the method described in SSPC-PA-2.

**Note:** Preparing the substrate to a SSPC SP6 or SSPC--SPWJ3 Surface Preparation, will optimize the Termarust® TR2100 HRCSA Primer/Topcoat's corrosion resistance. Testing indicates 25+ year service life.

Excellent results have been achieved on corroded surfaces prepared to SSPC-SP2, SSPC-SP3 or SSPC-SPWJ4 Surface Preparation (25+ year service life).

Tremendous cost saving (50% to 75%) on lead abatement projects have been obtained over corroded steel and remaining tightly adhering paint systems, by cleaning the surface to a SSPC-SPWJ4 then overcoating the entire structure with Termarust® TR2100 HRCSA Primer/Topcoat as opposed to complete removal of the existing coating system. (See section 7.3 for application instructions.

**Reviewed September 15, 2014**



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