HERESITE VR-514

DEFINING PERFORMANCE IN EVERY ENVIRONMENT

Since 1935 Heresite Protective Coatings has been an innovator in the development of high-performance specialty coatings. In 1964, Heresite was the first company to develop and apply direct-to-metal thin film coatings to aluminum- finned, copper-tubed heat exchangers for the HVAC/R industry. These unique coatings increase equipment performance and service life while having less than 1% heat transfer loss. Heresite still remains the performance leader in protective coatings for the air conditioning and refrigeration systems that operate in moderate to severely corrosive environments. These coatings provide protection in coastal and/or industrial applications throughout the world.

VR-514 AIR DRY SOLVENT-BASED PHENOLIC

- A thin film coating developed specifically for heat exchangers and related equipment.
- Good resistance to corrosive fume atmospheres and marine salt air environments.
- Excellent durability with good adhesion and film building characteristics.
- Excellent drying qualities in humid environments.
- Increases the service life of heat exchange equipment exhibiting good flexibility and corrosion resistance.
- Good adhesion to ferrous and non-ferrous metals without complex pretreatment or primers.
- Can be applied by spray, flow coat, brush, or roller.
- If the coils are to be subjected to direct ultraviolet (UV) exposure, consider spray-applied UC-55XX UV-resistant topcoat.
- Can be touched up with VR-514T Red Brown air dry phenolic aerosol spray.

This product had been replaced with HereShield WB-506 Gray air-dry water-based coating. It is superior in all aspects of performance. HereShield achieves 15,000 salt spray hours in accordance with ASTM B117. HereShield also exhibits better performance in mild to medium chemical environments. It is the highest performing thin film water-based air-dry coating for heat exchangers.

Access the HereShield TDS online (https://www.heresite.com/coatings/wb-506-water-based-air-dry-coating/)

VR-514 TYPICAL PROPERTIES

Salt Spray ASTM B117: Passes 2,000 hours as primer-finish. Passes 3,000 hours with UC-5500 topcoat.

Water Resistance by Controlled Condensation ASTM D4585 (Cleveland Condensing Humidity): Passes 250 hours

Dry Heat: Withstands 200°F with excursions to 250°F without damage

Dry Cold: Withstands −40°F without damage

Flame Spread Test ASTM E84: 18.4 on a scale of 0–100 (oak wood = 100)

Smoke Density ASTM E84: 5

Bend Test ASTM D522: Passes 1/2” mandrel

Meets Mil Specs: Mil-C-18468, Mil-V-1137, and Mil-V-134897

Pencil Hardness ASTM D3363: 4H

Crosshatch Adhesion ASTM D3359: 5B

Impact Resistance ASTM D2794: Direct >25 in/pound; Indirect 13 in/pound

Heat Transfer Reduction: <1% as applied for heat transfer components

Meets FDA 175.300 for indirect food contact

PRODUCT DESCRIPTION

Air Dry Phenolic

RECOMMENDED USES

Heresite VR-514 is a heavy-duty primer-finish combination material specially formulated for marine/saltwater environments — particularly for HVAC equipment, agricultural implements, chemical and wastewater treatment plants.

If the VR-514 coated surfaces will be subjected to direct ultraviolet (UV) exposure, a spray-applied topcoat of Heresite UC-5500 series should be applied.

CHEMICAL RESISTANCE

VR-514 is chemically resistant to a wide range of acids, solvents, and inorganic salts. Please review the chemical resistance guide for further information.

See the Heresite Chemical Resistance Guide for performance results in hundreds of chemical environments. (https://www.heresite.com/chemical-resistance-guide/).

PACKAGING INFORMATION

VR-514 is available in one gallon, five gallon and 54-gallon drum quantities.

An aerosol version (VR-514T) is available upon request.

THINNERS AND CLEANUP

Recommended use of Heresite S-275.
Heresite S-440 may be used instead of S-275, although S-440 is not VOC exempt in the US.

STORAGE CONDITIONS

Coating should not be stored longer than 2 years. Coating should be stored in a clean, dry environment at 50–75° F/10-24°C. Best practice is upon receipt to store coating upside down and rotate every six months. Keep out of direct sunlight. Avoid excessive heat and keep from freezing.

PHYSICAL PROPERTIES

Solids by weight: Approximately 73%

Solids by volume: Approximately 56%

Pot life: NA

Mixing Ratio by Volume: NA (1 component)

Shelf life: 2 years

Color: Red Brown

VOC CONTENT

2.83 lbs/gal (339 g/L) fewer exempt solvents, as supplied

FILM THICKNESS

For heat transfer, a 2-coat spray process will typically yield a dry film thickness (DFT) of 1.5–2.5 mils (38–64 microns).

For use with Heresite UC-5500 series (in the event of UV exposure), apply approximately 1.5 mils DFT (~38 microns) of VR-514, followed by approximately 1.5–2.0 mils (~38–51 microns) of UC-5500 series topcoat.

For all other surfaces, a typical dry film thickness of 4–6 mils (101–153 microns).

COVERAGE

After thinning (see thinning instructions on page 3), theoretical coverage is 900 square feet per gallon at 1 dry mil (approximately 22 square meters per liter at 25 microns). At the recommended DFT for heat transfer surfaces (2 mils / 51 microns), theoretical coverage is 450 square feet per gallon (approximately 11 square meters per liter at 51 microns). Coverage rates are estimates and make no allowance for material loss. Actual rates will vary dependent on application method, surfaces, etc.

SURFACE PREPARATION

All surfaces must be clean, sound, and free of any oils, dirt, grease, wax, and any other contamination that may interfere with coating adhesion.
In general, for new construction, the surface should be cleaned by solvent or a cleaner at elevated temperature followed by a clean water rinse. All surfaces must be dried prior to application of coating.
In cases where there is a large amount of contamination, a commercial blast is acceptable. Contact Heresite for coil remediation process.

VR-514 SPECIFICATIONS

After proper surface preparation, the spray technique is critical to achieving maximum penetration as deep as possible into the coil. Please read and follow detailed instructions for all application methods carefully on pages 3, 4 & 5.

Monitoring viscosity is important in ensuring the correct mil film thickness.

THINNING

Reduce VR-514 with S-275 to 20 – 25 seconds on a Zahn #2 EZ cup. This requires approximately 1 gallon of paint to 0.25 gallons of solvent. If using S-440, the reduction ratio is equivalent.

The amount of thinner required is dependent upon temperature, ventilation, humidity, application type and desired film thickness.

APPLICATION

Application is specific to heat transfer components, for other parts — please contact Heresite.
Spray Application for Heat Transfer Equipment:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
Binks #2100	66-SS	66-SSx21MD-2
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on the type of equipment being used. Reduce per thinning instructions.
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. The air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8”–12” fan, holding gun perpendicular to the surface at a distance of 12”.
7. Apply a mist bonding pass.
8. Allow it to flash off for approximately a minute, but not long enough to allow the film to completely dry.
9. Coils shall be coated on both sides of fins (outside and inside)
10. Moving spray gun slowly — each coat consists of 3 spray passes: (1) straight into fins; (2) on 70-degree angle to right; (3) on 70-degree angle to left — on both sides of coil. These three spray passes are considered ONE coat— make sure to allow 15 minutes dry time between passes to avoid runs/sags.
11. VR-514 may be recoated with itself after 15–30 minutes of air dry.
12. Allow VR-514 to air dry for a minimum of 24 hours before assembly.
    a. Check dry by twisting thumb while applying pressure to paint or check with fingernail. If the VR-514 appears to be soft, let dry further and recheck. The VR-514 is dry enough if you do not leave a thumbprint in the paint, or if the films feel hard/tough using your fingernail.
        i. Temperature and humidity can dramatically impact dry times.

Application of VR-514 and UC-5500 Series:
If the VR-514 will be exposed to direct UV, a topcoat of UC-5500 series should be applied.

1. Following the directions above for spray application —follow steps 1 through 10
    a. Apply approximately 1.5 mils of VR-514
2. After application of VR-514, allow the VR-514 to air dry for approximately 1 hour.
3. After 1 hour has elapsed, apply the UC-5500 series topcoat.
    a. Part A and Part B are packaged in premeasured kits— with Part A being a short filled gallon allowing Part B to be added and mixed. The mixing ratio is 9 parts A to 1 part B. Mix Part A and Part B separately using an explosion-proof powder drill and blade type mixer. Add part B to Part A and thoroughly mix and blend using an explosion-proof power drill and blade type mixer. Mix only the amount that can be used within the estimated pot life. For optimum application, air and surface temperature should be from 10 to 32°C and at least 5°F above the dew point. Above 50°C, sagging may occur.
    b. Spray application is preferred. Rolling or brushing is acceptable.
    d. See UC-5500 series technical data sheet for additional information.
4. Allow the VR-514 with the UC-5500 series topcoat to air dry for at least 24–48 hours before assembly.

VR-514 Dip Application:

1. Consult SDS prior to use.
2. Tank mixing should be adequate to create enough mixing, able to witness surface movement. Mixing should not be turbulent, no waves in the tank. Excessive mixing will cause foam generation
3. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
4. Consult Heresite for tank and pump recommendations.
5. Ensure as the part is prepared for dip, one will have a low point for drainage.
6. Immerse the cleaned part for 5 seconds in the reduced VR-514.
7. Upon removal of the part from the coating, apply light air pressure (less than 30 psi) using an Air Knife or similar device to spread the air flow. Using compressed air, remove excess coating. Minimal brushing should be required.
8. It may be deemed desirable to apply a final aesthetic spray. This can be accomplished immediately after the final dip is accomplished and prior to final bake.
9. During dip application, the viscosity must bemaintained and monitored. It is recommended that the viscosity be checked every hour to ensure compliance with the specification of 20 – 21 seconds Zahn #2 EZ cup for a 1 dip application at the targeted DFT.
Additional solvent and coating can be added to adjust viscoisty as needed.

VR-514 Flooding /Flow coat Application:

1. Consult SDS prior to use.
2. The reservoir containing the paint needs to be under continual agitation .
3. Do not apply if temperature is less than 5°F or C above dew point, or if temperature is below 45°F (7°C)
4. Cork/tape all tube openings to prevent coating flowing to interior tubes. Check after each application to assure openings remain sealed.
5. Reduce VR-514 with S-275 solvent to ~20-21 seconds with Zahn #2 viscosity cup. It was noted that at lower viscosities, multiple coats were required to achieve the same internal appearance. The higher the viscosity, the higher the tendency to bridge fins. It was found that 20-21 seconds provided the ideal scenario of coverage as well as appropriate draining. This range is dependent on coil type, fin design, fin pack, temperature, humidity, etc. and will need to be verified accordingly.
6. Lay coil in a horizontal position elevated 25-30 degrees on a flow coat table with the fins vertical to ensure coverage of all bare metal.

7. Use a low pressure/high volume pump to flow the paint over the coil. Care must be taken to achieve uniform/complete coverage.
8. Apply paint to both sides of the coil by turning the coil over and laying it on the coated side.
9. Lift coil to allow draining with fins in a horizontal position. If needed, use compressed air (<30 psi) through the fins to help remove coating that may have bridged fins or any excess coating.
10. It may be necessary to brush out coating to remove drips/runs/areas of excessive coverage.
11. A final light cosmetic spray is recommended after flooding /flow coat process.
12. During application, the viscosity must be maintained and monitored. It is recommended that the viscosity be checked every hour to ensure compliance with the specification listed above. Additional solvent and coating can be added to adjust viscosity as needed.
13. Paint can be recirculated by catching it in a flow coat 'table' with drainage into the can holding the liquid VR-514.

Spray Application For Higher Film Build:

1. Consult SDS prior to use.
2. Do not apply if temperature is less than 5°F above dew point, or if temperature is below 45°F.
3. Use standard production type spray equipment (conventional, HVLP, airless, etc.). A few starting recommendations can be found below:

Guns	Fluid	Air
Binks #2100	66-SS	66-SSx21MD-2
Graco Air Pro HVLP		

4. Spray viscosity will be dependent on the type of equipment being used. Reduce per thinning instructions.
5. Spray equipment: always flush spray equipment with solvent to clean prior to applying coating.
6. The air supply must be uncontaminated. Adjust air pressure to approximately 50 pounds at the gun and provide 15–20 pounds at pressure pot. Adjust spray gun by first opening liquid valve and then adjust air valve to give approximately an 8"–12" fan (20-30 cm), holding gun perpendicular to the surface at a distance of 4"to 6" (10-16 cm).
7. To minimize sagging and dripping, apply a tack coat (a light first pass with maybe 30-40% coverage) first by turning down the liquid and holiding the gun 8" to 12" (20-30 cm) from the surface.
8. Allow it to flash off for approximately a minute, but not long enough to allow the film to completely dry.
9. Apply a 3–4 crisscross multi-pass maintaining a wet appearing film.
10. Allow a minimum of 15 minutes of air dry.
11. Apply another coat of VR-514 following same steps as above.
12. Repeat steps 9 and 10 until the desired film build is achieved [typically two to three coats for 4.0 to 6.0 mils (102–152 microns)].
13. VR-514 may be recoated with itself after 15–30 minutes of air dry.
14. Allow VR-514 to air dry for a minimum of 24 hours before assembly or follow force cure schedule outlined in the Curing/Drying section.
    a. Check dry by twisting thumb while applying pressure to paint or check with fingernail. If the VR-514 appears to be soft, let dry further and recheck. The VR-514 is dry enough if you do not leave a thumbprint in the paint, or if the films feel hard/tough using your fingernail.
        i. Temperature and humidity can dramatically effect dry times.

CURING/DRYING:

Air Dry:

1. Coil should be dry to touch within 5 hours of final application — warmer temperatures will enhance dry, cooler temperatures will lengthen the dry time.

Force Cure:

1. A force cure at 180°F for 30 minutes is an option if an appropriate oven is available.

These instructions are not intended to show product recommendations for specific services. They are issued as an aid in determining correct surface preparation, mixing instructions and application. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

HERESITE VR-500 SERIES COATINGS WILL WITHSTAND EXPOSURE TO THE FUMES NOTED BELOW

Acetylene
Alcohols
Alum
Aluminum chloride
Aluminum nitrate
Aluminum sulfate
Ammonium acetate
Ammonium alum
Ammonium chloride
Ammonium phosphate
Ammonium sulfate
Ammonium sulfide
Borax
Boric acid
Brine
Calcium carbonate
Calcium chloride
Calcium cyanamide
Calcium hydroxide
Calcium nitrate
Carbone dioxide
Carbon monoxide
Carbon tetrachloride
Carbonic acid
Caustic lime (dehydrated)
Chlorine fumes (up to 100 ppm)
Citric acid
Copper chloride
Copper nitrate
Dextrose
Ethylene glycol
Formaldehyde solution
Fruit juice
Gelatine
Glycerine
Glycerol
Glycols
Hydrogen gas
Hydrosufites
Lubricating oils
Manesium carbonate
Magnesium hydroxide
Magnesium oxide
Magnesium sulfate
Manganese ammonium sulfate
Manganese chloride
Manganese sulfate
Mercuric chloride
Mineral oils
Naphtha
Palmitic acid
Potassium bicarbonate
Potassium carbonate
Salt spray
Sea water
Silicic acid
Soaps
Sodium alum
Sodium aluminate
Sodium bicarbonate
Sodium silicate
Stearic acid
Stoddard solvent
Sugar
Sulfur
Surfactants
Tannic acid
Varnish
Vegetable oil
Zinc acetate
Zinc chloride
Zinc plating solution
Zinc sulfate

CAUTION: CONTAINS FLAMMABLE SOLVENTS. KEEP AWAY FROM SPARKS AND OPEN FLAMES. IN CONFINED AREAS WORKERS MUST WEAR FRESH AIR LINE RESPIRATORS. PERSONS SHOULD WEAR GLOVES OR USE PROTECTIVE CREAM. ALL ELECTRICAL EQUIPMENT AND INSTALLATIONS SHOULD BE MADE AND GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. IN AREAS WHERE EXPLOSION HAZARDS EXIST, WORKMERS SHOULD BE REQUIRED TO USE NONFERROUS TOOLS AND TO WEAR CONDUCTIVE AND NONSPARKING SHOES.