ResoCoat TS-314
Polyamide Extreme Wear Coating
Technical Bulletin (Revision A)

PHYSICAL PROPERTIES

Bond strength of ResoCoat™ 314 Coating on Steel (ASTM D-4541)	>800 psi (>5.5 MPa)
Flexibility (Mandrel Bend ASTM D-522-93)	No Failure by visual inspection
Direct Impact (ASTM D-5420, 120 in-lbs)	No Failure by visual inspection on grit blasted steel
Reverse Impact (ASTM D-5420, 120 in-lbs)	No Failure by visual inspection on grit blasted steel
Hardness (Shore D ASTM D2240)	65 Shore D
Hardness (Pencil Hardness ASTM D-3363)	2H - Pencil Hardness
Tensile Strength (At Break, ASTM D638)	7120 psi (40 MPa)
Compression Set (72hr@100□C; ASTM D395, method B)	44% non-recovery
MEK Double Rub (ASTM D5402)	100% coating retention after 100 double rubs
Glass Transition Temperature (T_G) (DSC, 10° F/min ramp)	150° F (65.5□ C)
Abrasion, Taber (ASTM 4060) 1000 cycles at 2.2 lbs, CS-17 wheels; coating deposited on steel substrate	2.8 x 10^{-4} oz. (8 mg)
Corrosion Resistance, Salt Fog 2000 hrs (ASTM D-1654)	<0.08 inches (<2 mm)
Finish appearance	Orange peel to smooth surface with gloss finish
Gloss @ 5 mils thickness (60° Gloss, ASTM D-523)	≈50 gloss units
Gloss @ 10 mils thickness (60° Gloss, ASTM D-523)	≈70 gloss units
Weathering/Gloss (UVA-340, 1000 hrs, ASTM G154) 60□ Gloss loss (OSHA Safety Red color)	<5 gloss units
Weathering/color (UVA-340, 1000 hrs, ASTM G154) (OSHA Safety Red color)	<0.8 ΔE*
Weathering/color (UVA-340, 2000 hrs, ASTM G154) (OSHA Safety Red color)	<1.5 ΔE*
Weathering/color (UVA-340, 2000 hrs, ASTM G154) (OSHA Safety Red color)	<3 gloss units loss
Type	Ready to use Polymer Thermal Spray dry powder, 100% <250 micron (60 mesh)
Coatings VOC (g/L)	None
Shelf life	One year when stored at 70° F in unopened original sealed container
Application Rate	70 to 200 square feet per hour
PTS Application Process Temperatures (IR Thermometer)	Preheat 356° F (180□ C) - Application 400° F (205□ C)
Thickness (suggested range)	6-10 mils (150-250 µm)
Coverage (per pound)	≈20 ft^2 at 10 mils thickness

Physical properties were determined on specimens prepared under laboratory conditions using applicable ASTM procedures. Actual field conditions may vary and yield different results; therefore, data are subject to reasonable deviation.

ResoCoat™ 314 Extreme Wear coating is specifically engineered to provide an ultra-durable finish for steel and non-tempered metal substrates capable of exposure to the higher spray application temperatures required for deposition.

ResoCoat™ 314 is formulated for superior adhesion to the substrate, and provides outstanding resistance to ultra-violet light, color fade, chemicals, extreme temperatures, abrasion, erosion and other physical damage. This coating has proven to perform extremely well in corrosion resistance testing, exhibiting the least amount of corrosion undercut after 2000 hours salt-fog observed for any coating tested to date. The coating is ready for immediate use following application when cool.

CHARACTERISTICS

- ❑ Ultra-durable wear resistant
- ❑ Excellent corrosion protection
- ❑ Outstanding adhesion
- ❑ Zero VOCs
- ❑ Ready for immediate use when cool

ResoCoat™ 314 powder coating may be applied directly to properly prepared metal surfaces. ResoCoat™ 314 is applied with the Resodyn Polymer Thermal Spray (PTS) systems to nominal thickness of 6-10 mils, but is not thickness limited. The coating may be applied to form a very thick layer if required for the application.

This thermoplastic coating is completely repairable, with new material added to the existing coating at any time throughout its useable service life. This makes the coating very suitable for use as a sacrificial coating in aggressive continuous wear applications, where coating thickness is routinely restored as part of a preventative maintenance program to prevent the wear

from reaching the substrate.

A single layer provides a complete, non-porous, continuous surface with all the desired properties for a durable, long-lasting finish. ResoCoat™ 314 is available in a variety of colors, and Resodyn also offers custom color matching.

Application Working Environment

ResoCoat™ 314 may be applied to properly prepared, clean, dry substrates at temperatures above 40°F (4°C). Polymer Thermal Spray application rates will decrease at lower ambient temperatures due to the time and thermal energy required to preheat and maintain the substrate surface at the proper temperature for good adhesion, material flow-out, and curing.

Thick cross-sectional substrates that readily absorb heat at a fast rate such as heavy steel plate will require longer durations of preheating before beginning the coating material application than a thin sheet metal surface.

The use of additional equipment to provide preheat to the substrate will substantially increase productivity by allowing the coating deposition to proceed immediately following the preceding heating equipment. This can be accomplished through the use of induction heating equipment which will rapidly raise the temperature of the substrate material to the designated preheat temperature. Convective or radiant flame heating equipment may also be utilized to raise the substrate temperature in advance of the coating application equipment.

Surface Preparation and Cleaning

Inadequate surface preparation can result in poor coating appearance, integrity and service life. The majority of coating failures can be attributed to inadequate surface preparation which directly affects coating adhesion.

To ensure maximum adhesive bond strength of the coating to the substrate, select and implement the proper surface preparation. The method of surface preparation will depend on the substrate material and the environmental conditions.

In general, the surface must be dry and in sound condition. It must be free of all oil, dust, rust or other active corrosion, old paint, or other contamination to ensure good adhesion. For coating applications where no surface preparation standard is specified, refer to the Surface Preparation Standards defined by the Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers International (NACE).

It is highly recommended to first prepare the substrate by solvent cleaning to an SSPC-SP1 level as allowable by application environment and/or applicable regulations to remove all oils and loose contaminates prior to blast cleaning to prevent inclusion of these contaminates into the blasted surface.

If applicable all surfaces should be prepared prior to coating to an SSPC-SP5 / NACE 1 White Metal Blast Cleaning surface. The SP-5 prepared surface when viewed without magnification shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter.

Coating should be applied within twenty-four (24) hours following surface preparation completion to prevent oxide/rust formation and recontamination.

APPLICATION

Installation

ResoCoat™ 314 powder coating is ready to use as supplied, and requires no mixing.

Apply using a Resodyn Polymer Thermal Spray system. System operational parameters will vary based on the PTS system, substrate type, ambient temperature, substrate temperature and other process variables. Refer to the applicable Resodyn System's Users Guide for information regarding setting and adjusting process parameters specific to your equipment and application. The process of PTS coating application utilizes methods and skills similar to that of spray painting. Practice of the application process using the PTS system on a non-vital, similar substrate is highly suggested.

Initial PTS Parameter Settings

Refer to the applicable PTS System Users Guide for general system parameters as suggested beginning parameters. Final applicator power level and material feed settings must be determined by the operator during spray application. Adjustments will be required to optimize the application rate, coating thickness, and material flow-out based on environmental and substrate variations, and other processing conditions. Refer to the PTS Users Guide section "Applying a Coating with the PTS System" for a detailed discussion on system operation and coating application.

Process Parameters

A note about I.R Thermometers: Pre-heating temperature readings of an uncoated metal surface taken by non-contact I.R. Thermometer will read lower than the actual temperature due to the emissivity value for the substrate material. When coating material is applied, the emissivity differential is reduced and an accurate reading can be read by the device. Good Manufacturing Practice dictates that a sample substrate of the same material and thickness be used to determine the difference between uncoated and coated readings taken with your thermometer. To do this, the practice substrate should be heated to 100° C (212°F) as read by the I.R. Thermometer. Immediately upon reaching the 100° temperature, deposit coating material onto the heated surface and observe the increased value now read by the I.R. Thermometer. The difference between uncoated and coated temperature readings is the percentage by which to reduce the listed pre-heat temperature when read with this device. Example: Uncoated substrate temperature of 100°C immediately changes to 160°C when coating is applied. The adjusted pre-heat temperature percentage is

calculated as: (160 – 100) / 100 = .60 Therefore if the listed preheat temperature was 185° C, it should be multiplied by .60 to reach the adjusted pre-heat temperature of 111° C for the particular I.R Thermometer being used on the particular substrate material.

Process Parameters

Pre-heat temperature: 356°F (180° C)

Application process temperature: 400°F (205° C)

Maximum process temperature: 437°F (225° C)

Applicator stand-off distance: 18”-24” as required for temperature control and spray pattern.

Note: Accurate determinations of the substrate preheat temperature and in-process coating surface temperature is required to ensure proper adhesion AND complete cross-linked curing is achieved. Use of an Infrared (I.R.) Thermometer is required to easily and accurately read the surface temperatures throughout the entire process.

The listed pre-heat temperature is specific to the coating material, and must be reached before beginning the material deposition to achieve proper wetting and adhesion. Pre-heat is also required to achieve proper flow-out of the material during continued application.

Exceeding the maximum temperature during the application process will degrade the appearance and the physical properties of the coating material. Coating that has been overheated may be indicated by discoloration (browning) and may appear to have a wrinkled finish.

Apply the material to a uniform thickness over the entire surface. Ensure complete coverage and overlap of spray passes. Achieving the optimum application rate will require adjustment of the feed rate and power level settings to allow for a steady application of material in a continuous, smooth, back and forth application pattern, with previously applied material flowing out from residual substrate/coating heat combined with current processing heat as each subsequent pass is deposited.

COATING REPAIR AND TOUCH-UP

Damage and physical wear to the coating surface can be easily repaired by simply reheating the surface to re-melt and flow the materials at the area of damage. If required, additional matching coating material may be applied to the heated area to completely fill and cover the damage. All materials should flow together to produce a coating repair that is not readily detectable, and will continue to provide outstanding performance.

COVERAGE

1 pound covers approximately 20 ft^2 at 10 mils thickness

CURING/RETURN TO SERVICE

ResoCoat™ 314 is fully cured after it cools. Upon reaching ambient temperature the coating is ready for immediate service.

PACKAGING

50 pound bag lined cartons with desiccant packet.

CLEAN-UP

Follow the User Guide instructions for powder hopper removal from the PTS control cart. Pour the remaining unused powder back into its original bag lined container. Ensure the desiccant packet remains with the powder inside the bag liner and reseal the bag. Vacuum the remaining powder residue from the hopper canister and from inside and around the powder feed pump. Engage the “purge” button on the control panel for 10 seconds to blow any remaining powder through the umbilical feed hose and from the applicator feed tube. The system is now ready for the next use.

SHELF LIFE

ResoCoat™ 314 has a shelf life of at least one (1) year when stored in the original, unopened, tightly sealed containers in a dry location at 70°F.

Return all unused material to the original container immediately after use. Remove as much air from the bag liner as possible and reseal tightly ensuring the desiccant packet remains inside the sealed bag. Agglomeration of the powder particles may occur when exposed to humidity and moisture.

CAUTION and SAFETY

Consult Material Safety Data Sheets and container label Caution Statements for detailed explanations of the hazards and personal protection required in handling these materials.

WARNING! May cause eye, skin and respiratory tract irritation.

INHALATION: Inhalation of dusts may cause respiratory irritation.

INGESTION: May cause irritation to the mouth, throat, and abdomen. May also cause nausea or vomiting.

SKIN CONTACT: Prolonged contact may cause irritation

EYE CONTACT: Contact with eyes may cause irritation.

CHRONIC EXPOSURE: No known chronic health effects.

AGGRAVATION OF PRE-EXISTING CONDITIONS: None known.

PERSONAL PROTECTION

VENTILATION SYSTEM: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

PERSONAL RESPIRATORS (NIOSH APPROVED): Not expected to require personal respirator. If the exposure limit is exceeded a respirator may be

required. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

An example of an OSHA approved air purifying cartridge respirator is pictured for reference below.

SKIN PROTECTION: Wear protective clothing as appropriate.

EYE PROTECTION: Use safety glasses and/or goggles, as appropriate where dusting or contact is possible.

GOOD HYGIENE CONDITIONS: Wash with soap and water before eating any food.

FIRST AID MEASURES

INHALATION FIRST AID: If individual develops breathing difficulties, remove to fresh air and seek medical attention if breathing difficulties continue.

SKIN CONTACT FIRST AID: Use good hygiene practices and wash skin with soap and water after handling.

EYE CONTACT FIRST AID: Remove contact lens if present. Hold eyelids apart, initiate and maintain gentle and continuous irrigation for 15 minutes lifting upper and lower eyelids occasionally. Get medical attention immediately.

INGESTION FIRST AID: Induce vomiting ONLY as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical advice immediately.

NOTE TO PHYSICIANS: Treat symptoms.

WARRANTY

We warrant that our goods will conform to the description contained in the order, and that we have good title to all goods sold. WE GIVE NO WARRANTY, WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE OR OTHERWISE, EXPRESS OR IMPLIED, OTHER THAN AS EXPRESSLY SET FORTH HEREIN. We are glad to offer suggestions or to refer you to customers using Resodyn materials for a similar application. Users shall determine the suitability of the product for intended application before using, and users assume all risk and liability whatsoever in connection therewith regardless of any suggestions as to application or construction. In no event shall we be liable hereunder or otherwise for incidental or consequential damages. Our liability and your exclusive remedy hereunder or otherwise, in law or in equity, shall be expressly limited to our replacement of nonconforming goods at our factory or, at our sole option, to repayment of the purchase price of nonconforming goods.

Information concerning government safety regulations available upon request. Visit our Website at www.resodyncoatings.com for downloadable versions of MSDS and Technical Data Sheet.