Corrosion Protection

Objectives Worksheet

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CPS01-STHO01-E

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Module 1 - Corrosion Origins And Prevention

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Causes Of Corrosion

Corrosion Formula

Corrosion is an electrochemical reaction called oxidation that is formed when combining exposed metal, _____, and an electrolyte, such as acids, salts, or moisture.

Corrosion Promoters

Elements that promote corrosion include road salt, magnesium chloride, _____ _____, pollutants, collision damage, and improper collision repairs.

OEM Corrosion Protection

Zinc Coating On Steel

A coating of _____ on the steel is applied at the steel mill before the steel is delivered to the vehicle makers.

Electrodeposition Coating (E-Coat) Process

The E-coat process fully immerses the body in a _____ coating, allowing the coating to reach areas that a spray gun cannot reach.

Anti-Corrosion Compounds

Anti-corrosion compounds are typically applied _____ the topcoats have been applied to prevent contamination of the finish.

Undercoating

European vehicle makers are more likely to apply undercoating under the _____ _____. Other vehicle makers consider the E-coat to be adequate chip protection for most of the underbody.

Variations In OEM Applications

_____ vehicle makers are more likely to apply anti-corrosion compounds to interior cavities than other vehicle makers. All vehicle makers require anti-corrosion compounds to be applied during repairs.

OEM Coatings To Service Parts

OEM coatings on _____ parts are exactly the same as applied to entire vehicle bodies. Some parts may be prepared and coated using an outside supplier, but these suppliers are held to the same standards for materials, treatment, and corrosion-resistance.

Preventing Corrosion During Repairs

Preserve The E-Coat

The E-coat is the _____ effective corrosion-inhibiting coating that is applied to the vehicle. E-coat can be kept mostly intact by not grinding an entire flange. Remove the coating just on the weld areas. E-coat should also generally be kept intact on inserts used for making GMA (MIG) butt joints.

Heat And Corrosion

_____ is a promoter of corrosion, whether applied during the grinding process, when GMA (MIG) welding, or directly with a heat source.

Remember The Backside

Most processes done on the front side also affect the _____. Examples are areas where picks, hammers, and dollies were used, and anchor clamp sites.

Backside Of A Paintless Dent Repair

_____ _____ _____ may cause an issue with the backside even if the front side does not require refinishing. This is recommended for most PDR repairs, as it is difficult to see if the corrosion protection was removed. It is better to assume that the finish has been scratched and apply corrosion protection to the panel backside.

Lower Hem Flanges And Pinchwelds

Lower hem flanges and pinchwelds are areas where problems could occur if corrosion protection is not considered, due to _____ collecting in these areas.

Preventing Galvanic Corrosion

To prevent galvanic corrosion, duplicate the original _____ installation. Drill required holes before applying coatings. _____ coated fasteners if the coating is damaged. Most of these fasteners are one-time use for this reason.

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Module 2 - Corrosion Protection During Repairs

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Cleaning

Mechanical Cleaning
Cleaning is a two-part process, including _____ cleaning and _____ cleaning.

Using Solvent Or Waterborne Cleaners
To use solvent or waterborne cleaners wipe with a clean cloth in _____ direction before the cleaner starts to dry. This will help ensure that contaminants are carried away with the cloth.

Part Preparations

Testing For E-Coat
It is a good practice to test replacement parts for E-coat. The coating may be a shipping coating, which is a temporary coating used on some non-OEM parts. A shipping coating may even have been applied to an OEM part that was returned and restocked. To determine if the coating is E-coat, do a solvent test or rub by rubbing the coating with a cloth soaked in _____.

Aluminum / Magnesium Part Considerations
With a bare and repaired aluminum or magnesium part, do not use grits coarser than ____. Both aluminum and magnesium scratch very easily. Oxidation forms quickly on bare aluminum. Keep aluminum, magnesium, and steel refinish and metal working tools and sanding materials _____ to avoid galvanic corrosion.

Joining Surfaces

Weld-Through Primer
Weld-through primer is _____-resistant, so it will not burn away during the welding process as much as other coatings would. Weld-through primer may be _____ or copper based, and is available as a spray or brush-on. Weld-through primer generally needs to be dry to the touch before welding.

Adhesive Bond Mating Surfaces
Adhesive bond mating surfaces usually requires removing all of the coatings, including the _____, down to bare metal for the best adhesion.

Primers

Primer Coatings

Primer coatings must be applied to a _____ surface. If there is no access for mechanical and chemical cleaning, primers will not adhere to the surface.

Epoxy Primer

Epoxy primer may require an _____ base, which is a two-step process of applying a metal cleaner and conversion coating, which chemically etches the surface. This process is most often done on restoration projects, rather than in production repair facilities.

Self-Etching Primer

Self-etching primer contains a phosphoric ____, which neutralizes as it dries. Once the primer has flashed, the ____ will not react with other coatings. Self-etching primer does not form a barrier like epoxy primers and would eventually break down. For this reason, self-etching primer must be coated with a primer-surfacer or primer-sealer.

Stationary Glass Pinchwelds

Stationary glass pinchwelds are _____ after applying the primer coat.

Aerosols

Aerosols

Aerosols are _____ for small, spot repairs. Aerosols are available for weld-through primer, self-etching primer, epoxy primer, anti-corrosion compound, and undercoating.

Seam Sealers

Purpose Of Seam Sealers

The purpose of seam sealers is to seal out moisture and contaminants from joints, stop water and air leaks, prevent _____ in the passenger compartment, and reduce wind and road noise.

Types Of Seam Sealers

Heavy-bodied seam sealers are good on _____ joints because they do not run when applied. There are also sealers considered medium-bodied and semi-self-leveling.

Seam Sealer Characteristics

All seam sealers are _____, flexible, non-shrinking, and have good adhesion.

Seam Sealer Varying Characteristics

Seam sealers may have an odor, such as _____-based seam sealer, which should not be used on joints that are open to the passenger compartment. The odors can linger.

Direct-To-Metal Seam Sealers

Direct-to-metal seam sealers require a _____ surface. These seam sealers are corrosion-inhibiting, not corrosion-curing. The surface must be similarly prepared as for applying primer and topcoats.

Matching OEM Application

The main goal when selecting and applying seam sealer is to _____ the OEM application in appearance, performance, and function.

Chip-Resistant Coatings

Chip-Resistant Coatings

Chip-resistant coating is usually applied _____ the topcoat in a repair facility, same as the vehicle maker, though sometimes the material is applied _____ the topcoat.

Locations Of Chip-Resistant Coating

_____ applications of chip-resistant coating may be found under the rocker panel, at the base of A-pillars, at the bottom of doors, and in the dogleg area.

Chip-Resistant Coating Identification

Chip-resistant coatings may be identified using _____ maker service information, by film thickness, or visually.

Choosing The Material

When choosing the materials for chip-resistant coatings, generally follow the _____ or paint maker's recommendation. Vehicle makers usually do not recommend specific brands of chip-resistant coatings.

Chip-Resistant Coating Application

When applying chip-resistant coatings to the vehicle, use the experience gained during the _____ _____ process.

Module 3 - Corrosion Protection After Repairs

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Anti-Corrosion Compound

Anti-Corrosion Compound Material

Anti-corrosion compound material is applied in a fine mist with a _____ attached to a special spray gun or an aerosol can. Anti-corrosion compound has self-_____ capabilities.

Anti-Corrosion Compound Application

Anti-corrosion compound application requires _____ drain holes after the material has set. It may be difficult to avoid the drain holes when applying the material, due to its flow and creep capabilities.

Where To Apply Anti-Corrosion Compound

Anti-corrosion compound is typically applied inside non-visible areas, including _____ cavities, not just steel.

Undercoating

Undercoating Material

Undercoating material is a thick _____- or synthetic rubber-based material. Undercoating may be solvent- or water-based. The bottom of the fuel tank is one area commonly recommended for undercoating application.

Undercoating Characteristics

Undercoating material may be _____-_____. If the material is scratched, some products will flow back into the scratched area.

Areas To Avoid With Undercoating

Vehicle makers are consistent in saying to _____ mechanical part and high heat areas when applying undercoating, including brake system parts, exhaust system and related parts, emission parts, ball joint covers, and electrical connectors.

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