



Technical Information For The Collision Industry

Restoring Corrosion Protection—Update

The I-CAR Tech Centre has received questions regarding the procedures and required materials for restoring corrosion protection inside structural parts during collision repair. New materials are being developed with recommendations that may vary from those published in previous I-CAR Advantage articles or existing I-CAR training programs. These new products or procedures may provide an acceptable level of corrosion protection as those that are currently included in I-CAR programs.

It is important to remember that I-CAR is an inter-industry organization that does not endorse, recommend, or approve specific brands of products. Considerations that influence I-CAR training on the subject of restoring corrosion protection during collision repair include the following issues:

- Tests have shown that there are considerable differences in performance between the various brands of epoxy, self-etching, and weld-through primers that are sold for aftermarket use.
- Specific brands of products are not recommended. Only material types such as epoxies, self-etching, and weld-through primers, etc. are referenced.
- Reports on the evaluation results of various product types are based on the average performance of the MAJORITY of the product brands in each group of materials. There are typically products that perform better than, and worse than, the average performance of the material group.
- A specific product within each group tested may have characteristics and a level of performance that allows the product to be used in a manner that is not consistent with general product recommendations provided by I-CAR, but may provide an acceptable level of corrosion resistance.
- Specific brands of corrosion-resistant primers may exist that exhibit superior characteristics in the categories including, but not limited to, heat resistance from welding, adhesion, moisture resistance, rust creep prevention, and levels of contamination effects on the weld caused by burning during welding.
- The processes taught by I-CAR have been tested and are known to provide an acceptable level of corrosion protection. It is not definitively stated in I-CAR training programs that other products and procedures may not exist that provide acceptable levels of corrosion protection. While I-CAR processes perform well there may be other acceptable options.
- The processes taught by I-CAR for restoring corrosion protection are

intended to inform the collision industry of the general characteristics of coatings and equipment types that are available to the industry.

- I-CAR informs the industry of how a system of products can be used in unison to provide high levels of corrosion protection inside enclosed areas during collision repair. This information focuses on using a three-stage process of corrosion protection. This process includes applying weld-through primer in the weld zone areas, epoxy or self-etching primer over bare metal areas, and anti-corrosion compound on the backsides of collision-repaired surfaces. The three-stage process will provide an acceptable level of corrosion protection when the individual level of performance of each product used is average. This process also helps ensure good corrosion protection when some of the coatings may have only minimal coverage inside enclosed areas.

EPOXY PRIMER

Epoxy primer is recommended by I-CAR for use over bare metal areas inside enclosed areas of structural parts to prevent corrosion (see Figure 1). Automotive epoxy primers typically perform well when used over bare steel to prevent corrosion on the interior of structural parts. However, the product user guides may not state that the product is designed or intended for that use. Some epoxy primers may be acceptable for use in weld flange areas if the epoxy is removed from the weld zone before welding to minimize weld contamination. Unlike weld-through primers, epoxy primers contain a high percentage of paint resins. These resins are likely to burn away, reducing the level of corrosion protection adjacent to the weld, and produce gases that affect weld integrity.

SELF-ETCHING PRIMER

As coating characteristics vary between product lines, the level of corrosion protection that self-etching primer provided on lab samples varied considerably. However, the average level of corrosion protection that self-etching primers provided was considerably lower than that of epoxy primers. Because of that, the general recommendation is that if self-etching primer is used to protect interior areas of structural parts against corrosion, it must be topcoated or coated with an anti-corrosion compound to achieve an acceptable level of corrosion protection.

WELD-THROUGH PRIMER

Weld-through primer is recommended by I-CAR for use over bare metal areas along mating flange areas on structural parts to prevent corrosion in areas adjacent to welds (see Figure 2). Unlike other refinish primers, weld-through primers are designed specifically for use in weld areas on body panels. Weld-through primer is not designed for use over large bare metal areas, only weld zone areas. Weld-through primer should be removed from exterior areas that will be refinished.

To improve weldability and weld integrity, weld-through primer can be removed from the direct weld area. Care must be taken to not remove the primer from any area beyond the immediate weld area.

As with a number of other corrosion-resistant primers, weld-through primers are not intended to be used alone to provide a high level of corrosion protection. They are best when used in conjunction with other products to achieve an acceptable level of corrosion protection. They may be acceptable in areas of the vehicle that are not subjected to concentrations of moisture or in areas that are not prone to corrosion by de-



Figure 1—Epoxy primer is being applied inside of this A-pillar to ensure corrosion protection.

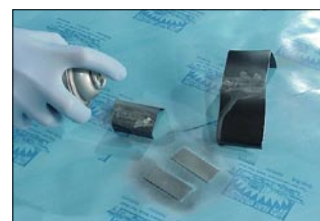


Figure 2—Weld-through primer is applied to weld-zone areas, such as these inserts for a sectioning butt weld joint.

sign. Weld-through primers are designed to provide some corrosion protection in areas directly adjacent to welds and in areas that will not be accessible after a structural part is completely assembled. The primary desirable characteristic of weld-through primer is burn resistance in areas adjacent to the weld.

Typically, weld-through primers offer a relatively low level of corrosion protection when used alone when compared to epoxy primer. For that reason it is preferable to protect areas coated with weld-through primer with applications of epoxy primer or anti-corrosion compounds.

ANTI-CORROSION COMPOUNDS

Anti-corrosion compounds are generally wax- or petroleum-based coatings (see Figure 3). They may be recommended by the product maker to be applied directly to bare metal or over primers and topcoats in cavities within the vehicle.

OEM E-COAT

In many cases, OEM E-coat primers that are provided on most replacement body panels provide a very high level of protection against corrosion on enclosed areas of structural parts. The E-coats tested for temperature and corrosion resistance performed better than any aftermarket coating in the categories of burn resistance and corrosion resistance. Many E-coat samples evaluated exhibited the same, or lesser amount of burning around the weld compared to many of the weld-through primers. However, OEM E-coats are typically susceptible to degradation from sunlight because of the lack of UV arrestors in the majority of OEM E-coat formulations. This characteristic is obviously not a concern inside a structural part.

OEM CORROSION PROTECTION RECOMMENDATIONS

Some examples of OEM recommendations for protecting the inside areas of structural parts from corrosion are the following.

General Motors

The 2004 Chevrolet Malibu, 2004 Chevrolet Colorado/GMC Canyon, 2003 Saturn Ion, 2000 Chevrolet C/K pickup truck collision repair manuals recommend that weld-through primer be applied to all bare metal areas on weld mating surfaces. Following welding, primers, sealers, and anti-corrosion compounds are also recommended on interior surfaces of body panels in areas where moisture might accumulate.

Ford

The 2003 Ford Focus Collision Repair Manual states that the mating surfaces of panels to be joined by welding must be prepared by removing dirt, grease, oil, paint, E-coat, and galvanized coatings prior to the welding process. Use primers rich in zinc content to offer corrosion protection during and after welding. When body repair work is done, apply wax- or asphalt-based anti-corrosion compounds using a flexible wand inserted into existing holes.

The Ford article number 04-2-5 technical bulletin for the 2004 Ford F-150 recommends that if the powder coating on the magnesium radiator support becomes scratched or damaged, Motorcraft PM 12-A Low Temperature Anti-Corrosion Coating must be applied to the bare metal areas to restore corrosion protection to the part.



Figure 3—Anti-corrosion compound is applied to the inside of a rear rail using an extension wand.

DaimlerChrysler

The 2002 DaimlerChrysler “Welding and Weld Bonding” publication states that weld-through primers are not recommended when STRSW or GMAW is used. There is concern that using anti-corrosion coatings in weld zones before welding affects weld integrity because of weld contamination. To avoid weld contamination, avoid using anti-corrosion primers directly in weld zones. When possible preserve the E-coat in areas away from weld zones.

Mazda

The Mazda 1998-2003 626 Body Collision Repair Manual states that weld-through primer should be used on weld flanges. Mazda also recommends applying a wax- or oil-based rust inhibitor to the backside of welded areas.

Toyota

The 2003 Toyota “Collision Pros” publication states that weld-through primer helps protect against corrosion in areas that are inaccessible after a weld has been performed. Toyota also recommends the use of anti-corrosion compound on the inside surfaces of enclosed areas of the body structure. And Toyota recommends applying epoxy primer underneath polyester body filler to prevent corrosion from forming between the filler and the body panel.

Volvo

Volvo recommends the use of weld-through primer on weld flanges.

NEW MATERIALS

New products being tested and introduced into the field for corrosion protection inside structural parts include “Motorcraft PM 12-A Low Temperature Anti-Corrosion Coating.” Already being recommended on the F-150 radiator support, more applications may be recommended by Ford Motor Company in the future on enclosed areas of vehicle structures. It is intended to replace weld-through primers and epoxies inside enclosed areas.

Another product soon to be evaluated is a weld-through primer that is formulated using copper as an anti-corrosion element rather than zinc.

The results of these evaluations will be disclosed when the studies are completed.

SUMMARY

Information in I-CAR programs for restoring corrosion protection inside structural parts during collision repair focuses on using a three-stage level of corrosion protection. This process includes the use of weld-through primer, epoxy or self-etching primer, and anti-corrosion compound. New products being tested may alter these general recommendations.