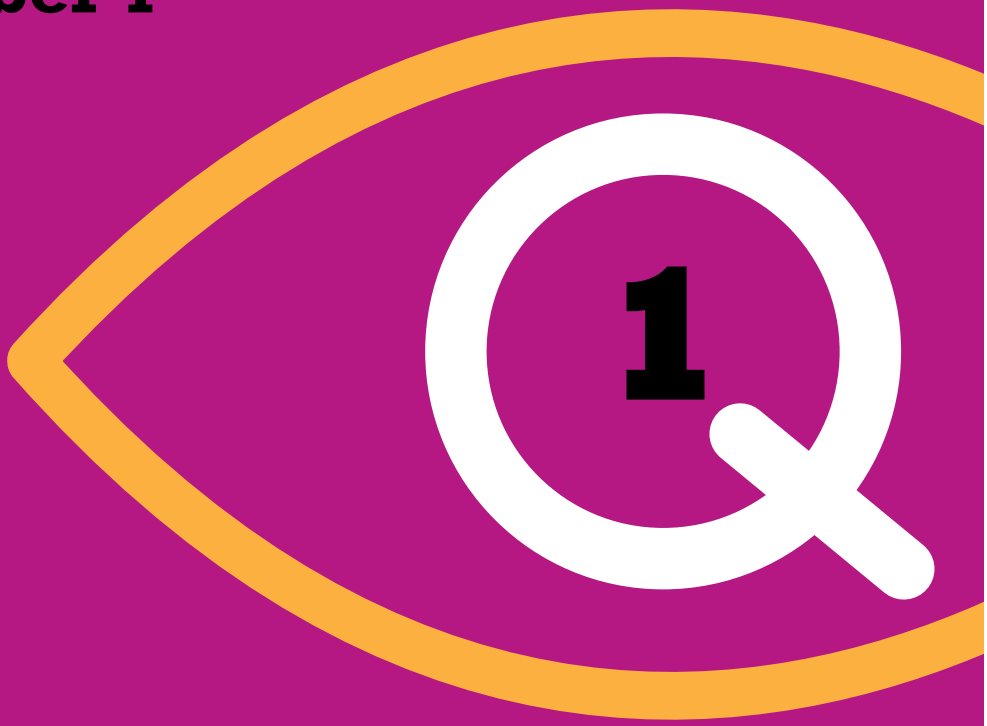
CAPA

QualityWatch

A Periodic Report on Non–CAPA Certified Aftermarket Replacement Parts

Report Number 1

November 2011



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Report Number 1 Results

Nearly 90% (13 out of 15) of the independently manufactured replacement parts purchased for this report failed to conform to the CAPA requirements for comparability to the car company brand part.

Test Parameters

Test Methods:
CAPA Standards are based on the comparative testing of independently produced aftermarket parts and their car company brand service counterparts using nationally recognized test methods, including those from ASTM, AWS, and SAE.

For the cosmetic metal parts in this report, material thickness, chemical comparability, mechanical comparability (tensile and yield strength), welds (location and strength), presence of galvanization, and fastener and striker (hood) retention were tested.

For structural metal bumper parts in this report, material thickness, chemical comparability, mechanical comparability (tensile and yield strength) were tested. In some cases, CAPA Full Part Stress Test (FPST), CAPA Vehicle Test Fit (VTF), and/or full vehicle crash testing was performed as well.

For the structural plastic bumper part in this report, material thickness, chemical comparability, and mechanical comparability (flexural strength, Izod Impact) was tested. CAPA Full Part Stress Test (FPST) and CAPA Vehicle Test Fit (VTF) were performed as well.

For the structural foam bumper parts in this report, material thickness, chemical comparability, and mechanical comparability (flexural strength, compression, and density) were tested. In some cases, CAPA Full Part Stress Test (FPST), CAPA Vehicle Test Fit (VTF), and/or full vehicle crash testing was performed as well.

Test Samples:
This analysis included six hoods, one fender, four front bumpers, one reinforcement bar, and three energy absorbers. In all cases, both the aftermarket and the car company brand parts were tested and compared to each other.

Overview Of Results By Test Category

Failure to Galvanize

Of the seven car company brand cosmetic metal parts, six parts were galvanized. Only one of the non-CAPA Certified aftermarket parts was galvanized.

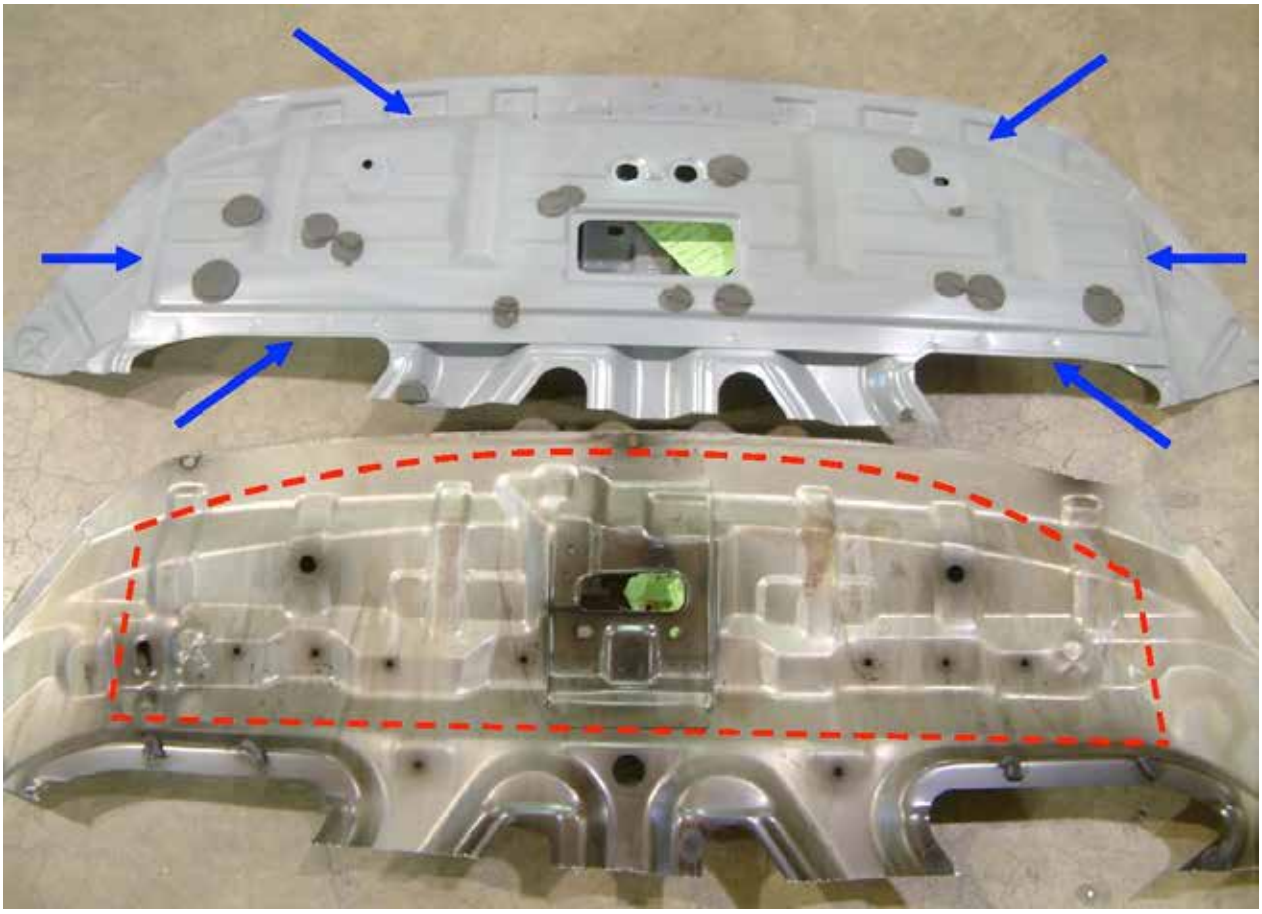
The presence or absence of galvanization is significant because there is a clear difference in the potential corrosion resistance and life expectancy between galvanized and non-galvanized parts. The galvanized car company brand parts could be expected to have superior corrosion resistance and a longer use life in comparison to the non-galvanized, non-CAPA Certified aftermarket parts. Remarkably, one of the car company brand parts, the Hyundai Sonata 99-01 Hood, was made of non-galvanized metal.

Missing Hood Reinforcement Plates

One of the car company brand hoods was designed using a reinforcement plate. This plate is located in the front of the hood between the striker and the outer skin. The non-CAPA Certified aftermarket part was completely missing this critical reinforcement plate.

The reinforcement plate provides structure and support to the outer skin in the striker area. Because the reinforcement plate is located between the inner and outer skins of the hood, its presence or absence cannot be seen by simply looking at the hood. For an aftermarket part to meet CAPA requirements, all construction features of the car company service part must be present and tested for comparability to the car company brand part.

Figure 1: Missing Striker Reinforcement Plate



These are portions of the inner skins of a car company brand (upper) and non-CAPA Certified aftermarket (lower) hood for the Kia Rio Sedan 03-05. The blue arrows indicate the perimeter of the striker reinforcement plate on the car company brand part. The non-CAPA Certified aftermarket part is missing the reinforcement plate entirely, as indicated by the red dotted line.

Inadequate Strength and Impact Resistance

Six of the seven non-CAPA Certified cosmetic metal aftermarket parts did not meet CAPA requirements for yield and/or tensile strengths when compared to the car company brand parts. The variations between the non-CAPA Certified aftermarket and car company brand parts were significant. The most egregious non-CAPA Certified aftermarket part was the Toyota Avalon 00-04 Hood. Its yield strength was 31% less and tensile strength 12% less than the car company brand part. Other non-CAPA Certified aftermarket parts exhibited yield strengths ranging 24% to 17% less and tensile strengths 18% to 12% less than the car company brand parts. These variations are significant because lower strength materials can result in lower dent resistance. These aftermarket parts did not meet CAPA requirements for comparability to the car company brand parts.

Three of the five non-CAPA Certified structural metal aftermarket parts did not meet CAPA requirements for yield and/or tensile strengths when compared to the car company brand parts. The variations between the non-CAPA Certified aftermarket and car company brand parts were significant. The most egregious non-CAPA Certified aftermarket part was the Ford Fusion 06-09 Reinforcement Bar. Its yield strength was 89% less and its tensile strength 80% less than the car company brand part. This extreme variation may be attributed to differences in alloys between the two parts: the non-CAPA Certified aftermarket part was manufactured of a low carbon steel and constructed differently than the car company brand part, which was made of an ultra-high strength steel. Other non-CAPA Certified aftermarket parts exhibited yield strengths ranging 23% to 19% less and tensile strengths 32% to 28% less than the car company brand parts. The variations are significant because in addition to protecting the vehicle, bumper systems may also have an impact on the operation of some of the safety items in a vehicle. These aftermarket parts did not meet CAPA requirements for comparability to the car company brand parts.

All three of the non-CAPA Certified structural plastic and foam aftermarket parts did not meet CAPA requirements for strength and impact resistance. Again, the variations between the non-CAPA Certified aftermarket and car company brand parts were significant. In the case of the Ford Fusion 06-09 plastic Energy Absorber, the non-CAPA Certified aftermarket part's flexural strength was 53% less than the car company brand part. This extreme variation may be attributed to the difference in material used to make the parts: the non-CAPA Certified part was made of PC/PBT (Polycarbonate / Polybutylene Terephthalate). To see how differently the non-CAPA Certified aftermarket and Ford energy absorbers performed during an impact test, visit the CAPA website at http://www.CAPAcertified.org/crash/. In this comparative test, the non-CAPA Certified part literally shattered upon impact. In addition, the non-CAPA Certified aftermarket part was falsely

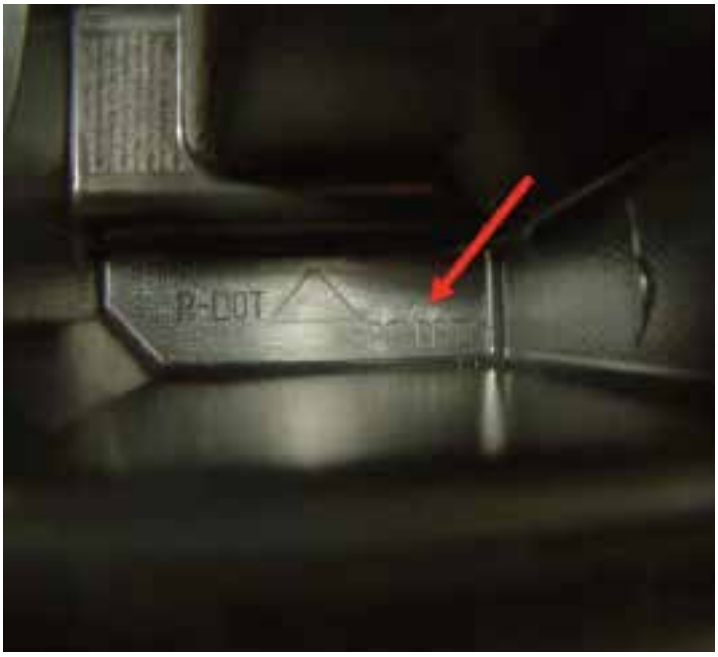
identified as being made of “PC+PBT.” In the case of the two foam energy absorbers, the non-CAPA Certified aftermarket parts ranged from 51% stronger to 20% weaker when compared to the car company brand parts.

For structural parts, an aftermarket part made of stronger material than the car company brand part may have a detrimental effect on the vehicle’s safety systems, i.e. stronger does not necessarily mean better, particularly for a part that is intended to absorb energy in a collision. Of equal concern are those parts we found to be made of significantly weaker materials. None of these aftermarket parts met CAPA requirements for comparability to the car company brand parts.

Figure 2: Accurate Material ID on Car Company Brand Part

The material identification "PC/PBT" (Polycarbonate / Polybutylene Terephthalate) molded into the car company brand energy absorber for the Ford Fusion 06-09.

Figure 3: Fraudulent Material Marking on Non-CAPA Certified Aftermarket Part



The material identification, indicated by the red arrow, "PC+PBT" (Polycarbonate / Polybutylene Terephthalate) molded into the non-CAPA Certified aftermarket energy absorber for the Ford Fusion 06-09. The part is actually made of ABS (Acrylonitrile Butadiene Styrene).

Improper Hood Strikers

Five of the six car company brand hoods had striker bars that were heat treated, either by through hardening or case hardening.[1] None of the corresponding non-CAPA Certified aftermarket hoods had striker bars that were heat treated.

The proper (and comparable) heat treatment of striker bars is significant because it affects wear resistance. Over time, the non-CAPA Certified aftermarket hood strikers would likely demonstrate greater wear due to abrasion with the latches than the car company brand hood strikers. In the case of the Kia Rio Sedan 03-05 Hood, the non-CAPA Certified aftermarket hood striker, which was not heat treated, broke during the retention test at a strength that was 21% less than the car company brand part. CAPA requires that any hardening process used by the car company brand part must be used in the manufacture of the CAPA Certified part.

In addition, three of the six non-CAPA Certified aftermarket parts did not meet CAPA requirements for striker retention when compared to the car company brand parts. CAPA striker retention testing measures the strength of the attachment of the striker to the striker plate. The variations between the non-CAPA Certified aftermarket and car company brand parts were significant. In the case of the Hyundai Sonata 99-00 Hood, the non-CAPA Certified aftermarket part's striker retention was 24% less than the car company brand part. CAPA requires the aftermarket part's striker retention to be comparable to that of the car company brand part. In addition, once a part becomes certified, CAPA requires that one part per lot undergo, and pass, striker retention testing in order to maintain certification. This on-going requirement (via continuous testing and inspection) for full compliance is one of the many components of the CAPA program that makes it unique.

Missing Welds

The size of the spot welds in the striker areas of the six hoods, and the spot welds of the reinforcement bar were tested. All seven non-CAPA Certified to the car company brand parts. This is significant because weld size equals weld strength: smaller welds mean weaker welds.

All seven of the non-CAPA Certified aftermarket parts were missing welds, or had weld patterns that were different than the car company brand parts. In the case of the Ford Fusion 06-09 Reinforcement Bar, the non-CAPA Certified aftermarket part was missing 50% of the welds present on the car company brand part. In the case of the Hyundai Sonata 99-01 Hood, the non-CAPA Certified aftermarket parts used a different welding method than the car company brand part, i.e. the aftermarket part had arc/tack welds, and the car company brand part had spot welds.

Missing welds indicate that the strength of the welded connections found on the aftermarket part will be less than that of the car company brand part. Changes in the weld pattern and weld method indicate that the aftermarket part will perform differently than the car company brand part because stress applied to the part will be transferred differently, which is particularly significant in the case of structural parts.

CAPA requires that size, strength, position, and method of welds on the aftermarket part match those of the car company brand part.

[1] Through hardening is a heat treating process where the entire diameter of the striker is hardened. Case hardening is a heat treating process where only the surface of the striker is hardened in preference to the core.

Weak Fastener Retention

Fastener retention was tested on the hood hinge areas. Four of the six non-CAPA Certified aftermarket parts failed to meet CAPA requirements for fastener retention when compared to the car company brand parts.

The variations between the non-CAPA Certified aftermarket and car company brand parts were significant. In the case of the Ford Focus 05-07 Hood, the average fastener retention of the non-CAPA Certified aftermarket part was 81% less than the car company brand part. The non-CAPA Certified aftermarket part used a different type of fastener than the car company brand part. Hinge fasteners with low retention strength may break during installation.

Conclusion

This analysis showed that nearly 90% (13 of 15) of the non-CAPA Certified aftermarket parts failed to meet CAPA's requirements for comparability to the car company brand counterparts.

Four of five aftermarket parts used by collision repairers are not CAPA Certified and thus have not demonstrated compliance with the CAPA Standards. Given that the vast majority of aftermarket parts are not CAPA Certified, this analysis indicates that the industry's complaints about the quality of the majority of the aftermarket parts used every day may be well founded. This means that consumers may get aftermarket parts that are not comparable to their car company brand counterparts.

NO.	Non-CAPA Certified Aftermarket Part	Quality Issues
1	Buick Century 97-05 Hood	Outer skin non-galvanized; failed to match thickness and yield strength of car company brand part. Striker not heat treated; failed to match car company brand part. Failed to match welds of car company brand part: smaller welds.
2	Chevrolet Silverado 1500/2500 Series; Base/LS/LS Hybrid, Chrome 03-07 Front Bumper	Failed to match tensile and yield strength of car company brand part. Failed to match Full Part Stress Test performance of car company brand part. Failed CAPA Vehicle Test Fit (VTF).
3	Chevrolet Silverado 1500/2500 Series, Painted 03-07 Front Bumper	None observed.
4	Dodge Pickup New Style 07-08 Front Bumper Bumper Brace L	None observed.
5	Ford Fusion 06-09 Reinforcement Bar	Failed to match thickness, material composition, tensile and yield strength of car company brand part. Failed to match Full Part Stress Test performance of car company brand part. Failed CAPA Vehicle Test Fit (VTF).
6	Ford Fusion 06-09 Energy Absorber	Failed to match material composition, flexural strength, and Izod Impact of car company brand part. Failed to match Full Part Stress Test performance of car company brand part. Failed CAPA Vehicle Test Fit (VTF).

NO.	Non-CAPA Certified Aftermarket Part	Quality Issues
7	Ford Focus 05-07 Hood	Outer skin non-galvanized; failed to match thickness and yield strength of car company brand part. Failed to match welds of car company brand part: smaller welds. Failed to match hinge weldment construction of car company brand part; failed to match hinge fasteners of car company brand part; failed to match fastener retention of car company brand part.
8	Ford Pickup F150 New Style with Fog Lamps 04-05 Front Bumper	Failed to match thuckness, tensile and yield strength of car company brand part. Failed CAPA Vehicle Test Fit (VTF)
9	Honda Civic Coupe/Sedan (USA) 96-90 Energy Absorber	Failed to match thickness. flexuarl strength, compression, heat aged compression, and density of car company brand part.
10	Hyundai Sonata 99-01 Hood	Outer skin non-galvanized; failed to match thickness and yield strength of car company brand part. Striker not heat treated; failed to macth car company brand part; failed to match striker retention of car company brand part. Failed to match welds of car company brand part: smaller and missing welds; different weld method. Failed to match fastener retention of of car company brand part. Missing striker area reinforcement weldment.
11	Kia Rio Sedan 03-05 Hood	Outer skin non-galvanized; failed to match tensile and yield strength of car company brand part. Striker not heat treated; failed to macth car company brand part striker; failed to match striker retention of car company brand part. Failed to match welds of car company brand part: smaller and missing welds. Failed to match fastener retention of of car company brand part.

NO.	Non-CAPA Certified Aftermarket Part	Quality Issues
12	Kia Sorento 03-09 Hood	Missing striker area reinforcement weldment. Outer skin non-galvanized; failed to match tensile and yield strength of car company brand part. Striker not heat treated; failed to match car company brand part striker; failed to match striker retention of car company brand part. Failed to match welds of car company brand part: smaller and missing welds.
13	Toyota Camry (USA) 07-09 Energy Absorber	Failed to match flexural strength and compression of car company brand part.
14	Toyota Avalon 00-04 Hood	Outer skin failed to match tensile and yield strength of car company brand part. Striker not heat treated; failed to match car company brand part striker; failed to match striker retention of car company brand part. Failed to match welds of car company brand part: smaller welds; different weld pattern.
15	Volvo S80 99-06 Fender	Non-galvanized. Failed to match hole pattern of car company brand part

Glossary

Term	Definition
ASTM	ASTM International. Formerly American Society for Testing and Materials. www.astm.org
AWS	American Welding Society www.aws.org
Compression	The deflection or deformation resulting from the application of a load.
Density	The mass per unit volume of a material.
Flexural Strength	A material's ability to resist deformation under a bending load.
Galvanization	A zinc coating applied to a base metal such as steel to inhibit the corrosion of the base metal.
Izod Impact	A test method used to measure the impact resistance of plastics.
SAE	SAE International. Formerly Society of Automotive Engineers. www.sae.org
Tensile Strength	The stress observed for a material under tension. The maximum stress achieved under tension is often referred to as the Tensile Strength or Ultimate Tensile Strength.
Yield Strength	The stress at which permanent deformation occurs.