SETTING THE RECORD STRAIGHT

CAPA's Response to the General Motors Corporation Review of 10 CAPA Certified Hoods and Fenders Revised July 10, 2003

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Review of 10 CAPA Certified Grand AM Hoods and Fenders

On November 16, 2001, General Motors released information to the National Conference of Insurance Legislators on a review of a variety of parts. When CAPA asked GM for supporting information to confirm that the parts were, in fact, CAPA certified, they were unable to do so. In addition to failing to keep accurate information that would allow CAPA to properly identify the purported CAPA certified parts, apparently, they have not provided any additional information to the legislators that would confirm the CAPA certification status of the parts in the months following the Scottsdale meeting.

On February 18, 2002, General Motors released a document that discussed their observations on CAPA certified parts. This report responds to the allegations made by General Motors upon its review of 10 CAPA certified parts for the 1999-2001 Pontiac Grand Am. [1]

Background

The GM report appears to present information that was either collected from actual GM parts or derived from GM's internal specifications. GM fails to identify the basis for their critique. However, the clear implication is that all of GM's 1999-2001 Grand Am parts were fabricated in the same manner, whether they were production parts intended for use in an assembly plant or service parts for the collision repair industry. The report implies that the CAPA parts sampled from the marketplace are inferior because they did not match the specific GM parts or specifications referenced in their report.

Because CAPA parts must demonstrate comparability to their car company service counterparts, CAPA has test results on car company service parts from independent accredited laboratories for 1999-2001 Grand Am service parts from as early as 1999. The test data was accumulated during the normal course of the CAPA certification process, and indicates the variability of GM Pontiac Grand Am parts over a period of time.

CAPA's Response

In its report, GM never indicates if their parts meet their own standards—they do imply that CAPA parts are somehow inferior. Because CAPA regularly tests car company parts as a result of its normal activities, we have at our disposal significant data on GM parts in general, including specific information on 1999-2001 Grand Am hoods. The legitimacy of this data is that it was not collected to respond to GM's allegations but simply in the course of CAPA's activities. This data revealed considerable inconsistencies in the Grand Am parts and failure to meet the criteria outlined in GM's own study.

[1] This report was originally issued on July 16, 2002. In 2003, revisions regarding weld variation were made to pages 7 and 8 to more accurately reflect CAPA's findings.

By attempting to identify problems with CAPA parts and failing to indicate if its own parts met its own standards, GM fails to establish any legitimate differences in the parts. If the implications made in the GM report are correct, then a number of GM manufactured parts do not meet the GM specifications:

General Condition of GM Parts

- Data from 467 GM service parts test fit on vehicles (concurrently with their CAPA counterparts) shows that 304 parts, 65% of the GM parts, failed CAPA Vehicle Test Fit or appearance requirements. This suggests that it is quite likely that GM parts that fall within their established tolerances do not fit properly on the vehicles for which they were designed.

Specific Failure of GM to Meet their Own Requirements

- The GM report implies that 3120 mm of adhesive is always dispensed on their Pontiac Grand Am hoods. However, independently tested GM Pontiac Grand AM hoods show 55% variation between GM parts in areas of number of adhesive patches and 105% variation between GM parts with regard to the total surface area covered by the adhesive.

- The GM report states that 19 welds are required on its GM Pontiac Grand AM hoods per GM4488M. Not only does GM4488M not reference the number of welds required on a hood, but independently tested GM Pontiac Grand AM hoods show a 71% variation between GM parts with regard to the number of welds.

- Independently tested GM Pontiac Grand AM hoods show a 129% variation between GM parts with regard to the size of welds.

- Surface variations are constantly monitored by CAPA. If a problem is detected, a part decertification and issue of a corrective action request will result. To the best of our knowledge, GM does not appear to have systems in place that monitor such problems.

GM Misinformation

- The GM report attempts to create the impression that the use of "bake hardenable steel" is a critical factor in product performance. The process of rendering steel "bake hardenable" is simply one of many acceptable methods used to achieve the desired mechanical properties of steel.

- The GM report implies that the "hardness" of sheet steel is a critical factor, even though hardness is not the preferred method of assessing sheet steel's mechanical performance. The "Tensile Test" is the preferred industry technique, and is the test method utilized by the CAPA certification program.

While these points highlight the misleading nature of the GM report by simply looking at the GM parts, the marketplace is likely the most telling measure of GM's quality. With millions of products recalled and millions of complaints filed with the U.S. DOT, state attorney general's offices, the Federal Trade Commission, state and local consumer agencies, their own customer service departments and consumer groups—the American public is well aware of the overall quality of GM products.

Detailed Results

The following is a detailed response to the various allegations and representations made to State Insurance Legislators in their February, 2002 report. A review of this data makes clear that GM failed to disclose critical information about the performance of its own products.

1. Fit and Appearance

Fit

While the GM report includes data about the fit of CAPA parts on "certified GM OEM checking fixtures," it does not include any data on how the GM parts fit on those same checking fixtures. While the GM report includes a table that references "Probe Checks" that were "Out-Of-Spec.," it does not state the GM tolerance(s) for their checking fixture measurements. Not only does GM fail to indicate what their specifications call for, but they fail to indicate how their own parts performed.

The CAPA parts referenced in the GM study also have their own certified checking fixtures that are used for product monitoring during production. Like the GM checking fixtures, CAPA checking fixtures are also used to verify dimensional conformance of gaps, flush, contours, and the size and locations of mounting features.

While a certified checking fixture is integral to the manufacturing process of any part, the CAPA program demands an even more strenuous demonstration of quality. Before a part can become CAPA certified, it must pass a Vehicle Test Fit (VTF).

The CAPA New Part Approval Process requires that the test parts are mounted on an undamaged vehicle to demonstrate that they are compatible with adjacent vehicle components. Attributes of the CAPA parts that are checked include flush, gap, contour, length, style lines, and attachment points.

During the CAPA Vehicle Test Fit, car company service parts are also mounted on the undamaged vehicle. The CAPA part or the part pursuing CAPA certification, and the car company service parts are compared to the car company original parts (parts installed at the car company assembly plant). The CAPA part or the part pursuing CAPA certification

must fit the vehicle in the same manner as the car company service part. If a car company service part that properly fits the vehicle cannot be located, then the part pursuing CAPA certification must fit the vehicle in the same manner as the car company original part.

During the course of the CAPA Vehicle Test Fit studies, it has been determined that car company service parts do not always fit the vehicle in the same manner as the car company original parts. Data from a population of 467 GM service parts test fit on vehicles (concurrently with their CAPA counterparts) from March 1999 through March 2002 shows that more than one-third failed the CAPA vehicle test fit. See Table 1.

Appearance

The CAPA Vehicle Test Fit also includes an appearance inspection. The criteria for unacceptable appearance includes dents, grind marks, metal fold lines, waviness, distortion, ripples, and non-uniform coating.

Data from the 467 GM service parts test fit (concurrently with their CAPA counterparts) from March 1999 through March 2002 indicates that nearly one half of the GM parts failed the appearance requirements that CAPA parts must achieve. (See Table 1.)

GM and CAPA have the same types of appearance categories for their parts. The GM report states that the CAPA parts "…were placed in a lighted inspection room to identify surface issues that are not present on the GM products." The GM report does not explicitly state the conditions under which the GM products were inspected, what the results were, or if they were inspected at all.

TABLE 1:
FIT AND APPEARANCE INSPECTION RESULTS OF 467 GM SERVICE PARTS

GM Service Parts That Failed CAPA Vehicle Test Fit (VTF) **and** CAPA Appearance Inspection	84	18%	**Overall 65% Failed**
GM Service Parts That Failed CAPA Vehicle Test Fit (VTF)	86	18%	
GM Service Parts That Failed CAPA Appearance Inspection	134	29%	
GM Service Parts That Passed CAPA Vehicle Test Fit (VTF) and CAPA Appearance Inspection	163	35%	35%
	467	100%	100%

This data suggests that it is possible for GM service parts to fall within their proprietary tolerances when mounted on their checking fixtures, but not fit appropriately on the vehicles for which they were designed.

Clearly, with 65% of the GM parts failing CAPA tests, there are significant fit and appearance problems with these parts.

2. Adhesives, Welds, Weld Nuts, and Fasteners – Hoods

Adhesives

The CAPA Quality Standards require that the location of the adhesive on a CAPA part shall match that on the car company service part. The cumulative amount of adhesive applied to the CAPA part shall be no less than that on the car company part when evaluated on a coverage per area basis.

The GM report indicated a "length" of adhesive dispensed on the hoods. The report stated that the total contact length of all stitches required on the GM hood outer panel was 3120 mm. While GM does not disclose whether this is a theoretical value or a measurement from an actual GM part, it clearly implies that this is their standard.

The CAPA requirement uses "surface area" as a criteria rather than the linear "stitch" length stated in the GM report, because the bond strength of adhesives is a function of the surface area coverage.

GM reported that the CAPA parts were discrepant because the comparative length of "stitches" was between 1939 and 2452 mm. The GM report implies that all GM parts have the same precise amount of mastic/adhesive. However, as Table 2 below indicates there are significantly inconsistent adhesive amounts on the very same GM part.

TABLE 2:
ADHESIVE VARIATION
PONTIAC GRAND AM HOODS

	Pontiac Grand Am Hood 1	Pontiac Grand Am Hood 2	Pontiac Grand Am Hood 3	Range or Variation	Percent Variation Between GM Parts
No. of Patches of Mastic/Adhesive	59	58	38	21	55%
Total Surface Area Covered by Mastic/Adhesive (cm^2)	555	273	560	287	105%

The bond strength of adhesives is a function of the surface area coverage. As noted below, there are two aspects of variability identified in the data derived from these independently tested Pontiac Grand Am hoods:

- The location and configuration of the mastic/adhesive as indicated by the number of "patches" or independent areas where adhesive was applied varies widely.

- The surface area covered by the mastic/adhesive varies widely.

Since GM failed to indicate its own requirements regarding the cumulative surface area of adhesive, it cannot be determined whether these GM parts are within the range of GM's own requirements. What is clear is that the same GM service part shows an amazing inconsistency in the amount and placement of mastic/adhesive.

Adhesives in the Hem

The CAPA Quality Standards requirement states that if the car company service part exhibits a sealant or adhesive in crimped areas, the CAPA part must exhibit a comparable sealant or adhesive.

The GM report states: "Hem Periphery Adhesive was absent between the entire hem on the CAPA hood." The report then describes a "caulk-like substance" on the CAPA part. The "caulk-like substance" on the CAPA part is, in fact, an adhesive in the hem area.

Welds

The CAPA Quality Standards require that the CAPA Sample Part shall have an equal or greater number of welds than the car company service part. In addition, the locations and integrity of the welds on the CAPA part shall match the car company service part.

The GM report indicated that 19 welds were required on the GM Hood Assembly per GM4488M. GM4488M is a general standard for "Automotive Resistance Spot Welds" and contrary to the GM report, it does not reference the number of welds required on a hood.

It is interesting to note that the GM report did not describe the discrepancies found on the CAPA parts, but obvious discrepancies to GM's own standards were readily observable on the independently tested GM service parts.

GM parts independently surveyed from 1999 to 2001 indicated the following:

TABLE 3: WELD VARIATION PONTIAC GRAND AM HOODS				
	Pontiac Grand Am Hood 1	Pontiac Grand Am Hood 2	Pontiac Grand Am Hood 3	Variation/ Conformance of GM Parts
Number of Welds Present (Exterior welds)	17	29	17	71%
Number of Welds Required by GM Report	19	19	19	
GM Weld Number Conformance	Appears to be Too Few	Appears to be Too Many	Appears to be Too Few	Up to 100% Failed
Minimum Weld Size Present (mm)	3.28	2.81	6.44	129%
Minimum Weld Size (mm) Required by GM4488M	3.50	3.50	3.50	
GM Minimum Weld Size Conformance	Too Small	Too Small	Acceptable	67% Failed

As noted below, there are two aspects of variability identified in the data derived from the three GM parts:

- Variation in the number of the welds. The independently tested GM service part hoods do not consistently meet GM's own weld number requirements. The GM parts have visible welds on the exterior of the hood, and welds on two (2) fasteners. However, the fasteners have multiple welds, which, if counted in accordance with GM4488M, still do not meet GM's weld number requirement.

- Variation in the weld size. Two of the three independently tested GM service part hoods had welds that did not meet GM's weld size requirements as stated in the GM4488M specification.

GM service part hoods show significant inconsistencies and failure to meet their own weld requirements, as stated in their report.

Weld Nuts and Fasteners

The CAPA Quality Standards require the comparison of CAPA part fasteners to car company service part fasteners for the following features:

Dimensions: The fastener size determined by the threads and the threaded length.
Retention Strength: The strength of the fastener in relationship to a mating fastener and surfaces adjoined with the fastener.
Hardness: A metallurgical analysis that measures the fastener's resistance to indentation.
Chemical Composition: Identification of the material composition of the fastener.

The GM report cited a visual difference between the CAPA and car company service fasteners, but did not cite any evidence of functional or performance issues.

CAPA part fasteners are required to demonstrate comparable performance to the car company service part fasteners as an integral part of the certification process.

3. Surface Quality Check

The CAPA Quality Standards recognize that hoods and fenders have decorative surfaces. A decorative surface requires strict appearance criteria. The CAPA appearance criteria include the same types of requirements stated by GM. The presence of bumps, dings, ripples, dents, rough surfaces, and non-uniform coating (primer) is not allowed.

The GM report pointed out CAPA parts they described as discrepant. CAPA maintains that appearance features that adversely affect a collision repair would be unacceptable. There does not appear to be any difference in the goals of GM or CAPA for the appearance of exterior body panels such as hoods and fenders.

Surface variations are constantly monitored by CAPA. If a problem is detected, it may result in a decertification and the issue of a corrective action request. To the best of our knowledge, GM does not appear to have systems in place that monitor surface problems. In our review of 467 GM service parts, 47% had appearance problems severe enough that they could not have met CAPA standards. These are all, presumably, parts that have been deemed acceptable by GM.

4. Material Evaluation

Material Strength

The CAPA Quality Standards require the comparison of CAPA parts to car company service parts for material thickness, chemical composition, and mechanical properties.

The GM report refers to the GM service parts as "bake hardenable steel." The GM report explains the technical rationale for using this particular steel, and that is "…to increase the strength and dent resistance of the hood and allows a thinner gage of metal to be used to reduce vehicle weight." CAPA does not dispute that GM may use a steel that is processed in a manner that allows it to be classified as "bake hardenable."

The process of rendering a steel "bake hardenable" is just one of many methods used to achieve desired mechanical properties. The CAPA program does not specify all aspects of the steel processing methods used to achieve mechanical properties, but requires that the mechanical properties perform in a manner comparable to the car company service counterpart. The GM report appears to utilize the same "Tensile Test" technique used by CAPA to assess the mechanical properties of metal.

The GM report indicates that the GM service parts had lower "Peak Stress" values and higher "0.2% Offset Yield" values than the CAPA parts.

The related GM report information is summarized in the following table.

TABLE 4:
GM MECHANICAL PROPERTIES TESTS

Sample Description	Peak Stress (MPa)	0.2% Offset Yield (MPa)
CAPA #9 Hood Sample A	294	186
CAPA #9 Hood Sample B	298	185
CAPA #10 Hood Sample A	284	193
CAPA #10 Hood Sample B	286	167
GM Service Sample A	272	256
GM Service Sample B	277	262

CAPA does not dispute this data, except that it implies that these are the ranges of values that the GM service hoods always derive from their steel.

An increase in "0.2% Offset Yield" may provide an advantage in dent resistance, however, it is not the sole factor, nor even the leading factor, in contributing to dent resistance. Metal thickness is believed to be the greatest factor contributing to dent resistance.

The GM report argues that "strength" is the primary issue with the steel, but "strength" has at least three components:

- Thickness of the Material
- 0.2% Offset Yield
- Peak Stress

The claim by GM that their hoods are "40% stronger" than the CAPA hoods is misleading. Basing this claim solely on the "0.2% Offset Yield" data may not be valid, considering that the GM report cited that the CAPA parts were stronger with respect to the "Peak Stress" (also referred to as "Ultimate Strength"). GM provided no information on the thickness of their base steel. The steel thickness is an important component of "strength."

When data from independently tested GM service hoods was compared to the GM service hood data in the GM report, a wide range of "0.2% Offset Yields" was observed.

TABLE 5:
COMPARING MECHANICAL PROPERTIES AMONG GM SERVICE PARTS

	GM Report Data	Independently Tested GM Service Parts				
		Pontiac Grand Am Hood 1	Pontiac Grand Am Hood 2	Pontiac Grand Am Hood 3	Range or Variation	Percent Variation Between GM Parts
Mean 0.2% Offset Yield (MPa)	259	254	189	297	189 - 297	57%
Mean Peak Stress (MPa)	274	317	307	366	274 - 366	34%

Note: The GM report data "Mean" values were calculated from the individual GM data points from Table 4.

The CAPA 0.2% Offset Yield values found by GM fall within the statistical distribution of GM service part values stated in Table 5. The Mean Peak Stress or "Ultimate Strength" for the CAPA parts tested by GM was 290 MPa, which is well within the above stated GM service part range. Therefore, the CAPA parts appear to fall within the statistical distribution of the strength of the GM service parts.

Hardness

The CAPA Quality Standards requirements for "Hardness" are focused on fasteners that have a configuration that is not amenable to the standard "Tensile Test."

The GM Hardness values for the Outer Hood (sheet steel) were not presented with any corresponding technical rationale. Hardness is not the preferred method of assessing the mechanical performance of sheet steel.

The "Tensile Test" is the preferred industry technique, and GM would appear to agree, based on their presentation of the "Tensile Test" data. It is suspected that if the full statistical distribution of independently tested GM service parts had been evaluated for Hardness, then a wide range of GM service part Hardness values would have been observed.

Chemistry

The CAPA Quality Standards require the comparison of the CAPA parts to the car company service parts for material thickness, chemical composition, and mechanical properties.

CAPA recognizes that chemistry is one of the factors that can be used to achieve desired mechanical properties. As such, CAPA evaluates the chemistry of all metal components comprising a part. This provides assistance in distinguishing between classes of metals that have unique characteristics. The CAPA process of comparative analysis recognizes the relationship of chemical composition, mechanical properties, and material thickness.

The GM report discusses the "grain structure" and states the chemistry "…creates a certain grain structure that provides dent resistance to the steel." However, there are other grain structures that can provide comparable performance. As GM well knows, performance of steel is not limited to a single grain structure.

Dent Resistance

The CAPA Quality Standards require the comparison of the CAPA parts to the car company service parts for material thickness, chemical composition, and mechanical properties.

The GM report states that the dent resistance studies were performed using the SAE J2575 method that is the "industry procedure for evaluating the dent resistance of a part." At the time the GM report was released, a search of the SAE standards database revealed that this "industry procedure" was not in the SAE database. SAE had reported this method was a "work-in-progress" and was not yet approved by SAE. Nevertheless, CAPA recognizes that regardless of the current status of the SAE J2575 test method, dent resistance is related to material thickness and the mechanical properties of the steel.

Again, it is unclear whether an actual GM part was tested at the same time as the CAPA part. The GM report states that, "The test results were then compared to GM Engineering requirements." It is unknown if the GM Grand Am data originated from contemporary GM parts or from ideal engineering specifications. Given the wide variation of mechanical properties of GM service parts, (presumed to be acceptable by GM) similar variations are expected for dent resistance.

5. Electrocoat (ELPO) and Galvanized Coating Thickness

The CAPA Quality Standards requirements are based on the performance of the protective coating system. The coating system of steel parts required by CAPA consists of a galvanized coating, phosphate pretreatment, and electrodeposition primer (EDP). The term "EDP" is referred to by GM as "Electrocoat (ELPO)."

The coating performance tests CAPA utilizes are based on test methods commonly employed by the automotive industry and include:

- Adhesion Tests
- Humidity Exposure Tests

- Coating Brittleness Tests
- Primer Cure Tests
- Cyclic Corrosion Tests

The GM report references the thickness of the coatings as bearing a relationship to long-term performance. However, there are additional factors that relate to long-term performance, most notably the adhesion of the coatings to the base metal, and the adhesion between the interfaces of all coatings. Therefore, the integrity of a coating system is evaluated most effectively by performance tests. The performance tests employed by CAPA are commonly used by the automotive industry. In fact, most of the tests utilized by CAPA are specifically cited in GM specifications.

The GM report chose to focus solely on the variation in the primer thickness for the parts they selected for their study. They did not provide any supporting evidence that the CAPA parts did not perform appropriately.

Galvanized Coating

The GM report remarked that galvanized coatings did not appear to be universally used by non-OE collision part manufacturers. However, the report failed to mention that galvanized coatings are not universally used on all car company service parts. The GM report was careful to state that CAPA parts were in fact galvanized.

The GM report references the galvanized coating of the CAPA parts, and states that it does not meet their specifications (although they did not explicitly cite their specification).

The GM report focused on minor thickness variations, but again, did not support any of its findings with performance tests. CAPA uses industry accepted test methods as evidence of long-term coating performance.

Most significant, however, is the real world performance of CAPA certified parts. Currently there are over 15 million CAPA certified parts on vehicles and there is no evidence of premature corrosion.

Conclusion

The GM service part data presented in this response was collected by independent laboratories as part of the certification process of CAPA parts. It was not based upon a potentially biased selection of parts procured during a limited time frame. While the GM report implies that its products consistently meet all of their specifications, the independently tested GM service parts indicate the contrary.

The GM report did not disclose the performance of all the GM parts or indicate if all of their parts complied with GM's own specifications. Clearly, there are GM service parts available in the marketplace that do not meet GM's own specifications.

As the nation's only independent, third party, standard setting and quality assessment program for crash repair parts, CAPA's sole goal is to enable the market to identify high quality, fairly priced alternatives to expensive car company parts. Doing so has already dramatically improved the quality of competitive parts. CAPA's goal is to ensure consumers have access to high quality, fairly priced alternatives to car company parts and that, through competition, car companies themselves dramatically improve the quality of their parts.