A Global Market Survey of Trends and Drivers in Decorative Plating on Plastics

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A global customer survey was undertaken to assess customer trends and market needs for industrial production of metal decorated plastic parts for use in the automotive trim, cosmetics/sanitary and consumer electronics industries. The survey explored growth estimates, resin trends, finishing demands, environmental trends, economic pressures, service needs and regional differences in customer and end use demands. A better understanding of the forces driving the markets can help both producers and suppliers meet the decorative finishing requirements and demands of customers within the plating industry.

For the past 40 years the electroplating of plastics has grown in acceptance and quality throughout the world. A combination of R&D and commercial promotion by resin and chemical supply companies and producers has successfully addressed the challenges for durability of plated plastic finishes in the automotive decorative trim and sanitary parts industries. The market has grown at the expense of aluminum and zinc die-cast parts previously used for these end uses. In addition to corrosion resistance, adhesion under impact and thermal cycle requirements, the electroplated plastic parts must also pass challenging decorative appearance specifications from all the major OEMs. The most widely plated resin is a copolymer of styrene-acrylonitrile and butadiene (ABS). In addition a blend material, ABS/PC, with a varying percentage of PC (polycarbonate) has been of increasing importance in recent years in all regions as the temperature requirements for plated parts in service have increased beyond the limits of ABS alone.

It is estimated that 340 million lb. of ABS is used for bright decorative plated plastic parts in the world and the cumulative surface area is estimated at 310 million square feet. The high for this plated market was in the early 1970s and the low was in the late 1990s. For the last 10 years, there has been steady growth in bright surface production for auto styling in all regions of the globe. The U.S. is the largest market for automotive POP compared with the European Union (EU) and Asia-Pacific region (AP).

Recently, we conducted a global survey of users and producers of plated plastic products to understand better the dynamics of the market and discern technical trends in the industry. The detailed survey was conducted by phone in three regions: North America, Asia and Europe. Some of the data was quantitative, asking for a numerical ranking of choices within limits and other questions were open-ended, seeking a qualitative response. Respondents represented a mix of business and technical leaders in the companies. The companies served either automotive, sanitary/cosmetics or consumer electronics end markets.

Survey responses were distributed about one third in each of the three regions sampled: North America, Europe and China. In terms of industries served, the breakdown was 41% automotive, 27% sanitary ware and 22% consumer electronics. A number of producer companies served multiple industries.

Industry trends and drivers

Q: Will there be more plating on plastics in the future?
82% of the respondents replied positively, citing cost, weight and physical property advantages of plastic compared with alternative substrates like metals.

Q: Outlook for growth in the POP market and reasons why.
In the automotive sector, roughly 75% of U.S. respondents believe further growth will occur in the Plating on Plastics market.

- "Decorative finishes are in demand…muscle cars with shiny grilles are making a comeback."
- "10% growth/year…driven by automotive."
- "20% growth/year…from automotive exteriors….mainly wheel cladding."
- "60-70% growth/year…coming from automotive interiors."
- "10-15% growth/year…the chrome look is in and growing."
- "10-15% growth/year…both in automotive interiors and exteriors."

Automotive sector feedback in Europe and Asia reflects a bullish outlook for future growth

Q: What do you think the percent of growth will be?
Europe:

- "I see 10% growth rate in chrome on vehicles over the next few years. It is with exterior composites, exterior trims, front and rear end modules."
- "There will be a 10% to 20% growth rate."
- "Growth will be 5% to 10% for automotive."
- "Cars are being chromed inside and outside."

Asia:

- "10% to 20% a year."
- "No more than 10% a year."
- "It won't be less than 10% a year."
- "Business will grow 15% to 20% a year."
- "8% to 10% a year."
- "Automotive business will grow 15% a year."
- "Orders are increasing from overseas automakers."

Differentiated resin and styling trends to come

Q: Do you see OEMs looking for any new differentiated styling effects?

75% of the respondents replied positively to the question.
- "Trend toward dark and duller surfaces."
- "More galvanic PVD processes to achieve variations of dull tones for more high-end cars."
- "I think multicolor will be popular."
- "Satin finishes and dark chrome finishes."
- "We were just awarded a grille mesh. It is bright nickel and satin plated."
- "Audi specializes in aluminum design, BMW in velour chrome."

Q: What trends do you see in resin choice in the future?
Of the respondents, 62% believed ABS/PC would grow in use as substrate in the future.
ABS:
- "ABS resin is easier to process, easier to handle and 10% to 15% more cost efficient than ABS/PC."

ABS/PC:
- "It allows varied approaches with diverse materials like brass, copper, aluminum."
- "More use due to non-hazardous and non-toxic nature."
- "We just spent $1.5M to renovate a line to handle blended resins."

Another alloy:
- "Electroplating on nylon will be a big market."
- "Polyamides, ABS/PP, ABS/PE, ASA, PMMA materials, nylon"

Final finish trends driven by end-user demands, economics, emerging technologies and environmental issues

Q: Are there any new final finishes on the horizon?
A majority of Asian respondents agreed with this question and this differed from response in North America and the European Union.

Q: What trends do you see in final finish?
Satin:
- "I see a trend towards smoked chrome, satin chrome and smoked satin chrome final finishes." (Eight mentions)
- "Satin finishes and black chrome."

Colors:
- "Black and gold smoke finishes in automotive and plumbing." (Five mentions)
- "Multicolor finishes."
- "More paints and coatings by 2012. I see red, yellow and silver."

Environmental-friendliness:
- "People want to go from hexavalent to trivalent chrome. Personally, I don't think they will be able to replace hexavalent because it is so durable. There is no comparison with trivalent for salt-spray resistance and rust."

Other technologies:
- "Vapor metal deposition is being used on moldings in the automotive industry."
- "Vacuum and ion electroplating."

Q: Do you see any new trends in name plates?
A large majority thought this statement true in China but this was not true in North America and the European Union.
- "See a demand for satin finish."
- "There is a movement away from scripted nameplates to loose block lettering."
- "OEMs are using stickers to cut costs."

Q: Do you see OEMs moving from plated door handles to painted door handles?
80% of respondents said No.
- "I think half are chromed and half are painted – Germany."
- "The door handle must match the car door."

Q: Will there be a demand for fingerprint free finishes?
71% of respondents said Yes

Automotive – other related commentary

Q: How do you see the plating on plastic industry changing over the next two to three years?
More outsourcing to China for cost and environmental issues:
- "Due to environmental concerns, many U.S. and European electroplaters are dumping/outsourcing jobs to China." (China Electroplaters)

Customer-specific solutions:
- "I see more customer-specific chromes. OEMs are requesting specialty finishes like satin nickel and black chrome."

Consolidation in the industry:
- "I see the platers becoming fewer and fewer, and at the same time, the field is growing. The small platers will go out of business, and the big ones will become larger and larger.

Heightened environmental focus:
- "Demands will be greater, for example, in environmental. R&D efforts to get rid of hexavalent chrome have grown."

Sanitary/cosmetics markets

Q: Will there be more plating on plastics in the near future?
88% of respondents said Yes
The increasing cost of metal is driving POP:
- Predict 5 to 10% growth rates
- Responses were similar for both the European and Asian regions

Market comments:
- "I see a change in aesthetics: a trend towards variations in design, more decorative design, a trend towards dull finishes - away from shiny surfaces." - Europe
- "It will depend on fashion, particularly in relation to perfumes." - Europe
- "I hope the trend goes in that direction. In regard to decorative designs in general, the answer is Yes." - Europe
- "I see an evolving trend of plating on plastic in the future, because of more decorative accessories." - Europe
- "However, in the sanitary and automotive industries, I see that the plastic that is not electroplated has a bad effect on the tactile and visual appearance. That is why I think that there will be more of it in the future." - Europe

Q: Do you see a trend in plating on polypropylene?
55% of respondents said Yes.
- "I see more use of PP in perfumes."
- "I see it happening in building showcases."
- "I expect the cosmetic industry to go to 40% polypropylene."

Consumer electronics

Q: Do you see OEMs looking for nickel-free processes?
59% of respondents said Yes, mostly driven by consumer electronic finishing in China.

Q: Do you see the industry adopting technology like vapor metal deposition as a replacement for electroplating?
53% did not agree with this statement

Yes:
- "I see a trend, but finished goods lack the shine and have a tint of yellow."
- "We are currently doing vacuum and electroplating, it is called PVD."
- "This is part of our business plan."
- "We are using a technology called sputtering. It has a better metal feel, but the coating is much thinner than electroplating."

No:
- "Electroplating quality is still much better."
- "It would be too thin to use as a plating process."
- "It is an unproven technology."

Environmental drivers in the industry

Q: In the next 2 to 3 years, do you anticipate the elimination of hexavalent chromium from your plating on plastics line?

The majority of U.S. and E.U. respondents expect a slow shift away from hexavalent chromium, whereas there was slight majority in agreement with statement in China.

U.S.:
- "I don't think it will happen unless the government or OSHA really comes down strong. Trivalent doesn't hold a candle to hexavalent."
- "You'll need to 'show me' before changes will occur. The automobile industry will not take a step back from visual appeal, corrosion protection or quality - not with high-end cars, trucks and SUVs starting out at over $40,000."
- "[The shift will be slow]…Trivalent is not as durable in the field and it costs a lot more. It's also very difficult to recover and reuse."
- "Nobody wants to use hex chrome. The EPA is driving trivalent…(but) trivalent won't be used in automotive unless they come up with a product that's more durable."
- "I haven't seen this trend yet…the automotive industry must have corrosion protection, durability and high visual standards."
- "Automotive wants trivalent but no product yet meets their standards."
- "We expect the regulations (for trivalent) will require it within two years."
- "Less than 2% of our jobs are trivalent. It just doesn't have the durability of hex chrome."

Europe:
- "Automakers are driving this. Within five years, it will be gone."
- "The demands of our clients drive everything."
- "This will happen in two to three years. Laws in Europe are proving this."
- "Environmental issues are proving this."

Asia:
- "We are currently using a very small amount of hexavalent, and we expect to completely replace it with trivalent in three years."
- "I see the trend for reducing the usage of hexavalent eventually completely eliminating hexavalent."
- "Some of the European customers do not allow any hexavalent in the product, therefore we must use trivalent."
- "We are on the verge of eliminating it now. We have fewer and fewer requests on hexavalent chrome usage."

Some selected companies are willing to consider elimination of hexavalent chromium in their operations.
- "Hexavalent is definitely the most dangerous process we have. The bottom line is the amount of scrap." (TM)
- "Chrome etch is very dangerous. It is probably the most dangerous stuff we use." (TM)
- "It is extremely dangerous, and it corrodes our machinery." (TM)
- "We would if we could save elsewhere." (GM)
- "We would if we could pass on to automotive." (GM)
- "It depends if we are talking about paying a premium on POP procedure as opposed to a premium on the final product." (GM)
- "We have already done this." (TM)
- "If we can go easy on the pollutants, then we are willing to pay more." (GM)
- "For a more environmentally friendly electroplating business we can pay more." (TM)
- "After factoring wastewater treatment, cost, and government fines, it is feasible to pay more to replace conventional hexavalent." (TM)
- "In order to keep up with the trend toward environmental protection, we are willing to pay a premium." (TM)

Q: Would you ever change out the front of the line without changing the back of the line?

Some companies are willing to entertain the replacement of the hexavalent chromium etch even if they cannot eliminate final chromium plate at this time because of specifications.
- "If I can change out the front of the line while maintaining quality." - United States
- "We would because there would be less airborne chrome." - United States
- "Something is better than nothing." - Europe
- "We have already changed the back of the line from using any hexavalent chrome. We are working with a company to change the front of the line." - Asia

Summary takeaways: hexavalent to trivalent shift

- The U.S. electroplaters do not believe that trivalent is a proven technology for the automotive industry.
- The U.S. car manufacturers are perceived as inhibiting the switch as they fear cars with trivalent will corrode quicker on exterior parts.
- Electroplaters continue to be squeezed for price concessions by the U.S. car manufacturers. They do not believe process price increases will be accepted by the car companies under the current economic climate.
- Europe and Asia are moving faster to eliminate hexavalent chromium.
- European car makers and environmental legislation are driving this both in Europe and in Asia.
- Companies that appear to be willing to replace conventional hexavalent chromium are more likely to serve non-automotive markets or have a strong focus on health and safety. **P&SF**

About the Author

Dr. Jack McCaskie is currently Sr. Business Manager, Finishing Technology, Rohm Haas Electronic Materials, in Freeport, New York. He earned his Ph.D. from the University of California - Los Angeles (UCLA). He has held senior positions in R&D with Lea Ronal, M&T Chemicals, M&T Harshaw, Atotech and Atofina over last 35 years. In that time, he has authored numerous patents and publications in chemistry, material science and surface finishing.