Powder Coating Forum

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Editor's Note: *This new monthly column will address, in "question-and-answer" format, issues relating to the powder coating industry, such as system design, coating selection, features, etc. Please e-mail (aesf-journal@worldnet.att.net) or send your questions to "Powder Coating Forum," 12644 Research Pkwy., Orlando, FL 32826-3298.*

Question
What are the main functional differences of epoxies, urethanes, TGIC polyesters and hybrids?

Answer
There can be many subtle differences among all these coatings, and many features can be formulated into each coating. The general functional differences, however, are as follows:

- Epoxies have excellent chemical resistance but have no UV (weathering) resistance.
- Urethanes have great weathering characteristics, but do not have good flexibility or impact resistance.
- TGIC polyesters have good weathering characteristics but reduced chemical resistance.
- Hybrids is a term that describes a mixture of resin technologies that can have all sorts of properties. One of the most common hybrids is an epoxy-polyester that has most of the properties of pure epoxy coatings, as well as some of the added UV resistance of polyester coatings.

There are many more features and properties in each of these coatings that should be discussed with a powder coating materials supplier. Selecting the right powder coating for your process requires you to list and discuss with a competent supplier the functional and appearance properties requested by your customer. Powder coating suppliers have a great amount of flexibility in formulating these performance properties into a coating that will meet your expectations, as well as your customer's. Some tradeoffs may be necessary to have a single coating achieve the most important performance criteria. It would be difficult, for instance, to formulate a powder coating with both good flexibility ($^1/_8$-in. mandrel) and high hardness (4h or higher) characteristics. It would be like asking for a material to be as flexible as rubber, while being as hard as glass.

Question
Aerospace manufacturers are being faced with increasingly tougher environmental regulations. We are using more and more high-VOC and water-based coatings, but that is still not enough to meet the regulations. Do any powder coatings meet the aerospace industry standards (*e.g.*, Boeing's BMS 10-11, BMS 10-79, BMS 10-72, BMS 10-60; Canadian/Bombardier's CMS 565-01, CMS 565-02, CMS 565-08, CMS 565-09, CMS 565-10)?

Answer
I suggest that you contact the Powder Coating Institute in Alexandria, VA, at 703/684-1770. They may have an answer for you, because they keep track of powder coatings that meet military and commercial standards. Their membership directory includes names of powder coating formulators that may have approved materials for your specific use.

Question
Are there any products that can be used as a "filler" to hide imperfections or to fill seams in cold-rolled steel prior to powder coating? We are currently using a polyester TGIC powder coating with a cure schedule of 400 °F for 10 min.

Answer
Standard fillers will not work under powder coatings, because they will outgas during cure of the powder. In addition, because these materials are nonconductive, they will not attract the electrostatically charged powder coating sprayed onto the surface. I do not know of any metal-based fillers available on the market that will give you what you want. Some fillers have metal in them, but they still have resins and hardeners that might cause outgassing, so should be thoroughly tested before using. You might consider a colored caulk that can be applied after the powder coating has been cured to fill unsightly areas. Welding and grinding the defected area has proven to be the most appropriate method of correcting metal defects prior to powder coating. If the metal being used is not a heavy enough gage to handle this, then the part will probably have to be scrapped. ***P&SF***

About the Columnist
Nick Liberto is president of Powder Coating Consultants, a division of Ninan, Inc., 1529 Laurel Ave., Bridgeport, CT 06604. He has more than 17 years' experience in the powder coating industry, holds a BS in mechanical engineering, and is a registered Professional Engineer in the State of Connecticut. He is a member of The Powder Coating Institute, the Chemical Coaters Association and the Association of Finishing Processes division of SME. He is the editor for and contributing author to the award-winning Powder Coating: The Complete Finisher's Handbook, *and has written numerous articles and columns on powder coating.*