New Hydroxyalkylamide Crosslinker VESTAGON® HA-3XX

One-Shot Matt Powder Coatings

In weather-resistant powder coatings, hydroxyalkylamide (HAA) curing agents are becoming more popular as an alternative to triglycidyl isocyanurate (TGIC) products, although this trend varies greatly from one region to another. In recent years, enormous progress has been made with the use of this crosslinking system to influence reactivity, optimize gas oven stability, and improve degassing properties.

A key demand made on all powder coating systems is simple and reproducible gloss reduction. About 30 percent of all durable outdoor powder coatings need to be matt, especially for applications such as automotive accessories, facades and housings for electronic components.

Evonik has now developed a new cost-efficient matting principle for the important hydroxyalkylamide powder coating segment.

State-of-the-art

To reduce gloss in HAA systems to less than 60 units one must produce two separate powder coatings based on polyester resins with carboxyl end-groups using β-hydroxyalkylamides as the crosslinker. A dryblend is then produced from these two powder coatings, which are based on chemically identical systems.

Gloss reduction is generally based on different functionalities of the polyester, which result in different levels of reactivity in the matrix.

This process entails high costs and risks, not only because it is time-consuming and partly because of the risk that the entire batch will have to be rejected if the required gloss level is not achieved, as subsequent fine-tuning is virtually impossible.

Due to these facts all well-known powder producers supply HAA powder coatings with just a few gloss readings: a half-gloss version produced with the use of fillers and a semi-matt version with a gloss between 30 and 45 units, based on the time-consuming process outlined above.

Table 1

Polyester		Crylcoat® 2617-3 [1)]	Crylcoat® E 36988	Pulverol® L 8123 [2)]	Uralac® P 800 [3)]	Uralac® P 865
Gloss	Unit	33	53	45	51	32
Ball impact	in lb	> 80	40	> 80	40	> 80
Gel time [200 °C]	s	165	163	140	144	–

1) Cytec Surface Specialties Inc. 2) Neochimiki S.A. 3) DSM Resins B.V.

Custom-tailored gloss

The new concept of shifting the gloss of hydroxylalkylamide powder coatings described here is simple. Initial laboratory trials indicate that replacing the standard curing agent in hydroxyalkylamide systems with the new matt hardener VESTAGON® EP-HA 3XX makes it possible to reduce gloss substantially and reliably using a single resin and a one-shot process.

A matt appearance is a key requirement for durable powder coatings for outdoor architectural applications

Varying the gloss

As may be expected, the reactive binder also has a major influence on the final gloss. Thus, one can adjust gloss within a wide range by selecting the reaction partner, as demonstrated by some examples in Table 1. This table shows only a small selection of the commercial polyester