



Glycol Ethers for Automotive Coatings Applications

Automotive OEM

Original equipment manufacturer (OEM) paint applied to automobiles and trucks is one of the most demanding of all coating applications.

Topcoats Enamels, basecoat/clearcoat, and two-component paint systems are employed for OEM topcoat finishes. These finishes are applied during assembly line operations as solvent-based or water-based formulations. They are cured in forced air ovens. DOW glycol ethers and acetates have found widespread use in these systems cured at elevated temperatures due to excellent performance characteristics, such as solvency and evaporation rate.

The resins used in OEM finishes may be acrylic, polyester, epoxy, or polyurethane. Curing agents used in conjunction with these resins are melamine-formaldehyde or blocked isocyanates.

The evaporation rates, high dilution ratios, and resin solvency of DOW glycol ether products make them especially suitable for OEM finishes. DOW glycol ethers that are commonly used in these finishes are DOWANOL[®] PM, DPM, PMA, DPMA, PnP, DPnP, Butyl CELLOSOLVE[™], Butyl CARBITOL[™], and Methyl CARBITOL[™]. Selection of the appropriate glycol ether or acetate product depends on the resin/crosslinker system employed and the application and curing requirements placed on the coating system.

Electrodeposition Coatings The electrodeposition process, in which electrically charged paint particles are plated out of a water dispersion onto a conductive metal surface, is the standard within the automotive industry for the application of primer coatings. It is also widely used for coating office furniture and appliances.

Most electrodeposition coatings are based on epoxy resins advanced with Bisphenol A, converted to a positively charged particle, and finally dispersed in water along with the pigment.

The DOW glycol ether is a critical component of an electrodeposition system, in which it plays two roles. First, in the resin cook, it is an active solvent for the resins. Second, it serves as a coalescing aid to enhance the proper film formation during coating cure. Although glycol ethers are used in low concentrations, they are critical to proper film formation. DOWANOL PM, PPh, Butyl CELLOSOLVE, and Butyl CARBITOL are used, either alone or in combination with each other in most electrodeposition technologies.

Automotive Refinish

Automotive refinishing coatings are divided into four categories:

- Topcoats – acrylic lacquers and enamels, alkyd enamels, two-component polyurethanes, and hybrids such as acrylicurethane.
- Undercoats – nitrocellulose lacquers, acrylic lacquers, and two-component epoxies.
- Primers – two-component epoxies, and acrylics (flexible for plastic parts).
- Surfacer and sealers – undercoats with fillers such as carbonates.

Automotive refinishing lacquers and enamels are generally conventional solvent-based coatings (less than 60% solids). To avoid possible dust contamination, they are designed for fast air drying so as to be tack-free in minutes. Such coatings must have excellent solvent, chemical and corrosion resistance, film hardness, adhesion, and gloss.

Selection of the correct DOW glycol ether product for refinish coatings is critical. By controlling evaporation rate the tack-free condition can be achieved quickly while allowing the film surface to remain permeable for evaporation of the latent solvent.

The future trends in auto refinish will be toward increased solids content and basecoat/clearcoat technology. The DOW glycol ether products are uniquely suited to meet these trends due to excellent solvency, high dilution ratios, low surface tensions, and broad range of evaporation rates. DOWANOL PM, DPM, PMA, DPMA, PnP, DPnP, PnB, Butyl CELLOSOLVE and Butyl CARBITOL find use in automotive refinish coatings.

