

LETTERS TO THE EDITOR

Easy care finishes based on polyurethane for Leather. Part I.

In recent times, owing to tremendous developments in polymerisation techniques, a number of coating formulations have been brought out, which include the 'Easy care finish' for leather. The formulations for the easy care finishes are based on linear prepolymer of urethanes having free NCO group which are then chain-extended with active hydrogen compounds such as phenols, alcohols, acids etc. to form fully reacted urethanes. They provide coatings which possess excellent film properties viz., high tensile strength, outstanding elongation and flexibility over wide temperature range coupled with excellent scuff and chemical resistance and high gloss, which have been associated with urethanes.

Polyurethane coatings thus far in use, have been mostly of two-pot systems² in which a prepolymer having active isocyanate group is made first by reacting excess di-isocyanate with polyol and curing this prepolymer on the surface by means of moisture in the air in presence of catalysts like tertiary amines or metal driers contained in diluents. The prepolymer and catalyst are kept in separate containers to avoid gelling.

Coatings from the two-pot systems having film characteristics as enumerated above, possess certain properties which are disadvantageous while using them. They have limited pot life and after mixing with

catalyst the formulation has to be used immediately to avoid gelling. The coating takes a longer time for drying.

To offset the limitations of the two pot systems and with a view to introduce an easy care finish, we have developed a product based on toluene di-isocyanate (TDI), castor oil and phenol.³

In our experiments, a prepolymer was first made by reacting castor oil with excess TDI using xylene as solvent. The prepolymer was then chain-extended by reacting with phenol at 80°C. The product was practically free of NCO groups.

The product obtained was remarkably stable on storage and was unaffected by water and other solvents, thereby rendering itself suitable for making emulsions as well. The product was then studied for its film-forming characteristic on leathers as per the procedure normally adopted for two-pot systems. This lacquer when diluted suitably with aromatic solvents and mixed with minimum quantity of nitrocellulose lacquer gave a tough and glossy film on leather. The drying time was approximately 25 minutes. The treated leather when subjected to flexing test withstood more than 50,000 flexes. A noteworthy feature of this product is that it remained stable even after mixing NC lacquer, drier etc., indicating its indefinite pot life. The use of NC has been made to provide a uniform coating besides its function as hardener.⁴

Further studies are underway to reduce still further the drying time of the product.

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