

PU104B – Polyurethane Elastomers and Coatings

Intro to Polyurethane Technology

- Basic polyurethane overview
- Definition of typical coatings and paints
- Definition of typical elastomers

Polyurethane Elastomers (Solid and Microcellular)

- Structure/property relationships of polyurethane elastomers
 - Basic polymer morphology fundamentals (soft and hard segments)
 - T_g and T_m, measurement and physical property effects
 - Dynamic properties - hysteresis
 - Effect of formulation components on properties
- Comparison of urethanes versus non-urethane elastomers
- Elastomer raw materials
- Types of urethane elastomers, formulation, market segments, and applications
 - Cast elastomers
 - Prepolymers and quasi prepolymers
 - One shot and RIM
 - Spray elastomers
 - Thermoplastic polyurethane
 - Millable polyurethane elastomers
 - Microcellular elastomers

Polyurethane Coatings

- Intro to Polyurethane based coatings – timeline, included technologies, basics
- Coatings market and different market segments and industry trends
 - Automotive
 - Building and Infrastructure
 - Corrosion
 - General Industrial
 - OEM
 - Textiles
 - XXX
 - YYY
- Coating Resins Review – Competitive technology comparisons
 - Acrylic
 - Epoxy
 - Polysiloxane
 - Polyurethane
 - XXX
 - YYY
- Types of Polyurethane coatings
 - One component solventborne including moisture cure
 - One component waterborne
 - Two component solventborne

- Two component waterborne
- 100% solids
- UV/E beam
- XXX
- Polyurethane coating raw materials and reasons for selection
 - Resins – polyesters, polyethers, polyaspartics, hydroxy functional acrylics
 - Isocyanates/Crosslinkers – aromatic, aliphatic, carbodiimide
 - PUDs
 - UV cure resins
 - XXX
- Additives to polyurethane coatings and their effects
 - Pigments
 - Flow and leveling aids
 - Surfactants
 - Solvents/VOCs
 - Catalysts
 - XXX
- Application Techniques
 - Brush, roll, spray, ribbon coat, deposition
- Safe storage, handling, and application
- Characterization of final coating film properties
 - Physical testing
 - Weathering – Accelerated and field testing
 - Chemical testing
- Case Studies
 - In-use case studies in multiple market segments
 - Detail on material selection, prep, application and in-use update
- Summary and Questions