

## **PU 104B: 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)
  - Tg and Tm, 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
- Coating markets, different market segments and industry trends
  - Automotive
  - Building and Infrastructure
  - Corrosion
  - General Industrial
  - OEM
  - Textiles
- Coating Resins Review – Competitive technology comparisons
  - Acrylic
  - Epoxy
  - Polysiloxane
  - Polyurethane
- Types of Polyurethane coatings
  - One component solventborne including moisture cure
  - One component waterborne
  - Two component solventborne

- Two component waterborne
  - 100% solids
  - UV/E beam
- Polyurethane coating raw materials and reasons for selection
  - Resins – polyesters, polyethers, polyaspartics, hydroxy functional acrylics
  - Isocyanates/Crosslinkers – aromatic, aliphatic, carbodiimide
  - Polyurethane Dispersions (PUD)
  - UV cure resins
- Application Methods
  - Brush, roll, spray, dip and flow, 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