PU 104B: Polyurethane Elastomers and Coatings

2 x 2 hour sessions

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

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**