



Soy-PK

Bio-Based Alternative to Epoxy Resins

The Soy-PK reactive oligomer cross-linker resin (Soy-PK) offers a practical, cost-effective drop-in replacement for epoxy resins containing bisphenol-A (BPA). Such resins are widely used in coatings, especially in metal beverage and food container coatings that present serious mutagenicity and health concerns. The new technology offers a viable option to displace fossil-based BPA-containing epoxy resins with a renewable-source raw material, improving industry's environmental footprint.

THE TECHNOLOGY

Resin and coating manufacturers have attempted to replace BPA-containing epoxy coatings. Various chemistries have been tried and failed in one or more functional requirements: flexibility, adhesion, application, corrosion resistance, or hydrolysis under low pH. In addition, these alternates are often costly.

Recognizing a need, Airable Research Lab teamed with Battelle to develop bio-derived reactive oligomer resins for use in coating applications. The resulting technology uses oil from soybeans and other crops as chemical feedstocks. The product has functionality, molecular weight, and rheological properties to perform equivalent to epoxy-, phenolic-, and polyester-based coatings. Using electrochemical impedance spectroscopy (EIS), researchers evaluated Soy-PK's corrosion resistance and found that it outperformed commercial BPA alternative coatings (see graph). In addition, Soy-PK cures at a speed comparable with current industrial coatings and therefore requires no additional processing equipment.

Soy-PK has potential applications to myriad industrial and specialty coatings that are currently BPA-based resin. The resin can also be used in phenolic- and acrylic-based coating formulations and applications.

THE BENEFITS

- Presents no health or toxicity hazards
- Formulates easily with traditional coating solvents
- Shows excellent adhesion, flexibility, and corrosion resistance
- Provides enhanced cure kinetics
- Forms stable bonds during cross-linking
- Affords an excellent pot life
- Costs less than \$1 per pound
- Serves as a drop-in replacement for BPA-based resins

Corrosion performance of Soy-PK compared with BPA control and commercial BPA alternative

