

TAPPI BARRIER COATING FOR PAPER & PAPERBOARD SHORT COURSE

Course Instructors: Dr. Prakash Malla and Dr. John Roper

Tentative Course Schedule (2.5 Days)

DAY 1

1. Introduction to Barrier Coating and Sustainability
 - a. Why barrier coating
 - b. Issues with the conventional barrier coatings – regulatory (health and environment), recyclability and compostability
 - c. Issues with single use plastics
 - d. Sustainability goals
 - e. Aqueous barrier coating
2. Barrier coating mechanisms and fundamentals
 - a. Two approaches to barrier coatings - physical barrier & chemical barrier
 - b. Transport mechanism through barrier coatings
 - c. Key differences between liquid barrier coatings and vapor barrier coatings
 - d. Overview of polymer barrier performance metrics
3. Barrier requirements for different market segments
 - a. Key market segments / short term versus long term barrier requirements
 - b. Special considerations for food contact barrier coatings
 - c. Fit of barrier coated fiber-based articles to replace alternative barrier packaging
4. Barrier Coating Test Methods
 - a. Oil & Grease (3 M Kit and others)
 - b. Water Resistance (Cobb 30/Cobb60)
 - c. Water Vapor Transmission Rate
 - d. Oxygen Transmission
 - e. Heat seal
 - f. Blocking
5. Barrier Coating Test Methods Demo at Applied Testing Lab (Atlanta)

DAY 2

6. Materials for Barrier Coatings
 - a. Pigments
 - b. Synthetic binders
 - c. Biobased materials
 - d. Nano/microfibrillated Cellulose (NFC/MFC)

- e. Additives
- 7. Paper and Paperboard Substrates for Packaging
 - a. Overview of paper and paperboard substrates
Sustainability considerations in choice of substrate
- 8. Barrier Coating Formulations
 - a. Additives and Optimization of Barrier Coating Formulations
 - b. Single vs Multilayer barrier coatings
 - c. Coating Preparation
- 9. Barrier Coating Rheology and Application Methods
 - a. Blade Coating
 - b. Rod Coating
 - c. Curtain Coating
 - d. Rotogravure and Flexographic Presses
 - e. Drying of Barrier Coatings

DAY 3 (half day)

- 10. Coating Defects and Fold Cracking issues
 - a. Common types of coating defects
 - b. Ways to detect coating defects
 - c. Ways to mitigate coating defects
- 11. Q&A with instructor and Open Discussion