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TAPPI Journal
Editorial Board

Coating innovations for driving the next generation of sustainable packaging

Welcome to the 2025 Special Coating Issue of *TAPPI Journal*. As we reflect on developments in 2025, the industry's focus on sustainable packaging continues to sharpen, bringing several critical coating challenges and opportunities into view.

1. Optimizing base stock performance to control coat weight, and the associated costs, to make sustainable packaging structures more commercially competitive with the plastic ones we are trying to replace.
2. Addressing the evolution of sustainable packaging solutions from the current state to recyclable and eventually to completely biodegradable. A key part of this evolution will center on our ability to achieve the high barrier properties and low cost seen with plastic using a paper replacement.
3. From a process standpoint, it will likely take a series of coating layers to achieve our performance goals. This may mean part of the coating process is done at the mill and another part at a converter. Print applicable coatings will be critical to the evolution.

Selected coating, printing and surface enhancement content

The technical works within this issue represent key manuscripts from the Coating, Printing and Surface Enhancement Division program at TAPPICon 2025. This content has undergone additional peer review for publication in *TAPPI Journal*, and we are proud to present them to you in this forum. Here is an overview of these works:

"Influence of base sheet properties on barrier coating performance"

– *Dustin Burton, Alan Piwowar, and Greg Welsch; Trinseo LLC (p. 518).*

Various base stock properties, such as caliper, porosity, roughness, and ash content, are reported to influence the

barrier performance of synthetic-latex-based barrier coatings. These findings will help paper and board producers design better, more cost-effective, purpose-built substrates for barrier applications in the packaging industry.

"A method to produce paperboard with a lightweight low-density coating"

– *Gary Fugitt and Scott Ginther; Smurfit Westrock (p. 532).*

A method variation on traditional cast coating is described in which a coating layer is produced that consists of a network of bubble-shaped air-filled voids within the coating. This is accomplished by instantaneously flash-drying all the water in the coating as it exits the application nip. With a coat weight of only 5 g/m² on 12 point to 14 point paperboard, a flat, smooth surface was produced. Mills might consider this study in their efforts to produce low-density grades.

"A laboratory-scale automated vacuum-assisted device for coating of cellulose nanofibrils onto paper"

– *Sandro Zier, Zechariah Hoeft, Jamieson Snape, Douglas Bousfield, and Caitlin Howell; University of Maine (p. 541).*

An automated vacuum-assisted coating system was developed to deposit cellulose nanofibril (CNF) layers onto paper substrates. Vacuum assistance makes it possible to obtain coat weights over 5 g/m² in a single pass and increases solids after coating from less than 10% to over 25%–30%, substantially decreasing drying energy requirements. The resulting sheets showed high Gurley porosity values and excellent oil and grease barrier.

"Designing paper and board barrier constructions for food contact applications"

– *Alan Piwowar and Greg Welsch; Trinseo LLC (p. 549).*

An industrial pilot coater was employed to examine the effect of multiple factors on barrier performance for purpose-built paper and paperboard constructions. Multiple

chemistry and process variations were studied and effects on porosity, water, and oil barrier were tested. This research is helpful for mills as they look to optimize topcoat barrier formulation and thickness.

“Pre-damping effects on water absorption and drying dynamics in flexographic printing”

– Janet Preston and Eli Gaskin, *Artemyn Minerals; Martti Toivakka, Åbo Akademi University (p. 563).*

Optimizing flexographic printability can involve the ink and the substrate, as well as the printing process. This study focuses on how pre-damping a surface impacts liquid absorption and improves wet trapping (ink-on-ink with no intermediate drying) in flexographic printing. A unique part of this work was development of a flexo trapping test so that one color was printed on top of another fast enough to see the effects. The study gives mills another option to improve or control flexo printing.

Collectively, the manuscripts in this issue reflect the ingenuity and dedication driving progress in coating, printing, and surface enhancement. We trust this Special Coating Issue will inform your work, spark new ideas, and strength-

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en our shared commitment to sustainable packaging solutions. We also thank the authors and peer reviewers who participated in creating and refining this content. **TJ**

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