

ADVANCEMENTS IN SUSTAINABLE BINDER TECHNOLOGY FOR COMPOSITE WOOD PANEL APPLICATIONS

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ABSTRACT

CARB 2 and the new EPA regulations on formaldehyde emissions from composite panels are the designated minimum requirements to enable a healthier indoor environment across North America. These standards define the increased regulation of chemicals such as formaldehyde in a number of household products. In response to these standards and underlying consumer concerns, many composite board manufacturers have long been seeking an alternative to formaldehyde for use in their products. However, most alternatives have failed to meet all their criteria, including availability, price stability, uniformity of properties and batch-to-batch or year-to-year performance consistency.

A new solution now makes it possible to produce next generation composite boards using bio-based binders that deliver the required technical performance and simultaneously deliver cost competitiveness vs. incumbent formaldehyde based-resin systems. With more than 40 combined years of application experience using modern bio-binder technologies, EcoSynthetix and its technical partner, Chimar, have developed high performance products that deliver the industry's lowest emitting boards.

In this presentation the concept of engineered biopolymers is presented in detail and the production procedure, from raw material to product, is described. The final products, as well as the raw materials, are characterized and their properties are discussed using examples ranging in scale from lab to full industrial trial in oriented strand board (OSB), medium and high density fiberboard (MDF & HDF) and particleboard applications.

In addition, the effectiveness and economics of the emulsification system, comprised of a bio-based binder and Polymeric Methylene Diphenylene Diisocyanate (pMDI), are discussed. Demonstration of the macro-level benefits enabling the use of pMDI within the emulsified system to produce no-added-formaldehyde (NAF) panels, such as improved machinability, reduction of process build-up, reduction in release agent required, increase pot life of resonated fiber and reuse of MDF refiner water, will be reviewed.

A forecast will be presented regarding the future demand for biopolymers, together with a vision of a future less dependent on fossil-based, harmful chemicals where the benefits green chemistry can be realized at no added cost.

KEYWORDS: bio-resins, bio-polymer, no added formaldehyde