Production of Bio-Phenol Formaldehyde Adhesives from Lignin

Advanced Biorefinery Technologies Ltd

At Advanced Biorefinery Technologies Ltd., we have developed Bio-Phenol Formaldehyde (BPF) Adhesives, a sustainable and high-performance alternative to traditional petrochemical-based adhesives. Derived from lignin, a major component of lignocellulosic biomass, our BPF adhesives are environmentally friendly and suitable for a wide range of industrial applications.

How It Works

The production of BPF adhesives involves a step-by-step process that transforms lignocellulosic biomass into bio-based, high-performance adhesive materials:

Fractionation and Separation of Lignin

Lignin, a natural polymer found in biomass, is extracted through an eco-friendly fractionation process to serve as the primary feedstock for BPF adhesives.

Modification of Lignin

The extracted lignin undergoes chemical modifications to enhance its reactivity and bonding properties, enabling it to replace petroleum-derived phenol.

Co-Polymerization with Formaldehyde

The modified lignin is co-polymerized with formaldehyde to produce a bio-based adhesive with superior bonding strength and durability.

Formulation of the Final Product

The adhesive is refined and formulated into a ready-to-use product for industrial applications.

Key Features and Advantages

Low Formaldehyde Emissions:

Meets stringent environmental standards, including E_0 Grade (≤ 0.050 mg/m³) and ENF Grade (≤ 0.025 mg/m³), ensuring safety and compliance.

High Bonding Strength and Water Resistance:

Demonstrates excellent adhesive properties, suitable for demanding industrial applications such as plywood and particleboard manufacturing.

Environmentally Friendly:

Utilizes lignin, a renewable and biodegradable resource, significantly reducing reliance on fossil fuels and lowering carbon footprints.

Cost-Effective Alternative:

Offers a competitive, sustainable replacement for petrochemical-based adhesives without compromising performance.

Applications

Wood and Furniture Industry:

Ideal for manufacturing plywood, particleboard, and laminated wood products with high bonding requirements.

Construction Industry:

Used in building materials to enhance structural integrity and environmental sustainability.

Automotive and Aerospace Industries:

Applicable for lightweight composite materials requiring strong and durable adhesives.

Sustainability Impact

Our BPF adhesives help address the dual challenges of reducing formaldehyde emissions and replacing petroleum-based materials with renewable alternatives. By leveraging lignin, a natural byproduct of biomass processing, we are contributing to the circular economy and promoting sustainable manufacturing practices.

Why Choose Our BPF Adhesives?

Eco-Friendly Innovation: Developed with a focus on reducing environmental impact and promoting sustainability.

High-Performance Materials: Delivers exceptional adhesive strength and durability for industrial applications.

Compliant with Safety Standards: Meets and exceeds global formaldehyde emission regulations.

With our Bio-Phenol Formaldehyde Adhesives, we are not only offering an innovative solution to the adhesive industry but also paving the way for greener, more sustainable manufacturing practices across sectors. This technology reflects our commitment to creating a cleaner, healthier, and more sustainable future.

Fig. 1 Production Process of Bio-Phenol Formaldehyde (BPF) Adhesives