

Renewable adhesive solutions for panel and furniture production

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The ongoing pandemic and changes in consumer behavior have created many challenges for panel and furniture manufacturers around the globe. The demand for furniture products is still high, along with the evergrowing demand for sustainable products. Many countries have taken actions and launched stimulus packages to promote “green growth”. This is further spearheaded by retailers who strive to stand out

by offering sustainable products to their consumers. Consequently, manufacturers need to classify and establish their supply chains, which ensure the highest possible amount of renewable and recycled materials in their products in line with that demand.

As an adhesive manufacturer with focus in the panel and furniture segment, Jowat has been researching and developing solutions to meet the

targets for renewable and recycled materials, while ensuring there is no compromise in product performance and suitability for efficient industrial processes.

The global adhesive demand is estimated to about US\$37 billion in 2021. The fastest growing region is Asia-Pacific, led by China as the world’s largest adhesive market. The furniture and panel industry is a small,

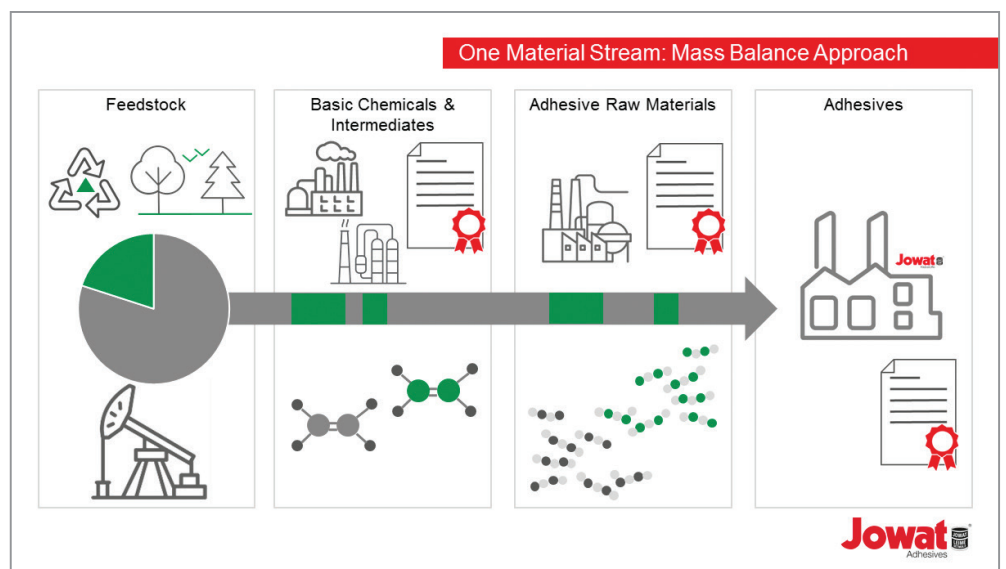
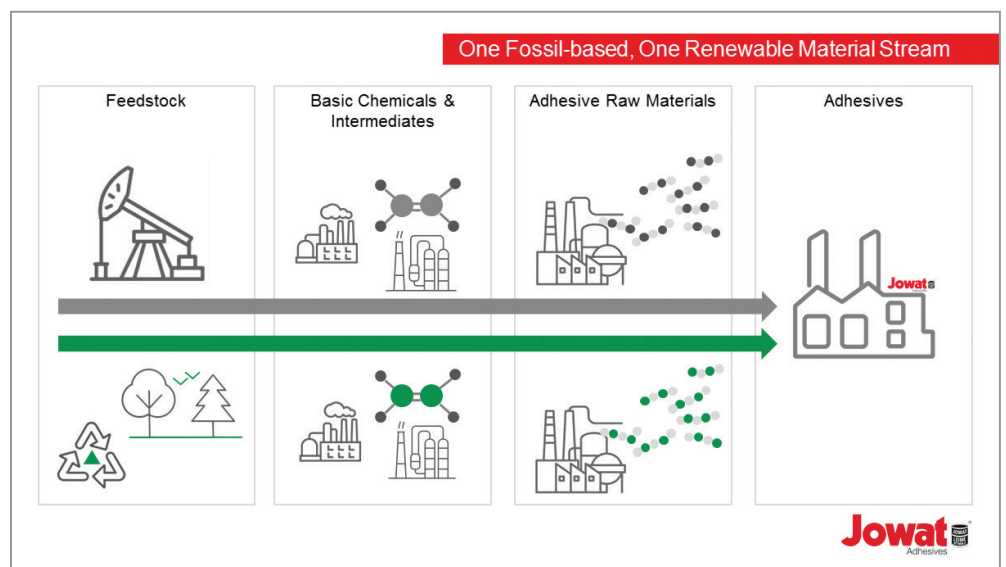
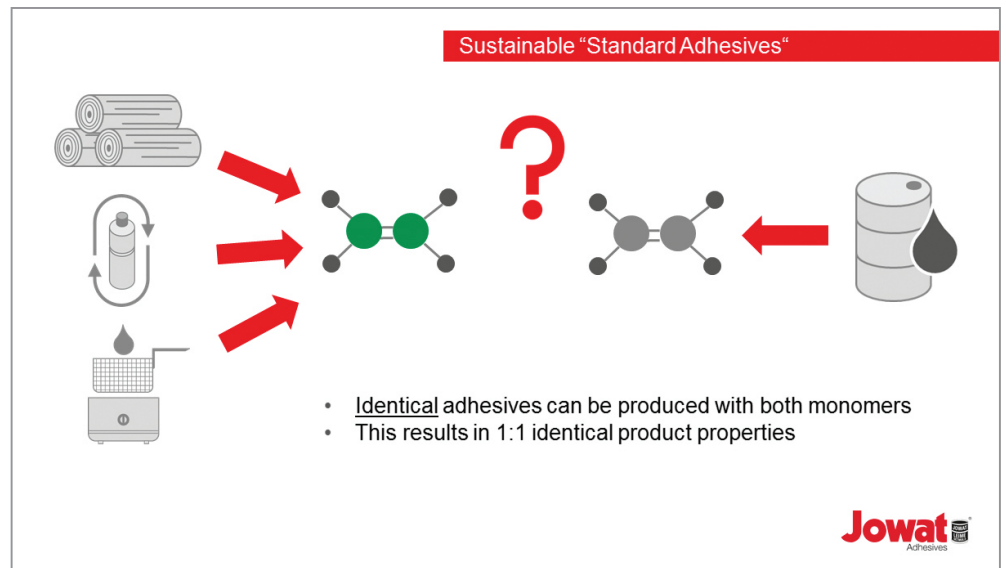


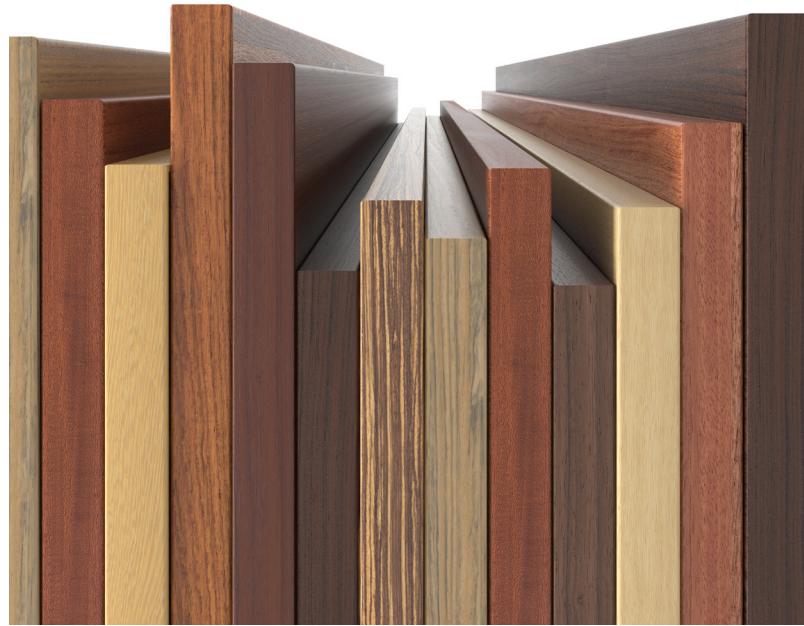
highly specialised sub-segment. Of the approximately 10 million metric tonnes of adhesives used annually in Asia-Pacific alone, less than 2% are used in this market segment. Nevertheless, products based on renewable raw materials will play a significant role in the future.

THE CHEMISTRY OF RENEWABLE ADHESIVES

Plant-based oleochemistry, which converts renewable raw materials such as natural resins, vegetable oils and fats directly into base chemicals for everyday products, has been around for decades. The best known and by far the highest conversion rate is in biofuel or the detergent industry, based on such converted tensides.

For instance, vernonia oil can be extracted from the vernonia galamensis plant, or Ironweed, which can be converted to vernolic acid, of which epoxy resin can be manufactured. This technology is constantly expanding, and is useful and competitive for many





industries. However, direct conversion of plants has limitations in terms of continuous availability, for instance during droughts, and possible impurities, usually based on the environmental growing conditions. That means the price and quality will fluctuate.

Therefore, more options have been developed to transform petrochemical processes by incorporating renewable and even recycled feedstock such as biomass.

UNDERSTANDING THE APPROACH

Ultimately, adhesives consist of carbon building blocks, and these carbons can come from a variety of sources, such as natural oil or gas, or renewable or recycled biomass. These carbon atoms are indistinguishable from one another. These sources are then fed into a steam cracker and refined into base chemicals. A mathematical calculation can be used to determine how much of the different feedstock has been fed into this process, and how high the proportion of renewable or recycled raw material is.

Jowat has shortlisted three main applications in panel and furniture

production to demonstrate the usability of sustainable products:

- **Edgebanding**
For the joining of decor edges with boards, Jowat developed a hot melt adhesive which contains 16% of carbon from renewable sources. Those substances are obtained from crude sulphate turpentine (CST), a byproduct of paper production, which can be converted into a terpene resin via purification and polymerisation. As such, the raw material used is 100% renewable, and does not compete with the food industry. If the mass balance approach is applied, a higher proportion of renewable raw materials of up to 30% is already within the realm of possibility today.
- **3D lamination of foils**
Polyurethane dispersions (PUDs) are used for the lamination of 3D furniture fronts with thermoplastic foils. Jowat supplies a portfolio of one- and two-component PUDs for this application. With this development, Jowat is able to produce PUDs based on renewable resources that can reach up to 50-60% of bio-based content. Polyester polyols from biogenic

sources based on dicarboxylic acids, succinic acid, sabacic acid and adipic acid serve as building blocks for PUDs from renewable resources.

- **Packaging of furniture products**
To properly package and ship finished furniture goods, hotmelts are required to seal the carton boxes. Jowat offers such packaging processes and products. In 2019, Jowat launched the bio-based Jowatherm GROW packing products. These products are based on pine resins and have a renewable content of up to 50%, and they are characterised by clean processing characteristics and low maintenance, and are thus an efficient use of materials. **P**

