

EKOLUTION

... AND ANDRITZ SCALE UP CO₂-NEGATIVE HEMP INSULATION

In 2025, Swedish pioneer Ekolution successfully commissioned a fully integrated industrial production line for high-performance hemp fiber insulation at its plant in Malmö, Sweden. Delivered and installed by ANDRITZ, the new facility signals a major milestone in the commercialization of truly sustainable building materials.

Founded in 2013, Ekolution started with a clear mission: develop CO₂-negative, bio-based building materials that outperform conventional alternatives. While many companies in the green construction sector purchase fibers from third parties, Ekolution took a bolder route. The company decided to control the entire value chain – from raw hemp stalks grown by farmers to refined fibers and finished nonwoven felts.

This vertical integration is still rare in the industry and gives Ekolution complete oversight of quality, traceability, consistency, and environmental performance.

"Coming from a construction background, we saw the need for better insulation materials," says Remi Loren, CEO of Ekolution. "We didn't just want to buy fibers – we wanted to produce them ourselves to ensure the highest quality and the lowest possible carbon footprint. Partnering with ANDRITZ allowed us to industrialize that vision."

COMPLETE PROCESS SOLUTION

The ANDRITZ scope of supply comprises two perfectly synchronized technology platforms: A teXline bast fiber line for decortication and refining of industrial hemp and a neXline airlay flexiloft+ line for forming high-loft felts.

The bast fiber line processes approximately five tons of hemp feedstock per hour, separating the valuable bast fibers from the woody core (shives) and refining them into a clean, consistent feedstock. The



Hemp based insulation

airlay line then converts this material into insulation felts at a rate of up to 1.5 tons per hour. The result is a continuous, industrial-scale production flow that turns raw agricultural material into ready-to-install insulation products.

OVERCOMING NATURAL CHALLENGES

Working with natural fibers brings unique challenges. Unlike synthetic fibers, hemp varies with harvest conditions, moisture content, and growing regions. Mastering the agricultural upstream process was therefore critical.

"Every natural material has its own character," explains Francis Elias Junker, ANDRITZ Sales Manager, Nonwoven & Textile. "The biggest challenge is not just the machinery, but understanding and controlling the entire chain, from field to factory. Only when the agricultural part is mastered, the downstream processing can deliver consistent, high-quality output."

ANDRITZ's extensive experience in bast fiber processing, combined with its airlay expertise, helped Ekolution overcome these hurdles. The result is a stable, repeatable industrial process that delivers insulation with excellent thermal performance, moisture regulation, and sound absorption properties.

EKOLUTION Sweden



Production line, Ekolution, Malmö

VERIFIED CARBON-NEGATIVE PERFORMANCE

One of the project's standout achievements is its environmental credibility. The hemp insulation produced on the new line is among the first hemp-based products to receive a full Environmental Product Declaration (EPD). This third-party verified document confirms the material's carbon-negative footprint – meaning it sequesters more CO₂ during the hemp's growth phase than is emitted across its entire production life cycle.

This positions Ekolution's product as a genuine alternative to traditional glass wool and mineral wool insulation, which have significantly higher embodied carbon. Beyond construction, the hemp felts also serve markets such as automotive interiors, acoustic panels, furniture, packaging, and technical textiles – all sectors actively seeking high-performance natural fiber solutions.

GETTING TECHNICAL

ANDRITZ teXline bast fiber line high-capacity decortication and refining system:

- Processes ~5 tons of hemp stalks per hour
- Gentle mechanical separation preserves fiber length and quality
- Designed specifically for bast fibers (hemp, flax, kenaf)
- Produces clean bast fiber and shive fractions for multiple applications

ANDRITZ neXline airlay flexiloft+ line advanced airlay forming technology:

- Output up to 1.5 tons of nonwoven felt per hour
- Creates uniform, high-loft structures ideal for insulation
- Excellent fiber blending and web uniformity
- Flexible for different fiber types and densities

Combined output: Full vertical integration from raw hemp to finished insulation felt in one seamless process.

A LONG-TERM PARTNERSHIP

The collaboration between Ekolution and ANDRITZ began with first contact in 2021. After thorough evaluation and testing, the decision to proceed was taken in 2023, the contract was signed in August 2023, and the line was successfully commissioned in January 2025 – a rapid timeline for such a complex project.

"ANDRITZ acted as a true one-stop-shop partner," Loren adds. "From process design through to commissioning, the company supported us every step of the way. This project proves that sustainable ideas can be scaled into competitive industrial reality."

With this new line in full operation, Ekolution is well positioned to meet growing European demand for low-carbon building materials. The project stands as a compelling example of how ANDRITZ is actively supporting the shift toward a more circular and climate-friendly economy – one hemp fiber at a time.

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FROM FIELD

TO FACTORY