




ALKUS® SUSTAINABILITY ASSESSMENT

Exposé

The following report covers the measures taken by alkus® on sustainability. The analysis highlights the different phases of the entire product lifecycle, from manufacturing to disposal.

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Introduction

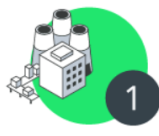




At alkus®, we are deeply committed to integrate sustainability into every aspect of our operation. Our strategy focuses on several core topics, ensuring a comprehensive approach to environmental responsibility. These topics form the pillars of our sustainability efforts.

The manufacturing process of alkus® products involves the combination of various raw materials. These materials are 100% sourced in the European Union. With two production sites, we are committed to minimizing the consumption of raw materials, both for the sake of our environment and our customers. To achieve this goal, we employ strategies such as utilizing short supply routes and implementing customized waste and recycling management.

At the core of alkus® sustainability expertise lies our flagship product, the alkus® AL. It comes with an assured 7-year long-term warranty and has been employed in over 1,500 verified concrete pours. The life cycle of alkus® formwork panels typically surpass that of steel and aluminium formwork systems.

This assessment emphasises on the practical use of the existing and widely-accepted environmental performance assessment structure of EN 15804 (Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products). In this context, the different measures of various life cycle phases are described as per Table 1.

Table 1: Assessment methodology¹

				
Production <ul style="list-style-type: none"> - Raw material extraction - manufacturing - transportation 	Construction <ul style="list-style-type: none"> - transportation - assembly - installation 	Operation <ul style="list-style-type: none"> - use - maintenance - repair - renewal 	End of life <ul style="list-style-type: none"> - deconstruction - waste processing - disposal 	Beyond asset life <ul style="list-style-type: none"> - reuse - recycling - energy recovery

In the following chapters an overview about the different measures will be given according to the methodology in Table 1.

¹ Source: <https://www.rics.org/profession-standards/rics-standards-and-guidance/sectorstandards/construction-standards/whole-life-carbon-assessment>

The following directory provides an overview of the measures taken in accordance with EN 15804:

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1 Production

1.1 Sourcing of high-quality raw materials with short distances

We rigorously assess the environmental and social impacts of our raw materials, aiming to source from suppliers who prioritize sustainable practices and reduce environmental degradation.

The two alkus production sites receive their raw materials exclusively from Central European suppliers, particularly polypropylene (PP), rolled aluminium and glass fibre. These suppliers also carry out the processing of these essential materials within Central Europe. This approach not only ensures an efficient supply chain but also **minimizes the carbon dioxide emissions associated with the production of raw materials.**



Figure 1: alkus® warehouse



Figure 2: Polypropylene silo filling station

1.2 Production with a disposal rate close to 0% "zero-waste production"

To achieve economic efficiency, efforts are made to minimize the occurrence of offcuts during the production process. However, some unavoidable polypropylene-aluminium composite cuttings are generated during production. Since 2022, a process has been implemented to break down this aluminium-polypropylene composite. The separated and unmixed aluminium is incorporated into the melt during the production of new aluminium alloys. The separated polypropylene is returned to alkus production and integrated into the AL sheet production. **This approach allows for the reintegration of high-quality raw materials into the circulation process, thereby reducing the need to purchase new materials.**

At both production sites, residues are finely ground and either reintroduced into the production process as recycled material, maintaining a consistent level of quality (recycling), or combined with other product groups as regenerated material. **As a result, the disposal rate is nearly 0%.**

The CNC machines transform the raw panels into formwork panels that are ready for installation (incl. rivet and anchor holes). The primary benefit for customers is that they no longer need to carry out any additional processing on the panels. Furthermore, customers are relieved of disposing any additional waste resulting from cutting to size or transporting it back to the manufacturing plant.



Figure 3: Collecting cut offs from production

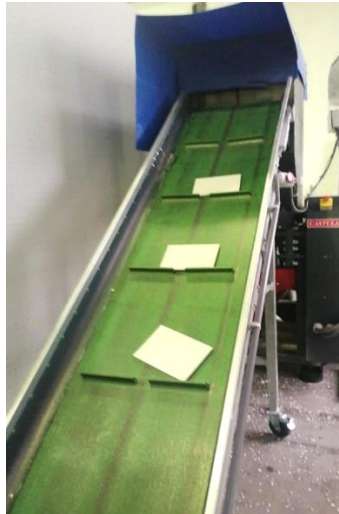


Figure 4: Material supply to the recycling process



Figure 5: Recovered granulate „ready-to-use“

1.3 Optimized transport logistics

Thanks to optimized shipping logistics, the alkus® partner concept, specifically designed for long-term operations, enables achieving a truck utilization rate of $\geq 85\%$. The same applies to the efficient exchange of basic materials and recycled material, as previously mentioned.



Figure 6: Loading with maximum capacity



Figure 7: Part of the logistics concept

2 Construction

2.1 Installation

alkus® panels are suitable for every common formwork system. To make the installation as fast and simple as possible, the panels are cut to the specified dimensions including anchor holes and rivet holes if needed. Thus, the panels only need to be installed and secured on-site. The primary benefit for customers is that they no longer need to carry out any additional processing on the panels. Furthermore, customers are relieved of disposing any additional waste resulting from cutting to size or transporting it back to the manufacturing plant.

Since the alkus® panel neither swells nor shrinks, it is installed flush with the frame. This guarantees a perfect joint pattern from the very first use. Since the panels are not sensitive to water, the gap between the panel and the edge of the frame does not need to be filled with silicone. During the first concrete pouring, this gap is filled with concrete slurry. This saves additional time and resources.



Figure 8: Positioned into the frame

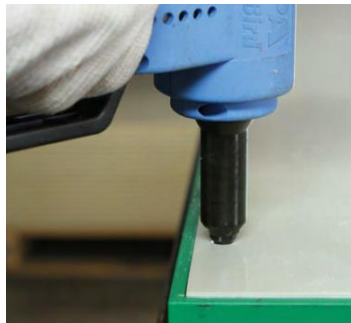


Figure 9: rivet gun to fix the rivets



Figure 10: installed flush into the frame

3 Operation

3.1 Repair method to extend the service life

In nearly any state of damage, all alkus sheets can be repaired using the same material in a resource-efficient manner, without compromising quality (by welding instead of gluing). The dedicated repair method allows for the repair of scratches, holes, damaged anchor holes, broken edges and corners. In cases of severe and extensive damage, a significant portion of the panel can be replaced through a process known as "panel section change," allowing it to **maintain its full service life without any reduction in performance**. The repair process is an essential part to fully leverage the potential of the material and avoid unnecessary early replacements.



Figure 11: alkus® repair set



Figure 12: Reliable and easy repair on site

3.2 Reduction of release agent and easier cleaning

Due to the material properties, the use of release agents can be significantly minimized. Compared to conventional formwork panels with absorbent surfaces, this leads to approximately 80% savings. Consequently, the need for cleaning between applications is also minimized, thereby conserving resources.



Figure 13: High-pressure cleaner with up to 1.000 bar



Figure 14: Cleaning with rotation cleaner

3.3 Product Life Cycle

The alkus® material does not have a precisely estimable life cycle. The initial product presentation occurred on February 2, 2000. A substantial number of panels that were installed in framing systems during the early 2000s are still in use today, surpassing 20 years and having been applied in over 2,000 concrete applications. Our experience demonstrates that the formwork panel frame typically fails before reaching the alkus® panel's service life. **As a result, even the first generation of alkus® panels does not contribute significantly to a widely noticeable and systematic disposal process.**



Figure 15: Frame and panel > 20 years in use (left side after repair and cleaning / right side before repair and cleaning)



Figure 16: Actual panel with > 1.500 uses

The product lifetime and quality of the alkus® panel is the dominant influence factor regarding sustainability.

Main Benefits:

- No replacements: Customers can avoid frequent replacements and the associated costs.
- Reduced Maintenance: The products are designed to be durable and reliable, resulting in fewer maintenance needs over their lifespan. This reduces the time, effort, and resources required for upkeep, resulting in additional cost savings and convenience for customers.
- Enhanced Performance: The products tend to maintain their performance levels over time. They are designed to withstand wear and tear, ensuring consistent and reliable performance throughout their lifespan.

Following figure shows an extract of a life cycle analysis conducted for a client in the UK. It is evident from the analysis that the primary factor influencing costs and subsequently resulting in waste generation (see picture below) is the replacement of the panel. Consequently, the product lifetime is the key factor for a positive impact on sustainability.

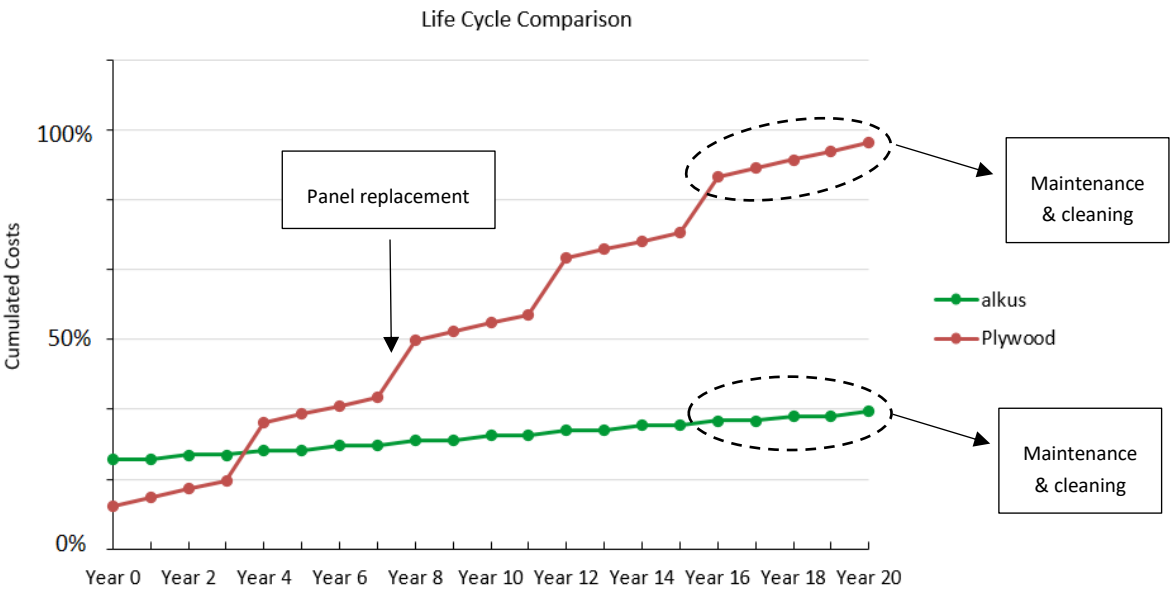


Figure 17: Replaced panels (plywood)



Figure 18: Waste generation from replaced panels (plywood)

The R&D department of the alkus Group is presently engaged in the development of a recycling concept for utilized panels in collaboration with a strong partner from the recycling industry. The objective is to retrieve old panels from customers and reintegrate them into the raw material cycle, all without imposing any costs on the customer site. **Even though several hundred thousand square meters of alkus panels are introduced and utilized annually, the rate of return is extremely low.**

4 End of Life

4.1 Deconstruction and replacement process

At the end of the panel's lifespan, the panel can be removed from the frame with simple steps. Depending on the condition of the panel, it can be used in special formwork applications or sent for recycling.

Since the formwork panel has a symmetrical structure (i.e. the back side is the same as the front), the panel can also be easily rotated and reinstalled. The prerequisite for this is a symmetrical anchor hole pattern in the frame. Further information regarding the recycling process, please refer to the following chapter 5.

The alkus® panel is non-absorbent, thus preventing substantial contamination from concrete, oil, and grease. This has a positive impact on the recycling process and makes it possible to recover the raw materials.



Figure 19: Remove rivet head (drill out)

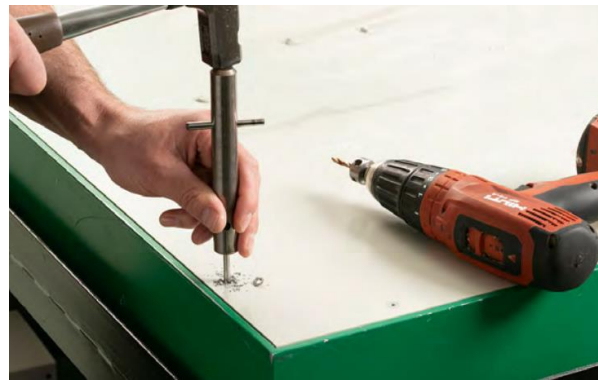


Figure 20: Using the rivet-removing tool to punch the rivet out

5 Beyond asset life

5.1 Embracing the Circular Economy: A Sustainable Pathway

The Circular Economy is a transformative approach that seeks to redefine our traditional linear economic model of "take, make, dispose" into a regenerative system. It aims to maximize resource efficiency, minimize waste generation, and create a sustainable and resilient future for generations to come.



The concept of alkus emphasizes three major pillars:

- Zero percent waste production: In the Circular Economy, the principle of waste prevention takes center stage. Alkus minimizes waste generation by adopting practices throughout the entire production process. This involves careful resource selection, efficient manufacturing techniques, recycling of waste and the elimination of unnecessary packaging. By prioritizing waste reduction, we can conserve valuable resources, reduce environmental pollution, and minimize the need for disposal.
- maintenance and repair concept: The concept of maintenance and repair forms a crucial component of the Circular Economy. Rather than embracing a throwaway culture, the focus shifts towards extending the lifespan of products. Alkus designs its products with durability in mind, using high-quality materials that facilitate easy repair and maintenance. Additionally, repair services are encouraged and supported.
- Recycling of utilized panels and reintegration into the raw material cycle: Circularity in the economy also involves the recycling and reintegration of materials at the end of their useful life. For utilized panels an efficient recycling process is in the development. The process aims to extract valuable components and raw materials from the panels, which can then be reintegrated into the manufacturing cycle. By closing the loop through effective recycling, we can reduce the demand for virgin resources and minimize waste sent to landfills.

By embracing these principles, we can transition towards a more sustainable and regenerative economic system that preserves resources and minimizes waste.

Conclusion:

The alkus® Group views continuous improvement not as a limited-time project, but as an ongoing process ingrained throughout every aspect of our company. We strive to continually unlock further potential, aiming to provide maximum value to our customers and promote resource-efficient value creation.

Developing and implementing an environmental strategy for a product that emits less CO₂ over its entire life cycle (15 – 25 years) is a crucial step towards sustainability. By considering the product's life cycle from raw material extraction to disposal, we have identified key areas for improvement and implement effective measures to reduce CO₂ emissions.

Several important aspects need to be addressed. Firstly, optimizing the production process by adopting cleaner technologies and energy-efficient practices can significantly reduce the carbon footprint associated with manufacturing. Similarly, minimizing waste generation and promoting recycling and reuse can help to reduce the need for new materials, thus lowering its overall carbon impact. Transportation and distribution also play a crucial role in the product's carbon emissions. Implementing efficient logistic strategies, such as optimizing transportation routes can significantly reduce the carbon footprint associated with the product's distribution.

By promoting a circular economy approach, where products are designed to be easily repaired, upgraded, or recycled, we can minimize waste generation and further reduce CO₂ emissions.

In conclusion, by embracing sustainable practices, promoting circular economy principles and engaging stakeholders at every level, we can make significant progress in creating a sustainable product.