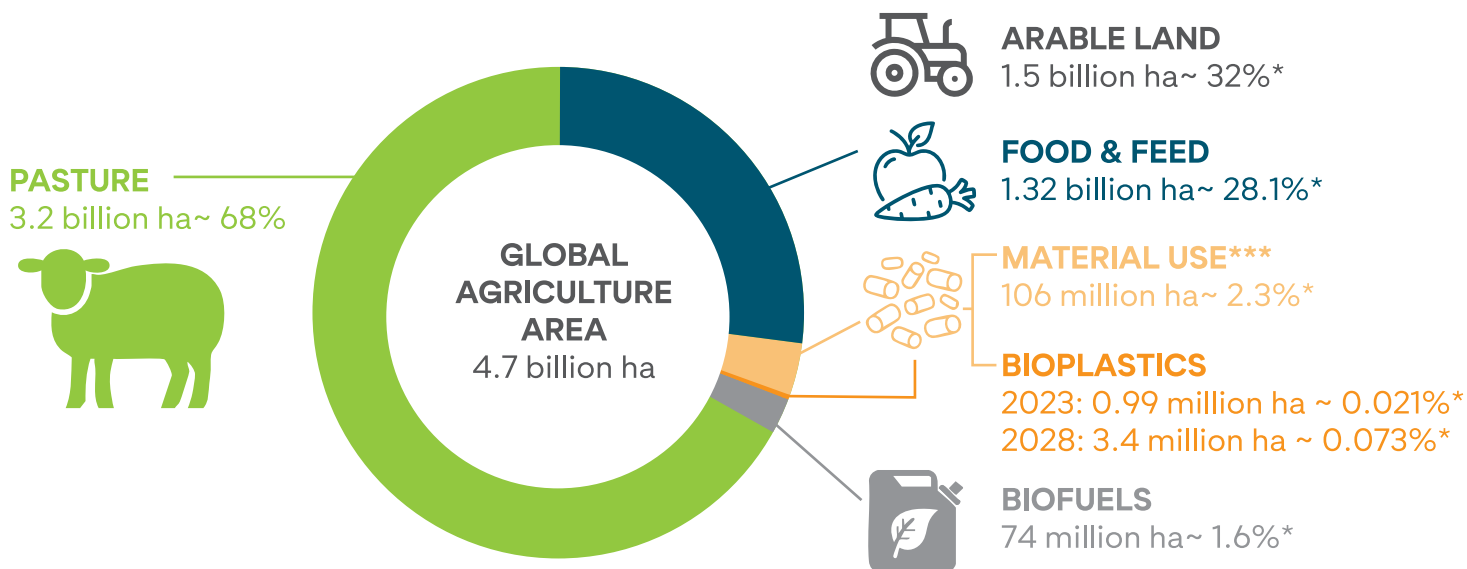


## Are bioplastics competing with land used for food & feed?

According to the European Bioplastics Association, the current use of land for bioplastics represents a small fraction of global agricultural land (circa 0.02% of arable land in 2023)\*. Moreover, advancements are being made in utilising non-food crops and waste materials to reduce the reliance on food-based feedstocks, aiming to balance both food security and the production of sustainable bioplastics.



\* compared to the global agricultural area  
 \*\* including approx. 1% fallow land  
 \*\*\* land used for bioplastics is part of the 2.3% material use

Source: <https://www.european-bioplastics.org/bioplastics/feedstock/>

## From what feedstock are Floreon bioplastics made from?

Floreon bioplastics are currently made from plant-based feedstocks, including corn and sugarcane. In the short to medium term, we have the option to source recycled PLA, albeit at a premium. Recycled grades with post-industrial and post-consumer content ranging from 30% to 100% are available. For the longer term, we are working with our upstream supply chain partners on second-generation (2G) feedstocks such as lignocellulosic biomasses derived from farm or industrial waste streams and also third-generation (3G) sources such as algae and seaweed.



## What is the carbon footprint of Floreon bioplastics?

From cradle-to-gate, the carbon footprint of PLA is typically 0.5-0.6 kg CO2 eq per kg of polymer, which means that Floreon bioplastics have a carbon footprint up to seven times lower than traditional fossil-based plastics, such as ABS, PC, or HIPS.

## What are the End of Life (EOL) options with Floreon bioplastics?

### RECYCLING

Floreon® Therma-Tech and Dura-Tech can be recycled both mechanically and chemically. Floreon has conducted its own recycling study on Floreon® Therma-Tech, in collaboration with the Biorenewables Development Centre at the University of York. The study demonstrated that the majority of lactic acid can be efficiently recovered through a simple and rapid reaction, with all flame retardants and fillers removed via straightforward filtration. This recovered feedstock can then be used to regenerate polymers without downcycling.

While the infrastructure for PLA recycling is not yet as advanced as that for fossil-based polymers like polyolefins, it has been shown that NIR identification and sorting of PLA from mixed plastic waste is feasible due to its unique IR fingerprint. Currently, closed-loop collection is the preferred method for PLA recycling, but as investments in plastic waste sorting continue to grow, more facilities will be able to identify and sort PLA, enabling both mechanical and chemical recycling on a broader scale.

### COMPOSTING

Floreon Bio-Tech is our compostable, high-performance PLA (polylactic acid) product, certified by 'OK Compost.' This certification guarantees that our bioplastic is fully biodegradable in industrial composting environments. Our dedicated R&D team is actively developing the next generation of Bio-Tech, with plans to introduce a home compostable grade soon, extending our commitment to sustainable and environmentally friendly solutions.

## Is LCA available for Floreon bioplastics?

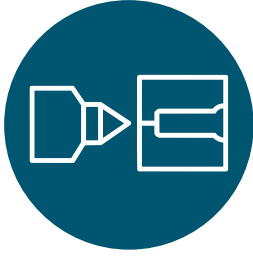
Floreon provides customised Life Cycle Assessments (LCA) for customers, specifically tailored to evaluate the environmental impact of their products.

This allows businesses to gain insight into the sustainability performance of Floreon bioplastics in their offerings and therefore make data-driven improvements.

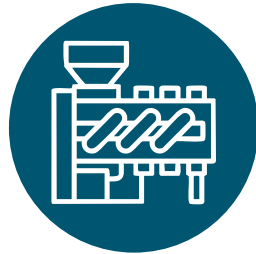


**In which processes can Floreon bioplastics be used**

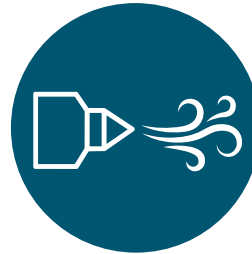
Floreon bioplastics are versatile and can be used in a wide range of processes.



**INJECTION  
MOULDING**



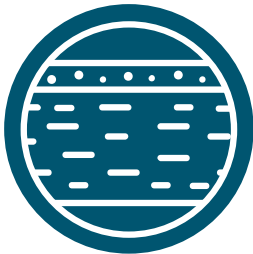
**SHEET & PROFILE  
EXTRUSION**



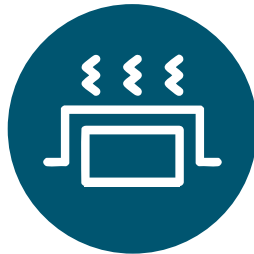
**BLOW  
MOULDING**



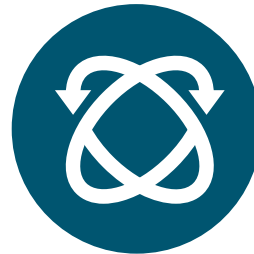
**FIBRES &  
FILMS**



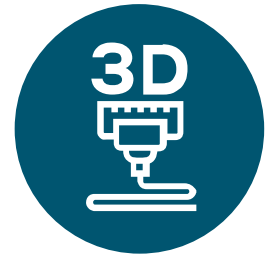
**FOAMING  
APPLICATIONS**



**THERMO/VACUUM  
FORMING**



**ROTATIONAL  
MOULDING**



**3D PRINTING**

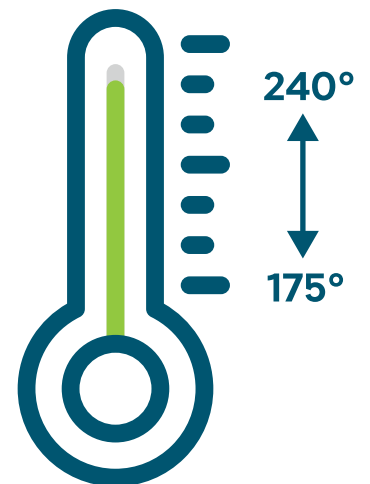
**Do Floreon bioplastics need to be pre-dried?**

For optimal results, we recommend drying Floreon bioplastics at 50°C before processing to ensure the moisture content is below 0.025% (250 ppm).

**What is the optimal processing temperature for Floreon bioplastics?**

The recommended melt temperature range for Floreon bioplastics is between 175°C and 240°C.

The mould temperature plays a critical role in determining the polymer's structure: an amorphous structure is achieved when moulding at 25°C, while a crystalline structure is attained at 95°C, with a holding time >60s. For more comprehensive information, a detailed processing guide is available. Additionally, Floreon's Application Engineer offers hands-on technical support during initial trials to ensure optimal performance of the bioplastic.



## Do Floreon bioplastics impact cycle times?

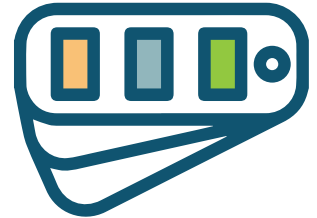
If a crystalline structure is required, a minimum holding time of 60 seconds is necessary. For all other processes, the cycle time remains unchanged.

## Can Floreon bioplastics be used in clear/transparent applications?

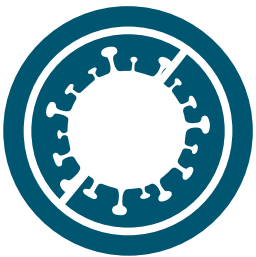
Floreon® Dura-Tech (substitute for ABS and PC-ABC) and Floreon® Bio-Tech (substitute for HIPS) would be translucent at low thickness's, however parts made from Floreon® Therma-Tech (halogen-free, UL94 V-0 rated flame retardant grade, substitute for FR ABS and FR PC-ABS) can only be opaque.

## Can Floreon bioplastics be coloured?

Floreon bioplastics can be custom colour-matched and are fully compatible with both universal and PLA-based colour masterbatches, providing flexibility in achieving precise colour requirements.



## Can other functional additives such as Antimicrobial, Antistatic or UV stabiliser be used with Floreon?



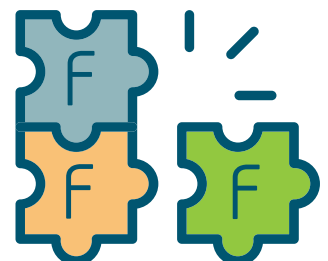
Functional additives, including antimicrobial agents, antistatic compounds, and UV stabilisers, can be integrated into Floreon bioplastics or introduced through a masterbatch. Floreon bioplastics are compatible with both universal carriers and PLA-based carriers.

## Can Floreon moulded parts / extruded sheets or films be printed or painted?

Floreon bioplastics exhibit low surface energy, making them highly suitable for the application of printing inks, coatings, and adhesives. This property ensures excellent adhesion and finish quality in various surface treatments.

## Can Floreon moulded parts be welded?

Yes, parts made with Floreon bioplastics can be solvent welded (for example, dichloromethane works well) or bonded by ultra-sonic welding.



## Is PLA suitable for durable, engineering applications?

Unlike typical PLA, which is commonly used for disposable items, Floreon's patented technology transforms PLA into a highly durable, impact-resistant material with exceptional strength. This advanced formulation makes it ideal for demanding applications in industries such as automotive, rail, marine, and aviation, where high-performance materials are critical. It also excels in producing electrical and electronic components, building and construction materials, toys, medical devices, sporting goods, and safety equipment, providing superior impact strength and long-lasting durability across a wide range of uses. Additionally, Floreon bioplastics offer excellent impact and scratch resistance, impressive dimensional stability, and an outstanding gloss and surface finish.



## To what temperature are Floreon bioplastics resistant?

In its crystalline form, Floreon bioplastics achieve a heat deflection temperature (HDT) of 90°C.

## Are Floreon bioplastics water resistant?

In its crystalline form, Floreon bioplastics exhibit excellent water resistance. However, in its amorphous phase—similar to traditional PLA—Floreon bioplastics are not inherently water-resistant. While the amorphous phase offers some moisture resistance, it remains biodegradable and can absorb water over time, particularly in humid environments. Prolonged exposure to water or high humidity can cause the material to weaken, swell, or warp.



## Are Floreon bioplastics resistant to chemicals and/or cleaning products?

Compared to standard PLA, Floreon bioplastics offer improved resistance to chemicals and cleaning products. However, we recommend verifying compatibility with specific ingredients to ensure optimal performance.

## Are Floreon bioplastics UV stable?

To achieve optimal UV stability, it's advisable to use a UV stabiliser package. Please reach out to the Floreon technical team to discuss your specific requirements, so they can recommend the appropriate UV additives for your needs.

## Is there enough PLA capacity around the world to meet demand?



Yes, there is a promising outlook for PLA capacity to meet global demand. By 2024, production capacity is expected to reach about 400,000 tons per year, with new plants being established in Thailand, France, India, and the UAE, adding an additional 250,000 tons per year. This expansion positions the industry well to satisfy increasing demand for PLA worldwide.

## What is Floreon's production capacity?

Floreon collaborates with toll compounders globally, allowing production to be localised to meet demand. This approach minimises transportation and helps maintain a low carbon footprint for our materials. Consequently, Floreon's business model enables us to be highly agile and responsive, with virtually unlimited production capacity to meet all emerging demands.



## How much more expensive are Floreon bioplastics compared to fossil-based counterparts?

Floreon bioplastics currently have a higher cost compared to fossil-based alternatives, though the price gap is significantly narrower when compared to recycled polymers rather than virgin ones. This cost difference is primarily attributed to higher raw material expenses and smaller-scale production. As the demand for Floreon bioplastics continues to grow and more clients make the switch, we expect to benefit from economies of scale. Increased production volumes will not only help reduce costs but also enhance our ability to offer competitive pricing in the marketplace.

## Can Floreon be tailored to my specific needs?

Absolutely! Floreon has a dedicated R&D and innovation team with over 12 years of experience in enhancing PLA performance, along with extensive expertise in bio-based materials and polymer processing. If you have specific performance requirements, we would be delighted to discuss the possibility of developing a customised grade tailored to your needs.

