

# Optimize your Plastic Products



## **Streamline Your Production**

- Ongoing and Upcoming



## **Reduce your Carbon Footprint**

- Material, Energy and Transport



## **Design for Recycling**

- Repair, Re-use and Sort

## Who are You?

We imagine that you, the reader of this text, are someone involved in working with plastic products in your business in one way or another. Perhaps you are a product owner, product developer, designer, range manager, project manager, or someone handling procurement and orders. You could also be a student looking to deepen your knowledge of sustainable product development. We are addressing you because you share our ambition to create sustainable, high-quality products that contribute to a circular and more environmentally friendly future.

## What do You gain by contacting us?

If you have a product or product idea that you want to improve in terms of production cost, carbon footprint, and/or recyclability, there's a lot to gain by reaching out to us at Ingenjörbyrå Forma. The scope of potential improvement we identify in your product or idea will naturally vary, but we are completely transparent and open about our findings and recommendations. With the results in hand, it's entirely up to you whether you choose to make any changes and, if so, how. Perhaps your company already has the expertise needed to implement one or more of our improvement suggestions. If not, we're here to help.

## What is re:velop?

At Ingenjörbyrå Forma, we have developed a method to help companies that design plastic products optimize their products and reduce their carbon footprints. We call the method re:velop – a play with words that emphasizes the idea of taking a step back to re-develop, evaluate, and fine-tune the process in order to achieve valuable improvements for both the customer and the environment. Depending on where you are in the process and the type of product you have, the method may vary from case to case to deliver the best possible results.

## How does it Work?



*A Forma team has disassembled a consumer product and is analyzing its components from a design and sustainability perspective.*

To start this process, we'll need a physical product, model, sketch, and/or 3D drawing from you. Simply provide us with whatever you have at the stage you're currently at in the development process. It could be an existing product you're planning to update, a prototype in an ongoing project, or even a product already on the market that you're curious about improving for your next project. Once we have your materials, we'll assemble a creative team of 3-4 people at Forma who will analyze and reflect on your product from several perspectives, such as design, construction, cost-efficiency, sustainability, tooling optimization, recyclability, and more. The goal is to identify possible improvements that can benefit both you and the environment in the best possible way.

### Examples of Questions we will try to answer:

- Can the product design be optimized in terms of potential parting lines, surface quality, and functionality?
- Can the product's construction be improved, thus simplifying tool complexity, optimizing the placement of fasteners, material selection, etc.?
- Can the product be made more sustainable by, for example, reducing the number of parts, reconfiguring how parts are joined, extending the product's lifespan, and/or making it more suitable for recycling?
- Can manufacturing costs be reduced by simplifying tool design, lowering energy consumption, or shortening cycle times?

## What happens Next?

Well, that's completely up to you! If you feel that our input is sufficient, you'll leave our office with a wealth of valuable insights for your continued product development. If you'd like more help or support from us, we'd be happy to schedule another meeting. Perhaps this will mark the beginning of an exciting new collaboration! In any case, we hope that we have contributed to a higher awareness and understanding of how we can all reduce our environmental impact within the plastic industry.

## Sustainability = Expensive?

On the cover, we've stated that we can help you and your company reduce costs while also lowering the carbon footprint of your products. But is that really possible? Many people would say that opting for more sustainable alternatives automatically means a higher price tag. The reality, however, is more nuanced. It's true that recycled plastics can sometimes be more expensive than virgin plastics when comparing the same type, such as pure PP versus recycled PP. But when we analyze your specific case, there are often opportunities to rethink the approach. In some cases, for example, we might suggest switching plastic types and combining it with natural fiber reinforcement to achieve comparable properties - while also improving the sustainability profile.



*One of the several ways to reduce the CO2 footprint of a product is to use a biocomposite. Here, you can see a granulate made of PP (polypropylene) and wood fibers.*

There are often significant opportunities to reduce plastic usage by optimizing material thickness, eliminating unnecessary material, or introducing gas bubbles into the material. This not only reduces material consumption but can also shorten cycle times. A lighter end product also lowers other costs, such as shipping expenses.

Another key area where costs and environmental impact can be optimized is in design and construction. Through smarter solutions, it's possible to reduce size and complexity of the tools that are cheaper to manufacture and easier to handle. Additionally, a smaller tool can be used in a smaller injection molding machine with lower clamping force, reducing energy consumption.

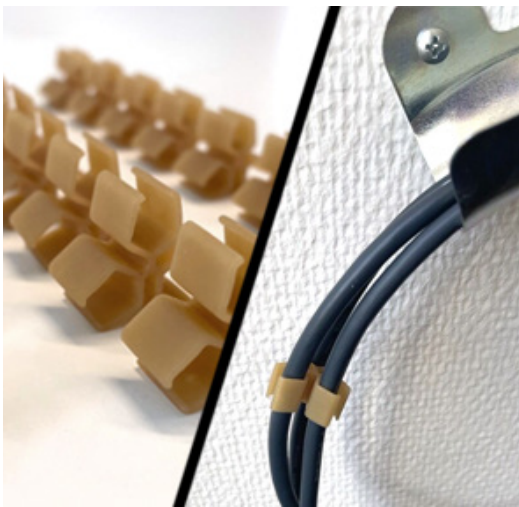
In some cases, it may instead be more efficient to replace several smaller tools with a single larger one, saving both time and resources.

The key is to look at the big picture and evaluate each case individually. Generally, wherever there's time and energy to save, there's money to save as well.

## Some examples

### Streamline your Production

There are several ways to reduce production costs. A significant portion of the cost is often related to the tooling itself. By exploring the possibility of reducing the size of the tool and/or simplifying its design, production costs can be lowered. Often, the product consists of multiple different parts, and it might be possible to reduce the number of parts if the design and construction are optimized, which in turn reduces the number of tools required. Other important factors for cost reduction include energy consumption and cycle time. With our re:velop method, we examine the opportunities to reduce energy usage, such as by decreasing the number of welds and/or optimizing flow paths. These types of optimizations, along with material reduction and temperature adjustments, can lead to shorter cycle times, which over time result in lower production costs.



*Our own product, CordFIX. Above made from a biocomposite with wood fibers, which reduced the product's CO2 footprint by about 50% without affecting its functionality.*

### Lower CO2-emissions

By reducing energy consumption, lowering the machine pressure, and/or minimizing material usage, we already make significant sustainability gains. However, there are many more areas to optimize in order to benefit our planet, such as considering the use of alternative materials, recycled materials, or bioplastics. An example of this is when we changed material in our own product, CordFIX, using a PP-based biocomposite with 20% wood fiber. The original material was pure ABS, and we found that only by changing the material, we could reduce the product's CO2 footprint by approximately 50%.

Further ways to make a product more sustainable include optimizing design and construction - not only to reduce material consumption but also to extend the product's lifespan, resulting in a more durable end product.

Another important aspect when discussing sustainability is reviewing transportation routes and intermediaries. Today, many plastic products are produced in Asia, for example. If you or your company are interested in exploring the possibility of producing your product closer to your market, we are happy to help. We have a network of Swedish contacts in plastic manufacturing that we can connect you with to make production more local and sustainable.

### Design for Repairability and Recycling

It is increasingly important to consider what will happen to the product when it is discarded and should be recycled, and to have this in mind already at the early stages of the design process. To facilitate the sorting and recycling of plastics, it's advisable to avoid using adhesives, coatings, and films made from materials other than the primary plastic. Adhesives and thermosetting plastics are generally not preferred from an environmental perspective. For the same reason, it's important to avoid welding different types of plastics together and aim to use as pure plastics as possible, meaning avoiding mixtures of different plastics and excessive additives.

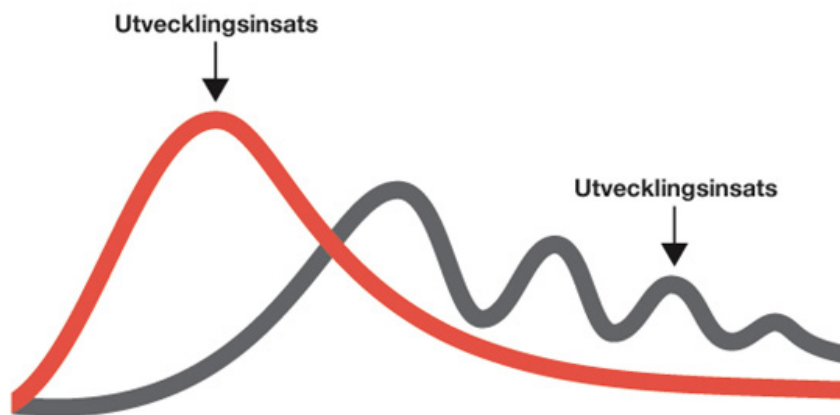
Regarding the design itself, it is crucial to keep in mind from the outset that products should be designed with repairability in mind. And if possible, to be able to replace the parts that are most prone to wear or breakage, instead of discarding the entire product.

## Who are Forma?

Ingenjörbyrå Forma was founded in 1999 and today consists of over 30 creative problem solvers specializing in plastic product development. The majority are engineers, but our team also includes experienced project managers, designers, and tooling experts. With over 30 years of experience in plastic design, we can confidently say that we know what we're doing and that we deliver what we promise. Simply put, we have the expertise and capacity to provide sustainable solutions and meet the demands of our clients and suppliers. Our long and diverse experience gives us a unique holistic approach throughout the entire development process, resulting in the right quality for the intended environment. We offer knowledge across all stages of the product development process, from idea and concept to a finished product on the store shelf that meets both quality standards and sustainability goals.

## The Forma Way

By handpicking the right competencies early in each project, we can develop and deliver well-thought-out and optimal solutions for every assignment. We identify problems and find solutions early in the process, thus saving both time and money for our clients. Our greatest strength lies in leveraging each other's unique experience and expertise, allowing us to avoid many common pitfalls and mistakes. By focusing on the right things in the right order, we can proudly stand by what we confidently call "The Forma Way" – that is, we get it right from the start.



## Challenge us!

At Ingenjörbyrå Forma, we face the industry's high demands for design and development on a daily basis. We love challenges, innovative solutions, and have broad knowledge and extensive experience in the field. One of our key business goals is to continuously strive for better and more circular solutions, and we are constantly educating ourselves and staying updated on new sustainable alternatives. We have the most fun when we're presented with a complex challenge that lets us brainstorm together. Perhaps you're in the idea phase of a new product and would like our input on sustainability at an early stage? Or maybe there are other aspects within sustainable plastic product development that you need assistance with? Thinking outside the box, staying constantly curious about new solutions and materials, and sharing great ideas is what keeps our work exciting every day.

# Contact

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