

CUSTOMIZED POLYMER MATERIALS

Engineered
for Bike
Components

High-quality, functional bicycle accessories - sustainable and with social benefits!

A cooperation between FESCHD, ARBURG, Scherdel Wiesauplast, Scherdel Group, PGT, Ejot and the LEHVOSS Group

Today, smartphones have taken a firm place in our everyday lives as electronic companions. At any time we are able to communicate, retrieve information, and listen to music. Various apps allow countless additional functions, including the tracking of movement data, navigation or the display and recording of performance data during sports. When cycling, the smartphone acts as a sophisticated, universal bike computer. A non-trivial challenge, however, is a secure and reliable mounting of the device on the handlebars. The electronic helper should not get lost or damaged on a walk through the forest or when riding a demanding single trail on a mountain bike.

The young company FESCHD has set itself the goal of developing a multifunctional holder that integrates a whole range of functions. In addition, the declared goal from the outset was to make the product as sustainable as possible, i.e. to leave the smallest possible carbon footprint. The special thing about this project is the social commitment. Part of the proceeds from the sale of the smartphone holders are used to finance bicycles in developing regions. To make this possible, FESCHD works together with the World Bicycle Relief Organization. More information at www.feschd.com/mission.

A consortium was established for the implementation of the product, consisting of the companies ARBURG, Ejot, SCHERDEL Wiesauplast, SCHERDEL Group, PGT, LEHVOSS Group and of course FESCHD.

The project – Anyone can do it easily (in plastic).

As is usual in complex projects, it took a lot of discussions, explanations, changes and adjustments before a final design could be released and the first simulations could be carried out.

A particular development challenge lay in the design specification that full spare parts and recyclability had to be provided. What sounds simple is quite challenging to implement. Considering that today it is common to weld and glue to create high-strength connections. Molded or embedded thread inserts were therefore out of the question. The holder must be able to be dismantled into its individual parts! Another design requirement: to make the assembly on the bike as fault-tolerant as possible and to produce a durable and robust article.

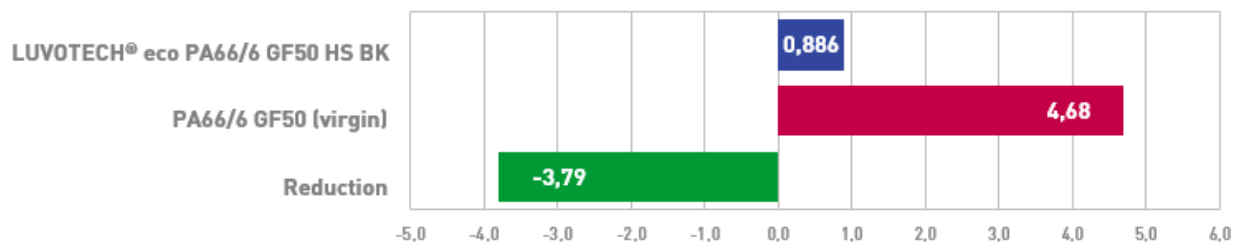


FESCHD Smartphone mount

Sustainability and high-quality technical materials - can that be reconciled?

What initially seems contradictory, namely the manufacture of high-quality technical articles based on recycled plastics, is nevertheless feasible. The implementation of a technical article always requires the coordinated effort of all those involved, with the contribution of all competencies. Resource conservation is practiced over the long useful life of an article, which generally depends on the quality and durability of the individual components and materials. If materials with a low carbon (CO₂) footprint are also used, this has a significant effect on the overall CO₂ balance.

The functional components of the FESCHD smartphone holder are made from the LEHVOSS recycling material LUVOTECH eco PA66/6-GF50-HS-BK. Compared to new material, this material is characterized by a significantly lower CO₂ equivalent. All connecting elements are made of stainless steel, so that the life of the mobile phone holder is not prematurely ended by corroded components. In addition, all parts can be exchanged, replaced and returned to a technical or natural cycle.



Carbon footprint in kg CO₂-eq. of LUVOTECH eco PA66/6-GF50-HS-BK compared to virgin material

To ensure that parts are produced with as little material as possible, the main component - the holder - is supplied with melt during injection molding via a hot runner system from the system specialist PGT. Since a stepped level is required in the mold and injection has to be carried out on the visible side of the part, the hot runner valve gate nozzle is connected via a short distributor bar. The control or regulation of the hot runner takes place via the OPC UA interface integrated in the injection molding machine.

A magnet is also used in the holder. A reliable hold and protection against loosening caused by vibration are required here. A plastic-compatible screw connection with an Ejot DELTA PT screw was provided for this. An additional loosening safeguard can be omitted. Preliminary investigations have clearly shown that the LUVOTECH eco PA used can be screwed with identical parameters compared to virgin material. Screwing, overturning and tightening torques are on the same level.

Idea - construction - prototype - serial part

Translating a good idea into a production-ready series item is a lengthy process. Many design hours had to be invested before the demonstration and functional models could be produced. The first usable constructions allowed structural simulations, which served as the basis for the necessary mechanical optimizations. This was followed by detailing, in which the design optimization and the best possible plastic-compatible design were implemented. The result is a design stand that meets the visual requirements, is constructed and manufactured with quality in mind that can be assembled and completed as a highly developed holder.

To fully test such an article, prototypes are still required. These were manufactured (resource-saving) using the laser sintering process. LUVOSINT PA12 was used for this, which is characterized by particularly high toughness and good strength at the same time. The components manufactured in this way were

tested in tough everyday operation in wind and weather and in various climate zones. The user feedback was implemented in design and material adjustments until a technical status for tool creation could be released.

Through the clever combination of different materials and components, a product could be realized that withstands the highest demands and also works safely when mountain biking, for example. The smartphone is securely fixed to the holder thanks to the tricky locking mechanism using a metal bracket. Here, the forming specialist SCHERDEL supplies what appears to be a simple bent wire part, which, however, has to be manufactured very precisely in order to guarantee a secure hold.



Mounted holder and adapter plate with metal bracket glued to the protective cover. Both components with integrated magnets.

Success factors

- The great competence of all project participants
- Clear communication and joint coordination throughout the project process
- Fixed schedules and a clear commitment to meeting deadlines
- Sophisticated part designs for tool release
- Detailed throughput planning in toolmaking and comprehensive tool design
- Successful prototyping and testing for constructive optimization
- Systematic testing of all functionalities on the holder in real operation

Overall ecological consideration

As already described, a LUVOTECH eco polyamide is used as the base material. All joining elements are made of corrosion-resistant materials that ensure the longest possible service life. The consideration of the entire CO₂ balance, even if this cannot yet be fully quantified here, does not end with the article! FESCHD attaches great importance to the fact that the packaging materials also come from sustainable sources. Colored or varnished cardboard was deliberately avoided. Instead, only recycled cardboard is used. It conveys the brand message in a simple design.

As far as possible, all materials and purchased parts are obtained from local sources in order to keep transport routes as short as possible (local for local). Rather unusual for such components, the production takes place in Germany and not in Asia, this also helps to keep the transport routes as short as possible for the main sales market EU. In an end-of-life analysis, all elements were evaluated and it was found that almost the entire assembly and the accessories can be returned to the material cycle. First of all, the

smartphone holder should give the user pleasure for as long as possible and securely fastened to the bicycle handlebars should keep the smartphone firmly (FESCHD) under control.

Manufacturing demonstration at the K 2022 LEHVOSS booth

It only took a few words to convince the decision-makers at ARBURG of the component and the idea of a production demonstration on an ARBURG machine at the trade fair stand. On the one hand, since it is a sophisticated article, the series production of an article using a recycled material can be demonstrated with direct control of the hot runner. In addition, production takes place on an all-electric and therefore energy-efficient ALLROUNDER 270 A.

FESCHD about its product:

With the patented FESCHD system, the smartphone can be quickly and securely attached to the bike. This makes it a versatile bike computer and allows you to navigate, track fitness data, listen to music and much more. Whether on a mountain bike, racing bike, e-bike or city bike - you take your bike ride to the next level and at the same time enable others to ride a bike.

Secure:

Thanks to the mechanical locking of the integrated stainless steel bracket, your smartphone is rock-solid even in the event of major shocks. So you drive worry-free over the wildest terrain, cobblestones and single trails.

Easy and fast:

Thanks to the magnetic lock, your smartphone can be attached with a single movement and removed just as quickly to take a closer look at the route or to take a quick photo.

Always in view:

Due to the aerodynamic attachment in the middle, in front of the handlebars, you always have a good view of your display without losing sight of the road. In addition, your smartphone can be rotated by 90° and used in landscape format. Your entire display, all buttons and plugs remain freely accessible.

Versatile in everyday life:

The 2.5 mm thin adapter plate makes your smartphone a better tool for everyday use. With the hinged finger ring you always have it FESCHD under control or you can use it as a stand. The strong neodymium magnet allows it to be attached to any magnetic surface and to standard mounts in the car, on the wall or on the desk.

Social, local, sustainable:

We believe the bike can move a lot! Therefore, with 50 FESCHD smartphone holders sold, we finance 1 bicycle for people in developing countries. We also want to act as sustainably as possible and therefore manufacture our holder from recycled plastic. From production to assembly to shipping, we do everything on site in Germany.

More about purchase, accessories and spare parts in the FESCHD web shop: www.fesch.com/shop

The project team

FESCHD enables the smartphone to be attached to the bike quickly and securely and at the same time offers smart functions for everyday use. We produce sustainably, locally and use the proceeds to finance bicycles for people in developing regions. www.feschd.com

ARBURG is one of the world's leading machine manufacturers for plastics processing. The product portfolio includes ALLROUNDER injection molding machines with clamping forces between 125 and 6,500 kN, freeformers for industrial additive manufacturing and robotic systems, customer and industry-specific turnkey solutions and other peripherals. www.arburg.com

For almost 60 years, the name **SCHERDELWiesauplast** has stood for experience, competence and innovation in the field of plastics technology. During this time, the company has developed into an internationally renowned system supplier for leading key industries for complex technical components and systems made of plastic. The service portfolio ranges from development and mold making through series production to finishing and complete device construction - and all of this at the highest level of quality. www.wiesauplast.de

As a fast-growing and innovative family company, the **SCHERDEL Group** has specialized in the development and manufacture of technically sophisticated wire, tube and strip forming products. The breadth of the product range is exceptional: in addition to the traditional core area of technical springs, SCHERDEL manufactures stamped and stamped-bent parts, media-carrying lines, ball joints, welded assemblies, assembly groups, electromechanical assemblies or metal-plastic connections. The market portfolio is supplemented with its own machine, plant and tool construction, which also supports the permanent improvement of its own manufacturing processes in series production. www.scherdel.com

PGT Thermprocesstechnik GmbH is a partner in the design, calculation and simulation, as well as the manufacture and commissioning of process-stable hot runner solutions. In the target market of the activities there are many applications with technical plastics and part applications that place high demands on the entire injection molding series process due to particularly stable processes. PGT ensures this through its own solution-oriented developments in the hot runner area, the monitoring sensors and the measurement and control technology. All components are matched to each other and are the first choice when standard systems reach their limits due to increased requirements. In the technical center at PGT in Troisdorf, there are also a wide range of examination options available. Samples can also be realized there. www.pgt-gmbh.com

EJOT is a medium-sized group of companies and a specialist in connection and forming technology. In the Industrial Division, EJOT offers a wide range of innovative fasteners, in particular self-tapping screws for metals and plastics, multifunctional cold-formed parts, individual metal-plastic assemblies, technical plastic parts and complete fastening solutions. In partnership with our customers, we develop individual solutions for their joining applications. The aim is to ensure outstanding quality of the connection through the use of intelligent products. www.ejot.de

The LEHVOSS Group under the management of Lehmann&Voss&Co. is a chemical group of companies that develops, produces and markets chemical and mineral specialties for various customer industries. Lehmann&Voss&Co., Hamburg, was founded in 1894 as a trading house. In its approximately 125-year success story, the owner-managed company has developed into a powerful global organization - with long-standing connections to well-known suppliers and with its own production sites in Europe, the USA and Asia. www.lehvoss.de

The Customized Polymer Materials business unit is a partner to industry when it comes to material selection, development and production, application-related advice and support, from design to production. The materials with precisely defined properties are based on almost all available thermoplastics and are tailored to individual customer and application requirements. www.luvocom.de

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Our material competences



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