

BIONTEC

BIONIC COMPOSITE TECHNOLOGIES



Composite serial production in a **new dimension**

MPT - Multi Parallel Technology®

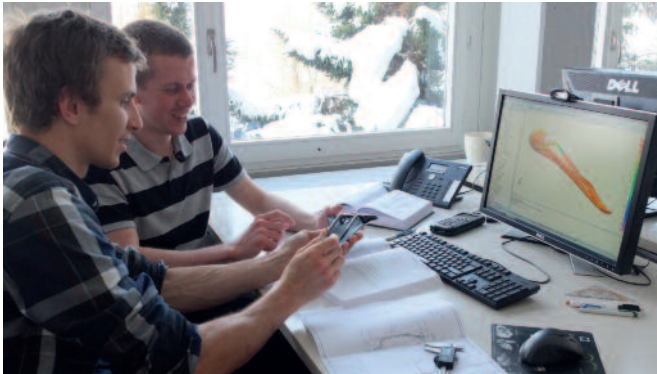
Serial Production of High Performance Composite Components



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Company Profile

BIONTEC combines the expertise in composites and process engineering with more than 100 years of tradition in textile manufacturing. Due to innovative, industrialized production technologies and experienced engineers, BIONTEC offers high quality composite components with outstanding reproducible performance especially for medium and large series.



Development

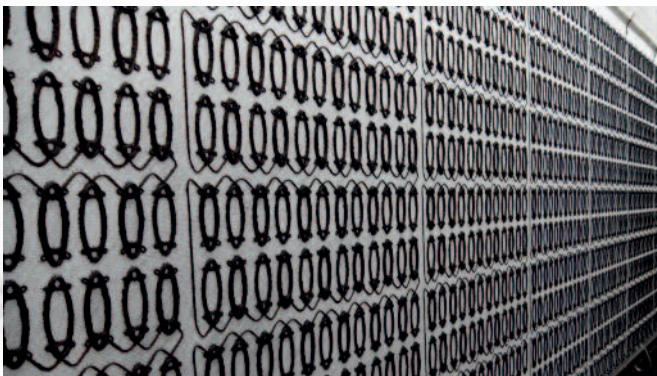
BIONTEC provides the complete development for your product. Using the latest CAD and FEM software we tailor the exact properties already in an early development phase. The close and direct cooperation between customer, engineering and production results in an efficient development from the first draft till introduction into serial production.



Industrialized composite production

In our Europe based production, the dry fibre preforms are net-shape produced by our patented Multi Parallel Technology® and processed by resin transfer moulding (RTM). Our equipment and tools are specifically developed to allow a high level of automation. Therefore, we are able to influence and control every step of the production with the ultimate goal to satisfy all your high quality expectations – even for several thousand pieces a year.

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Bionic fibre placement

Bionic fibre placement based on load transmissions is the technological base of our success in producing high performance composite components and has its roots in nature copying the growth of plants. It allows us to design local reinforcements in critical areas and to save fibres in less critical areas – no wastage, just as in nature.

- Large variety of fibres can be processed. From high tenacity (HT) to ultra high modulus (UHM) carbon fibres and also glass, aramid and natural fibres
- Nearly unlimited choice of fibre orientation
- Computer controlled processes and very high reproducibility
- Economical efficiency due to parallel placement of multiple preforms



Brake Lever and Clamp

The manufacturing approach of BIONTEC is especially optimized for a weekly serial production of up to 1,200 pieces. Brake levers have to work reliably under any circumstances and BIONTEC offers the appropriate technology to face this challenge: High quality in serial production at a very competitive price.



- Load path oriented fibre architecture to obtain the best mechanical performance
- Design-to-manufacture concept feasible for large series leads to an economical advantage over traditional manufacturing methods
- Already the 3rd generation of brake levers in production. Each revision allowed further improvement regarding mechanical performance and economy.
- Creep optimized design of the handlebar clamp
- The clamp saves 40 % of weight compared to the aluminum version without compromising on functionality.



Precise fibre placement – maximum performance

Placing the fibres precisely and considering even the smallest details are the key advantages of our Multi Parallel Technology®. In case of the clamp, even small boreholes are already considered in the fibrous preform. Therefore, no additional machining is needed and no fibres are cut, which results in a part with best mechanical properties.



Serial production

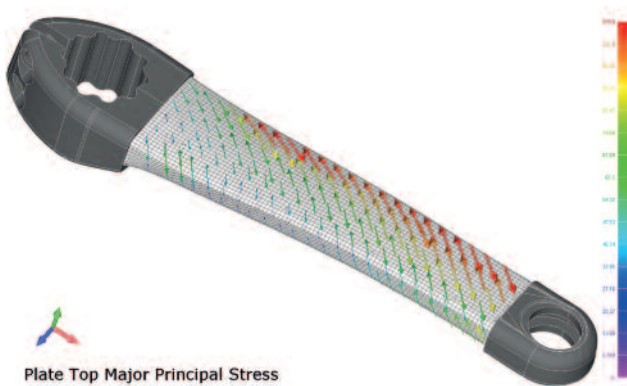
Serial production of composite components is our daily business. The use of computer controlled machines reduces manual work and increases efficiency and precision. In the history of BIONTEC, more than 100,000 brake levers were produced and no mechanical failure was reported. This confirms the quality of our serial production approach of composite components.

Bicycle Crank

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Our definition of lightweight design is the lightest possible construction without any compromise on stiffness and strength. The use of high modulus fibres, a layup optimized for stiffness and strength as well as interfaces already integrated into the preforms lead to a bicycle crank with an exceptional stiffness to weight ratio.



- Optimized design to obtain the best combination of lightweight design, stiffness and strength
- Fibres oriented according to load paths based on finite element analysis
- 40 % weight saving compared to the aluminium version without any reduction of stiffness
- The use of high modulus (HM) carbon fibres leads to a bicycle crank with an exceptional stiffness to weight ratio
- Process integrated metal inserts do not require another assembly step



Complex preforming to enhance performance

The durability of composite lightweight structures highly depends on the quality of force transmission points. BIONTEC considered this fact by integrating the complex shape of the interfaces already in the preforms. Therefore, all interfaces are produced net shape out of the mould. No subsequent machining is needed and no fibres are cut, which results in a maximum mechanical performance.



Brilliant out of the mould surface finish

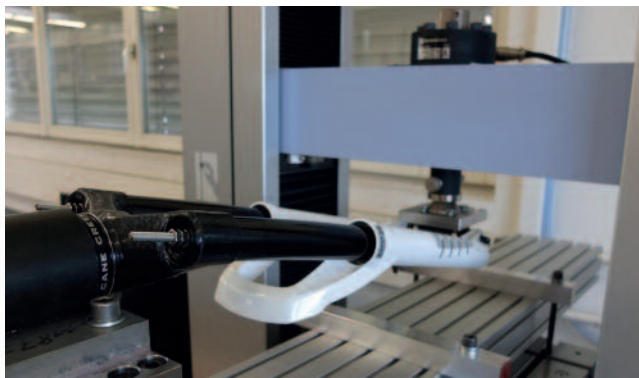
Our process allows an out of the mould surface finish which does not require an additional coating. The absence of a coating does therefore not add additional weight to the product and this is our commitment to lightweight design. Needless to say that also economical aspects benefit from this circumstance.

Crown/Steerer Unit for the Lightest Suspension Fork

Safety and lightweight design do not need to be a contradiction. Already in an early development phase a fail safe design was realized and combined with a damage tolerant fibre layup. Together with very reproducible process conditions, the upper unit demonstrates that our Multi Parallel Technology® is suited to meet requirements regarding lightweight construction and safety aspects.

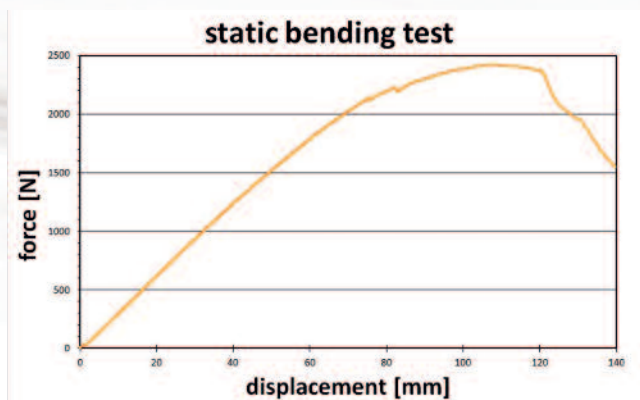


- 2-piece fail safe design to avoid separation of steerer and crown under any circumstances
- Foam core improves precise placement of the fibres during preforming and supports the mechanical integrity
- Specific fibre and matrix selection for a superior fracture toughness and impact resistance
- Damage tolerant fibre layup and computer controlled fibre placement for maximum consistency
- Higher stiffness and strength compared to the 55 % heavier standard aluminum upper unit



Mechanical testing

Verification of the mechanical performance by mechanical tests were a key stage during the development. Based on careful analysis of the result, the upper unit was further improved until satisfying even the highest expectations. The validity of the test results were also confirmed by external specialized laboratories.



High damage tolerance

In case of a crash, exceptional high peak loads can potentially damage the crown/steerer unit. To avoid any danger for the user, particular attention was paid to obtain the highest possible damage tolerance. A resin-fibre combination optimized for toughness and a damage tolerant fibre layup prevent catastrophic failure. The preferable "ductile-like" behaviour is very similar to what is known from metals. Even in the presence of visible cracks, the upper unit can still bear high loads.

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Complex challenges – we will meet your requirements

Skills

- Design and industrialized production of net shaped, load optimized carbon fibre preforms
- Reproducible and efficient consolidation into high quality composite parts

Location

- Head office in St. Gallen, Switzerland
- Less than one hour by car or train from Zurich airport

Company

Thanks to an innovative and industrialized production process Bionic Composite Technologies supplies composite components with high reproducibility and outstanding performance for medium and large series. Our technology allows new approaches of composite components mainly in industries such as sport and leisure, automotive, mechanical engineering, medical and measurement industries. We develop the ideal fibre architecture and the needed net shape textile preforms are produced by an automated production process. These preforms are processed by resin transfer moulding (RTM) to finally become custom-made components according to detailed specifications.



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