Beyond Today's Horizons

The latest products from the designfabrik presented at the K2010 include the "Join" cutlery combination set by ding3000 and Konstantin Slawinski: It is both a utility object and an entertainment object in one that is made from a polyamide specially optimized for contact with food (photos: BASF)

Industrial Design Projects. With the "designfabrik", BASF has an advisory center that makes specialized know-how about its plastics available to industrial designers and engineers. Design products are thus developed together. The support provided ranges from the choice of suitable materials and production methods, through plastics-oriented design right up to topics such as styling, color, surface and function.

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Engineering plastics, as the name implies, are something of technicians and engineers. This prejudice would appear to have created a divide between the engineer who is responsible for the function and manufacturability of technically complex parts, and the industrial designer who is "only" bothered with the outer form and aesthetic appearance of products. It is true that engineering plastics such as polyamide (PA) or polybutylene terephthalate (PBT) are widely used in the automotive and electrical engineering industries. That is due to their outstanding chemical and mechanical properties. But since BASF opened the designfabrik in 2006 as an advisory center with plastics experts specially for industrial designers and in the meantime has expanded the center, the view has changed. Segments of industry beyond the automotive and electronics applications are now coming more into focus. Household products, construction and furniture, but also medical technology, sport and leisure are fields of application with a great potential.

Joining Creative Ideas and Plastics Know-how

Design is often very much a question for debate. Not only as far as taste is concerned. Industrial designers and engineers can easily talk at cross-purposes here, because in the German-speaking world the word 'design' is more linked to the form and the overall appearance, while in English the term '(to) design' goes further and also covers the technical implementation, or the construction. Designers and engineers therefore work between these two poles, and hence so do the activities at the BASF designfabrik – it is open as a platform to all the company's customers who as freelance or employed designers need support in working with BASF materials **(Fig. 1)**. The earlier the cooperation between designer and technical development engineer starts, the faster the new product can be launched onto the market. The number of time-intensive and costly optimization loops drops if the designer understands the plastic better, and the engineer the design concept, so that the creative input is

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Fig. 1. Good design aids differentiation from the competition, which is why many manufacturers are increasingly concentrating on the design of their products: The BASF designfabrik is open as a service platform to all the company's customers who as freelance or employed designers need support in working with BASF materials

faced with the technical feasibility from a very early stage. The BASF designers speak the language of the designer in the customer's company and can interpret his expectations.

The support by BASF can extend here from the first good idea right through to the series production process. BASF can also perform this "bridge function" within companies in order to advise the designers and engineers there together, for example in companies wanting to go further into the field of design orientation. Interdisciplinary workshops are also possible in order to soften the borders of the different faculties. At the end of the process are products that distinguish themselves from similar products of equal performance capability on the market in particular through their better design.

Products from the designfabrik

The first more widely known project from the designfabrik was the development of the "Myto" chair, the first plastic cantilever chair since the legendary "Panton" chair, together with Konstantin Grcic **(Fig. 2)**. Here it was already possible to successfully combine the engineer's know-how of plastics processing with the designer's concept. The particularly free-flowing plastic, Ultradur High Speed, and the processing know-how available at BASF helped Grcic develop precisely the object that he had in mind, both from the point of view of design, but also from the point of view of performance and manufacturability. Today the chair produced by the Italian company Plank can be found i. a. in the collection at the Museum of Modern Art (MoMa) in New York.

The series of chair projects also includes the very differently created "Vegetal" designed by the French designers, Ronan und Erwan Bouroullec, for Vitra and which is reminiscent of a treetop with its multitude of branches **(Fig. 3)**. Apart from the near-nature design, the focus here was on the manufacturability using the gas injection technology (GIT) which resulted in a particularly lightweight chair thanks to its partially hollow construction. For this a plastic first had to be found that could be effectively processed using GIT. The experts from BASF Leuna were able to offer a polyamide (grade: Ultramid) here that satisfied the demands of design and injection molding. And finally the designfabrik cooperations led also to the development of the "Fritz" hybrid seat. Here →

Fig. 2. The "Myto" all-plastic cantilever chair by Konstantin Grcic from 2007 is the first project to achieve international renown in which the BASF designfabrik played a major role: The elegant structure of the chair was achieved using a PBT with improved flow properties and the Ultrasim simulation tool

Fig. 3. The Bouroullec brothers designed the "Vegetal" chair for Vitra that is based on a very natural design reminiscent of the branches of trees: The very lightweight chair is made from a polyamide grade that is particularly suitable for the gas injection technology

Fig. 4. One of the most interesting concepts from the project that BASF carried out together with the Royal College of Arts (RCA) in London in 2009 is the folding plug of PBT by the Korean young designer, Min-Kyu Choi

the young designer was able to utilize the good sliding friction and flexural fatigue strength of the BASF plastic Ultraform (POM) for a multifunctional seat: The chair with variable seat height can be transformed within moments into a bar stool. Franz Göttler received an IF concept award 2010 for this development.

At the beginning of 2009, the designfabrik embarked on a further project together with the renowned Royal College of Art (RCA) in London. The very versatile plastic Ultradur (PBT) was intended to give the students and lecturers inspiration for new design ideas. After several weeks of intensive work, surprising concepts and prototypes evolved, including a high-performance table lamp with visible gas springs, a color-coded modular cable plug system and an induction clothes iron. Particularly outstanding was the folding plug developed by the Korean design student, Min-Kyu Choi, who presented a slim, foldable version of the large and heavy British 3-pin plug of Ultradur which received the coveted Brit Insurance Design of the Year Award in 2010 **(Fig. 4)**.

Fig. 5. White has become a trend color in the field of household and entertainment electronics: But white is not just white, a fact evidenced by the more than 1,700 white shades available at the designfabrik

But the designfabrik supports its customers not only in the design engineering sector: Developed originally from the historic color laboratory at BASF, the designfabrik today also has profound color expertise: The Colorthek contains 20,000 specimen plates that in combination with various surface textures from gloss through matt to ribbed lead to a very wide range of different color impressions to excite not only automobile interior specialists. These include more than 1,700 white shades that have developed as a reaction to the trend in white goods and in the entertainment electronics sector in recent years **(Fig. 5)**.

The two latest projects that were presented to the plastics public for the first time at the K 2010 are the "Join" cutlery combination set by ding3000 and Konstantin Slawinski made from the polyamide Ultramid A3EG6 FC approved specially for food applications **(Title photo)** and the new "uni_verso" chair of Ultradur. In both cases the CAE know-how available at BASF contributed to the rapid development of the products. The technical demands for the new "2000_uni_verso" special-purpose chair from Kusch+Co, in particular, were very high. The plastic seat shell of the chair that is intended for the public sector, for example in hospitals, canteens, airports and event centers has to be sturdy, easy to manufacture, simple to clean and must also have flame retardant properties **(Fig. 6)**. Ultradur B4406 G2 proved ideal here: Through the detailed examination of its properties and the use of BASF's Ultrasim computer simulation package it was possible to exactly predict the part properties and to plan the seat shell perfectly for production together with the designers.

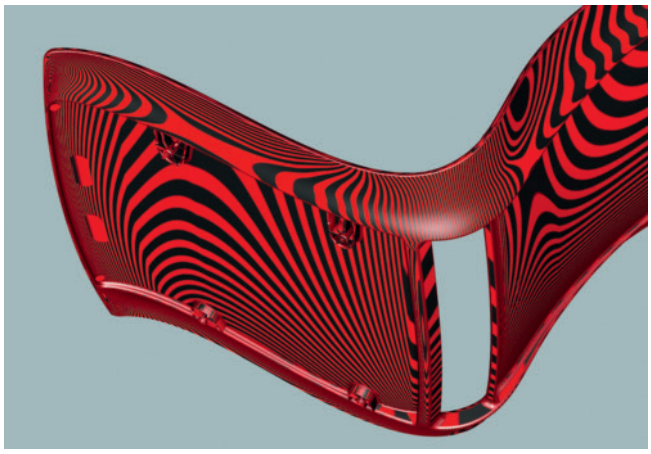
This chair is a good example of how the formal design and the technical implementation of the draft have to be carefully balanced in order to achieve an impressive result. The designer, Norbert Geelen, was faced with the task of integrating the enormous functional demands for special-purpose furniture in the public sector into the design in such a way that the chair is given the aesthetic and emotional qualities of living room furniture that you are happy to have in your own home. The result is a product with an independent and modern wealth of forms that at the same time meets the demands in the client's requirement and design specifications.

Here again, the demands made on the plastic part could only be satisfied by making use of the possibilities offered by Ultrasim. Extensive two-dimensionality of the backrest, high sitting comfort, flame retardant properties and sturdiness to withstand vandalism were all achieved this time in particular using the morphing-based Shape Optimization, a special instrument in the Ultrasim toolbox **(Fig. 7)**. The aim was to achieve high stability with the least possible material, and at the same time implement the designer's aesthetic ideas. Where in automotive engineering the simulation limits are dictated by the available installation space, the boundary condition in industrial design is the designer's concept from which the construction should deviate as little as possible.

Fig. 6. The seat of the new custom-made "2000_uni_verso" chair from Kusch+Co is made from PBT (grade: Ultradur): The material has to be not only sturdy, lightweight and flame retardant – it also has to be easy to process

The Concrete Product Development

The bearers of well-known names – in addition to Konstantin Grcic also Stefan Diez, Werner Aisslinger, Tom Dixon, Karim Rashid, Clemens Weisshaar or Dieter Rams – all have contacts with the design institution at the BASF industrial site in Ludwigshafen. In most cases, →



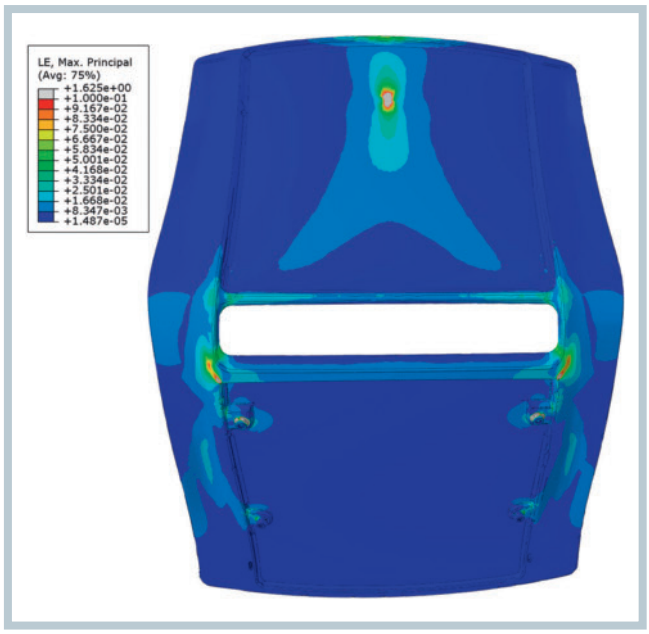


Fig. 7. In order to meet both the very varied and high technical demands and the demands for an attractive and functional special-purpose chair for the public sector, the plastic seat shell of the "2000_uni_verso" was designed at the computer using the Ultrasim simulation tool. Left: The designer examines the surface continuity using the zebra analysis; right: The main strain in the seat shell can be determined using Ultrasim

however, the cooperations do not lead to cultish products with star design and the charisma of a "Myto". Products are mostly developed here together with industrial designs that have a concrete function to fulfill. The more concrete the better – although BASF can also sometimes help a young start-up company with good ideas in the search for a processor or producer.

The advice covers the broad spectrum of materials as a source of inspiration for new products, as well as the choice of the most suitable material and production method. Here it is possible to draw from the extensive range of BASF's engineering plastics, the styrene plastics and the polyurethanes. The engineers provide input in the development of a plastics-oriented design, and the in-house designers look to meet the wishes with respect to styling, color, surface and function. And finally the specialists at the computers are able to predict and optimize the filling behavior and load-bearing strength of the object using the extensive – and in the meantime often successfully employed – BASF simulation tool, Ultrasim. Material and design are merged efficiently to create a successful product. Particularly for engineering plastics, the designfabrik opens up new horizons in fields of application even beyond the intake modules and control housings. ■

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Lightweight for Still Water

Caps. Light weight is the topic of the day in the PET bottle industry. One of the main reasons is the desire for resource conservation not least due to the again rising raw material prices. Corvaglia Mould AG, Eschlikon, Switzerland, has therefore developed a cap for still water that is lighter than comparable products and which children and older people can open easily.

The weight of the cap with the designation CSN (Corvaglia Short Neck) 26 mm BTL (Break, Then Leak) has been reduced from originally 1.6 g to 1.0 g. At the same time the developers were able to reduce the weight of the bottle neck from 3.15 g to 1.75 g. With an annual output of over one billion bottles and caps, that amounts to a saving of more than 2,000 t of plastic and a reduction in the energy consumption of around 50 % with no limitation on the productivity of the bottling line.

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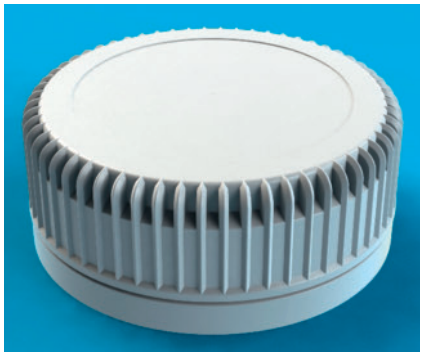

The design of the cap reduces the weight from 1.6 g to 1 g (photo: Corvaglia)

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