The international plastics magazine from BASF www.plasticsplus.de

# plastics

## SPECIAL EDITION


**PlasticsPlus™**
**Small plus, big effect**

**PlasticsPlus™**
**Motor industry: Interior trends of tomorrow**

**PlasticsPlus™**
**Construction: Shimmering moment**

Dear reader,

"Specialty" - the dictionary has a simple definition for it: something that is special. And something that is special always needs to be handled in a special way. This is how BASF Styrenics will be treating its specialties in future. "Plastics-Plus™" refers to special plastics and foams available from BASF, each of which something special. Despite having different performance profiles, they all have one thing in common. They help our customers to be more successful. Reason enough to publish a special edition of "plastics" in which we will try to show how special plastics help to drive forward the growth of sectors such as the automotive industry, construction or packaging all over the world. Whichever product, sector or region you look at, the secret for success is always based on four principles: innovation, reliability, partnership and diversity.

Enjoy reading the magazine.
Your editor

Contents



# Small plus, big effect

**Whether you are buying a bicycle, some chocolate, a shirt, a pizza or even plastic - there are almost always cheap and expensive options. While first class lounges offer the appeal of being a little special and customers are happy to pay for extra, but bookings for cheap flights have at the same time reached record levels. When you take a closer look, the differentiation between discount and luxury suppliers is only logical. Both grow, both survive. It's the ones who position themselves in the middle who struggle to find buyers for their goods. "I wouldn't go to McDonalds to eat lobster," says Dr. Michael Stumpp to describe this trend. He should know, as manager of BASF's newly formed global business unit Specialty Polymers & Specialty Foams. Under "PlasticsPlus™", the unit will in future be marketing a range of plastics and foams which stands for precisely this premium claim. "Plastics-Plus™ customers," says Dr. Stumpp, "get more than just pellets, they get a product that is based on innovation, reliability, partnership and diversity."**

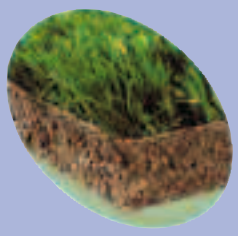
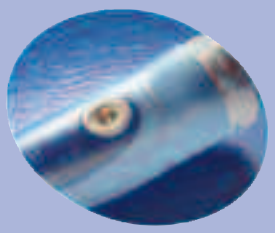
The columnist Andreas Steinle from the German Manager-Magazine sums it up as follows: "Nowadays, there are basically two consumer motives: finding a bargain or distinguishing yourself. The interested consumer either shops at H&M (swedish trade chain) or









INNOVATION • RELIABILITY • PARTNERSHIP • DIVERSITY •

## Which plastics does PlasticsPlus™ include?

**Terluran® HH** – High Heat ABS
**Palusol®** – Alkali metal silicate
**Basotect®** – Melamine resin foam
**PermaSkin®** – System for coating Polyethylene foam/ components
**Ecoflex®** – Biodegradable
**Terlux®** - Transparent ABS plastic/polyester
**Styroflex®** – Styrene/butadiene block copolymer
**Terblend® N** – ABS and polyamide
**Luran® S** – Acryloni-trilestyrene acrylate plastic
**Neopolen® E/Neopolen® P** – Polyethylene foam/ polypropylene foam
**Terlux®** – Transparent ABS

**(from top left to bottom right)**

at an exclusive boutique." Buying behavior which has characterized the consumer trade for some time and is also increasingly characterizing business between raw materials suppliers and industry. So the rules of fully developed markets apply to plastics based on styrene and acrylonitrile, or foams such as Styropor. Most suppliers concentrate on a small product portfolio which they produce at low cost in world-scale plants. However, for other products the laws of the specialty business apply. Application development, tailor-made service packages and product and application innovations characterize the market here. "By distinguishing them from each other, but keeping both under one roof, we can meet the needs of our customers individually and hence make them more successful," says Dr. Ehrenfried Baumgartner, manager of BASF's Styrenics division.

## 20 percent of turnover with innovations

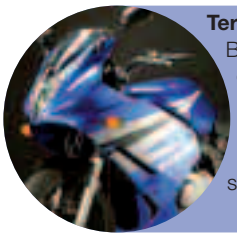
But where does the actual difference lie? For buyers of cheap or luxury textiles, the contrasts can be seen simply by going down to the local department store. But what about plastics? Dr. Stumpp is quite clear about the "plus". It's the icing on the pellets. "The essential business potential of specialties lies in knowing about the production processes of our clients and what we have to offer them in addition to a high-quality product." Comments made by customers support his theory. Overall, the results of a customer survey carried out by BASF focus on four key factors for success: whoever markets specialty plastics must above all offer innovation, partnership, reliability and diversity across the entire product range. And the new business unit is full of confidence about these principles. The keyword is **"innovation".** Styrene specialties should achieve 20 percent of annual turnover with innovations. It is far more than just a slogan, as Dr. Ursula Seeliger, Specialty Polymers Europe makes clear: "Our product and process innovations provide our customers with specific system cost advantages and therefore strengthen their position in their business sector. In-depth knowledge of the value-added chain right up to the finished product is a crucial factor for the success of our innovative system solutions." An attitude that does not just remain a declaration of intent. "Innovation monitoring" is the name given to the system used to ensure that a new product meets the requirements of the business. For example, at the beginning of a project, the likelihood of its reaching full-

**Standard or specialty: a split found in all areas of life. Do you choose a coffee or a cappuccino, ...**

scale production is determined. Marketing then classifies the potential volume of sales in order ultimately to show how much business was actually generated. Monitoring should also speed up the exchange of information in global business involving specialties. “If transport containers made of Terblend® N are produced for Singapore Airport, the application should be offered to potential customers in

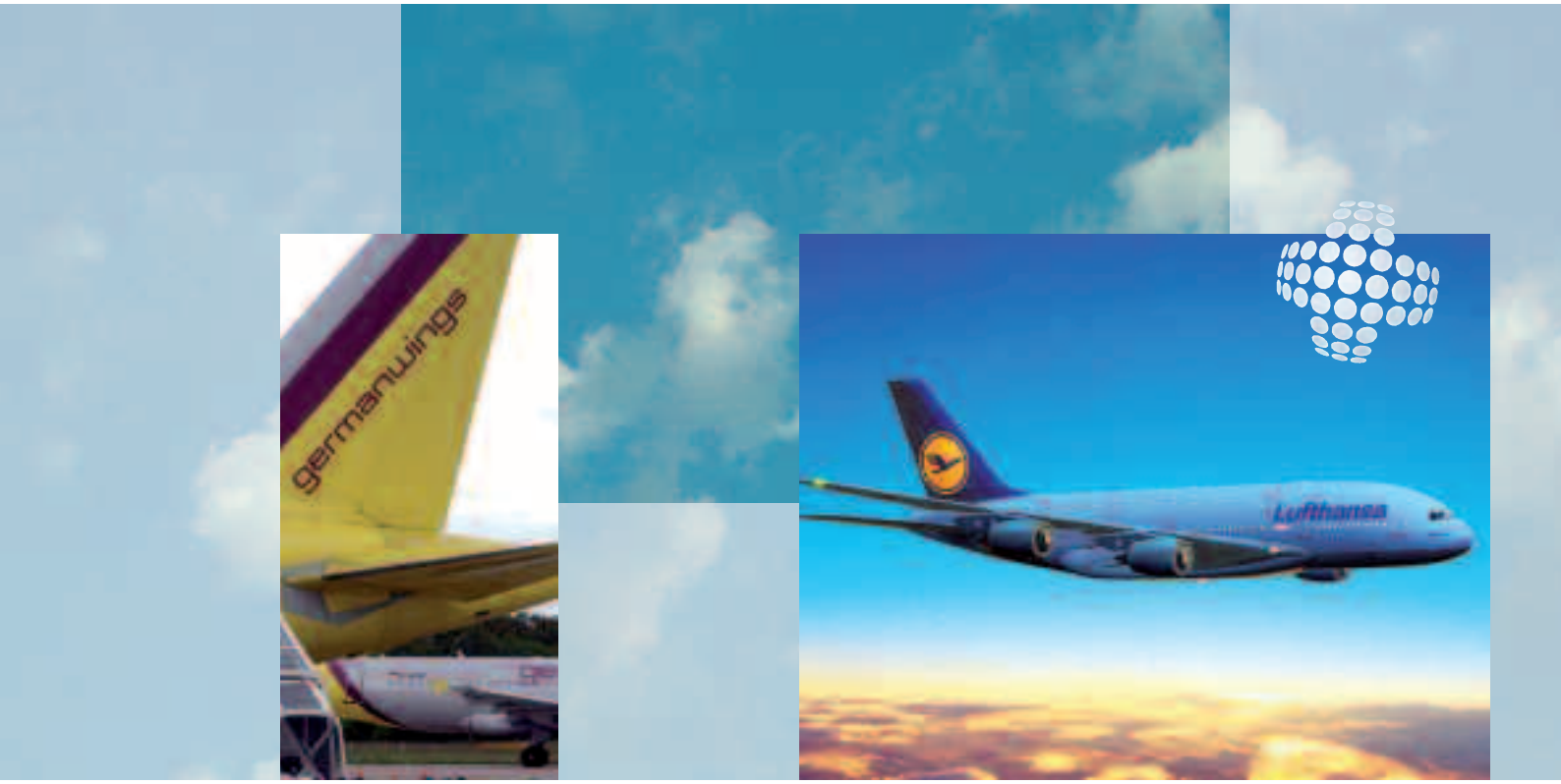
## Partners with an eye on the whole picture

“In the future, manufacturers of industrial goods should no longer sell products but rather the process per se,” says the professor, describing the market. High-quality specialty plastics thus find buyers in areas where an operational step can be saved and production costs do not have to be



**Terblend® N** – Blend of ABS and PA, characterizedby excellent impact strength, toughness, good processability and high surface quality

labor and is expensive. But it is different with PermaSkin“. In this case, a very thin tear-proof film made of Luran“ S, BASF’s ASA, covers the component part instead of the




**… a budget airline or the First Class Lounge, …**

Europe or America as quickly as possible using the ‘innovation monitoring’ platform,” says Dr. Seeliger, explaining the system. Defining innovations as the optimization of benefits means you have to think in terms of systems. Experts in Customer Relationship Management, such as Professor Peter Winkelmann from Würzburg, noticed some time ago the trend of raw materials suppliers increasingly following the system partnership path.

defined in terms of the cost of raw materials but instead the entire process chain is followed. How “partnerships” with customers lead to cost reductions throughout the market is shown by the example of PermaSkin“. This is what BASF calls the system it offers for the production of component parts. Where wooden doors are exposed to the elements, appropriate surface treatment is required. Manufacturers usually coat them, an operational step that relies on manual

lacquer. This saves numerous manual steps. “Looking at the system as a whole, the manufacturer saves considerable costs despite the initial investment,” explains Lars Koppelmann, the business manager responsible for the system. A similar advantage is enjoyed by the construction sector with the special foam Basotect® used for soundproofing. Flame-resistant and easy to fit, Basotect“ has proved itself to be clearly the most economic material in terms of total

system costs, despite higher material costs. "With Basotect®, our customers can once again tighten the 'system costs' screw considerably," says Basotect® Business Manager Dr. Christof Möck.

## Benefits in diversity of product line

Dr. Stumpp makes no secret of the fact that the marketing of system solutions will require his sales team to develop new skills. "**Diversity**" is the third and perhaps most important principle in the specialty business model. It's clear to anyone looking at the "PlasticsPlus™" product portfolio what this means. Diversity does not stop at the supply of Styrenics specialties. With more than 8,000 products available from BASF as a chemical company, marketing of the company's expertise and products becomes more effective because they come from a single company. With "PlasticsPlus™", BASF as a whole moves closer to the production process, giving producers of components an opportunity to buy from a single source not only plastic films but also adhesives, paint pigments or other plastics to coat the component. The fact that the range offered by the new BASF business unit rightly includes know-how like color services and colormatching, advice in component development and long-term commitment is clear to the managers. "Whoever buys PlasticsPlus plastics will in the future be able to play BASF's entire keyboard," promises Dr. Stumpp.

## Reliability of the product portfolio

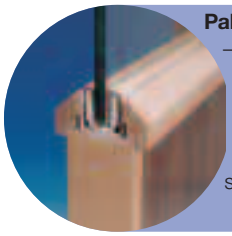
**"Reliability"**, as banal as it sounds, is what our customers consider to be essential to their business. And it is precisely this which distinguishes us from the standard product business," says Volker Hammes, Global Business Management Specialty Foams, explaining the fourth principle of "PlasticsPlus™". Radical withdrawls of products and the services associated with them, is what customers and producers had to accept in recent years as far as standard plastics were concerned. This is barely conceivable in the case of specialties in terms of their particular property portfolio and uses. Take medical technology as an example: guarantees of the product composition of the transparent ABS Terlux HD are important aspects of the business for customers in this segment. Just like in the construction industry. Supply agreements covering a period of many years for a specialty product like Palusol fire protection sheets on which people's lives may possibly depend are a vital part of the service offered. "We give guarantees that our customers can

**... a runaround or a sports car, ...**

rely on. We offer them products which are unique in the market in terms of constancy of quality and reliability of supply," says Mr. Hammes.

## Deliberately allowing for complexity

Color services, product guarantees and system solutions - a credo that is also a commitment to want to manage complexity. Dr. Stumpp knows about the differences he has to combine under "PlasticsPlus™". Tailor-made solutions for the construction sector are different from those for medical technology, where product purity and composition guarantees are what matters. The motto is to keep your discipline. Don't get bogged down, but focus on what actually needs to be done, balancing the relationship between service supply and service demand - that is what matters. Dr. Stumpp makes no secret of the fact that you only get what you pay for. "Value pricing" is the new term set to characterize the market for specialty plastics in the future. Taken from the field of traffic management, value pricing means setting prices for services in times of particular traffic volume. Experts talk about using the power of the market to reduce waste of resources - similar to differentiation between low season and high season in the tourist industry. Here Dr. Stumpp again draws parallels with the marketing of specialty plastics. "We must also be able to set prices for the additional benefits we offer with our PlasticsPlus™ products. Only in this way will our customers and ourselves benefit in the long term." Dr. Stumpp and his colleagues appear to have sown the seeds of success with "PlasticsPlus™." All that remains is to bring in the harvest - together with our customers.



**Palusol®**
– Noncombustible material which, in the event of a fire, foams when activated by heat and, for a given period, prevents spread of fire and smoke.

**www.plasticsplus.de**

**... a simple bar of chocolate or pralines.**

# First Class Restaurant for special occasions

Good standard plastics like ABS or EPS in large-volume plants with absolute cost leadership, that is how BASF's Styrenics business is currently seen. Somewhat rashly in the opinion of Dr. Michael Stumpp. His aim is now to expand a business area that means much more than just pellets. Under "PlasticsPlus™", this is to provide a new brand image for BASF plastics - as specialties that help to make its customers even more successful. Is this just paying lip service or is there more to it? Plastics spoke to the manager of the new business unit.

**Dr. Stumpp, is PlasticsPlus™ something old dressed up as something new or is there also a better range of goods and services?**

Of course, it is clear just from the name PlasticsPlus™ that we are going beyond purely the product, and this represents the dividing line between specialties and standard plastics. What we want to do is to show our customers that we are better than the competition in four areas: innovation, reliability, partnership and diversity.

**Colorflexx® stands for cost leadership in standard products, PlasticsPlus™, amongst other things, for tailor-made coloring. One company - two business models?**

In the past, we at BASF, and I don't just mean plastics, made the mistake of marketing specialties and standard products with the same business model. It presumably never dawned on us to do anything else. We have to meet the different needs of our customers using different business models. If I need to eat something quickly I go to a fast food restaurant where I can get a cheap meal. For a special occasion I would go to a good restaurant. We have to be able to serve our customers on the same principle. Cost leadership and flexibility for standard plastics. Innovation, reliability, partnership and diversity in supply of specialties like PlasticsPlus™ products.

**The PlasticsPlus™ products seem to consist of individual stars rather than team players. Can these products be brought under one roof?**

Of course our specialties differ somewhat in terms of their composition and applications. But they still belong together because they are marketed using the same business model. No PlasticsPlus™ product will survive for long unless it creates additional benefits.

**Let's be more specific. What are additional benefits?**

BASF's vision for 2015 is to make our customers more successful. Through innovations and system solutions like PermaSkin® or service packages like the one we have put together for medical technology, we are helping to break new ground and attract new business. With "reliability", we do everything to save the customer a headache by proving ourselves to be reliable in terms of our product portfolio, our technical service and our knowledge of coloring. "Partnership" stands for cooperation and communication so as better to understand the value-added chains and strategies of our customers. Our trump card is finally "diversity": do you know of any

Background

## Personal profile: Dr. Michael Stumpp

Since completing his PhD in chemistry, he has had 20 years of experience in BASF's specialty business. Manager of the global business unit Dyes and Performance Chemicals in the USA until 2004, he then took responsibility for BASF's global print system business. At the beginning of this year, this specialty expert took over the Specialty Polymers & Specialty Foams business. His reason? Specialties are a global business!

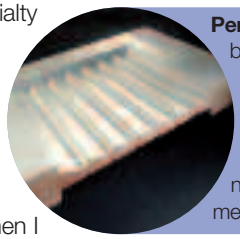
other supplier that offers BASF's diversity of products and know-how, not only in the plastics sector but in many others?

**If BASF wants to be more than just a supplier of raw materials with supply of "PlasticsPlus™" - what does this actually mean for Sales operations? Could additional training be needed?**

Sales and Key Account Management play a central role in our business model. We can only provide innovative solutions if we are aware of our customers' problems, dreams and desires. We can only start talking about integrated partnership once we have understood our customers' value-added chains. Who else but our sales team should vouch for the reliability we are promising our customers? Last but not least, our team must be trained so that it is familiar with BASF's product line diversity and potential and knows how to use these to benefit customers and ourselves.

**And finally, in Michael Stumpp's dreams, where will the Specialty Polymers & Specialty Foams business unit be in 5 years time?**

First of all, our specialty business will have increased its turnover and income by at least 50 percent. And when I then ask our customers what made them successful, I would love to hear that it was BASF's innovation, reliability, partnership and diversity of supply that contributed to it. As the icing on the cake, I hope we will have maintained our dominant position in Europe and have grown considerably in NAFTA and Asia.



**PermaSkin®** – System by which thermoplastic film is molded in one operational step and at the same time applied to one or both sides of components of wood, plastic or metal.

# At the beginning there is just the idea…

## PlasticsPlus™-plastics are paving the way to radical shapes

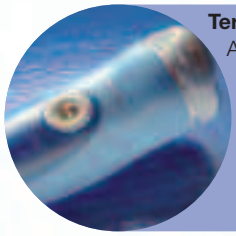
Photo: Tom Vack

**What starts out as just a radical vision in the minds of designers like Luigi Colani could, with special plastics, become a mass application ready for production.**

Multicolored, easy to process, constantly good and durable in large quantities: originally developed as a replacement material, the property of the plastic of being moldable if energy is added was quickly used for industrial mass production. Initial design trials were carried out in Celluloid and Bakelite, but with the development of newer and newer plastics for industry, the foundations were laid for a new design generation. No other material is able in the same way to change like a chameleon and to create, if need be, diversely radical shapes and new constructions.

But that was not enough. Plastic brings art within the means of the man in the street. We have for a long time used little plastic tools in our day-to-day lives. Practical, fancifully designed and comfortable to the touch, from bathroom to kitchen to office, plastics always have a say in the design. Popular shapes and patterns are therefore effortlessly made in their thousands. Boring everyday items blossom into gaudy colors to become cult objects thanks to plastic. Famous designers long ago rediscovered the material plastic for their projects.

Since the 1950s, for example, Luigi Colani has been designing utensils out of plastic, combining esthetics with ergonomics. Reason enough for BASF's new business unit Specialty Polymers & Specialty Foams to support the "Colani Back in Japan" exhibition for the market launch of PlasticsPlus™. "As the sponsor of this exhibition, we want to acknowledge the life's work of Luigi Colani, who realized very early on that the mass production of organically and ergonomically designed products was best carried out using plastic," said Dr. Christian Bonten who works for BASF as a member of business management for the Terlux® plastic. Luigi Colani is in no doubt about the contribution made by a raw materials supplier like BASF to modern product design. "With its plastics, BASF has contributed significantly to ensuring that design ideas can be



**Terlux®** – Transparent ABSwhose key properties lie in transparency, brilliance, high toughness and chemical resistance.

**Luran® S** – This ASA from BASF is characterized by its resistance to weathering, high ageing stability and good chemical resistance.

**Designers like Luigi Colani rely on styrene plastic specialties.**

converted into economic mass production," explains Colani.

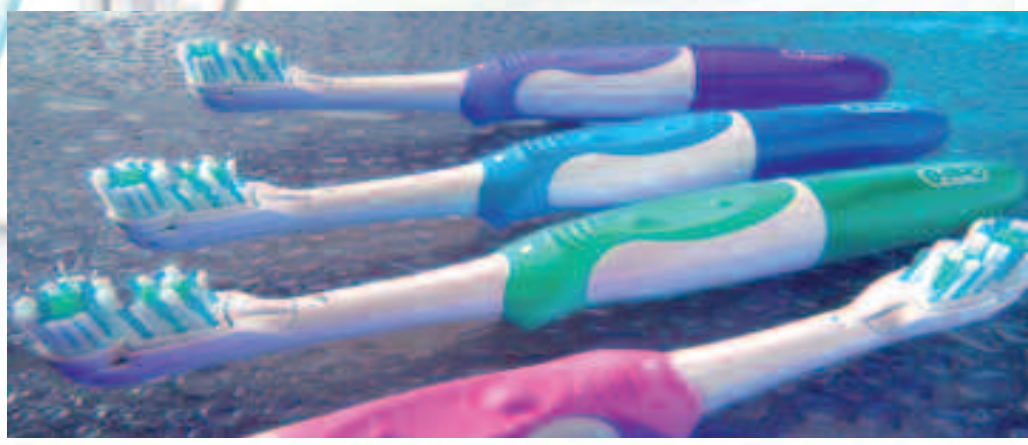
## Styrene plastic specialties for designers

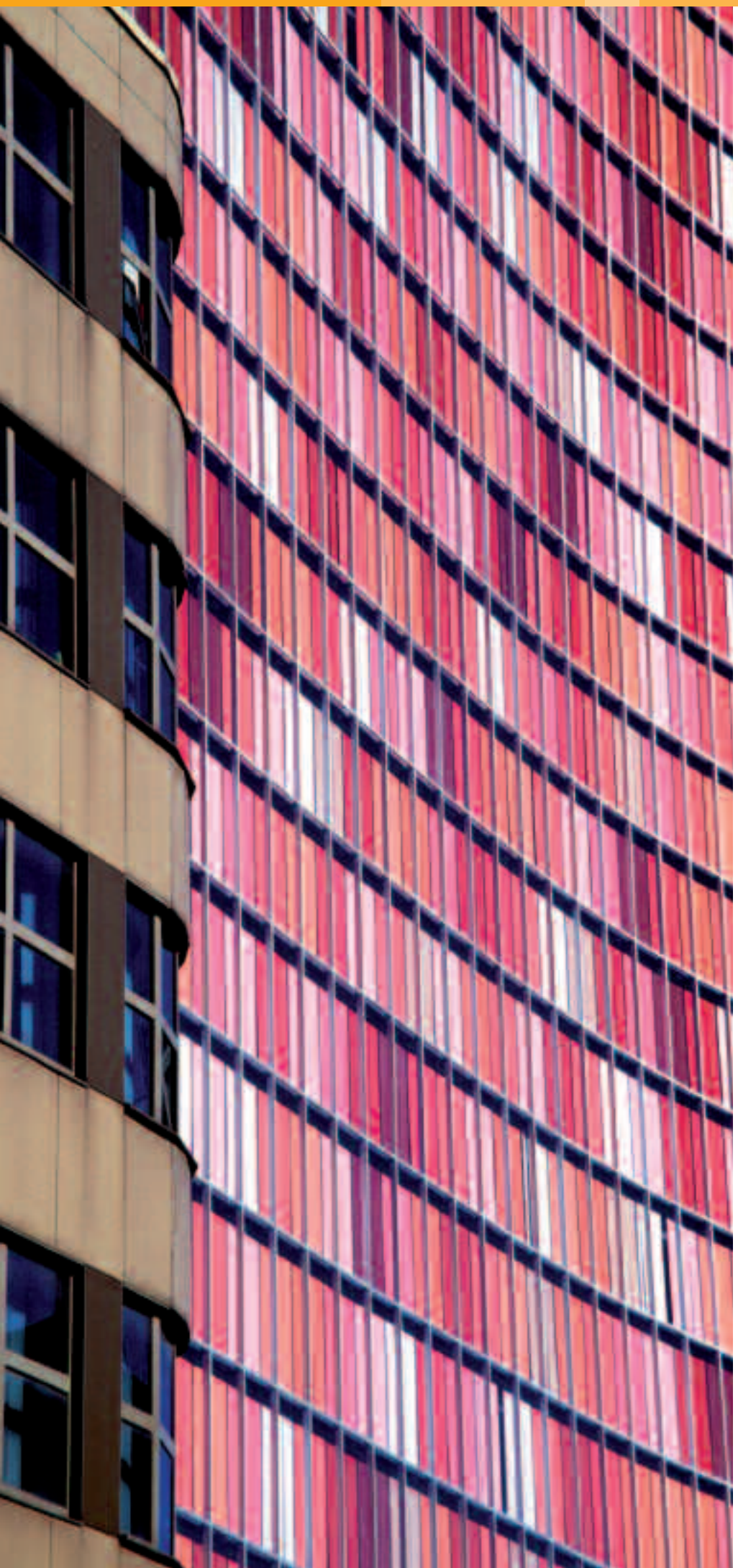
When you are trying to combine practicality and unusual design, industrial designers tend to turn to the special plastics Luran® S, Terlux® and Terblend® N in the PlasticsPlus range.
The transparent ABS Terlux® lets the user see the internal workings of PC accessories or electrical appliances like shavers. In this way, the material gives product designers new scope. Another example is Terblend® N, an ABS/PA blend whose flowability gives pleasantly opaque surfaces. But product designers also rely on the hard skills of the plastics: if chemical resistance has to be combined with a diversity of colors, then an ASA like Luran® S provides the required practicality. A color and advice service for designers is also provided for all the special plastics available. A service for which BASF also won the Gillette Omnimark Award in 2004. "There is no question," says Dr. Bonten, "that, thanks to special plastics, designers of today have more choice than ever - and use them in ever more polished applications." Take electric toothbrushes as an example. For 25 years, the Trade Association for Plastic

Photo: Rüdiger Buhl

Consumer Goods (FVKK) has awarded a prize for the 'Product of the Year'. It looks at new plastic consumer goods and aims to promote innovation in the plastics industry. An independent panel looks at the function, creativity and design of the products entered. In 2004, the battery-operated toothbrush Oral-B CrossAction® Power from Braun won the prize in the "General use" category. The toothbrush handle is made of Luran® S and is available in blue, magenta, purple or green. Luran® S is ideal for this application, particularly on account of its chemical resistance and toughness. BASF's ColorCompetenceCenter developed the colors according to the designers' wishes exclusively for this toothbrush.

**Your contact:**
**Dr. Christian Bonten,**
**Tel. +49 621 60 59349**





Megalopolis: that is the name given to a massive city landscape in which a number of cities with over a million inhabitants have grown together. The largest megalopolises in the world are in China and are still growing: the capital city area of Beijing-Tianjin or the economic center around Shanghai and Nanjing. In these “tiger cities”, it is not only economic growth that knows no bounds, the laws of physics also seem to have got out of control. In Hong Kong, skyscrapers are joined together by walkways, so that the streams of pedestrians no longer even have to go down to street level. In China’s purpose-built town of Shenzhen, construction is taking place so quickly that essential things often fall by the wayside, like the lift in a fifteen-storey building.

Since the experiments with special business areas in the 1980s, the construction boom on China’s eastern coast shows no sign of ending. With the joining of the World Trade Organization (WTO) and the awarding of the 2008 Olympics to Beijing and the Expo in Shanghai in 2010, the demand for buildings has increased dramatically.

China’s planners estimate the growth in the

# Asia and North America building for the shimmering moment

## PlasticsPlus plastics prompt a construction boom in Asia

construction sector at 12 percent a year - well above the already high growth rate for the economy as a whole of more than 9 percent. The construction materials industry is benefiting from this, with growth rates of more than 20 percent (as at: 1/2003) according to the German Federal Agency for Foreign Trade (bfai).

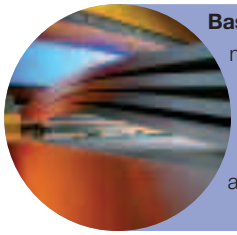
A trend which the plastics and foams from the PlasticsPlus™ range are helping to accelerate. Reliability, for example, is not only an essential requirement for buildings, it is also a decisive advantage of Luran® S, the ASA in the PlasticsPlus family. Long-term durability is the keyword. "Luran® S, which is used to make doors, window frames, roofing tiles or sanitary applications, is dominating the market on account of its resistance to weathering and its chemical resistance," explains Lucy Li, manager at BASF for the Asia construction sector.

### A protective shield for colorful houses

Lucy Li and her colleagues in the regions are in no doubt that the boom is also primarily dependent on innovations. Help is available to anyone looking for color, as Luran® S has long been available in various colors as a capstock for decorative elements and accessories in the USA. Example of these elements are residential home siding/cladding, fencing, railing, decking, window frames, exterior trim and doors. Until a few years ago, Luran® S was too shiny to be used for surfaces the size of entire house facades. To produce a dull surface, BASF's development teams produced a low gloss version of Luran®S designed specifically for the building and construction market. The weatherproof thermoplast from BASF acts as a suncream: it forms a long-lasting shield and hence protects against fading. "The possible diversity of colors of plastic-covered house facades has since risen considerably," explains Doyle Robertson, manager of the construction sector for North America. Architects and clients for whom buildings are being constructed are therefore also able to use colors like slate or khaki that are particularly popular among America's homeowners for long-lasting plastic facades. The fire-resistant Palusol® and the soundproofing Basotect® also have a good chance of establishing themselves on the massive Asian market. And the greater the requirements, the higher the chances. Builders turn to Basotect® when they need a soundproofing foam that is fire-resistant. As a current example, those in charge of the new construction of the subway in Shanghai are using Basotect®. According to Lucy Li, "even though Chinese manufacturers in these areas have a lot of catching up to do, the system cost advantages of the foam are increasingly winning through."

A very particular trend in Asia is helping the special plastics here: in order to reduce the high heating costs caused by a shortage of raw materials, the authorities are recommending a switch to well-insulated windows.

**Your contact:**
**Asia: Jürgen Keck, Tel. +65 6432 3285**
**NAFTA: Doyle Robertson, Tel. +1 973 245 6107**
**Europe: Dr. Michael Breulmann,**
**Tel. +49 621 60 21583**



**Basotect®** – Foam made of melamine resin, which has a high soundproofing capacity, high temperature resistance and good fire resistance.

Photos: DaimlerChrysler

# Longing for uniqueness

The interior of a car is the interface between man and machine. Numerous technologies come together here. Current interior trends rely on PlasticsPlus™ special plastics.

According to a popular quote from Stefan Sielaff, manager of DaimlerChrysler's Interior Competence Center in Sindelfingen, "the exterior is love at first sight, the interior is marriage."
Finding products that meet this long-term requirement and that continue to convince in exactly the same way day after day is a constant challenge for all vehicle manufacturers.
In order to offset the weight of increasingly extensive comfort and safety fittings, the use of lightweight materials in modern vehicle construction is more important than ever. In particular, in many instances the use of plastic in the vehicle interior is 'state of the art'.
As well as reducing the weight, polymer materials from the dashboard to the rear-window shelf offer numerous other advantages. These include a greater degree of design flexibility, the option of integrating additional functions into the components and ensuring accurately definable behavior in the event of a crash. There are numerous demands being placed on the vehicle interiors of today and tomorrow. Coherence, emotions, comfort, safety and functionality all have to be combined to produce a superior overall package and at the same time have to protect the respective identity of the make.

## Growth in the premium segment

Mercer Management Consulting, amongst others, are predicting exceptional growth possibilities for vehicle interior suppliers. Even now, the global market volume for vehicle interior fittings is around 120 billion euros a year. About a fifth of this is accounted for by the trim sector, in which the seat and door modules make up the most significant proportion.

According to Mercer, "the average growth of trim applications over the next few years will be more than twice that expected for vehicle production." The main driving forces behind the growth are the increasing importance of the interior as a criterion for differentiation and the growth of the premium segment.

In this context, the aims of interior designers are largely comparable. For example, BMW sees a "clear trend toward higher quality interior fittings." This means that there is a "need to work on new surfaces and materials and to design the vehicle interior to be an 'experience' for customers and something that is 'identifiable as being customer-specific'." According to its company literature, Opel is also going to continue to make "diversity and flexibility" the focus of its interior design. High quality materials and their harmony with the interior should "gain in importance" in this context. "Variability and top quality appearance at competitive prices" are at the center of Volkswagen's strategy. And Audi wish to rise above the competition "through top quality workmanship, precise material changeovers and finely differentiated surfaces."

In order to be able to meet such growing demands on vehicle interiors with the necessary profitability, plastics are continually growing in significance in the material strategies of vehicle manufacturers.

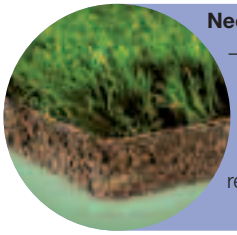
The conditions in the vehicle often place

high requirements on the materials used. These include not only low system costs and as little weight as possible, but also good nonfading properties and excellent temperature and acoustic behavior.

## Maximum design flexibility

BASF's specialty range "PlasticsPlus™" includes numerous materials that meet these needs. For example, using the open-cell foam Basotect® helps meet the growing requirements for both sound-proofing and weight reduction. However, the French carmaker Peugeot has now recognized that Basotect® can help not only with noise reduction but also with the protection of pedestrians. Placed directly under the hood, the material gives on impact and can therefore help prevent more serious injury. The polypropylene foam Neopolen® has also found other safety-related applications in the vehicle, such as side-impact protection or energy-absorbing bumper cores.

Particularly in summer, the temperature inside parked cars can easily reach more than 80°C. As standard ventilation designs take such a long time to take effect, plastics are needed which neither become brittle nor go yellow at such temperatures (even over prolonged periods). An example of how the best possible design guarantee can at the same time also reduce system costs is in the use of styrene copolymers like Terblend® N. The PA/ABS blend can be worked to produce high quality, attractive and robust plastic components and can at the same time help save a whole process stage, that is



**Neopolen®** – Polypropylene foam which is characterized by high energy absorption, low weight and good resilience

to say the additional matt coating usually required for exposed components made of PC/ABS to prevent annoying reflections and to guarantee a high quality appearance. This is not needed when you use Terblend® N. “As a result of the high flowability of the material, even the finest tool marks are visible. This means that surface quality is possible that could otherwise only be achieved through matt coating,” explains Dr. Stefan Grutke who is responsible for special plastics in business management of vehicles at BASF.

## Save operational stages

As the coating of plastic components often makes up up to 50 percent of overall production costs, replacing coated materials with uncoated Terblend® N (that has the same appearance) produces a considerable cost saving. As well as in the VW Lupo or the Fiat Stilo, Terblend® N is also used in the new Citroën C4 and the new Opel Zafira.

BASF’s specialty range can also offer a tailor-made material for the high temperature conditions in the vehicle interior. For example, the range of standard Terluran plastics has been expanded by a particularly heat-resistant specialty: Terluran® High Heat (HH).

## Criteria in motor vehicle construction

According to Christian Schweiger, in charge of vehicle market development at BASF styrene specialties, “the resistance of Terluran® HH to heat deformation goes

**Terluran® HH** – the answer when you need particularly good resistance to heat deformation. Components from High Heat ABS also remain dimensionally stable and retain their shape even under extreme conditions

far beyond the capabilities of the standard ABS." However, resistance to heat deformation is not enough on its own. Dimensional stability, shape retention and good workability to meet profitability requirements are other criteria which matter when it comes to building cars and which Terluran® HH meets.

The potential uses of the various types of Terluran© High Heat in cars range from interior coverings to external parts such as the radiator grill, external mirror and light housings or number plate carriers. Current uses of the heat-resistant Terluran® variants include the rear-light housing on the Peugeot 307, the Citroën Berlingo, the Mercedes-Benz E Class and the BMW 3 Series.

**Your contact:**
**Dr. Stefan Grutke, Tel. +49 621 60-92623**

# The Olympic dream

## Green Olympics - is Beijing built on biodegradable plastics?

China's economy is growing and growing. Towns that used to be just a few huts are now metropolises packed with skyscrapers. And the packaging industry is also attracting some of the attention there. For example, according to figures published by the German Federal Agency for Foreign Trade, plastics account for 27 percent of the packaging market. Whether this is plastic bags, cups or plates - the Chinese consume 150,000 tons a year on lunchboxes alone. While those less developed areas in the West are just beginning to package products at all, the authorities in the East are already thinking about alternative methods of disposal. The keyword is the Olympic Games in Beijing in 2008. They should be used as a showcase for China and demonstrate that China can also set standards in environmental matters. The model is the "Green Olympics" in Sydney in 2000. The use of food packaging made from renewable raw materials, such as those produced with the aid of the biodegradable plastic Ecoflex®, should also help to achieve this ambitious aim. That was why the organizers of the Games invited manufacturers of biodegradable plastics to visit in June this year - an opportunity for BASF to present its PlasticsPlus innovation Ecoflex®. Dirk Stärke who organized BASF's visit, emphasized that "because of the numerous environmental problems facing the country, the idea of sustainable development over a broad spectrum is not only being discussed, it's being supported too." The awarding of the Olympic Games to Beijing triggered a storm of national enthusiasm. "The Chinese want to see working examples of sustainable development - and, with Ecoflex®, we can help them to do so."


As far as the Olympics are concerned, the organizers are yet to decide on the use of biodegradable materials at the Games. However, "the market potential is there," says Dietmar Heufel, manager of the global Ecoflex® business. "In the long term, biodegradable plastics are going to make an important contribution to solving China's waste disposal problems."

**Your contact:**
**Dirk Stärke,**
**Tel. +49 621 60-49978**

**Ecoflex®** – Biodegradable plastic that improves the functionality of products made of renewable raw materials and degrades to compost within a few weeks.

**Styroflex®** – Transparent, elastic copolymer that is suitable both for film extrusion and injection molding as a result of its excellent workability and high thermal stability.

# What we do not hear when we hear

Imagine that there was no such thing as sound. No Mozart, no Beatles. This is precisely what recording studios need - and Basotect®, the special PlasticsPlus foam, makes it possible.

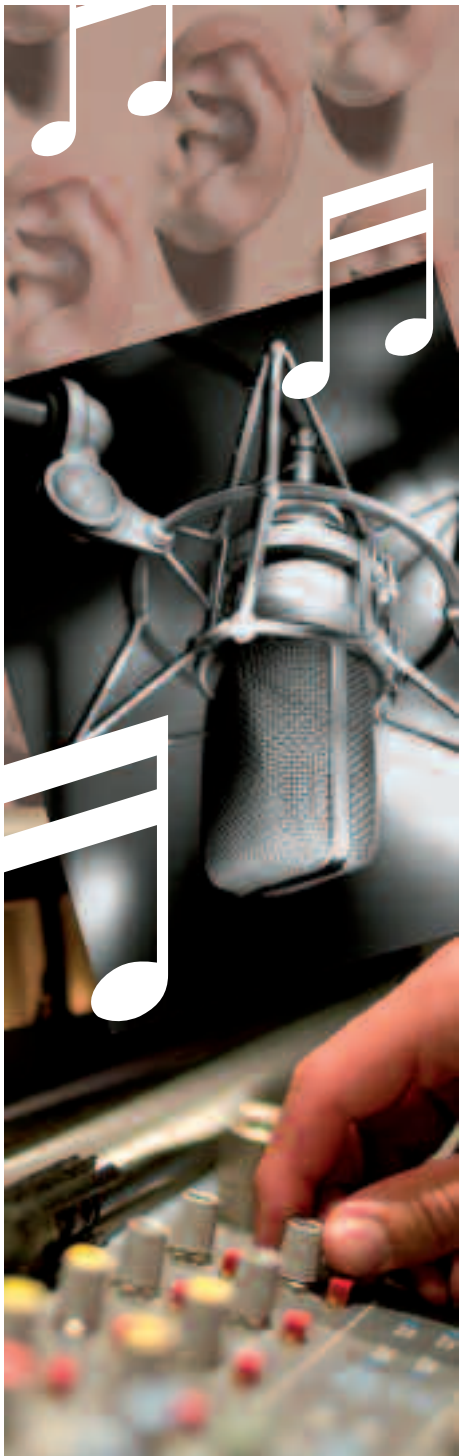
Fortunately, there is such a thing as sound. And fortunately there are also people whose life's work it is to produce and record it. Reiner Opelland is one such person. At the Bauer Studios, Germany's first private recording studio, as the university-trained sound-mixer and manager, he is also responsible for the studio's high quality sound. However, his responsibilities at the studio involve more than just setting up the microphone and pressing the record button. With meticulous care and using the latest technology, he and his colleagues have tinkered around to find the right sound for recordings by artists like Stevie Wonder, the jazz legend Miles Davis and Germany's top jazz trumpeter Till Brönner. Even big bands or symphony orchestras have squeezed into his studios.

## Basotect® for the right sound

However, even technical assistants and careful preparation are not on there own enough to produce the perfect sound. Getting a great sound also requires the best possible studio conditions. Good soundproofing is essential for high quality recordings. "Imagine a church. This is a room with no soundproofing whatsoever," explains Horst Drotleff from the Acoustics

# Sound from the depths of the room

Department of the Fraunhof Institute for Constructional Physics. “Sound waves bounce back off the bare walls and arrive back at their starting point with a certain time delay.” This means that, before the sound produced by the organist reaches him again, he has already pressed other keys and produced new sounds. “Newly produced” and “reflected” sounds mix together and create a muddy sound.
What may perhaps sound quite good in the context of an organ concert is a headache to the engineers at the mixing desk. “It is the sound engineer’s job to minimize the influence of the room on the recording,” says Mr. Opelland, describing one of his main responsibilities.
Although a studio is nothing like a church in terms of its form, structure and dimensions, there are still disruptive reflections off walls, ceilings and floors. The room therefore has to be designed according to the laws of physics to produce the best possible sound. And, in the opinion of Mr. Drotleff from the Acoustics Department, “this is only possible with good soundproofing.”
Despite technical developments and stylized processing options on the computer, the basic requirement for a successful and above all perfect recording is the absolute



soundproofing of the studio using, amongst other things, Basotect“ from the PlasticsPlus range. According to Mr. Drotleff, “we are unable to produce sound results with simultaneous reprocessing on the computer that are identical to those we can produce using conventional foam soundproofing.” Recording expert Mr. Opelland adds that “this theoretical form of recording would always require a certain processing time by the computer. However, the human ear can detect even the slightest delays, right down to milliseconds, and finds them disruptive. So, when recording, it would not work if you did without the best possible studio conditions and tried to have the disruptions caused ‘computed out’.”
Therefore, sound studios are likely to continue to have to use suitable soundproofing material as this is the only way in which people who buy records will really hear what they want to hear - disruptive environmental influences or “the sound of the room” must be eliminated. So the next time you listen to a CD, just think about everything you cannot hear on the recording.

# The history of the plus sign

Addition is denoted by the plus sign - of that there is no doubt. But it was not always so.

The "+" sign was used for the first time in print in 1489 by John Widmann in his work on bookkeeping entitled "Quick and easy accounting for all businessmen." Mr. Widmann had a simple explanation for his readers: "What is - is minus … and + is more." After its introduction, the sign went on a right triumphal march through arithmetic, an up-and-coming science at the time. Giel van der Hoecke used the plus as a sign for calculations in 1514 in "Een sonderlighe boeck in dye edel conste Arithmetica" (Amsterdam). The sign was seen in England for the first time in 1557.

## Ligatures

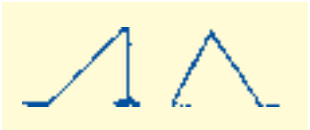
Historians have a theory on the origin of the sign: it probably came from the abbreviation of the Latin word "et" (and). "&" (Ampersand) also came from the abbreviated form of the word "et". In texts, the word "betrachtet" therefore used to be abbreviated to "b&racht&".

These sorts of abbreviations (ligatures) are common in German. Umlauts are

abbreviations for "ae", "oe" and "ue", the "ß" is the joining together of "s" and "z" and "w" is the joining together of two "u's" (double "u"). The percent sign , "%", originated from cto, the abbreviation of cento. The reason for this "abbreviation-mania" is to be found in the emergence of printing: lead had to be used sparingly, so nothing was to be written in a way that was unnecessarily complicated.

## Old spellings

The first addition sign was in fact used in the Egyptian Rhind papyrus, in which the plus sign was represented by legs walking to the left. This corresponded to the reading direction from right to left. The subtraction sign was accordingly repre-



sented by legs walking from left to right. The Italians later used the signs "p" and "m" for plus and minus. The word "plus" comes from the Latin and means "more", so in this respect Widmann was absolutely right in his sentence. It is also the origin for words like plural or complementary and is closely related to the Greek word "poly".

## Editorial information

**Editorial staff:**

Waldemar Oldenburger,
BASF Aktiengesellschaft (manager)

Jürgen Keck,
BASF South East Asia

Doyle R. Robertson,
BASF Corporation

John Schmidt,
BASF Corporation

**Publisher:**
BASF Aktiengesellschaft
KS/KC – E 100
67056 Ludwigshafen
Tel.: +49 621 60-46910
Fax: +49 621 60-49497

**Sales:**
BASF Aktiengesellschaft

**Layout:**
Spektrum, Ludwigshafen

## Fax reply to the editorial office

I would like more information on

- ☐ Terlux®
- ☐ Terblend® N
- ☐ Luran® S
- ☐ Terluran® HH
- ☐ Ecoflex®
- ☐ Styroflex®
- ☐ PermaSkin®
- ☐ Neopolen®
- ☐ Palusol®
- ☐ Basotect®

® = registered mark of BASF Aktiengesellschaft

Name

Company name:

Street

Zip code/Town:

Country:

Tel.:

I need this information in

- ☐ German
- ☐ Englisch

For further information:
www.plasticsportal.com

**BASF Aktiengesellschaft**
"plastics" editorial office
KS/KC – E 100
Fax: +49 621 60-49497

Fax

plastics

# *Success grows when we work together to achieve it.*


## *Plastics Plus*

**Basotect®**
**Ecoflex®**
**Luran® S**
**Neopolen®**
**Palusol®**
**PermaSkin®**
**Styroflex®**
**Terblend® N**
**Terluran® HH**
**Terlux®**

PlasticsPlus™ refers to innovative plastics and solutions developed by BASF. And to our belief that we are both even more successful when we work together to develop and implement solutions to meet market requirements. And naturally, we also want to support you in all sorts of ways, as we would in any good partnership. So a Plus for us in terms of partnership becomes a Plus for you in terms of success.

**www.plasticsplus.de**

BASF Plastics
key to your success

BASF
The Chemical Company