TB&C Group
hybrid technologies

We live Quality

Going from Strength to Strength since 2004

Table of contents

Dear Business Partners and Employees,

A new generation has taken over at TB&C. The move follows long and careful planning, but it is still one that will bring changes in its wake. Hartmut has entered his well-deserved retirement, and I have stepped back from day-to-day operations and taken on a new, non-executive role advising the Group management as Chairman of the Executive Board. The new management team under Robert van der Weck knows the business inside-out, and will be leading TB&C into the future. We believe that moving on to the next generation will supply the new ideas necessary to take the next step in our development.

The change offers us an excellent opportunity to take stock of TB&C today and to look back at our fascinating history. We would also like to thank our employees, both those who have been with us for quite some time, and those whom we are welcoming to our team worldwide each and every day.

When Hartmut and I founded TB&C, our primary goal was to create a good company with a strong culture, team spirit and good communication. Over the past 14 years we have enjoyed many successes in these areas, and we remain firmly convinced that there is no better goal a company could have.

TB&C is an international Group that is a successful market leader in a number of rapidly changing segments. We are recognized for our technological competence, dedication, flexibility and dynamism, qualities that have made our success possible – and that are our recipe for a successful future.

The TB&C Group today

TB&C in 2018 – a Group comprising nine companies with sales of approximately 70 million euros and over 600 employees developing and manufacturing innovative hybrid components at four different locations worldwide.

We live Quality

Customers can expect the very best quality from TB&C. The hybrid specialist continuously develops innovative and cost-effective solutions for complex and critical applications. Its collaborative development process gives rise to metal-plastic components with elaborately customized designs and reliable quality in series production. The experts from TB&C contribute their extensive technological and materials expertise to expand the range of the possible in the field of hybrid technology.

Innovative technology – multifaceted product worlds

The core competence of TB&C lies in hybrid technology, an area in which the Group's expertise and development skills are almost unrivaled. Be it outsert or insert, overmolding or multi-component injection molding – the focus is always on the highly precise combination of plastics and metal to create complex (electro-)mechanical components that integrate multiple functions and can be produced in just a few production steps.

Outsert technology combines the bending and stamping of metal plates with the extrusion of various functional elements made from technical plastics. The use of high-precision tools makes it possible to place them onto base plates in one shot, a rapid process that ensures top-quality products. For example, outsert components have long since proved their worth in medical technology, and with over three million outsert sunroof components manufactured to date, TB&C has established itself as the global market leader in this segment.

Electromobility is one of the most important future applications for insert technology. It is a field in which TB&C has been a key driver of development and where basic electroconductive elements are overmolded with plastic. Busbars function as 'current bridges'; in other words, they connect electrical components such as batteries and electric motors. In future, it will be possible to use these compact, individually manufactured hybrid assemblies in place of complicated cable connections. Compact insert components from TB&C can be used not only in electric cars, but also wherever large currents have to be transported under constricted circumstances.

"Electromobility – an important future market for our hybrid components."

Timo Arnold

TB&C's hybrid innovations also include overmolding, a process in which three-dimensional plastic or metal core elements of any desired geometric complexity are overmolded with one, two or three shot engineering plastics or other technical elements like carbon fiber nets or electronics. The result: extremely robust and lightweight and movable components that can be fitted with metal inserts as required. These ready-to-install elements are used wherever precision, installation space, stability or weight are key factors, such as in lightweight construction and automotive engineering.

"We integrate ourselves maximally into our customers' supply chains."

Robert van der Weck

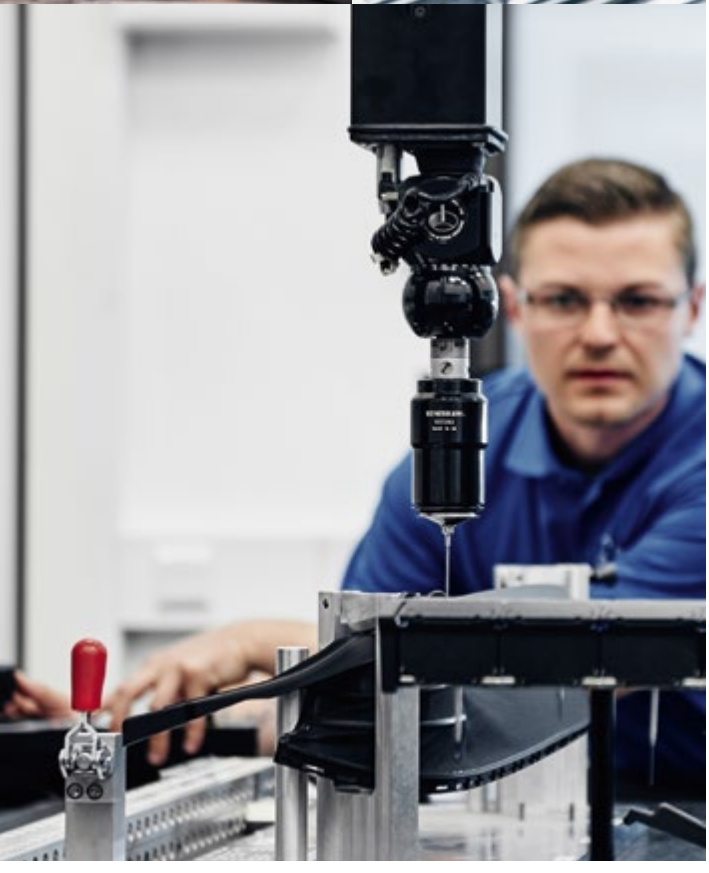
Innovative products, processes and applications in hybrid technology are the DNA of the TB&C Group. Its competence center, TB&C Technology GmbH, is continuously developing new solutions for new and existing customers in every industry.

High-performance facilities worldwide

TB&C is distinguished by its customer proximity and efficiency. With four production locations, the Group is present in the key industrial regions Europe, North America and Asia – where its customers are located.

The Group's headquarters have been in Herborn, Germany, since 2006, where 240 people work in development, administration and production in a large facility that has been expanded on numerous occasions. The new technology center, which opened in 2014, combines product development, tool construction, prototype and pre-series production under a single roof. With state-of-the-art equipment and a wide range of expertise all conveniently united in one location, TB&C's interdisciplinary teams are able to help their customers with the search for innovative applications in the field of hybrid technology.

In Mexico, TB&C has maintained a top-notch production location in Puebla, capital of the eponymous state, since 2010. Located near Volkswagen de México, what was originally a very small plant has grown into a facility with more than 200 employees, over 5,000 square meters of production area and its own stamping facilities, with the ability to produce such items as fuel doors and engine components for all VW models and sunroof mechanisms in large volumes. In order



"We know the technology and we know the business – this fuels our development."

Timo Arnold

to expand capacities to meet demand, the company plans to build a second plant in Irapuato, Mexico.

TB&C Outsert Romania SLR has been expanding continuously ever since it began production in 2015. Located in the city of Arad in western Romania, TB&C Outsert Romania has developed from an assembly plant into a comprehensive production facility for injection molding and overmolding with more than 100 employees, which made it necessary to add a second production hall in 2017.

TB&C Precision Parts in Suzhou, near Shanghai, has grown just as rapidly. Following a very brief start-up phase, in November 2016 a nine-person team began producing the first parts in a 6,000-square-meter facility. Nine-figure contracts from leading OEM manufacturers in the automotive industry had already been received, and just two years later in 2018, TB&C China employs over 60 people in series production.

We follow our Customer's Strategy

All around the world, the TB&C Group has strong partners and highly motivated employees with unique expertise. Its products for automotive, electromobility, medical technology and industry are widely recognized for their quality and innovation. The hybrid specialist's success is rooted in its customers, who value the TB&C's relentless focus on their wishes, expectations and priorities. TB&C offers its customers its full support in pursuit of their strategies – and it never lets them down.

"Our mission: using customer focus to achieve market leadership."

Derk te Bokkel

The TB&C story

2018	Mechatronics business unit is launched Hartmut Groos steps back from day-to-day operations Group Controlling is transferred to the Netherlands
2017	Minority shareholders bought out with assistance of H2 Equity Partners as investor Establishment of new holding company TB&C Investments in the Netherlands Expansion of the Arad plant
2016	Puebla plant moves into a larger production hall; installation of a 630-ton press Certification of TB&C as an official development supplier for VW TB&C Precision Parts begins production in Suzhou, China
2015	Establishment of TB&C Technology GmbH as Group-wide competence center for product development Establishment of TB&C (Suzhou) Trading in China
2014	Establishment of TB&C Outsert Romania in Arad, Romania
2010	Establishment of TB&C Outsert México in Puebla, Mexico
2008/ 2009	Gulf One Bank (Bahrain) and MIT GmbH acquire stakes in the Group
2006	TB&C moves to Herborn, Germany
2004	Derk te Bokkel and Hartmut Groos acquire PHILIPS Outsert Center and establish TB&C Outsert Center GmbH in Wetzlar, Germany

One of the key assets of the TB&C Group is its 30-plus years of experience with outsert technology – it is part of its DNA. The roots of the company and of this technology lie in the Netherlands-based PHILIPS Group, from which TB&C emerged in 2004 as an independent firm.

PHILIPS APM – the prequel

PHILIPS has been present in Germany since 1925 with multiple locations. In 1947, PHILIPS began production in Wetzlar. At first, the focus was on radios and car radios, but work expanded to include cassette players, CD and DVD drives. To produce these drives, in the 1980s the Automotive Playback Modules (APM) department developed outsert technology, because they needed to find a way to ensure precision and durability for the production of large volumes while keeping production costs to a minimum. At times, PHILIPS held a market share of as much as 80 percent for playback technology based on outsert components. When PHILIPS underwent a major restructuring in the mid-2000s, one of the results was a decision to part ways with APM. Consequently, a solution had to be found to secure the future of the APM business unit's production department.

In this situation, PHILIPS turned to Derk te Bokkel, a corporate consultant and interim-manager with a great deal of experience in spinning off production units. He had already spun off an area of activity for PHILIPS in the Netherlands and taken a majority share in the new company himself. In Wetzlar he met with the plant manager of PHILIPS Outsert Center, Hartmut Groos, a quality and technology expert who was very interested in a management buyout. For Derk, involvement in this company was risky, but it was also a move that offered promising development opportunities. Together, they decided to embark on this new adventure.

Launch in 2004

It was but a short time from creating the concept to establishing the company, a period full of activity and negotiations. The partners found a sustainable solution: the company's founders acquired the production, engineering and toolmaking activities from the Outsert business unit, while PHILIPS undertook to continue awarding contracts to its former subsidiary during a transition period. When the contract was signed in 2004, Derk and Hartmut were faced with the biggest challenge of their lives: TB&C.

Difficult start

It took from 2004 until 2009 for TB&C to firmly establish itself in the market. While the company possessed sophisticated technology, it still lacked market-ready products outside the field of playback technology. If the company was going to eliminate its dependence on PHILIPS, it would have to find new areas of application. This required a great deal of persuasion, for while outsert elements offer considerable advantages in terms of productivity, costs and quality, their use also demands changes in the development and production processes of customers. Ideally, TB&C needed to be involved in the

"Our start was more difficult than we had expected, but we remained confident in our technology and our business model."

Derk te Bokkel

development process early on, and sometimes assembly steps at the customer or their suppliers could even be eliminated.

Precision proved to be the decisive argument in the end. The TB&C team was able to demonstrate that outsert elements were also useful in such fields as medical technology and the automotive industry, where both stationary and movable complex elements made from metal and plastic have to be combined with one another in a precise, durable and cost-effective way.

BBraun, a provider of medical technology systems, and Inteva, an automotive supplier, were among the first to recognize the advantages offered by hybrid components in 2005. BBraun utilized them in infusion pumps, for example, while Inteva, a first-tier supplier for Opel and BMW, relied on TB&C components for Astra and Smart sunroofs. The latter application proved to be the major driver of growth in the following years. The company acquired additional products and platforms at Inteva and became a qualified preferred supplier. This success meant that TB&C had to deliver large quantities quickly.

"The move to Herborn was a team effort. Everyone did their part, and production was up and running again right on schedule."

Ottmar Loh

As a result, in 2006 the company moved to Herborn. This opened up excellent logistics possibilities and greater development potential – the relocation also offered the chance to restructure machinery and facilities in order to more efficiently organize production.

Yet no sooner had the foundation been laid for growth than the impact of the financial crisis hit the automotive industry and TB&C with full force in 2008/2009: in just three months, the young company lost nearly two-thirds of its turnover. As a result of strict cost management and the fortunate circumstance that a series of new projects was just entering production, TB&C was able to make it through

the recession without any layoffs. At the same time, the intensive marketing work made necessary by this situation resulted in the acquisition of new customers – not only had the company weathered the crisis, but it had also successfully survived its difficult start-up phase.

Rapid expansion

By 2010, TB&C had firmly established itself in the automotive industry. In addition to Inteva, TB&C acquired Webasto and Magna Car Top Systems as customers, suppliers to such companies as Mercedes and Volkswagen. Their requirements shaped the company's development in the years that followed: flexibility, global customer proximity and high volumes were all needed. TB&C became more international, establishing itself in Mexico, Romania and China.

In order to serve customers in the NAFTA region quickly and cost-effectively, in 2010 TB&C set up shop in Mexico. Its Puebla facility began production in 2011, and was already operating at a profit in 2012. With the establishment of a subsidiary in Romania in 2014 and a production facility in Suzhou, China, in 2016, TB&C achieved its goal of being able to offer large quantities at competitive prices. While TB&C rigorously pursued its strategy of internationalizing produc-

tion, Herborn increasingly took on the role of sales and development center for the Group, an emphasis that was underscored by the founding of TB&C Technology GmbH in 2015 and VW's subsequent designation of TB&C as a development supplier. This subsidiary has been intensively exploring the potential of hybrid technology in new product platforms ever since.

Gaining strength

Internationalization, rapid growth, the establishment of three production facilities on three continents, investments in state-of-the-art machinery and IT, and the large number of product platforms could only be managed with dedicated personnel, efficient management structures and a new shareholder strategy. New employees were added worldwide and a middle management structure established, and since 2017 a strategic investor has been working with the TB&C Group to help them achieve their ambitious international growth objectives.

New horizons

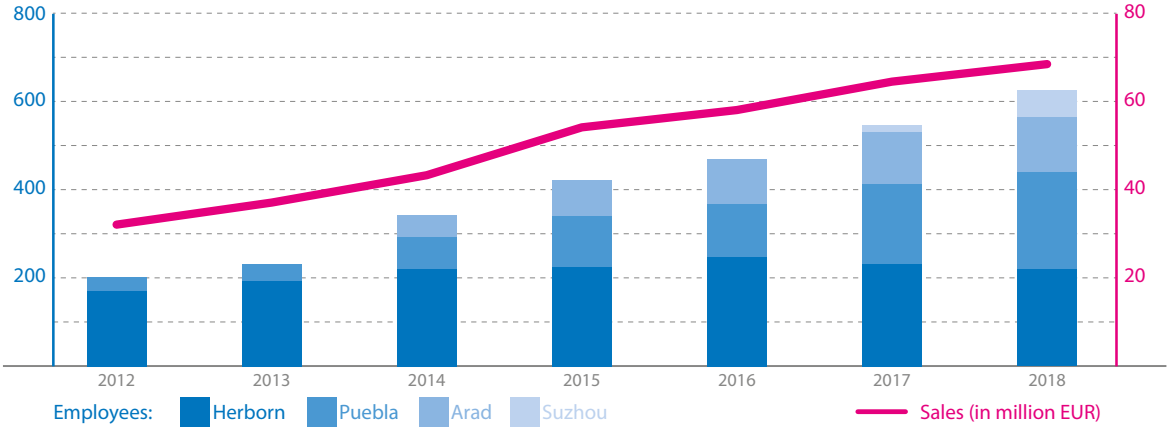
The TB&C Group is also moving forward technologically. TB&C Technology GmbH works intensively and systematically to explore new potentials in the field of hybrid technology, in order to provide the Group with new opportunities to further broaden its reach. Everyone at TB&C has always firmly believed that the full potential of functional integration through a tool-based production process has yet to be tapped.

The focus has moved to insert technology, which to date had only been used for very specific applications and small, electromechanical connecting components. Yet TB&C contributes its entire scope of expertise so that insert 'current bridges', known as busbars, and other power electronics components, such as those required in electric vehicles, can be manufactured in large quantities at a low cost.

This technological-strategic reorientation towards electromobility, most recently reflected in the founding of the Mechatronics business unit, supplements the TB&C Group portfolio while opening up new horizons and securing the long-term future of the TB&C Group.

"The automotive sector will be undergoing major changes in coming years, and we are ready."

Derk te Bokkel



We are TB&C

Klaus Mot

Injection Molding Technician in Arad

In 2014, Klaus saw the job listing on the internet: a German company was looking for employees for its new production facility in Arad. Klaus, who was 20 at the time and had attended a German school in this town in western Romania, applied right away – and got a job at TB&C Romania. Soon he was taking part in courses at the headquarters in Herborn, where he and his three colleagues were trained for assembly work. Klaus quickly became a trainer himself and started showing new colleagues what they had to do. He underwent further training at the SKZ (South German Plastics Center) and was promoted to team leader and setter. Now, as an injection molding technician, he is responsible for providing support for machines and processes. Alongside his work for TB&C, Klaus is also studying automotive engineering in Arad. Klaus is happy that he has been there right from the start. He has enjoyed helping to build up the plant and watching it grow, and continues to be enthused by the team spirit in Arad.

Angelique Ojeda-Kauferstein

Production Supervisor in Herborn

"Here, all doors are open to anyone who is dedicated to their job," says Angelique. She had already met Hartmut during her work-study program in pursuit of a degree in industrial engineering. When she came to TB&C in 2015 and met Hartmut for a job interview, she knew immediately that she was at the right place.
While Angelique had originally been looking for an administrative position, Hartmut recognized her strengths in production planning and convinced her that she should then continue as a cost engineer. She accepted the challenge and eventually also worked in project controlling.
From October 1, 2018, Angelique (33) has taken on a new role: as the first female production supervisor at TB&C, she now has sole responsibility for production personnel in the Automotive division at the Herborn plant.

Leon Gu

Senior Project Manager in Suzhou

Leon already had many years of experience in the automotive industry, including with TB&C's core product, sunroof assemblies, when he came to TB&C in late 2015. Leon (38) was particularly attracted to the freedom of action and future prospects. Being able to set up the production process right from the start and to develop alongside a fresh team in an up-and-coming company makes his work for TB&C particularly rewarding for Leon. He is especially proud of the fact that TB&C China no longer simply mounts components, but that under his charge, it also supplied Herborn and Puebla with new tools. As Senior Project Manager at TB&C, Leon is now responsible for the Webasto and Inalfa projects in Suzhou.

People are the key to success. Be it in Herborn or Puebla, Arad or Suzhou, dedicated teams of experts continue to write our story around the world. Six short profiles illustrate the qualities that make us who we are: individuality, diversity and team spirit.

Samuel Semler

Operations Manager in Herborn

When Samuel Semler worked for TB&C in 2006 while still in school, the plant was a different world: one half of the hall that is currently home to state-of-the-art injection molding machines was hardly used, and every evening it lay in darkness. But Samuel was completely taken with TB&C and with Hartmut, and knew that this was the place he wanted to start his career. Once he graduated from secondary school with his university entrance qualification in 2007, he convinced Hartmut that he should do a work-study program, and went on to earn bachelor's and master's degrees in industrial engineering. In 2012, Samuel, who sees himself as a generalist, took on a position as a sales engineer, then went on to oversee logistics. Samuel (31) has held the post of Operations Manager since 2017. He has also been appointed an authorized company officer, and is responsible for all production operations in Herborn. Samuel feels indebted to Hartmut for the role he has played in his professional development. His boss may have thrown him in at the deep end at times, but he has always been there to advise and assist him.

Mehrdad Shahgholi

Projektmanager, currently in Suzhou

Mehrdad came to TB&C in 2004. A mechanical engineer and injection molding specialist, he started off as a process engineer, but soon moved on to take charge of a navigation drive project that had entered a critical phase. Since this time, he has played an active role in TB&C's specialization to become the leading supplier of sunroof mechanism components and has taken part in its internationalization.
In October 2017, Mehrdad has been in charge of setting up the plant in Suzhou. He is fascinated by the chance to plan, develop and evaluate TB&C's fourth global site every step of the way, and hopes that the Chinese plant is able to continue its healthy and profitable development in years to come.
Mehrdad continues to relish the fact that TB&C is a technology-driven company, and he is certain that the Group's intelligent and innovative ideas will go on fueling its growth in spite of strong competition.

Juan Carlos Jaramillo

Sales Engineer in Puebla

Heroica Puebla de Zaragoza, or Puebla for short, is Volkswagen's primary production facility in North America. And Juan Carlos is responsible for TB&C's VW projects in Puebla. The automotive engineer came to TB&C Mexico in 2014. He was drawn by the rapidly growing company and its development opportunities. At first, Juan Carlos supervised the state-of-the-art measurement equipment in Puebla, where, as in all TB&C locations worldwide, input materials, end products and tools are subjected to careful, state-of-the-art quality inspections.
In 2017, Juan Carlos (32) moved into sales as an APQP engineer, where he coordinates quality management at the interface between customers, suppliers and production for all projects for Volkswagen Mexico.

Looking ahead

TB&C has been working for 14 years to make the future reality. When the company was established, it took with it a manufacturing technology and the know-how of its employees. With dedication, curiosity, entrepreneurial spirit and a willingness to take risks, it has leveraged these assets to create a sound corporate Group that is active worldwide and which continues to grow sustainably.

A new team under Robert van der Weck has now taken charge of the TB&C Group. Derk te Bokkel will continue to serve as a representative of the Group‘s owners and draw on his many years of experience to advise the management team. Together we will tackle the challenges and seize the opportunities of the future.

These challenges are as big as ever. TB&C must maintain its consistent and efficient international growth even as the global economy appears set to an era of instability and imminent technological change. The entire TB&C Group must continue its resolute pursuit of growth, new customers and new product opportunities. Our high-quality products have brought us success that is reflected in worldwide growth in demand. Our goal is to safeguard and secure the success we enjoy with our customers over the long term.

There are also many opportunities, and it is up to us to seize them. We have a great deal of experience in entering new market segments; in fact, the ability to create innovative and as-yet unknown applications for our technology is perhaps our greatest strength. The electrification of our world holds tremendous potential. Our pioneering busbars, for example, ‘current bridges’ for electric vehicles, are but the first of a whole series of innovative components for the promising future markets of electromobility and wind energy.

TB&C will remain true to itself, and will continue to change. Together, we will draw on our experience, our strengths and our potential to shape our future.

Derk te Bokkel,
Timo Arnold,
Robert van der
Weck

Publishung details

Publisher
TTB&C Holding GmbH
Junostraße 1
35745 Herborn
Germany
Phone: +49 (0) 2772 / 575 95-00
Fax: +49 (0) 2772 / 575 95-81
Email: info@hybrid-technologies.com
http://www.hybrid-technologies.com

Concept, text and editing
Engels & Faridi GbR.
Corporate and technical history consulting,
Cologne, Germany

Graphic concept and design
Redaktionsbüro Kupilas, Cologne, Germany

Photos
TB&C, Nico Pudimat