exact

THE WORLD OF DISPENSING TECHNOLOGY
ISSUE 01

DOPAG

We bring you the power of automation

Turnkey solutions for potting, bonding and gasketing

Page 10

LUBRICATION

Brake system greasing in automotive production

Page 4

3D PRINTING

Dispensing systems for serial production

Page 6

ANNIVERSARY

DOPAG France celebrates 30 years of success

Page 14

HILGER&KERNGROUP

Did you know?

A car primarily consists of sheet metal. Then there are glass panes, carpets, seat upholstery and the list goes on. What you may not be aware of though – as it cannot be seen from the outside – is glue. Glue is a vital ingredient in cars and fairly large amounts of it are used in their production – about 18 kilograms. That's the equivalent of 1800 little glue sticks!

Adhesive is used to bond components in the chassis and the interior but also windows and even some parts of the engine. It is interesting that gluing actually increases safety in the event of an accident. Compared to cars with welded parts, cars with glued parts perform better in crash tests. At DOPAG we help ensure that adhesives are metered, mixed and applied accurately using our dispensing systems.

Imprint

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Dear reader,

As we watch key developments such as Industry 4.0, the Internet of Things, automation and novel production processes such as additive manufacturing bring a higher complexity to the modern industrial world, it can hardly be denied machine and plant engineering are facing new challenges. This is certainly the case in the area of dispensing technology, where requirements are on the rise not just in terms of application accuracy but also in terms of automation and user-friendliness. An individualised approach to dispensing solutions is simply a must. At the same time, new fields of application are emerging, such as electric mobility.

At DOPAG, we want to be in close touch with these fast-changing developments and applications. That is why we are relaunching our customer magazine exact after a few years' break. We are pleased to be presenting you with the first edition today. Be prepared for an intriguing and stimulating read. We will explore the ways in which DOPAG technology moves forward to meet the challenges posed by the above mentioned developments. We will also report on the solutions we offer for a wide variety of applications. For example, you will read about our dispensing system eldomix and its success as part of 3D liquid printing processes, where it helps manufacture tailored sports gear and dental models. Our automation solutions are tailored just as well. In our application report, we will show you how custom dispensing systems are designed for specific electronic potting tasks. Lastly, our dispensing systems can be found integrated within highly automated processes across the automotive industry. Here we will take the example of the Swiss automotive supplier SFS to look at an ideal incorporation of valves and pumps by DOPAG.

We hope you enjoy reading the first reissue of our exact.

Yours sincerely,
DOPAG Executive Board
Steffen Knaus, Daniel Geier und Dr. Mike Wehmeier

GREASING AND OILING

Optimal power transmission

Customised lubricant application for brake systems

DOPAG has developed two special lubricant application systems for the SFS Group AG, a global leader in mechanical fastening systems, precision formed components and assemblies. Finding the ideal solution involved not only complex testing in DOPAG's Technical Center, but also the manufacturing of a special adapter.

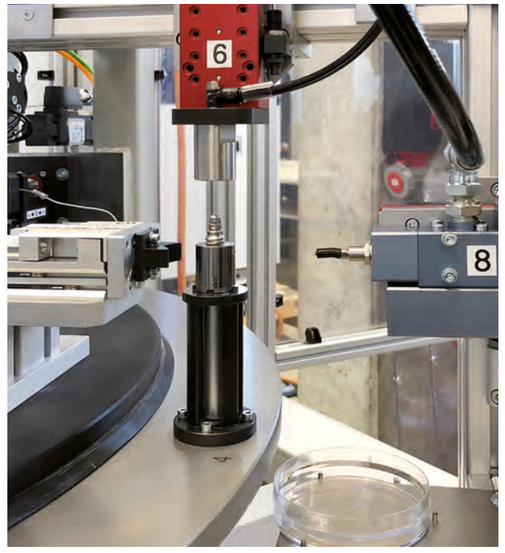
Modern vehicles offer a vast array of assistance systems designed to improve driver experience, while increasing safety. Think for example park assist, lane keep assist, electronic stability control, traffic sign recognition, proximity sensing, etc. There is always room for new functions. However, this goes hand in hand with increasing requirements on the integration of these functions into the vehicle mechanics. Across the automotive industry a great deal of effort is being put into finding effective solutions and at the Swiss company SFS things are no different. SFS provides the industry, among other things, with a variety of mechanical assemblies and components, for example from the areas of airbag and ABS/ESP systems, sensors, seats, doors or interior fittings. Founded in 1928, the company is now an international group with more than 80 sales and production sites across the world.

The SFS product portfolio also includes ball screws and screw jacks for electric parking brakes. These generate brake pressure by converting rotational movement into linear movement. The production of ball screws requires two lubricant applications, since the component must be both greased and oiled at the same time. For both these applications, DOPAG has designed individual dispensing systems that meet all the requirements in terms of accuracy, repeatability and cycle time.

The ball screw drive is greased on a rotary table using a chamber metering valve. The benefit of this valve is that it allows for a clean and precise application of material in the smallest dots. Only a few seconds are available for the greasing process, so the cycle time is extremely short. Material is supplied via a tandem version of the P200 drum pump from the DOPAG lubriLine range. This ensures that material is available to the fully automated production line at all times and that drums can be changed without interruption to the production. A material pressure regulator is interposed, reducing the pressure of the conveyed material to the required working pressure. As a result, the material is being discharged evenly at all times.

Thorough testing in the technical center

To achieve a truly accurate and even oiling of SFS' components, DOPAG engineers additionally devised a special adapter. Initially, test series were carried out in the technical center of the DOPAG Competence Center in Cham, Switzerland. These showed that the shot valve would not be suitable for the application and that another solution had to be found to ensure the material would be applied in a perfectly clean manner. The answer was developing an additional, special adapter for the needle metering valve (0.05-1ml). The adaptor was performing well during further tests and after consultation with SFS, it was redesigned and finalised. The material is supplied via a pressure tank filled by a bunghole pump from a 200l drum. A gear flow metering cell is used to monitor the flow rate. Based on the volumetric gear displacement system, the cell is capable of measuring the exact flow rate with a very high degree of accuracy. This is all the more important when it comes to the production of components for the automotive industry, where automated production processes need to comply with numerous strict requirements. Finally, the two metering systems were delivered to a system integrator, who incorporated them into the entire production line.



Greasing of a ball screw drive with a chamber metering valve

Oiling with a needle metering valve and a special adapter

Project plan

Depending on the parameters of each case, a metering unit can take various forms. Within a few project steps, DOPAG team and the customer reach a plant concept that meets all the application requirements.

1.
Customer enquiry

2.
Enquiry is processed by DOPAG (application form, datasheets, sketch)

3.
Feasibility study, first layout design, possibly testing in the technical centre

4.
Budget quotation is made

5.
Customer reviews budget quotation

6.
Further testing in collaboration with customer

7.
Fixed quotation is made

8.
Customer places an order

9.
Project engineering / elaboration of detailed configuration

10.
Production

11.
Delivery and commissioning

Production Redefined

Digital Manufacturing at Scale

The world's leading digital manufacturing company, Carbon® has cracked the code on delivering the promise of 3D printing as a real manufacturing tool. Using Carbon® Digital Light Synthesis™ (DLS™) technology, companies are using the Carbon® Digital Manufacturing Platform to produce innovative applications ranging from protective sports gear to automotive components and dental models. With the adoption of additive technologies to digitally manufacture parts, there is a growing demand for precise material dispensing solutions that can scale with quality and cost.

Good cushioning, a high degree of flexibility, a custom design – the sports industry of today is undeniably a highly advanced one, where athletes expect to rely on customised equipment that offers the highest amount of protection so they can perform their best. Traditional approaches to manufacturing are limited. That is why 3D printing has come to play an increasingly important role in product innovation across a range of industries. For example, the healthcare industry uses 3D printing to manufacture custom and durable dental implants. The automotive industry incorporates additive technology to produce more and more of its components. So, for example, complex assemblies are being replaced with a single, printed component, while the technology has also opened the door for unique interior designs. 3D printing has been around for three decades, but only recently has it begun delivering on its promise as a real manufacturing tool. After decades of trying to define its relevance in manufacturing, 3D printing can now truly scale part production with quality and cost. That's what Carbon®, a US-based company from Silicon Valley, is doing with its Digital Manufacturing Platform. Parts produced on the Carbon® Platform using their patented dual-cure materials are mechanically comparable to injection molded parts made from unfilled thermoplastics.

Photo: Carbon®

Photo: Carbon®

Carbon® Digital Manufacturing Platform

eldomix – a metering and mixing system for liquid bath filling

The DLS™ Technology

The driving force behind Carbon® Digital Light Synthesis™ (DLS™) technology is its layerless CLIP technology, which transforms 3D models into physical objects rapidly. The photochemical process balances light and oxygen to produce parts by projecting light through an oxygen-permeable window into a reservoir of ultraviolet (UV)-curable resin. As the technology projects a UV image sequence, the part solidifies, and the building platform rises. CLIP continuously grows objects from a resin pool at speeds 25-100 times faster than traditional 3D printing. Similar to injection-molding parts, CLIP produces consistent and predictable mechanical properties. Carbon's patented „dual-cure" approach to resins uses both light-activated and heat-activated chemistries. Many of Carbon's dual-cure materials rely on precisely mixing two part resins in the right ratio to achieve optimal properties. Though this is relatively straight forward at small scales, it is more challenging at the production level. The challenge is supplying the 3D printer with the correct ratio and amount of material continuously and reproducibly.

A material supply system fit for the task

The metering and mixing system DOPAG eldomix has been selected by Carbon® to take on this simple, yet at the same time complex task. Eldomix fills material reservoirs with two-component material based on polyurethane, silicone, epoxy or acrylic resin, either manually or automatically. It uses gear metering pumps driven by three-phase asynchronous motors, a static-dynamic mixing system and a valve with a separate material supply. As a result, the eldomix meters and mixes Carbon's unique dual-cure materials with utmost accuracy, repeatability and high quality. It is an ideal way to achieve optimal results and produce perfect and durable components. As far as series production is concerned, reproducibility and reliability are the very pillars of the whole concept.

news

A dispensing system for vacuum infusion, RTM and pultrusion

compomix FI: a specialist in resin bath filling

Compomix FI is a dispensing system developed by DOPAG specifically for the production of fibre reinforced plastics. Its task is the impregnation of glass, aramide or carbon fibres and it is ideally used in applications such as vacuum infusion, resin transfer moulding (RTM), pultrusion and filament winding. Depending on the application type, the compomix FI can be used to either fill a resin bath with two component material and keep it at fill level or to inject material directly into a mould. The material is supplied from two material tanks installed on the system. They can be filled directly from the original delivery containers, whereby the tank refill is done automatically and can be gravimetric or done via standard refill systems.

Process monitoring for shot applications

New light barrier completes the lubriLine product line

Contactless application of grease and oil is most frequently used by the automotive industry in its highly automated production processes. This sector is known for setting the requirements for process monitoring and quality assurance particularly high. DOPAG now offers a new light barrier for the monitoring of the very fast switching shot and high-speed valves. It comes with a completely revised design, offering the user better handling and greater comfort.

The light barrier counts the number of discharged shots, checking them against the set target quantity. On the technical side, it has been equipped with a new monitoring device and new fibre optics. Additionally, the new light barrier has a special feature, whereby the nozzle can be cleaned with compressed air. For detailed product information about the barrier and other lubriLine products, visit www.dopag.com/lubriline.

Contract manufacturing of foam gaskets

DOPAG offers comprehensive advice and flexible solutions

DOPAG customers can now take advantage of extended services for foam gasketing. Having successfully established its presence in the new business area, DOPAG now has several dynamicLine systems available for the production of foam gaskets at the company sites in Mannheim (Germany) and Hohenems (Austria). Customers can use services such as sampling, prototyping and small series and mass production.

The possibilities for foam gaskets are vast. Most often we will see their use in the automotive and lighting industries or in the production of switch cabinets, household appliances, filters and packaging. Contract manufacturing of foam gaskets does not require a separate production line with skilled labour, the costs are easy to keep an eye on and ensuring a continuous production comes at little effort. All DOPAG contract gasketing services are based on the principle of personalised advice. For example, customers can expect support with gasket development and with prototyping.

evomix DF: Potting of dialysis filters

DOPAG presents a dispensing system for use in the medical industry

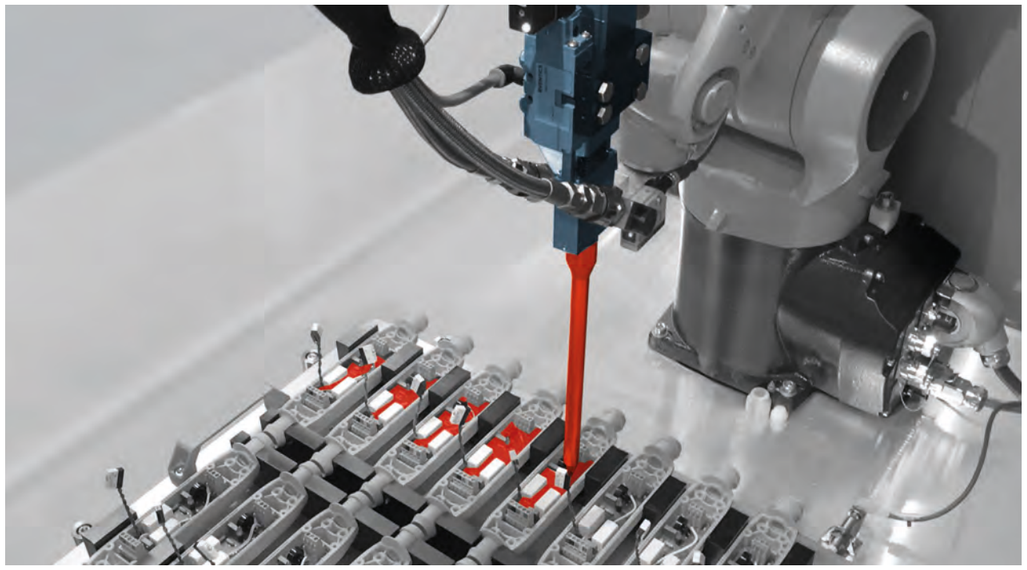
The production of medical devices requires extremely high levels of care and accuracy, particularly when it comes to the production of sensitive products such as dialysis filters. Here the production process requires that a membrane with thousands of hollow fibers be firmly bonded with an outer shell. To achieve that, the two components are potted with a two-part polyurethane.

DOPAG has developed a special metering and mixing system for this task, called the evomix DF. This system is based on the well established two-component dispensing system eldomix, one that reflects and addresses all the particular challenges of potting very effectively. Like the eldomix, evomix DF is also equipped with gear metering pumps, which allow for a highly precise and repeatable dispensing of highly viscous, even pasty materials (viscosity range 50 to 80,000 mPa s), such as those used in the potting of dialysis filters. The mixing head of the evomix DF is certified for use in cleanrooms and the system can be integrated into a fully automated production line.

IN FOCUS

„Spot on!“

Tailored solutions for automated potting



Automated solutions are becoming more and more popular in the world of electronic component potting. This applies to production cells, as well as customised systems. Here we present two examples of the implementation of automated potting solutions.

Inside a production cell, a robot arrives at a component, discharges an exact, pre-specified amount of material and immediately moves on to the next component. Within a very short time, it will have finished potting more than 15 electronic components. The potting material seals the components, protecting them from environmental influences such as dust, dirt and moisture. Behind what may look like a simple task, there is actually a phase of intensive planning and engineering. This is because the dispensing system had been designed by DOPAG to fit very specific requirements of the user, so that it can be smoothly integrated into the existing production process.

DOPAG develops and builds automated dispensing systems for potting, bonding and gasketing. These can be either small, compact production cells or more complex, tailored systems capable of taking on additional upstream and downstream process steps and handling. For projects of this kind, DOPAG brings together all of its expertise in a single team. From the Kierspe (Germany) location, Director of Automation Technologies Michael Wortmann and his team take over the entire design, engineering, software programming and commissioning on site. „As a result, we are able to fully immerse ourselves in the application and the process, because it is the only way to develop a system that will ultimately meet all customer's requirements,“ says Michael Wortmann. „In addition, our customers clearly benefit from having the same contact persons from the very start until the end of the project, always knowing who they can turn to, including in the after-sales stage.“

A production cell for potting, bonding and gasketing

A custom-built metering system for potting: a robot takes over the entire component handling process

A tailored solution for more flexibility

Working on a project for a global machinery manufacturer, DOPAG developed a dispensing system for automated potting with a range of integrated pre- and post-treatment processes and an entire component handling system. Part of this dispensing system are a number of special features ensuring the highest degree of efficiency and flexibility. For example, there is a robot dedicated exclusively to handling. Upon the completion of manual assembly, it moves components from one production step to another. So, for example, it will take a component from the preheating station and move it on to potting, then to curing, etc. Another special feature is that there is flexibility in the way the system pots the three various assemblies. The order and quantity can be adjusted by the user at any time to meet the current need. The dispensing station features another robot. This one is equipped with the eldomix dispensing system, which has been designed specifically for potting applications. „Depending on which of the components is being potted, material application is automatically adjusted to be carried out in dot or continuous form for example,“ says Wortmann. „On the whole, the system concept and robot programming are designed in such a way that the user can intervene with flexibility in all the steps of the process, all the while keeping the entire system optimally utilised at all times.“

Production cells for a compact manufacturing process

Production cells offer a compact solution for automated potting applications. Like custom-built dispensing systems, they can be equipped with eldomix or another system from the DOPAG range. After manual assembly, automated potting of components is carried out one after the other. Should the production process require more steps, individual production cells can be installed in a line. This means that any additional pre-treatment or post-treatment can be integrated into the production process without the user having to manage the handling. While each manufacturing process has its own specifics, DOPAG custom-built systems and production cells offer wide-ranging options for process-reliable potting with high repeatability and consistent quality.

Automated dispensing systems

project outline

1.
Enquiry including application and material information, etc.

2.
First project outline and quotation generation

3.
Material and component testing

4.
Fine tuning and order placement, possibly further testing

5.
System design phase

6.
Construction and commissioning

7.
Acceptance by client

8.
System delivery and installation on site

9.
Final acceptance

Video: Tailored solutions for automated potting

INTERVIEW

„Today customers are looking for complete turnkey solutions“

Managing Director Daniel Geier talks about automated dispensing technology

Mr. Geier, the increasing demands on dispensing technology seem to constantly come up in discussions. What do these mean specifically in the field of automation?

The requirements have been on the increase across the whole spectrum of dispensing applications, be that bonding, gasketing, potting or greasing and oiling. On the one hand, of course, this affects the very application itself. On the other hand, customers have long since stopped looking simply for a dispensing system that does just that. Instead, they seek complete, turnkey solutions that can be effectively integrated into the entire manufacturing process. An intelligent, comprehensive design will also cover any associated peripheral components for pre- and post-treatment of the product, as well as quality assurance measures and any required conveyor and handling technologies.

What does this mean for dispensing technology manufacturers and what for the customers?

Having a high level of expertise in dispensing technology is of course no longer enough. Experience in custom machine building is required if you want to present a turnkey dispensing system which reflects – in addition to the dispensing application – also the accompanying process steps. We can do both. The key is a detailed analysis of our customer's needs, because this is the only we can arrive at a solution that brings the customer the maximum benefit. This is why we have our own team that specializes exclusively in automation solutions.

Let us come back to the question of applications: What are the requirements here and what does DOPAG offer?

It is no longer just about precision. Rather it is, above all, about material savings, cycle times, handling speed or standards that need to be observed. Cycle times are becoming tighter and at the same time they are the most important factor to consider. In addition, automated dispensing systems must be able to cover various applications, that is, be able to bond multiple variations of a component or pot different components. We offer a high level of safety here, because in the construction process or already in the project initiation phase, we carry out an extensive series of measurements as well as final acceptance after the completion.

Daniel Geier, Chief Technology Officer at DOPAG, is responsible, among other things, for the key business area of Automation. As a mechanical engineer, he has decades' worth of experience in the field of dispensing technology. At DOPAG, he also worked in the development department and as the head of DOPAG Technical Center. In this interview, Mr. Geier goes on to talk about the latest demands on automated dispensing technology, its future challenges and the performance profile of DOPAG.

A custom-built dispensing system for the household appliance manufacturer Amica: Oven door components are being processed, including pretreatment with Pyrosil and post-treatment in a curing buffer.

Automation in numbers

15 bn

The total turnover in euro of the German robotics and automation industry in Germany and abroad in 2018.

2,6 mio

According to official estimates, this is the number of industrial robots worldwide in 2019.

710

Is the number of industrial robots in South Korea per 10,000 manufacturing workers in 2017. In Germany there were 322, 200 in the USA and only 97 in China.

How does DOPAG set itself apart from other providers in the field of automation?

We attach particular importance to nurturing partnership-based relationships with our customers. This is evident from the fact that from the beginning of project discussions through to delivery and even after-sales, the customer is looked after by the same set of DOPAG staff. In addition, as I already mentioned, we rely on a thorough and clean analysis of the customer's needs as well as of the application, because we believe this is the only way we can offer a truly reliable solution that meets customers' requirements in their entirety.

What challenges is metering and mixing technology facing at the moment?

New applications are constantly being added to the existing spectrum, as we can see for example in the areas of 3D printing or e-mobility. Moreover, the applications are becoming more and more complex and so placing an ever higher importance on the question of user know-how. New materials are being developed in increasingly shorter cycles. We have decades' worth of experience with a wide range of applications. We work closely with material manufacturers and have tested over 2,000 different materials. Such know-how allows us to confidently master the challenges the increasingly complex applications bring with them. Industry 4.0 is also becoming an increasingly important topic in terms of system availability, maintenance planning and flexible use.

Over 30 years of success

DOPAG France celebrates an anniversary

DOPAG France is the eldest subsidiary of the HILGER & KERN GROUP. This year marks their 30th anniversary. We look back at their success story.

It all started in a small office in Valence: here Pierre Montala and his small team of two employees started working towards establishing DOPAG on the French market of metering and mixing technology in the spring of 1990. Reiner Kern, the holder of Hilger und Kern GmbH, and Gerhard Witzig, co-holder of DOPAG AG in Switzerland, wanted to expand their position on the European market. So, on the 1st of March, 1990, they founded DOPAG Sarl together with their French business friend Pierre Montala. Later in 1996, Pierre's son Elain joined the company, initially to work in the commercial sector. After the death of his father in 2011, Elain took over as company manager.

Over the past 30 years, DOPAG France has become a well established player on the local market, serving many important customers from various industrial segments. These include automotive suppliers such as Plastic Omnium, Faurecia, Valéo and Michelin or customers from the aerospace and general industries such as Airbus, Safran or Staubli.

As part of the HILGER & KERN GROUP, the subsidiary has become an important competence center. Its headquarters is currently located in Valence, where the subsidiary runs its own production facility where both standard and special metering and mixing systems are built. A team of 30 employees looks after DOPAG customers in France, while a sales engineer is also available for customers in Morocco, Tunisia and Algeria.

Managing Director Elain Montala speaks of his aims for DOPAG France in the future: „Our employees have always been at the heart of our company, because it is only thanks to them that we can ensure the high quality of our products and services in the future and maintain our know-how at this high level". Additionally, DOPAG France will continue to work on maintaining the customer satisfaction in the region – the one it has so carefully built up here over the last 30 years.

Pierre Montala in 2000

Managing Director Elain Montala

Following DOPAG

This time in Prague

Jan Nožička is General Manager at DOPAG Eastern Europe. He shows us around the city, giving us a few useful insider tips.

Which highlights should not be missed?

- **Charles bridge** – Best time to go is early morning or late evening to avoid large crowds of tourists.
- **The Jewish Quarter (Josefov)** – Prague means Kafka. A stroll through this part of Prague will indulge you in a truly unique atmosphere.
- **St. Vitus Cathedral** – often called the twin sister of the Notre Dame. Do go inside too – there are beautiful stained glass windows by various prominent artists.

What can be explored off the beaten path?

- **Pragulic** – let the city's homeless take you on tour of Prague as they know it. A very successful sustainable social project.
- **Náplavka Rašínovo Nábřeží** – a bank of the river, where locals meet up to relax with a beer or a glass of wine. Often there are farmers' markets and other events on.
- Shop and snack at **Jiřího z Podebrad Farmer's Market** – open Wednesdays to Saturdays, this is a hidden gem where you can buy fresh produce from locals. Go before 2pm.

Where to go for a culinary experience?

Definitely Cafe Imperial. The food never disappoints and the space is just breathtaking with an art deco interior from 1914. Check table availability in advance. For a good, classic Czech meal, go to one of the Potrefená Husa franchises.

What do you like most about your city?

Compared to other European capitals, Prague has managed to largely escape bombing in the Second World War. That's why its original architecture is well preserved, so you don't need to look for the nice parts of the city. Wherever you go, you're surrounded by beautiful old buildings. With exceptions, of course…

Prag is the location of one of the company's youngest subsidiaries established in 2017 – DOPAG Eastern Europe. Here, a team of eight are looking after the company's customers in Czechia, Slovakia and Hungary. With more and more car manufacturers opting to set up their modern production sites in these countries, Prague is an ideal location, from which DOPAG can support customers with bonding and greasing applications, providing a fast, local service. The office is only about 10 minutes away from the airport and about half an hour to the center of the city.

Do you have questions or suggestions?

Please find your local DOPAG contact here:
www.dopag.com/contacts

Worldwide sales and service network

We are one of the world's most experienced manufacturers of high-quality metering technology. Wherever adhesives, resins, silicones or lubricants are metered and applied in industrial production, we offer reliable, precise solutions. We provide systems and components for highly automated production processes, including for the automotive, wind, household appliances and electrical industries, as well as for aviation and space travel.

DOPAG is part of the HILGER & KERN GROUP, a reliable supplier, development and service partner to industrial companies in a variety of market segments for over 90 years. The group employs around 350 people and has subsidiaries and distributors in more than 40 countries.