Needle-Trap …
Don’t Get Stuck Without It

Unique, label-integrated needle protection
Our award-winning Needle-Trap is a cost-effective solution to help prevent accidental needlestick injuries. The simple, economical design of its integrated safety mechanism allows the needle to be quickly and safely secured after use. Needle-Trap can be easily incorporated into conventional labeling systems and is adaptable to the most common syringe types.

To learn more, scan the QR code below or go to www.needle-trap.com

Interested in our latest sample kits?
Just send an e-mail to:
info@schreiner-medipharm.com

Needle-Trap. Making safety a snap.

Integrated Sustainability
Learn more about Needle-Trap’s reduced environmental footprint: www.needle-trap.com/en/advantages
Dear Readers,

2021 is a special year for Schreiner Group. In 1951, exactly 70 years ago, my grandparents, Margarete and Theodor Schreiner, founded “M. Schreiner – Spezialfabrik für geprägte Siegelmarken und Etiketten,” a factory specializing in embossed seal stamps and labels which they started in a garage in Munich’s Laim district. With a lot of diligence and a little bit of luck, the small operation soon turned into a flourishing business. Our commitment to assisting and serving the customer without fail has driven our commitment to innovation. Our willingness to keep reinvesting profits has been driving our continuous growth. Today, we’re a globally successful hidden champion and I look forward to looking back on the past 70 years together with you (page 5).

While looking back, we definitely want to keep an eye on the future as well. Not long ago, Schreiner Group ventured its leap abroad and established its own international locations. In 2008, we launched our U.S. site in Blauvelt and in 2016, we opened a manufacturing plant in China. A move that has paid off! Our location in Fengpu has now existed for five years. Compared to Schreiner’s 70th, this is no doubt still a “small” anniversary, but with huge potential going forward. As early as in 2019, after merely three years, the location reached the break-even point. Jamie Long, our General Manager in Fengpu, will share with you what else has changed (page 8).

Obviously, our business units and competence centers have a lot of new and exciting stories to tell as well. Enjoy the read and stay healthy.

Sincerely yours,

Roland Schreiner
<table>
<thead>
<tr>
<th>Schreiner Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>05 Anniversary: Schreiner Group Celebrates its 70th</td>
</tr>
<tr>
<td>06 Award in Asia: Needle-Trap Wins in China</td>
</tr>
<tr>
<td>07 Prize Winner: FINAT Label Competition 2020</td>
</tr>
<tr>
<td>08 5 Years: Fengpu Celebrates Anniversary</td>
</tr>
<tr>
<td>09 SAP GoLive: Fit for the Future</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner MediPharm</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Medication Adherence Monitoring: Digital Therapy Control</td>
</tr>
<tr>
<td>12 China Premiere: N’hao, Needle-Trap!</td>
</tr>
<tr>
<td>13 Digitalizing Syringes: Cap-Lock plus RFID</td>
</tr>
<tr>
<td>14 Specialty Combo for Clinical Trials: Pharma-Tac + Booklet-Label</td>
</tr>
<tr>
<td>16 DoseID: RFID Standard for Healthcare</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner ProTech</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Displays: Solid Protection for Infotainment</td>
</tr>
<tr>
<td>19 Two-in-One: Color Laser Film Translucent</td>
</tr>
<tr>
<td>20 Steam-Permeable Adhesive Solution for Humidity Sensors</td>
</tr>
<tr>
<td>21 Permanently Durable Marking</td>
</tr>
<tr>
<td>22 Thanks to Printed Electronics: Wound Healing with Plasma</td>
</tr>
<tr>
<td>23 Simple Equipment: The ((rfid))-UHF Starter Kit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner PrinTrust</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Smart IOT RTIs</td>
</tr>
<tr>
<td>25 Self-Adhesive Moped Plates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner LogiData</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 RFID Process Analysis: The Optimal Product</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner ProSecure</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 BPA-Free Thermochromic Inks</td>
</tr>
<tr>
<td>29 Study: Authenticating Products with AI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schreiner Digital Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 Smart City</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PUBLISHED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schreiner Group GmbH &amp; Co. KG</td>
</tr>
<tr>
<td>Bruckmannring 22</td>
</tr>
<tr>
<td>85764 Oberschleissheim/Germany</td>
</tr>
<tr>
<td><a href="mailto:info@schreiner-group.com">info@schreiner-group.com</a></td>
</tr>
<tr>
<td><a href="http://www.schreiner-group.com">www.schreiner-group.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Responsible in the spirit of</th>
</tr>
</thead>
<tbody>
<tr>
<td>German press law: Roland Schreiner, President and CEO, Schreiner Group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Head of editorial team:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susanne Hoppner</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Editors:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eva Manzenreiter, Bernd Pfadler, Andrea Richter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graphic design:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernhard Altfalg</td>
</tr>
</tbody>
</table>

| We wish to thank all employees who have contributed to this issue for their support. |

© 2021 Schreiner Group GmbH & Co. KG
A Special Anniversary: Schreiner Group Turns 70

2021 is the year of a special anniversary for Schreiner Group. The high-tech company was founded as a small garage operation in 1951. Beginnings that are hard to imagine, considering the worldwide significance this hidden champion with a workforce of more than 1,200 has since achieved. Our anniversary will be duly celebrated this year with numerous activities tailored to the prevailing external circumstances.

On October 1, 1951, Margarete and Theodor Schreiner founded “M. Schreiner – Spezialfabrik für geprägte Siegelmarken und Etiketten,” a factory specializing in embossed seal stamps and labels, in a 45-square meter garage in Munich’s Laim district. In 1974, their son Helmut took the reins of the business and began charting its future course as an international high-tech company. Following numerous expansions and relocations, Schreiner Group moved into a facility at today’s headquarters in Oberschleissheim in 1993. Since then, five additional buildings have been erected, three other sites established in the United States, China and the Bavarian town of Dorfen. In 2012, Roland Schreiner, representing the third generation, assumed overall responsibility for the business.

In 2021, this tremendous success story will not only be told but, above all, duly recognized. Therefore, a number of activities will be held throughout the year to commemorate Schreiner Group’s 70-year history, to celebrate its 70th anniversary together with all employees, partners, customers and friends, and to show where the company is heading in the next 70 years. What are we planning in this context? We’ve set up a special anniversary landing page to keep you posted—or just follow Schreiner Group in social media.
Schreiner Group has won numerous national and international awards for Schreiner MediPharm’s Needle-Trap needle protection system. In the fall of 2020, the product achieved its first leap onto the winners’ podium also in the Middle Kingdom: In the competition of the Chinese packaging and printing industry association, it won a Gold Award in the “Labels” category.

The China Packaging Federation (CPF) and the Pharmaceutical Packaging Printing Committee of the China National Pharmaceutical Packaging Association (CNPPA) has been organizing the competition since 2014. The jury evaluates entries in various categories such as food and luxury food packaging, soft packaging and labels in terms of printing technology and printing quality as well as outstanding design and technical innovation. Needle-Trap won a first-place award in the “Labels” category.

The prize was presented in September during the “Suzhou Dialogue” in Suzhou (Jiangsu province, west of Shanghai), an annual event held by the CNPPA. Jamie Long, General Manager of Schreiner Group at the company’s Chinese site in Fengpu near Shanghai, accepted the award on behalf of Schreiner Group. “‘Made in Germany’ is highly valued in our country because German products are regarded as delivering reliable and safe performance. I’m very proud that Needle-Trap, a product that was developed at our German headquarters more than ten years ago, has won in a Chinese competition.”

Needle-Trap

Needle-Trap is a unique, active needle protection system for prefilled syringes. It consists of a label-integrated trap that secures the syringe needle after an injection. This mechanism helps prevent accidental needlestick injuries. More than 1.1 billion Needle-Traps have been produced since the product’s market launch in 2009. Needle-Trap is utilized for prefilled syringes by leading pharmaceutical manufacturers in Europe, North and South America, Asia and Africa.
For Schreiner Group, the presentation of the 2020 FINAT Awards was a resounding success. Last year, a total of three first-place awards went to Oberschleißheim: the Autoinjector-Label and the Covert-Hologram Seal from Schreiner MediPharm as well as a translucent Color Laser Film with a value-adding function from Schreiner ProTech impressed the jury. Due to the corona crisis, an all-new concept featuring an online event was created for the awards ceremony that brought the festive atmosphere right to people’s offices this time.

In the fortieth year of its existence, the European association for the self-adhesive label industry presented the 2020 FINAT Awards. Schreiner Group was recognized with a total of three first-place awards in diverse categories. “I’m delighted about these accolades,” said President and CEO Roland Schreiner on the occasion of the 2020 FINAT Label Competition awards ceremony, “because they show that our products stand out in a wide variety of sectors—which is tremendous motivation for all our employees.”

Schreiner MediPharm’s Autoinjector-Label for TEVA was successful in the “Pharmaceutical” category. Schreiner Group’s business unit developed the label for the globally operating Israeli pharmaceutical manufacturer TEVA. Due to the label’s special abrasion protection, vital user and product information remains permanently legible.

In the “Security” category, Schreiner MediPharm’s multifunctional Covert-Hologram Seal won a first-place award. Due to an initially covert holographic effect, the label delivers reliable, irreversible tamper evidence for pharmaceutical packaging and includes covert counterfeit-protection features.

An additional award went to a translucent Color Laser Film from Schreiner ProTech that won first-place recognition in the “Industrial” category. This Color Laser Film is a partially light-permeable marking solution enabling backlighting of customized inscriptions or symbols. Due to being adhesive on both sides, it additionally serves as a component bonding technique. As a result, it combines the positive properties of the classic Color Laser Film (CLF) with the benefits of translucence and the characteristics of Schreiner ProTech’s bonding solutions.

The Autoinjector-Label from Schreiner MediPharm for TEVA won in the “Pharmaceutical” category.

Another award went to the multifunctional Covert-Hologram Seal from Schreiner MediPharm in the “Security” category.

In the “Industrial” category, the translucent Color Laser Film from Schreiner ProTech won recognition.

2020 FINAT Awards: Three First Places
Anniversary in China: Fengpu Celebrates its Fifth

Shortly after the Chinese New Year’s celebrations, there was another occasion to celebrate in Fengpu. Five years have passed since Schreiner Group’s location in China was launched. In March 2016, CEO Roland Schreiner and Thomas Köberlein, the President of Schreiner ProTech, joined Jamie Long, the General Manager of Schreiner Group Ltd. China, and 100 guests for the site’s grand opening event. On the occasion of the plant’s fifth anniversary, we talked to Jamie Long about his memories and expectations for the future.

What’s your nicest memory of the grand opening?
The grand opening marked a major milestone of the business and organizational development in China. I have many positive memories of that day. Our guests came not only from all parts of China but from all over the world. Schreiner Group’s senior management attended the event and the Shanghai government was represented as well.

How did everything get started at the Fengpu site in 2016?
When production was launched at the site, we only had twelve employees, six of them Chinese and six of them Germans. In Fengpu, we initially started producing pressure compensation seals and labels with a maximum of three colors for the automotive industry.

What has changed over the past five years?
In the past five years, the Fengpu plant has grown in every respect and, above all, fast. Our workforce has increased from twelve to 24. The product portfolio has been expanded significantly as well, now even by products for our Schreiner MediPharm business unit and hence for the pharmaceutical industry. Plus, in 2019, we reached the break-even point.

What were the best moments during the past five years?
For one, it was the grand opening and for the other, the teambuilding activities in Fengpu together with the top leadership level from Oberschleissheim.

What were the greatest challenges and how did you master them?
We got started with a very small team in Fengpu and comparably low capital expenditures. For Schreiner Group as a medium-sized company, the development of the site as a whole posed a great challenge. Plus, there were some initial intercultural misunderstandings. With professional conflict management and team building activities, we managed to expose the underlying reasons of the differences and strengthen our team spirit in this way.

How do you view the development in the next five years?
We primarily expect to see further growth in China. In the long run, we’re going to not only manufacture even more products for both the automotive and the pharmaceutical industries, but will also develop products ourselves. I’m full of confidence that Schreiner will have a very successful future in China.
SAP implementation at Schreiner Group is on the home stretch: Following Schreiner Group’s successful SAP rollout in the areas of HR, Finance, Controlling, Purchasing and Maintenance in recent years, plus the beginning of a partial rollout at our U.S. site in Blauvelt, the conversion of value adding processes to SAP started at our headquarters in Oberschleissheim on January 1, 2021.

New year, new opportunities: Right at the beginning of the year, Schreiner Group put this motto into action. On January 1, 2021, SAP went live for the first production areas, and the first customers, products and manufacturing lines were successfully converted to SAP-supported processes. This marked a milestone achievement in the rollout of a modern ERP system. With SAP S/4HANA, Schreiner Group has opted for a modern, cross-industry ERP solution offering numerous advantages while fully retaining our time-tested product structure and manufacturing process.

SAP optimizes and simplifies many workflows, from development to order planning to manufacturing to aftersales support. The higher data quality of the integrated system and the consistent master data concept yield numerous benefits in planning, procurement, manufacturing control and documentation, and ultimately help us maintain our processes on their typically high level and to continue developing them going forward.

“As a result of the SAP rollout we’re able to raise transparency and process reliability to an even higher level and, consequently, will be able to optimally satisfy current and future customer requirements,” says Dr. Christoph Jung, the SAP implementation project leader.

“The conversion has a positive impact not only on our internal processes. Our collaboration with customers, partners and suppliers can be expanded as well, for instance, in the area of electronic connection to customers and suppliers.”

All other customers and products of the German locations will be converted in further implementation stages. The completion of the conversion in Germany will be followed by the international rollout at our two sites abroad.
Medication Adherence: Digital Therapy Management for Clinical Trials
Lack of knowledge, fear of side effects or forgetfulness: 50 percent of patients involved in clinical trials do not adhere to the prescribed dosage regimen. At the same time, pharmaceutical companies depend on strict compliance with therapy regimes. Otherwise trials may produce distorted outcomes such as insufficient drug efficacy or underestimated frequency of side effects, ultimately resulting in delayed time to market. The Medication Adherence Monitoring solution jointly offered by Schreiner MediPharm and AARDEX enables pharmaceutical companies to digitally monitor and manage medication intake and to thus cost-efficiently minimize lack of patient compliance.

Smart forms of medicine packaging linked to matching software are at the core of the solution for which Schreiner MediPharm has developed Smart Blister Packs and Smart Kit Boxes for vials or syringes with sensor technology: Whenever a patient extracts a tablet from a cavity or removes a vial from a compartment real-time data are generated such as the time of removal, dose or compartment from which the product is extracted. These data are automatically stored and transmitted to a database via a smartphone app or reader. The matching data platform is provided by AARDEX. The leading expert in digital medication adherence solutions offers MEMS® Adherence Software enabling the visualization and analysis of the data from the dosing history of the Smart Blister or Smart Kit Box. The data may also be shared with defined stakeholders.

“Our partnership with AARDEX combines Schreiner MediPharm’s unique smart packaging technology, which can be scaled up via roll-to-roll processes into large commercial volumes, with the necessary intelligence from AARDEX. This cooperation will enable us to leverage the full potential of medication adherence in clinical trials and commercial environments. We look forward to supporting our customers with a complete solution and joint consultancy expertise,” says Stefan Wiedemann, Senior Director Strategic Marketing and Business Development at Schreiner MediPharm.

Digital therapy management can decisively optimize drug development by enabling exact compliance with the requirements and dosing regimens of the Clinical Trial Protocols proposed by the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA). In addition, it is possible to detect structural deficiencies and collect important data about patient behavior that can be used for marketing strategies and other purposes.

With MEMS® Adherence Software from AARDEX the data from the dosing history of the smart packaging from Schreiner MediPharm are visualized and analyzed.

*Medication Adherence Monitoring refers to compliance with the therapy goals set by physicians and patients. For one, it is focused on adherence to action plans and for the other, on disease management between patients and caregivers. The objective is to enhance the personal competency of patients in coping with their disease. Monitoring provides the requisite management tool in this context.

**AARDEX**

Located in Belgium, Switzerland and the U.S., AARDEX Group develops and markets digital solutions to measure, analyze and manage medication adherence in clinical trials, research settings, and professional healthcare systems. AARDEX is the central actor of a complete ecosystem that combines its MEMS® Adherence Software with a wide range of smart packages and devices that measure patient adherence to all routes of drug administration. Our vision is to continuously innovate in data-driven medication adherence solutions to enhance digital therapeutics and patient empowerment.
"Made in Germany" is a label that stands for quality worldwide. In China, German products are associated with safety, reliability and functionality, among other things. Chinese customers, however, can only be convinced to buy if their expectations are quickly met and their needs precisely satisfied. Schreiner MediPharm’s Needle-Trap, which is already successfully used in many international markets, has now managed the leap into the Middle Kingdom: Kingfriend China equips its prefilled enoxaparin-sodium syringes with the world’s only label-based needle protection system.

Enoxaparin is an anticoagulant substance from the group of heparins used to prevent thrombosis. Kingfriend offers this medication as an enoxaparin-sodium injection solution in prefilled syringes. For the European market launch of the prefilled syringes, the company was looking for a special needle protection solution that was to be cost-efficient and meet the requirements of EU Directive 2010/32/EU and DIN EN ISO 23908 for protection against sharps. They found the solution in Needle-Trap. The needle protection label with an integrated trap marks the syringe and protects healthcare staff against needlestick injuries. Kingfriend was especially convinced of the Needle-Trap design. The needle trap is directly connected to the label and features a particularly compact construction. Consequently, the secondary packaging for the Enoxaparin sodium syringes with Needle-Trap remains the same as for standard syringes and adapts consistently in the production process. This is innovative and extremely economical, because it also saves warehousing and logistics costs.

The prefilled enoxaparin-sodium syringe was launched in Germany in the fall of 2020. The product is marketed via the partner company Venipharm.

Kingfriend equips its enoxaparin-sodium syringe with Needle-Trap from Schreiner MediPharm—and is thus the first Chinese pharmaceutical company to use the needle protection label.

Kingfriend equips its enoxaparin-sodium syringe with Needle-Trap from Schreiner MediPharm—and is thus the first Chinese pharmaceutical company to use the needle protection label.

Kingfriend
Nanjing Kingfriend Biochemical Pharmaceutical Co., Ltd. is a Chinese public company based in Nanjing that is primarily engaged in research and development, production and sale of injectable products. Kingfriend is the global leading company in heparin and low molecular weight heparin (enoxaparin sodium) products. The company with almost 1,000 employees primarily exports its products to Europe and the United States. Its customer base includes the top 500 pharmaceutical companies.

More information about Needle-Trap at www.needle-trap.com
Cap-Lock is a combination of cap adapter and label. The adapter is placed on top of the primary closure of the syringe and equalizes the diameter differences of the syringe body and cap. The label wraps around the syringe body and the cap adapter. Once the syringe is opened, the integrated perforation provides irreversible tamper evidence. Cap-Lock plus RFID has an additional label-integrated RFID chip embedded in the upper part of the label at the level of the cap. Because the chip largely sits outside the liquid-filled area it enables reliable long-range reading. Due to the RFID inlay, the previous, purely visual first-opening indication is now complemented by digital first-opening evidence. The RFID-Label is suitable for automatic application as part of the normal primary container labeling process. For live monitoring and control of the logistic material and product flow, the syringes equipped with RFID-Labels can be automatically read at various stations.

While digitalization continues to make headway in hospitals, product solutions with integrated RFID technology are required to accelerate the digital transformation process. Schreiner MediPharm supports this trend with a product evolution: The pharmaceutical label specialist has equipped Cap-Lock—its tamper-evident specialty label for prefilled syringes—with an RFID inlay. As a result, Cap-Lock plus RFID additionally enables digital first-opening indication as well as automated inventory and supply chain management.

Digitalizing Syringes with Cap-Lock plus RFID

Products that have been picked and placed are captured automatically so that current inventory levels are consistently stored in a database. For smooth medication management, the data stored on the RFID-Labels, such as product name, manufacturer, batch number and expiration date, are read automatically either individually or in bulk using simple handheld or specialty readers and matched with a database. This enables inventory tracking and provides transparency about medicines that are missing or approaching their expiration date. Thus, patients are protected against potential medication errors.

Efficient management and reliable authentication of medicines
Clinical research frequently involves drug delivery by intravenous infusions, be it for the development of blood plasma therapies, such as those currently used to treat Covid patients, or new cancer drugs. Conducting clinical trials on an international scale requires marking solutions with multilingual product descriptions for infusion bottles. By combining the “Pharma-Tac” hanger label and a Booklet-Label, Schreiner MediPharm’s Clinical Trial Supply (CTS) Team developed a perfect solution for this purpose.

The multifunctional Pharma-Tac Plus label with an integrated booklet combines Pharma-Tac’s strong hanger with a multipage paper booklet offering ample space for multilingual product information. The hanger is an integral component of the label and ready for use after simply separating it from the label construction and folding it over so that the infusion bottle can be suspended from it. The Booklet-Label is firmly connected to the base label and can be opened and closed again by means of a tab. The hanger label and booklet combination can be adapted to various vial and bottle sizes and the number of booklet pages is customizable to suit the respective requirement.

This product solution provides research-based pharmaceutical companies and CROs (Contract Research Organizations) with an intelligent label offering them the requisite flexibility and reliability for international clinical trials. Healthcare professionals benefit from a convenient and efficient solution enabling fast and safe administration of infusions while providing all the relevant information in several languages.
The combination of Pharma-Tac and Booklet-Label supports clinical trials.

The specialty label enables efficient and convenient use of infusion bottles.
DoseID: RFID Standard for Healthcare

RFID technology has been gaining traction in the healthcare sector, but standardized tools for tracking medications, devices and consumables are lacking. DoseID, a US consortium and the first industry association dedicated to standardizing the use of RFID tags in healthcare, was established for the purpose of introducing an industry-wide standard. Schreiner MediPharm has joined this alliance of leading players in the healthcare sector.
DoseID was established in August 2020. It is the first industry association dedicated to standardizing the use of RFID tags for drug product tracking across all hardware and software systems—from the manufacturer, through the distributor, to the hospital and eventually to the patient. Members include Omnicell Inc., Sandoz, Baxter, Hikma, Leiters, Nephron Pharmaceuticals, Avery Dennison and Kit Check. To ensure adherence to the standards established by the consortium and conformity with the requirements of pharmaceutical manufacturers, compounding pharmacies*, pharmacy automation services providers, and manufacturers of RFID inlays and tags, a special RFID tag certification is awarded after third-party testing.

Pharmaceuticals can be successfully tracked by serializing medications, containers and devices and when the RFID tags deliver reliable performance in all hospital and healthcare IT systems so that products can be tracked at unit level and across their entire lifecycle. DoseID serialization surpasses the requirements of the Drug Supply Chain Security Act (DSCSA), a standard securing the US supply chain of prescription drugs. RFID-Labels from Schreiner MediPharm are important enablers in this context: They allow frictionless integration and smooth processing on pharmaceutical packaging lines, improve the automation of processes to increase efficiency and, most importantly, enhance patient and drug safety.

“As a long-term provider of customized RFID-Labels for the healthcare industry we see the need for interoperability and quality standards as essential to leveraging the full potential of RFID. We look forward to being part of the DoseID consortium to mutually drive RFID-based smart solutions to enhance the pharmaceutical supply chain,” says Stefan Wiedemann, Senior Director Strategic Marketing and Business Development at Schreiner MediPharm. Some of DoseID’s concepts have already been successfully implemented. More than 120 million units have been tagged to date.

* Pharmacies that prepare individual medications for their customers.
In 1886, Carl Benz developed the first motor vehicle that’s regarded as the ancestor of today’s automobile. A lot has changed in the automotive industry since those early days: Advanced infotainment and entertainment systems, for instance, are just one of many technologies defining modern mobility. Display applications—be they used as instrument clusters or as user interfaces of touch displays—make for a comfortable, efficient and individual driving experience. The innovative film-based solution from Schreiner ProTech provides them with the requisite protection.

Displays have to be protected against external effects such as dirt or potential damage like scratching throughout the value chain from production to delivery to installation in a vehicle. Display protection films from Schreiner ProTech serve this purpose, because a scratched display in a brand-new car would result in considerable disappointment on the customer’s part and the resulting image loss to the manufacturer.

Moreover, the risk of electrostatic discharge (ESD) must be mitigated during the non-residual removal of this film from a display. ESD protection films reduce the probability of electric flashovers when the protection film is peeled off a display. This also mitigates the risks of damage to electronic components or persons suffering electric shocks.

Due to the increasingly larger sizes of displays, the protection film is required in unusually large sizes as well. Schreiner ProTech offers an optimal price-performance ratio. Besides the required durability, the product delivers additional benefits: “Application is simple and efficient. For instance, the protection film can be imprinted with processing information to facilitate manual application. Fully automated application is possible as well,” says Dana Imminger, Product Manager for Protection films at Schreiner ProTech. The layout can be customized to suit individual needs. In addition, the integrated tab ensures easy removal of the film.

**Benefits of ESD Protection films**
- Reduction of electrostatic charging and discharging
- Assurance of optimal performance of electronic components
- Prevention of personal hazards due to electric shock
- Avoidance of flammable substances being ignited due to spark formation
Human skin, wax and leaves: At first glance, there’s no apparent connection between them. However, contact with a light source shows what they have in common: they’re translucent. Translucence refers to the partial light permeability of an object and is a characteristic that can frequently be found in sectors like household appliances, mobility and consumer electronics using backlit displays with symbols or text. Schreiner ProTech offers an integrated film-based solution for such displays: the FINAT award-winning translucent Color Laser Film, a flexible alternative to pre-printed design films. It rolls the functions of marking and bonding into one flexible, efficient, innovative and customizable product.

A translucent layer is required to ensure the desired light permeability. The label from Schreiner ProTech combines the advantages of the proven Color Laser Film (CLF) with the characteristic of translucency. It enables customized backlighting to be achieved in a wide variety of versions and simultaneously serves as a means of bonding the display glass and the device. Late-stage customization is a key benefit of this film solution. In this context, it refers to the flexibility of performing customized, version-specific marking even at the customer’s site.

The inscription can also be performed through the display glass, which reduces both the number of display versions and required inventory levels. Moreover, the product is resistant against cleaning agents. Another difference between the previously existing and the translucent CLF is that the latter is an adhesive and an inscribable film rolled into one.

During the development of the product, Schreiner Group’s developers benefited from their extensive technical know-how and years of experience in adhesion technology. Besides serving as a means of bonding to the device, the CLF equalizes height differences. The extremely durable adhesive features a special composition that does not impair the film’s translucence. On request, the composition and thickness of the translucent CLF can be selected so that the film can replace the display.

Two-in-One: Translucent Color Laser Film

Color Laser Film (CLF)

CLF is a marking solution that is characterized by its high stability. It’s used for creating self-adhesive labels and nameplate sets for application to a wide variety of equipment. The contactless marking process produces zero emissions.
Small Pad, Big Impact: Steam-Permeable Adhesive Solution for Humidity Sensors

Innovative, breathable and self-adhesive: The adhesive pad from Schreiner ProTech combines all of these characteristics. It’s been designed specifically for the requirements of a humidity sensor. The sensor-integrated die-cut part ensures optimal performance.

The sensor measures the ambient humidity and temperature in 15-minute intervals. Afterwards, it forwards the information to a cloud where it’s stored. The wireless humidity sensors are produced by Disruptive Technologies and the circuit boards embedded in them by Zollner Elektronik AG.

Membranes in industrial applications work in ways comparable to those known from breathable functional clothing in the outdoor sector. They’re air-permeable toward the outside while protecting the interior against water ingress. This applies to humidity sensors as well. The circuit board in the enclosure has to be protected against water ingress and to ensure such protection, the board must be positioned precisely above the hole in the housing.

Commissioned by Zollner Elektronik AG, Schreiner ProTech developed an innovative solution for this purpose: a steam-permeable adhesive pad located inside the sensor. Embedded in the adhesive pad is a membrane. The integrated, non-adhesive area enables fully automatic SMD (surface-mounted device) processing. In addition, the double-sided adhesive die-cut part creates the necessary connection between the sensor housing and the board.

“The adhesive pad provides optimum control because the embedded membrane enables moisture wicking toward the sensor while preventing water ingress. For this purpose, there’s a hole on both sides of the pad that ensures the necessary breathability,” explains Michael Drollmann, Business Development Manager ETech bei Schreiner ProTech.
Marking that’s Meant to Last

Despite Extreme Physical Stress

Industrial tools and machines are permanently subjected to severe physical stress such as temperature fluctuations and mechanical effects (shock, abrasion, impact). Welding equipment, for instance, is constantly exposed to flying sparks, dust and heat while being used on construction sites. As well as the equipment itself, markings must withstand adverse ambient conditions because they’re essential to identifying a tool or machine. To ensure that high-grade nameplates remain intact throughout the equipment’s lifetime, they need to be highly durable.

Lack of protection and exposure to harsh conditions may lead to surface damage up to and including loss of nameplate readability. Schreiner ProTech offers an optimum solution for meeting the challenges of industrial environments: Color Laser Film HighResist (CLF HighResist). It has a long-proven track record of specific suitability for use in harsh operating conditions and delivers maximum stability combined with flexibility.

Color Laser Film’s typical features of exceptionally high temperature, scratch and weather resistance are complemented by an even higher level of scratch resistance in CLF HighResist and therefore against severe mechanical stress.

Strong UV and adhesion stability are further benefits of this solution. Optionally, additional security and authenticity protection features such as microprinting can be integrated and customized shapes are available as well. Markings are performed using various NIR (near-infrared) lasers (e.g., Nd:YAG, Nd:YVO4, Yb-Faser) and produce excellent contrast. The marking process takes place inside the material composite underneath the protective overlamination layer and produces zero emissions. Cutting to size and marking can be performed in single process step.

When using pre-cut CLF HighResist, the process is completely emissions-free and therefore suitable for application in controlled environments.

Start-up Advice and Support

Schreiner ProTech always focuses on the total system. The experts from Schreiner ProTech will assist in the rollout of laser technology and provide advice regarding the selection of the suitable laser marking systems as well as performing optimal settings and programming of the laser.
Thanks to Printed Electronics: Wound Healing with Plasma

Be it in the mobility, healthcare or packaging sector: Printed electronics are suitable for a wide range of uses. Compared to conventional, rigid solutions, printed electronics are flat, flexible and lightweight. As a result, they can be optimally adapted to diverse applications. Printed electronics are even utilized in wound healing. For Coldplasmatech GmbH’s plasma therapy, Schreiner ProTech has recently developed a new EIF (Electronics in Film) product that’s an essential component of the company’s PlasmaPatch or CPTpatch.

Following minor injuries such as cuts or lacerations, the skin quickly repairs itself, unlike in the case of chronic and large wounds such as diabetic foot ulcers, which often entail a long and painful healing process and require medical treatment.

In the area of wound healing, Coldplasmatech GmbH offers an innovative therapy option in the form of its patented Active Glow technology. The treatment unit consists of two parts. The CPTpatch is an active dressing to be placed on top of the wound. Due to the additional voltage supply, called the CPTcube, cold plasma is produced inside the CPTpatch, resulting in fast, effective and painless wound treatment.

Printed electronics are a prerequisite for the application of the product, so Coldplasmatech GmbH was looking for a suitable partner for product development and mass production of its CPTpatch. The specifications were clear: The project called for a flexible conductor structure for the wound dressing. The application had to withstand several thousand volts without causing electric shock. Another important requirement was high printing and die cutting precision, which is contingent upon an optimal material selection adapted to the product’s medical purpose. In addition, reliability of the manufacturing process and flexibility of the electronics were specified.

Schreiner ProTech was selected as the optimum development partner. The PlasmaPatch features a film-based conductor structure consisting of a film composite that produces the cold plasma. The product is tailored precisely to the conditions of the wound dressing. The highly complex composition made up of several functional layers ensures full functionality of the plasma therapy. “With Schreiner ProTech’s PrinTronics competence center, Coldplasmatech GmbH secured the support of a true expert in printed electronics,” says Dr. Carsten Mahrenholz, founder and CEO of Coldplasmatech.

COLDPLASMATECH GmbH

Medical device technology manufacturer COLDPLASMATECH GmbH is headquartered in Greifswald, Mecklenburg-Vorpommern. The startup emerged from the Leibniz Institute for Plasma Science and Technology. With its active wound dressing, the company developed an all-new innovation in wound healing. The product was recognized with the German Innovation Award in 2018.
A wide variety of applications for RFID (Radio Frequency Identification) can be found in everyday life, be it when paying at a supermarket cash register terminal, driving past a toll gate or checking out books from a library. But the contactless storage and reading of data plays a particularly important role in manufacturing and logistics. The comprehensive RFID Starter Kit from Schreiner Services easily paves the way into this modern technology and helps prevent potential challenges.

RFID technology offers many additional benefits compared to the conventional barcode method. They include large data capacity and wear resistance. The code can be read from any side and information can subsequently be added. Furthermore, RFID enables bulk reading because several chips can be read simultaneously. However, aside from the many positive aspects, the application of RFID products also poses a challenge: The surroundings may impair the functionality of the chip. For instance, contact with liquids or metals leads to reading issues. Metal boxes and steel structures may affect read range. Therefore, the environment must be checked first to ensure the full performance capacity of an RFID chip.

The Services competence center offers an optimal total package for this purpose: the RFID Starter Kit. It’s a set of equipment for testing RFID functionality at the future place of deployment. The tests take place over a longer period of time and, for realistic on-site testing, the technologies are equipped with a pre-programmed database. The customer receives a complete kit with all key components including selected RFID labels, an RFID TTR printer and an RFID reader.

The user-friendly Starter Kit is available at minimal costs and makes it possible for customers to readily run a comprehensive on-site test phase. The results can be logged within a very short period of time. The technology is subsequently analyzed in terms of performance and ease of use. The Starter Kit lends itself to optimal integration into the existing workflow. Customer-specific wishes concerning the Starter Kit can be implemented with no hassle. In addition, our team members can take care of on-site installation and conduct RFID technology training. Whether concerning the substrate, data processing or the label: many years of experience and extensive technical know-how in diverse areas of expertise make Schreiner ProTech the optimal place to go in terms of RFID.

Simply Smart:
The ((rfid))-UHF Starter Kit

Components of the ((rfid)) Starter Kit
- UHF-RFID labels
- RFID-TTR printer
- UHF-RFID reader
- UHF-RFID Starter Kit software
- UHF-RFID gate

Schreiner ProTech 23
Returnable transport items (RTIs) are used in practically all areas of industry including manufacturing as well as retail and wholesale distribution and the service sector. Volumes are steadily increasing especially in logistics settings. RECALO GmbH based in Laatzen (Germany) offers services in the field of RTI and asset management plus extensive logistics services for companies in a wide variety of sectors such as the food, consumer goods and pharmaceutical industries.

RTIs have to be adapted to suiting both the requirements of daily operations and efficient volume-related logistics. Because all the returnable transport items available on the market in recent years were technologically obsolete and outdated in terms of their functional features, Recalo decided to develop RTIs combining excellent handling and optimal logistic and hygienic qualities. The project has produced two industrial RTIs that Recalo began to offer a year ago.

Benefit of RFID Complementing Barcodes
Clear, reliable and permanent markings ensure optimal data readability of every RTI. The data storage media on the containers include a standardized long-range UHF-RFID chip, a printed barcode, plus a printed human-readable base number so that the same content can be captured with diverse reading equipment not only optically, in other words by conventional barcode readers, but also by means of modern RFID technology. The label is very robust and even wash- and weather-resistant.

Platform for Asset and RTI Management
A holistic service concept in the field of RTI logistics requires a large number of modules. Beyond the aspect of quality per se, it’s important to design all customer-related processes for maximum simplicity. All intermediate steps, from ordering to billing, must be transparently documented and correctly accounted for. Recalo ensures this with its proprietary platform for asset and RTI management.

Recalo selected Schreiner PrinTrust as an experienced partner in the field of RFID technology when the project was launched. RFID storage media provide every single container with a unique ID that can be read as needed anywhere in the world and communicated in real time. Going forward, Recalo is planning to equip its returnable transport items also with sensors. Additional information such as current location, temperature, vibrations and moisture during transportation and at the warehouse are relevant data providing customers and Recalo with major added value.
Self-Adhesive Plates for Small Motorbikes

Small motorbikes such as mopeds provide a space-saving, low-cost and flexible form of mobility. However, in Germany, for instance, owners of small motorbikes have been required to change their metal plates every year to prove that their liability insurance is still valid. The application of such plates involves considerable time and effort. Now, Schreiner PrinTrust has developed a film-based sticker as a robust, weather-resistant, eco-friendly and easy-to-apply alternative to metal plates.

In August 2020, the Federal Ministry of Transport and Digital Infrastructure (BMVI) together with the Federal Ministry of the Interior, Building and Community (BMI) issued a derogation providing for a test phase to determine if aluminum plates may be replaced by stickers. Such stickers have been available on the market since March 1, 2021 for a pilot period of three years. Federal Minister of Transport Andreas Scheuer emphasized that such a film-based solution offers numerous benefits: “Owners of small motorbikes can now simply apply their plates as stickers. This is citizen-friendly, practical and conserves resources.”

Commissioned by the Association of the German Insurance Industry (GDV), Schreiner PrinTrust developed an innovative self-adhesive plate specifically as proof of insurance for application to small motorbikes. The product features a film applied to a plastic substrate. Previously, in 2018, PrinTrust had created a corresponding solution for electric scooters as a development partner and the first manufacturer of such a product in the marketplace. In addition to its simple and flexible application, the film-based solution saves resources because in subsequent years the plate can just be applied on top of the previous one. Currently, more than two million aluminum plates are produced per year. As the production of aluminum is extremely energy-intensive, the utilization of adhesive plates significantly reduces environmentally harmful CO₂ emissions. The lower weight and reduced space requirement of the thin film also simplifies logistics, while the film-based solution is equally weather-resistant and robust as the previously used metal plates, as confirmed by Fraunhofer IFAM (Fraunhofer Institute for Manufacturing Technology and Advanced Materials) in its closing report “Expertise Pertaining to a Film-Based Solution for Insurance Plates.” The plate-integrated hologram is another special feature. It serves as a security element and therefore, unlike conventional plates, provides protection against simple counterfeiting attempts.

A symbolic step: Project Leader Christian Richter and President of Schreiner PrinTrust Dr. Kai Schnapauff jointly apply a film-based plate to the first small motorbike.

The adhesive plate from Schreiner PrinTrust combines ease of use and sustainability while being as robust and weather-resistant as a metal plate.
RFID (Radio Frequency Identification) has been gaining traction as a base technology in the past five years. The additional options RFID can offer are used in industry and distribution as well as in the service and ticketing sectors. However, increasingly broader fields of application entail new demands being made on the data storage media. For these requirements, the Schreiner LogiData competence center offers an on-site RFID process analysis to its customers. Involving only minimal costs and effort, the analysis investigates whether RFID can be deployed and what requirements have to be considered.

RFID Process Analysis: The Optimal Product

A number of aspects must be looked at in advance whenever an organization considers the deployment of a new, additional identification technology: What advantages does the technology offer? What disadvantages may have to be taken into account? How can the processes be optimally combined with the technical potential of RFID?

Benefits of RFID
The benefits of an RFID solution include bulk reading, secure encryption as an original, data acquisition through materials and supplementary data. The challenge lies in delivering
optimal read range, durability of the label across longer periods of use, appropriate choice of the content to be programmed and secure, long-term encryption as effectively as possible. Plus, not all substrates are optimally suited for RFID use. For instance, RFID-UHF technology does not work through metal, ESD, carbon or liquids. However, there are technical solutions available for designing RFID labels on such substrates in ways that at least make data acquisition possible on them. These requirements must be considered to ensure successful deployment of the new technology.

**Combination of Chip and Antenna**

The combination of chip and antenna is another factor. Not every RFID chip offers the same storage options, read ranges or efficiency in terms of speed. Combining a suitable chip with a perfect RFID antenna is a key factor on the path toward an optimal solution. The same applies to RFID reading systems and the related software. Not every RFID read or write antenna delivers the same range and speed or bulk reading capability. In this context, the primary differences between the manufacturers of RFID readers and RFID antennas concern the interaction with the integrated software.

All of these circumstances must be examined in planning the deployment of RFID in organizations. The requirements, workflows and RFID components must be optimally adapted to each other for the RFID solution to produce the desired success.

**RTIs as a Case in Point**

A company is seeking to equip RTIs (returnable transport items) with RFID. One of its objectives is to optimize receiving and shipping logistics using RTIs. In addition, empties management is supposed to be handled in real time. The technical products with metal housings should be captured in a fully automatic end-to-end workflow from the entire assembly process to shipping. In addition, it should be possible to document services or product returns.

An initial analysis has revealed that the UHF-RFID frequency is the best-suited choice. For the containers, a meaningful number range should be selected so that diverse types of containers or sites can be accommodated. In any event, the containers should be equipped with two RFID labels (one on either side) and, when the containers are washed, a protective overlamination should additionally provide permanent protection for the printed and programmed container IDs. For bulk reading processes, attention must be paid to all container labels achieving comparably good read range to ensure reliable reading.

**Technical Devices with Metal Housings**

It makes sense to also use UHF-RFID labels in this scenario so that a company can limit its RFID deployment to one technology throughout the organization. The labels on the device housings are optimized for operation on metal and all components installed can automatically be posted to the device ID while moving through the assembly process.

In the shipping department, the devices should be read in bulk. The RFID label should be complemented with inspection data and last for at least ten years even in non-clean environments. In this case, it’s important for the RFID label to achieve good read range on metal while still being suitable for on-site programming and printing at the first station of the housing production process.

Equally important is resistance against dirt, wetness, cleaning and aging. Once all the devices have passed all the stations in the assembly process, they’re packed into boxes. Service providers can store their data such as inspection dates and changed components on the label directly on the device for ten years and, as a result, have access to reliable, decentralized on-site information.

As these examples show, the optimal product is not always physically identical, but operates with the same reading systems in the same surroundings. Even so, a deployment of RFID technology requires every process to be looked at individually to achieve the best possible outcome in terms of efficiency and cost savings.

**Tailored RFID labels for diverse uses**
Safe Security: **BPA-Free Thermochromic Inks**

Black, blue or transparent? That’s often hard to tell with thermochromic inks because the perception of color changes under the direct influence of heat or cold. These inks are frequently used as a security feature on labels to detect faked products as a result of the change in color. The inks typically contain bisphenol A, a chemical that’s harmful to human health and the environment. Schreiner ProSecure has now qualified reversible, BPA-free thermochromic inks for security labels and therefore made the equally inconspicuous and definitive authenticity feature a safe choice for current and future use.

BPA is an industrial chemical that has been in use since the 1960s and is frequently found in everyday plastic products such as packaging, drinking bottles, food boxes, steel food cans (interior coating) and toys. Six million metric tons of BPA are produced per year, according to Friends of the Earth Germany (BUND). Due to its hazardous properties, the EU restricted its use several years ago.

The production of thermochromic inks without BPA is difficult. While many manufacturers have stopped producing thermochromic inks altogether, others are using alternatives that are often equally harmful. In collaboration with an ink manufacturer, Schreiner ProSecure has run extensive qualification tests of BPA-free thermochromic inks with identical functionality as BPA-containing inks for reliable authentication. The thermally induced color change occurs in a pigment-specific range (= the range in which the change between the two colors takes place). As a result, text or other elements can be concealed underneath solid areas and rendered readable only when reaching a specific range. Conversely, it’s possible to print near-transparent information that appears in color only below the defined range. Initial customer projects using the new BPA-free security inks have successfully been implemented.

Printing of a thermochromic ink can be demonstrated by various means depending on the range of the color change. The simplest way to accomplish this is by rubbing the area with a finger to warm it or to apply a cold spray to cool it. Labels with thermochromic inks can be created in a wide variety of color hues and shifting ranges. They’re a visually attractive characteristic and can be combined with additional security features such as color shifting inks. Their uses are wide and varied, ranging from pharmaceutical packaging to component nameplates to quality seals and logistics labels.
“Space. The final frontier.” The year is 2265. USS Enterprise has been deployed to explore far-away galaxies. On board of the starship is a 400-member crew, plus an on-board computer without which practically nothing works. Based on its knowledge of facts, it issues recommendations for actions it has generated by performing probability calculations. What was a mere vision in the “Star Trek” science fiction television series from 1966 has increasingly become a reality today: Human thinking and learning serves as a model for and provides impetus to an Artificial Intelligence with the ability to make sensible choices. In a concept study, Schreiner ProSecure and Schreiner Digital Solutions investigated how AI may be used for smartphone-based identification of security features in labels.

AI has become an integral component of everyday life, for instance in intelligent personal assistants and navigation systems. In industrial process automation, it has been gaining traction, too. In smartphone cameras, it’s used for image recognition, which the study was focused on as well: How can security features be identified using AI-based image recognition technology? How can hidden misprints be detected which are invisible to the human eye?

For the feasibility study, the investigators used ShiftSecure, an overt security feature produced using inks from banknote printing that generates a light-dark or positive-negative effect depending on the incidence of light and angle of vision. Commercially available smartphones and a modular software concept that also checks further security features were used for authentication. The objective of the study was to find out how precise AI-based authentication can be.

Compared to a conventional verification solution, AI-based authentication offers a wide variety of benefits, especially in terms of its compelling robustness: correct results are achieved even in poor lighting conditions or when using lower-end smartphones. There’s no need for training users because the security feature can be recognized automatically. A special algorithm is used for analysis. It automatically checks the features that otherwise require tools for testing. The system provides automatic feedback to the brand owner whenever it identifies a fake.

The outcome of the study: ShiftSecure is suitable for AI-based detection and authentication with 99-percent accuracy, which may be raised in combination with further security features. While still representing a concept study at this juncture, the analysis provides the basis for developing a pioneering solution for customers in the Mobility and Healthcare industries for protecting the authenticity of their products.

AI is one of the most advanced technologies for fighting product counterfeiting.
Many city governments have begun to equip and register a wide variety of objects with RFID in areas ranging from garbage and sewage disposal to fleet management. In a Smart City, all relevant objects can be captured and represented in a database with all pertinent details. Schreiner Group supports renowned organizations engaged in the pursuit of Smart City applications in implementing the required RFID marking solutions and so accelerates the digital transformation of cities into Smart Cities.

City governments are becoming increasingly receptive to digitalization by installing digital platforms enabling connected management of all objects, functions and services along with real-time analysis. Maximizing the integration of objects and sites makes significantly more efficient monitoring, control and optimization of workload and coordination times possible as well as enabling immediate response to faults and status deficiencies.

An optimal development of a truly flexible and comprehensive solution for larger cities requires central databases that store all the acquired information and make it available for diverse applications and analyses. The technical prerequisites must exist and the required communications and transactional structure be developed for this purpose. Important in this context are secure transmission, storage and use of the data in ways that satisfy data protection requirements as well. Afterwards, all the objects to be captured are provided with a
secure, unique identifier providing appropriate protection against unauthorized access and tampering.

An analysis of the current processes in terms of potentially used new and optimized processes following the integration into a Smart City Solution (SCS) is a basic prerequisite for generating a lasting financial and organizational benefit in addition to enhanced visibility of the functions. Examples include reliable workflow, faster handling and more sustainable logistics as well as a reduction of manpower requirements for monitoring and documentation.

All objects, services, checks, monitoring and documentation functions are based on the acquisition of a unique code on the objects or processes. This individual marking allows every tracking point to be captured and automatically communicated. In addition, a status update of the most recent activity can be stored on the object itself or data pertaining to the object or servicing of the object can additionally be stored or adjusted on-site. RFID labels provide the ideal basis for ensuring that these requirements are optimally met. The chip enables a high level of security to be achieved due to a unique and encrypted basic ID issued by the city government that every RFID label or RFID tag receives. This number is secured once and subsequently can no longer be modified or manipulated in a decentralized way. The remainder of the chip memory is available for individual use by the respective application.

RFID offers an optimal option as a data storage medium because every object has its own address in the system. As in the case of the Internet of Things (IoT), every object is part of a digital Smart City network.

Today, RFID labels can be made available for all substrates and requirements and are easy to program, print and apply. Due to the low cost of the labels, practically all objects can be equipped with RFID without having to use costly RFID hardtags or active (battery-operated) RFID tags. Now available as well for RFID are secure solutions with encryptions protecting both the stored data and communications with the reading stations against unauthorized access.

**Smart City**

The term Smart City refers to holistic development concepts aiming to make cities more efficient, technologically advanced, greener and more socially inclusive. These concepts include technical, economic and social innovations.
Schreiner Group Locations

Oberschleissheim
Headquarters
Germany

Dorfen
Second Production Site
Germany

Blauvelt
International Production Site
USA

Fengpu
International Production Site
China

Schreiner Group Social Media

Facebook
www.facebook.com/SchreinerGroup

Twitter
twitter.com/Schreiner_Group

XING
www.xing.com/companies/schreinergroup

LinkedIn
www.linkedin.com/company/129698

YouTube
www.youtube.com

Schreiner Group Trade Fairs/Congresses

Current trade fairs and congresses can be found at www.schreiner-group.com/en/news/trade-fairs.html or just use this QR code.

Our Forum Online can be found at forum.schreiner-group.com/en/ or just use this QR code.