

Eventful Year for CCL Design Stuttgart

Restructuring and good results in the first half of 2023 despite crisis

The uncertain times worldwide also impacted the label industry in 2023. In many places, companies are struggling due to military conflicts, recession, inflation, and other negative influences. Some of the most persistent topics in recent years and going forward are the climate and demographic change as well as the energy transition, which are long-term challenges. Despite these difficult circumstances, CCL Design Stuttgart achieved good results in the first half of 2023. Over the full year, the Nufringen and Nuremberg sites were able to meet their financial targets. In addition to the challenges that affect us all around the world, there were also personnel changes at the Nufringen site last year. A number of experienced employees departed the company. Their areas of responsibility have been successfully filled. We value the personal contributions of these employees and would particularly like to recognize long-time managing director Uwe Dessecker, who left in mid-2023 after 28 years of service. He played a key role in the develop-



ment and success of the Wölco company, which was integrated into the CCL Group in 2016. After the acquisition, he successfully managed to merge the European CCL Design sites in Stuttgart, Nuremberg, Solingen, and Tatabanya (Hungary). Under the new management of Mathias Männel, several CCL sites in Central Eu-

rope are currently being organizationally restructured. Mr. Männel has enjoyed many successful years at CCL in various leadership positions and, with his extensive experience in the industry and within the Group, offers the necessary professional and personal expertise to lead CCL Design Stuttgart GmbH into a successful future.

Top Management on Visit

CCL Industries Supervisory Board met at the Nufringen site



On November 8th and 9th, 2023, the highest management level of CCL Industries met with the Supervisory Board at the Nufringen site. The supervisory board members obtained insights into the pro-

duction conditions in the factory and were also able to find out about the innovative products manufactured at CCL Design. In addition to the Nufringen plant, colleagues from China also presented

their demo models and prototypes at this high-level meeting. The participants, who work as CEOs, Vice Presidents, and Managing Directors in well-known companies, were given a fascinating glimpse into the work at CCL Design and the innovative products of the CCL Design Division. On the evening of the first day of the meeting, selected representatives of CCL Design Stuttgart had the opportunity to exchange important ideas at dinner with the Supervisory Board members. The event drew the attention of top Group management to this site, and our professional working atmosphere certainly helped the Supervisory Board to set the course for the company's continued economic success.

Successful Recruitment of Trainees

CCL Design attracts young talent and introduces new apprenticeships

On September 1st, 2023, five new trainees started their careers at CCL Design Stuttgart. There are currently a total of seven apprentices in training, the highest number in the company's history.

In response to the changes in the labor market and to increase the attractiveness of CCL Design Stuttgart among young professionals, a new training concept has been developed over the past two years, which is now starting to pay off. An important aspect in this process was our participation in so-called trainee speed dating, which helped to recruit the five new trainees.

The training curriculum was also further refined. The internal training managers at CCL Design Stuttgart have taken a close look at the framework curriculum and optimized the internal procedure in order to ensure that the trainees receive the best possible knowledge transfer. Technical quality is not the only issue that's important.



Training officer at CCL Design Stuttgart GmbH

It is also important to the trainers that each trainee is viewed and treated as an individual. The young professionals are encouraged to not only talk about work issues, but also discuss private matters with trusted individuals.

There is no shortage of exciting tasks in a wide variety of areas at CCL Design

Stuttgart. The newly added training occupations "warehouse logistics specialist" and "IT specialist system integration" are prime examples of this. Of course, the current training opportunities as a "Print media technologist specializing in label printing" or "Industrial clerk" also offer young people an interesting and varied career choice.

Strong team spirit



On September 19th, 20 of our employees took part in the annual company run at Böblingen airfield in perfect late summer conditions. The approximately five kilometer long lap led twice around the artificial lake and was lined with spectators who cheered on the more than 900 runners.

The CCL Runners team achieved 10th place in the team rankings, while some employees achieved impressive individual performances.

It was a day full of shared effort, enthusiasm, and joy.

We are proud of our team and look forward to future challenges and successes, be it in the office or on the track.

Compulsory Internship in Development

R&D projects in printed electronics



Maja Besednjak,
student at the
Stuttgart Media University

"During my 6-month compulsory internship, I was able to get to know the research and development (R&D) department at CCL Design Stuttgart. This gave me extensive insights into the everyday life of product development and innovation.

A large part of my internship was dedicated to evaluating UV inks as a replacement for traditional solvent-based inks in screen printing. Before delving deeper into the subject of UV ink testing, I had the privilege of visiting the CCL factory in East Kilbride, Scotland. During this visit, our colleagues provided insights into the UV processes. Moreover, I was also able to gain knowledge in the printing production of homogeneous

luminous surfaces. Both were very helpful for my upcoming projects as part of my compulsory internship.

These projects included the preparation of the Eurobike trade fair, which took place in Frankfurt am Main in June 2023. I was given the task of developing the design and construction of a functional label, more specifically a charge status indicator. This label allows eBikes users to visually display the charge status of their battery using LEDs at the touch of a button. I also took part in the development of a seat heating concept. These prototypes were presented at the CCL booth during the trade fair. After the trade fair, the prototypes were integrated into the product exhibition at the Nufringen site. Interested visitors can see them on display during their factory tour.

I had another opportunity to expand my knowledge by visiting the two trade fairs LOPEC and FESPA. LOPEC is one of the largest trade fairs in Europe in the "Printed electronics" sector. FESPA is aimed at experts in the areas of screen and digital printing.

My internship at CCL Design Stuttgart was full of innovation, hands-on learning, and teamwork. I was able to learn a lot about project work in the area of research and development."

Screen-Printed Energy Source

Flat batteries for smart goods tracking

Through the acquisition of Imprint Energy Inc. (IEI, USA), CCL Design has secured patented expertise in the field of printed batteries. The printed batteries developed by IEI are based on a non-critical cell chemistry that can, for example, be transported safely on airplanes without any additional safety measures. Unlike lithium batteries, printed batteries based on zinc and manganese dioxide do not present a fire or explosion risk, even if used improperly or damaged. The additional safety comes at the expense of lower power density and cell voltage. But there are many useful applications for this cell chemistry. IEI presented examples of this in press releases in 2022. A so-called smart label uses a printed battery about the size of a DIN A4 paper, which is used as the energy supply for a smart shipping label. The electronics contained in the label enable the sending of SMS messages that are triggered by user-defined



events, such as excessive temperature or movements of the shipped item. In addition to an ingenious system of different sensors that can measure temperature, humidity, and acceleration, among other things, the label can be found anywhere in the world thanks to the integrated GPS electronics. The concept is primarily aimed at high-

quality and expensive goods, which bear a significant financial risk when lost. In this type of situation, the higher label price is not an issue. And when mass production follows, other applications are also possible due to the lower cost per unit.

This concept has aroused the interest of well-known companies. For example, the Schenker Group published a statement on this tracking method in 2023 and announced its use. The smart label is certainly of great interest to other logistics and shipping companies as well. Other sectors that would benefit from accurate supply or commodity chain tracking will follow this development closely. The market for functional labels in this product area appears to be in its early stages. But conservative estimates suggest that this technology has great potential. And CCL Design offers the right solution for the energy supply of these smart labels.

Technology Center in Nufringen Offers the Options

Development and realization of innovative functional labels



The CCL Design Stuttgart technical center at the Nufringen site has been operational since the beginning of 2023 and has since offered all the options for developing concepts and prototypes in the area of "functional printing." In this short time, we have already managed to produce several demo models for the trade fair appearance at Eurobike 2023 in Frankfurt. Moreover, new projects and prototypes were developed together with customers, which could become series products in the next few months. The orientation of the technical center as a central organizational unit for the development of products and processes in the area of "functional printing" also includes the possibility of producing small series' on site. However, the focus is on the

constantly increasing inquiries about the feasibility of project ideas and the development of innovative solutions. Since the beginning of 2023, many opportunities have emerged in the development segments of HMI (Human Machine Interface) and printed heaters. Despite, or perhaps because of the general economic downturn in the label printing sector, inquiries in these exciting areas are regularly received. For CCL Design, printed electronics – or, more generally, "functional printing" – is a future market. Pre-developments that have been launched together with customers and the general response to the concepts developed to date reinforce this assessment. By equipping previously simple solutions with more functions, customers receive an active

component that can be easily integrated into a simplified manufacturing process. An example is a cover film that is supplemented by a functional film. This film could contain electronic components such as LEDs, buttons, sensors, etc., so that this overall construct becomes an independent electronic assembly as an HMI.

Both sides benefit from these functional solutions. CCL Design can offer higher quality products, in return customers receive a precisely tailored and less complex solution to integrate. Functional printing is not limited to the areas mentioned above. Quite the opposite: new fields are constantly being added in which the printing production of functional products shows its strengths. This future market is very dynamic and offers promising growth opportunities. Thanks to the technical center, we in Nufringen are ready for the exciting topics that come with it, which lead to new products in joint development with customers.

Outstanding customer relationship with SICK was honoured

CCL Design Stuttgart receives SICK Award 2023 for digitalization and Industry 4.0

The SICK Supplier Awards recognize and reward outstanding achievements and partnerships with its suppliers. They emphasize the importance of the strong partnership between SICK and its suppliers, who make a significant contribution to the quality, innovation, and efficiency of the company's products and solutions. The annual SICK Supplier Awards ceremony took place on May 25, 2023, to which CCL Design Stuttgart was invited.

A total of five strategic partners were honored in the categories "Quality, Sustainability, Innovation, Digitalization & Industry 4.0 and Value Contribution."

CCL Design Stuttgart was able to secure the coveted award in the "Digitization and Industry 4.0" category. The Supplier Award is based on the evaluation of a large number of strategic suppliers who work for SICK AG. CCL Design Stuttgart was able to secure the "Digitization and Industry 4.0" award because up to 99% of the company's business transactions are carried out via digital communication channels.



Inquiries, offers, delivery notes, and invoices are processed and transmitted purely digitally via the corresponding portal.

The increased efficiency of workflows in general, but also better cooperation between all departments and SICK AG, are just two of the benefits.



TISAX Certification in Full Swing

A key to data security in the automotive industry



Preparations are currently underway at CCL Design Stuttgart to be able to handle customer data from the automotive sector even more securely in the future. To ensure conformity with the required guidelines, the site is subject to the implementation and verification procedure according to TISAX.

The acronym TISAX (Trusted Information Security Assessment Exchange) refers to a cross-company testing and exchange process for information security used in the automotive industry. The aim of TISAX is to protect data and guarantee its integrity and availability.

When processing sensitive data, TISAX reduces the number of checks otherwise necessary by the contractor to demonstrate that information security requirements are being met. Companies serving the automotive industry

must adhere to the TISAX guidelines in order to be allowed to process information with a high or even very high need for protection. In practice, this is done through certification by an external testing agency.

After a successful audit, the company receives a certificate confirming that the international requirements for quality management systems have been met.

Through the introduction of an information security management system, the level of protection against internal and external cyber attacks and against loss of information is continuously improved at CCL Design Stuttgart GmbH. Information should be available in the required form at all times.

The certification (DEKRA) and the introduction of the TISAX label (Level 3) at the Nufringen site are planned for the second quarter of 2024.

Electric mobility

Employee charging station for electric vehicles

A charging station with two charging ports has been available to all employees at the Nufringen site next to the delivery ramp since mid-2023. The charging process is booked using a simple software solution, so that the charging station can be used efficiently by as many users as possible. Two charging stations have also been available for business vehicles in the parking spaces at the main entrance for a long time. With the additional charging station, CCL Design supports the electrification of its employees' private transport and thus follows the transformation from combustion engines to electric motors desired by politics and society.

CCL Design at EUROBIKE in Frankfurt

Presentation of technical highlights and creative label printing



The bicycle sector is booming. So it's no wonder that almost 70,000 enthusiasts met in Frankfurt in June 2023 to discover the latest trends in all things related to bicycles. CCL Design Stuttgart GmbH was one of the more than 1,900 exhibitors and presented the latest developments in self-adhesive materials for technical applications.

Visitors and consumers had the opportunity to learn all about the company's latest developments and capabilities over an area of 36 m². At the booth, the guests had the opportunity to test the first prototypes hands-on or learn about traditional products in the field of labeling.

One of the highlights was the demonstration of an integrated saddle heater, which clearly shows the advantages of functional printing: the adaptation of the heating form to the geometric conditions, the mechanical resilience of the heating structure through the proper selection of materials and installation location, as well as the technical design of the heating output: all to give users a good riding experience even in colder conditions.

The visitors also had the opportunity to print individualized paint protection labels, marvel at water transfer labels, and test the advantages of a self-adhesive membranes. The five days at the trade fair were a complete success for CCL Design, and we are looking forward to the next exhibition.

Transition to UV-printing inks

For increased efficiency and environmental sustainability

Since October 2022, the Nuremberg site has been working continuously on switching from solvent-based inks to UV inks. The declared goal is to switch to UV-curing inks wherever technically feasible and sensible. There are many advantages to radiation curing, particularly the shorter process time and the reduced workplace exposure to solvents. In addition, UV ink does not dry in the printing screens and the curing energy in the drying tunnel is used efficiently. The faster production process using UV inks enables smaller drying channel lengths and thus improves the space utilization and increases the printing throughput.

The practical tests carried out in real-world operations in Nuremberg were supported by a student project and a student thesis. This resulted in an in-depth evaluation of the topic, which the staff in Nuremberg alone would not have been able to carry out by themselves due to their busy schedules.

After the initial findings, examples of individual products were created using UV inks in order to obtain a practical comparison with the solvent-based inks. It must be pointed out, however, that solvent-based inks cannot be completely replaced by UV inks, as there are differences between the ink systems in terms of the physical properties of the printing layers, e.g., opacity, adhesion, and durability. But there are definitely products that can be completely or at least partially switched over. In the course of a longer evaluation phase, the relevant products will now be examined



in more detail and the results of the UV conversion will be evaluated.

But the successes of the project so far are already impressive. About 80% of the orders with solvent-based inks were converted to the thermal process (drying channel). Previously, the drying process was carried out in so-called tray trolleys, which led to solvent contamination in the air of the printing room as well as a longer process. Thanks to the drying channel, almost all tray trolleys could be removed from the printing room. And for selected products it was possible to replace the previously used solvent-based inks with UV inks.

Spurred on by this success, the objective now is to intensify our cooperation with UV ink manufacturers. Additional products are being tested for their suitability for UV printing and an additional UV lamp is installed so that the working speed and print quality can be increased.

Eco-Friendly Energy Generation

New solar system supplies Nuremberg site with electricity



After the successful installation and commissioning of the photovoltaic system at the Nufingen site, a solar system was also installed on the roof of the plant in Nuremberg in 2023, which will help to produce energy more eco-friendly.

If the system is optimally utilized, over a third of the electrical power required on site can be generated via the roof-mounted solar system. Thanks to the saved electricity costs, the amortization period for the system will be between five and eight years. Since the manufacturer guarantees at least 80% of the nominal output for 20 years, the benefit for the Nuremberg plant must be viewed over the long term. In addition to the environmental aspects, the PV system also offers technical advantages. With

an increase in production machinery, the maximum current required to operate these machines increases as well. The solar system can handle peak loads, which means that a dedicated power plant will not be required at the Nuremberg site.

Milestone for Quality and Efficiency

Successful installation of new digital printing machine

After many years of examining the technical feasibility and the opportunities related to the use of a digital process flow, planning began in July 2022 for the installation of a new digital printing press at the Nufringen site. Thanks to further developments in digital printing technology, it is now able to deliver the quality standard required for the production of technical labels. This type of production is subject to stringent requirements, such as media resistance and compatibility with a wide range of different materials. The new digital printing system was put through its paces before the investment was made, ensuring the production of high-quality technical labels.

The investment project associated with the installation of digital printing was the first of its kind, which was managed by the project management team that had recently been estab-



lished at the Nufringen site. This project is also the largest single investment that CCL Design has undertaken in 2023. Thanks to the meticulous planning and excellent support from the project management team, the new printing press was installed and accepted on time and within budget in June 2023.



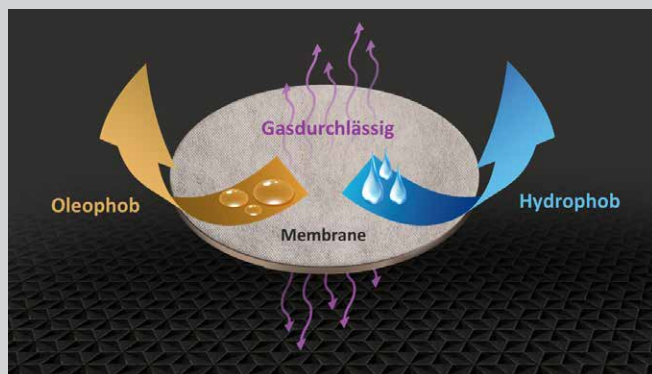
The advantages of digital printing over other printing processes depend on the system. For example, no physical printing form is required, the printing process is contactless, and integration into a digital workflow is easier compared to other printing processes. This opens up opportunities in terms of flexibility in production planning even for small batch sizes, the use of new substrates, as well as haptic effects, to name just a few benefits. Due to the greatly improved print quality and physical-chemical properties of the inks in recent years, the process is an alternative for the production of high-quality technical labels with rich colors and high ink application. Digital printing therefore represents a useful addition to the site's already extensive production possibilities.

Protection Against Condensation and Contamination

Pressure equalization elements for durable electronics, even for outdoor use

When designing electronic assemblies, it is important to always take into account the climatic environmental conditions in order to maximize the service life of the assemblies. If they are used outdoors, large climatic fluctuations can occur. This means that condensation can potentially form, which can lead to impaired function or even the complete failure of the assembly in the housing and in connection with the electronics.

A technical solution to prevent this type of climatic damage is a so-called pressure equalization element, or DAE for short. As the name suggests, this component facilitates the equalization of a given pressure difference between the environment and the inside of the housing and thereby reliably prevents the formation of condensation water in the housing. When using DAEs, the IP protection class of the housing is not affected, guaranteeing safe operation under the expected environmental influences. DAEs are equipped with a special membrane that is permeable to air, but repels wa-



ter and oil. The ePTFE membranes, also known in technical terms as hydrophobic/oleophobic, prevent the penetration of liquids and particles. Thanks to the design possibilities offered by the production processes available at CCL Design, the DAEs can be manufactured precisely to the customer's requirements and wishes.