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Insider



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DIGITAL PRINTING WITH LOW-MIGRATION INK ON PP FILM FOR IV BAGS

When printing packaging for the pharmaceutical and medical sectors, patient safety is paramount. Thus, low-migration inks play a crucial role. As part of a client project, Hapa worked intensively on the complex processes for the digital printing of polypropylene (PP) film with low-migration ink for IV bags.

The challenges of the project for an international company in the healthcare sector involved not only the development of low-migration UV LED ink. It was also necessary to develop a sustainable process for an industrial application that relied completely on digital direct printing. The switch from an existing industrial process to an entirely new one is a huge step that requires a great deal of patience and expertise. Mathias Theiler, Ink Department Manager, provides expert insight into the exciting project.

Greater flexibility and lower cost with digital printing

Previously, the client labeled its IV bags using labels and thermal transfer printing. "Both processes require additional consumables, namely labels and heat transfer films, of which 80 to 90 percent remain as waste. Furthermore, due to their adhesive layer, labels constitute an additional migration risk", explains Theiler. During digital direct printing, on the other hand, the materials consumed are limited to the film and the ink. In addition, because of the growing variety of options – with up to 16 different color markings – the flexibility of digital printing convinced the company to switch to a fully digital process.

Guaranteeing patient safety

As is mandatory in the pharmaceutical and medical industry, patient safety is paramount in this case as well. "Specifically, this means that at all times, it must be ensured that no limit value exceeding quantities of substances from the ink and the IV bag enter its content, i.e. migrate into it", explains Theiler.

Migration may result in substances entering the human body which could be unhealthy for the patient. What is relevant for the definition of migration limits is the scientifically determined quantity of foreign substances which the human body is able to break down and tolerate. In order to be able to correctly evaluate interactions

between the IV fluid, packaging, and ink, it is necessary to possess comprehensive knowledge of the ingredients of these components.

A sustainable and safe process

"Considering that the client's new system will be designed for a service life of 20 to 25 years, the printing solution must function over a very long period of time and therefore be perfectly mature", emphasizes Theiler. "This requires a meticulous development and testing process in which we have considered all parameters for safe and reliable production." These parameters are:

- Substrate
- Pre-treatment of substrate
- Dispersion and ink
- Printing process
- Post-processing (polymerization)
- Extraction test (worse case test)
- Evaluation
- Migration test

The **substrate**, the PP film, had already been tested by the client and proven its suitability. "The fact that the film continues to remain an important influencing factor may not be apparent from the very beginning", Theiler points out. "However, it is extremely important that the material to be printed on is always available with a constant level of quality, and that it does not exhibit any fluctuations with regard to its properties, such as material thickness and density, as well as surface tension." The first step was to determine the correct **pre-treatment** of the film to establish a solid basis for the adhesion and scratch-proofing of the ink. "During our tests with various pre-treatment methods, the cold plasma process was identified as the best solution", says Theiler. In the next

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Low-migration, fully cured inks provide the highest level of safety for patients.

KNOWLEDGE IS AN ESSENTIAL RESOURCE



The most important resource in a company is knowledge. It is composed of the experience of our employees, their abilities, and their passion for what they do.

Knowledge drives innovation – if it is constantly expanded and passed on. And this is exactly what we promote at Hapa through research, development, and further education, thereby creating added value for our clients.

In this issue of Insider, we give our "resources" a face – after all, no project would be possible without expert employees with a thirst for knowledge. Our Ink Department Manager Mathias Theiler will provide you with insight into a digital printing project for IV bags which is as complex as it is exciting. Read about what we are doing to promote knowledge transfer between our service technicians, and get to know our Technical Sales Manager Maria Sales

Requena, who considers it important to ask our clients a "barrage" of questions.

I wish you a pleasant read.

Beat Rupp
Chief Executive Officer
Hapa AG

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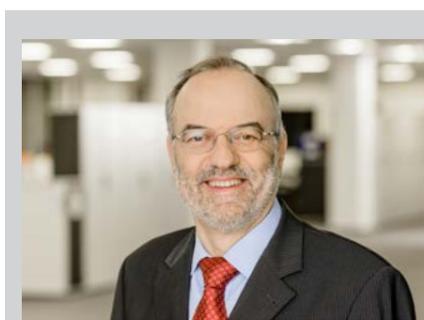
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phase, Hapa created a custom **dispersion** for the ink. "A stable dispersion makes or breaks the long-term quality of an **ink**. During the ink development, we analyzed each individual application carefully while considering the polymerization kinetics and the degree of curing. Based on this, we tailored the dynamic behavior of viscosity, surface tension, flow properties, adhesion, and opacity of the ink exactly to the client's printing process. We also paid particular attention to the print heads by optimizing what is called the jetability, which ensures the precise placement of the ink drops," says Theiler, describing the development process. One other major influencing

factor is the **polymerization**, which refers to the curing of the ink. This is because only fully cured inks provide the greatest degree of safety against migration; this also applies to low-migration inks. "We selected a polymerization with UV LED units, whereby the factors of performance and time played a decisive role. Thus, the question was: How much UV output is necessary and how long must the printed substrate remain in the curing unit when passing through it in order to achieve the chemical reaction for adequate curing of the ink?," says Theiler, explaining the challenge. After satisfactory curing results were achieved, the project was ready for



Comprehensive analyses and tests in Hapa Ink's in-house laboratory.



Mathias Theiler
Manager Ink Department

Mathias Theiler, an Electronic Engineer, joined Hapa in 1980, where he served as R & D Director for thirteen years. In 2014, he was involved in the acquisition of an industrial ink organization to form the Hapa Ink department.

During his years at Hapa, he acquired extensive experience in UV DOD inkjet printing design and application, experience that helps him support customers in his role as the manager of Hapa's Ink Department.

Mathias Theiler made a name for himself as a pioneering speaker at the inkjet conference "TheIJC", which takes place in Germany and in the USA every six months, and is aimed at inkjet specialists.

Visit us at „TheIJC“ in **Düsseldorf, Germany** **October 15-17, 2018.** www.theijc.com

Are you also planning a printing project and looking for expert assistance?

We would be glad to advise you. Contact us at marketing@hapa.ch

the **extraction test**. "It is also called the 'worst case test', because it investigates whether, in a worst case scenario, harmful substances which exceed the limits which the body is able to break down could migrate out of the ink." This stringent test is performed by an independent, certified institute and concludes with an **evaluation**. If it is within range, such that the ink is able to pass an elaborate **migration test**, the 'gold standard' of all tests, a huge milestone will have been reached on the path towards the

successful conclusion of the entire project. "The time spent on development and testing was definitely worth it. We have instituted a sustainably functioning overall process including ink for the digital printing of PP film for IV bags, and are currently in the migration test phase together with the client," says Theiler proudly.

The entire development process took place in Hapa's in-house laboratory; the extraction and migration test were performed with external partner institutes.

MAJOR SERVICE TECHNICIAN TRAINING COURSE AT HEADQUARTERS

For a whole week, Hapa trained its service technicians from all over the world in order to keep their specialist knowledge up to date for our clients. At the workshops, the exchange of valuable real-world experience was also on the agenda.

With the digitalization and continued development of printing solutions, the amount of information required also increases – both where clients and service personnel are concerned. In order to ensure that the latter are always able to provide clients with competent advice and services, Hapa invited service technicians from Brazil, China, India, Mexico, Poland, the UK, and the USA to a one-week training course at its headquarters in Zurich. Together with the Swiss

technicians, they deepened their specialist knowledge in various training courses and workshops. During the practical segment of the training course, the focus was on Hapa's latest developments. For one, participants were intensively trained on the fully digital web printing system Web 4.0, and received a detailed introduction to a new and improved ink supply system.

Above all, the workshops also provided the opportunity for exchanging specialist

experience. The service technicians shared and discussed their approaches for solving issues as well as the varying needs of clients based on individual examples from their real-world experiences. Doing so allowed valuable knowledge to be exchanged which benefits everyone in their day-to-day work.

During the courses of the engineering department, it became clear that their collaboration with the service technicians

is bearing fruit over the long term. This is because a regular sharing of information also takes place with engineering, which is then considered in product improvements and further developments. The result is machine upgrades and current improvements which are presented and explained to the service technicians.

After an intensive week, the teams returned to their home countries – optimally equipped for future missions.



Fully equipped to cater to clients: Hapa service technicians from Brazil, China, India, Mexico, Poland, the UK, and the USA with the training team.

ACHEMA: COLORFUL AND DIGITAL

Bringing splashes of color to the pharmaceutical market with the BlisterJet CMYK. And digitally, too – thanks to the new Web 4.0. Hapa addresses the topics of four-color printing on blister packs, serialization, and digitalization at the largest leading global expo for the process industries.

From inline printing to late stage customization, Hapa systems deliver the best results for every production process. The BlisterJet CMYK is a true late-stage customization specialist, and serves as the worldwide references when it comes to the four-color printing of graphics and text on prefabricated blister packaging. At Achema, it demonstrates four-color printing on aluminum blisters.



Four-color printing on prefabricated blister packs with the BlisterJet CMYK.

Fully ready for Industry 4.0, the Web 4.0 is designed for high-resolution printing on web materials. This flexible team player can easily be integrated into existing packaging lines and fits seamlessly into the digital workflow. Its modular concept is based on standard components which can be combined according to requirements. Thanks to the integrated digital printing module "redcube plus", which can be scaled if desired, the system can be expanded from one to up to six spot colors or WCMYK plus lacquer, thereby allowing it to be adapted to changing production requirements.

But there's more: The Web 4.0 already fulfills future serialization requirements, and is capable of printing individual data on each individual blister pocket.

Visit us at
ACHEMA in Frankfurt, Germany
Hall 3.1, Stand E71

We look forward to seeing you there!

Get your free day pass at
marketing@hapa.ch
(While stocks last)



Fully ready for Industry 4.0: At the expo booth, the Hapa team will be presenting the Web 4.0 and demonstrating two-color printing on aluminum foil.

REFRESHINGLY "EMOJIONAL"

Hapa and two Swiss companies are using digital direct printing to bring color and a refreshing variety to the current brand campaign "Letemoji" of the Italian drink manufacturer Lete S.p.A., which is using emojis for its mineral water Acqua Lete.

Twenty different emoji motifs on the caps of Lete S.p.A.'s PET mineral water bottles aim to inspire consumers to collect them. The challenge of realizing this variety is handled by the digital printing module "redcube plus" from Hapa, which is integrated into the Closure Digital Print (CLDP) solution by IMDvista, Switzerland. This innovative system is the first solution

on the market for the four-color direct printing of text and artwork on caps with a print resolution of 720 dpi, and is in operation at Corvaglia Closures Eschlikon AG. Also from Switzerland, this provider of cap solutions prints the bottle caps in-house with the various emoji motifs which give the "Letemoji" campaign its unmistakable face.



Discover the "Letemoji" campaign.



EATING HEALTHY FOOD AT WORK

"Good Food at Work" – Hapa provides its employees with the opportunity of having a balanced and varied nutrition.

How do I eat healthy at the workplace? This was the question the Hapa project team "Employer Branding" focused on. Much too often, persistent lethargy sets in after lunch – concentration suffers and performance declines.

"Many of our staff feel the need for nourishing, light meals during their workday," explains Michael Schöb, a member of the project team. "Furthermore, our surveys at universities have also found that this topic is also very important for potential applicants. We

were searching for a way to offer healthy yet tasty dishes, both warm and cold." The team found what it was looking for with the ambitious Zurich-based start-up Felfel, which has specialized in providing food in companies under the motto "Good Food at Work." "Felfel's concept impressed us," says a pleased Schöb. A refrigerated station is filled daily with fresh products that are made according to the principles of balanced nutrition – from salads to dishes that can be warmed up, as well as desserts and snacks. The purchasing process is as easy as it is



Fresh and healthy food at work: Employees are excited about the new meal concept.

modern: Employees log in using a badge, scan the selected product, and the system creates the invoice fully automatically. "After a sample meal with the entire staff, one thing was clear: It was perfect for

Hapa." And there is one other positive effect: More than ever, the new catering concept has turned the cafeteria into a communicative, cross-departmental meeting point.

MY JOB – MY PASSION

It is her thirst for knowledge which motivates Maria Sales Requena each day at her job. As a Technical Sales Manager, she determines and analyzes the needs of clients in order to implement them as suitable technical solutions.

Maria's tasks are complex, and require not only technical expertise, but also intensive research. Thus, asking, listening, and understanding are key for the successful management of a project. "Only by doing so can I understand what the client really needs. In particular, when the topic is a switch to digital printing technology, which the client is not yet familiar with, there is often a discrepancy between what is expected of a solution and what is technically possible," explains Maria. And this is where her healthy inquisitiveness comes in: "Using a large number of targeted questions, I determine the client's requirements, and get an idea of the current situation with regard to existing infrastructure and processes," she says.

An important link

When verifying technical feasibility, Maria is an important link between the Application, Ink, Engineering, and Project Management departments. What properties does the ink need to exhibit? Which is the most suitable pre-treatment method

for the substrate? How do the processes need to be planned? She works out the answers to these and other questions in close collaboration with the internal experts. Once the printing tests are successful, Maria develops a tailored technical solution. Finally, she and the project managers supervise the Factory Acceptance Test (FAT) at Hapa and the Site Acceptance Test (SAT) on site at the client's premises.

Passion for science

Why is a young woman so passionate and committed to a technical career? She smiles and replies: "I have always been interested in scientific topics and recognized early on that I wish to have a career in this field." That is what she did, and completed her degree as an industrial engineer at the Universitat Politècnica in Valencia in her home country of Spain. There, she worked in the electronics industry as a Quality & Process Engineer. When her husband took a job in the Netherlands, she followed him two



Maria Sales Requena prepares the Factory Acceptance Test for a client.

months later to work as a New Product Introduction Engineer for a leading online printing company. Later on, she moved to its offices in Switzerland before joining Hapa.

Exciting challenges

Maria loves being challenged at her job: "One of the greatest challenges is certainly the changes that many companies find themselves in – whether it is the

transition from an existing printing technology to digital printing technology or switching from external to in-house printing. Also exciting are projects which involve integrating our solutions into an existing line or supervising the installation of a system on site at the client's premises." Challenges which Maria will be overcoming together with Hapa's clients in future. Because she asks, listens, and understands.

DID YOU KNOW ...

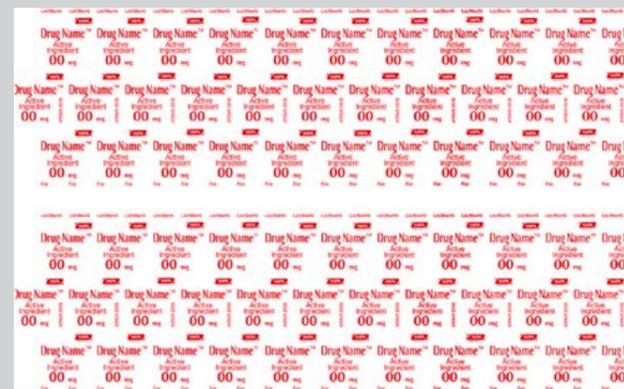
... how much you can print with a liter of ink?

The ink consumption can be determined precisely for each individual design and depending on the configuration of the printing system.

The layout shown is the size of an A4 page (210 x 297 mm) and is to be printed digitally in monochrome. Using print heads with a 6-picoliter drop size and at a resolution of 720 dpi, we have

an ink consumption of 0.0000305 liters per A4 page. Consequently, one liter of ink can be used to make 32,787 prints with this layout.

32'787



EXHIBITIONS & EVENTS 2018

FEBRUARY	Pharmapack Paris, France 07–08 February	
APRIL	TheIJC Chicago, USA 12–13 April	CIPM Chongqing, China 20–22 April
MAY	Hispack Barcelona, Spain 08–11 May	IPACK-IMA Milan, Italy 29 May –1 June
JUNE	ACHEMA Frankfurt, Germany 11–15 June	
OCTOBER	PACK EXPO Chicago, USA 14 –17 October	TheIJC Düsseldorf, Germany 15–17 October

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