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Increasing consumer and industrial demand for not only flexible packaging but sustainable flexible packaging, challenges the converting process. From the material side to production efficiency, every stage of the process is under pressure for improvement. It is an exciting time to be in the industry as these challenges are addressed and being overcome to produce, in some cases, even better outcomes.

Contents

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Sustainable Solutions in Flexible Packaging

By **Derrick Hemmings**, Product Manager, Screen, Energy Curable Flexo, LED North America, Sun Chemical

Environmental regulations are increasing pressure on the printing industry to exceed their sustainability goals. To comply with the most up-to-date legislation, brand owners and converters must work with suppliers who prioritize sustainable production.

Maintaining success and competitive relevance in the market now requires printers to integrate sustainable initiatives into their product development to promote a circular economy and help their customers meet their own sustainability targets.

In addition to sustainability targets, environmental groups and non-governmental organizations are working to implement stricter environmental regulations, like extended producer responsibility legislation and bans on single-use plastic. Suppliers, converters and brand owners must work together to transition from traditional products and technology that contribute significantly to landfill to methods that benefit the environment, improve recyclability and reduce waste.

While this transition can be costly and time-consuming, in certain segments like energy curable printing, sustainable options are widely accessible and able to be integrated with older systems without compromising performance.

This conversion in the printing market from standard UV mercury lamps to UV LED-curing systems is growing. Suppliers like Sun Chemical are working to ensure that their products are compatible across a range of systems so the transition to UV LED is accessible enough to help printers meet industry regulations for sustainability.

The Sustainability Benefits of UV LED Inks for Energy Curable Printing

As a sustainable leader in the printing and packaging industry, Sun Chemical has been a longtime proponent of UV LED printing. With sustainable initiatives guiding all segments of business development, Sun Chemical uses a '5R' approach of Reuse, Reduce, Renew, Recycle and Redesign to prioritize sustainability and promote circularity.

Sun Chemical's energy curable offerings include SunWave UV LED curing sheetfed offset

inks and SolarWave flexo inks for UV LED printing, both of which can be used with standard mercury-vapor lamps or with LED lamps.

Even though UV LED inks have been used in commercial, narrow web, flexible packaging and offset markets for many years, printers and converters still hold certain misconceptions about their capabilities. For instance, there is a common belief that UV LED inks are only compatible with LED lamps, making it difficult for printers with traditional lamp systems to transition to LED.

However, most (maybe all) UV LED inks are dual-curing and cure under both traditional UV lamps and LED lamps. Because Sun Chemical has optimized SunWave and SolarWave for maximum UV LED performance, printers have an easier time transitioning from conventional mercury UV lamps to the more sustainable LED lamps which have historically given varying levels of performance.

A highlight of the SolarWave range is the SolarWave CRCL series which exhibits a wide range of brilliant and high performing colors and was designed to enhance packaging recyclability by enabling excellent adhesion without primers, resulting in a washable, de-inking or retentive system, depending on specific application requirements.

Washable inks contribute impactfully toward effective recycling, as they are formulated to enable rapid and effective filtration during wastewater processing to afford clear wash solutions and clean plastic flakes. SolarWave CRCL inks utilize a Nestlé-compliant, low migration system and are compatible for high speed printing with many different substrates. They were recently formally recognized as meeting or exceeding voluntary recyclability requirements published by the Association of Plastic Recyclers (APR), demonstrating Sun Chemical's continuous commitment to providing consumers with products that can help them achieve their sustainability goals.

Another major sustainable advantage of the SunWave and SolarWave series is the energy savings they provide. Printers can benefit from significant energy savings when converting from standard curing lamps to LED-curing lamps due to their longer shelf-life and resulting lower cost of maintenance.

The ability to run lightweight and heat-sensitive substrates are further pushing demand for LED systems. In addition to energy savings, when using LED lamps, printers do not have to wait for the lamps to cool down or heat up, which leads to time savings. LED lamps do not produce ozone emissions, do not use mercury, limit the use of reflectors and, unlike mercury lamps, do not gradually deteriorate, which ensures optimized performance over time. However, as with mercury lamps, LED lamps must be kept clean to maximize their performance, which is easier to achieve with low-misting inks, like SunWave.

Meeting the Demands for Sensitive Packaging

Demand for LED solutions for primary and secondary packaging in the food industry is growing. Increasing demand for UV and LED inks in the food packaging market may be buoyed by the trend of LED curing under nitrogen which also results in lower migration by reducing the photoinitiator level.

Another factor influencing demand for LED in the food packaging market and other sensitive packaging markets like pharmaceuticals, is the ability to run heat-sensitive substrates. The cure consistency and print repeatability enabled by LED lamps make them especially compatible with sensitive packaging.

The transition from standard UV to UV LED printing is an important part of helping the printing industry adapt to dynamic environmental regulations and legislation. As an industry supplier partner, Sun Chemical has helped spur the widespread accessibility of UV LED printing across many market segments to enable brand owners and converters to meet their sustainability goals and help meet the needs of their customers. To learn more about sustainable solutions for UV LED printing, visit www.sunchemical.com/UV-LED. ■

ABOUT THE AUTHOR

With 40 years of experience in the graphic arts industry, Derrick Hemmings is a product manager of screen, energy curable flexo and LED in North America at Sun Chemical. He can be reached at globalmarketing@sunchemical.com.

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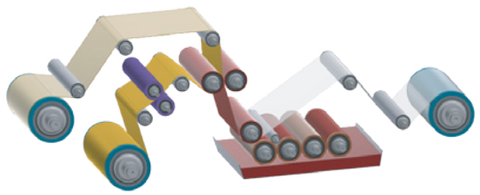
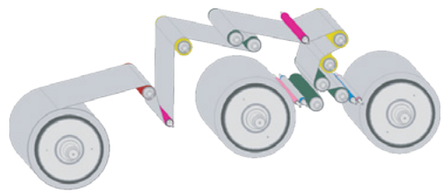


Plasma Coating Applications
- Backing
- Entrance/Exit
- Load Cell
- Tension Leveler
- Transfer

Roller Covering Applications
- Bowed
- Coating
- Laminating Nip
- Lay On
- Wrinkle Elimination

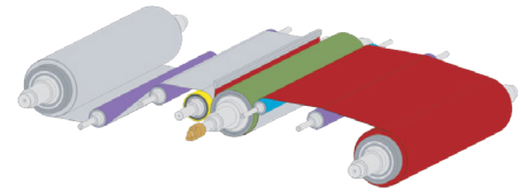
Slitting



Plasma Coating Applications
- Bed
- Drive
- Entrance/Exit
- Transfer
- Load Cell

Roller Covering Applications
- Bed
- Drive
- Load Cell
- Transfer
- Wrinkle Elimination

Extrusion Coating



Plasma Coating Applications
- Coating Pan
- Drive
- Entrance/Exit
- Oven Idler/Bar
- Thermal Transfer
- Transfer

Roller Covering Applications
- Coating
- Drive
- Lay On
- Load Cell
- Thermal Transfer
- Wrinkle Elimination

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A Look at Meeting Customer Demands

Innovations to Address Labor Shortages in Bag Converting

By **Craig Mickelson**, Machine Upgrade Specialist, CMD

Labor shortages in manufacturing and converting have become a prevalent issue, with companies struggling to find qualified workers for skilled positions. The departure of baby boomers from the labor market and the impact of the pandemic have compounded the problem, creating a perfect storm in the hiring and retention sectors. As a result, converters are facing significant challenges in finding and retaining experienced employees who possess valuable skills and expertise.

Along with personnel shortages, converters are also facing price increases, material supply chain disruptions and increasing customer demand for quicker turnaround times. This leads to them placing pressure on OEMs for faster speeds, easier-to-use controls and platforms, easier-to-access designs for quicker changeovers, the ability to run and maintain machines with fewer personnel, less waste and continuous support to avoid downtime.

Quick Change

One of the biggest challenges in bag converting is changing over from one product to another. Traditional bag-converting equipment requires significant time and effort to change the machine to a new

CMD's 1270 GDSE features advanced technologies and components, including large color touch screen with menu savable settings, perforation-to-seal registration, and patented rotary sealing technology to assure optimal process control and high-quality bags.

product. This process can take several hours and requires skilled operators to complete. However, this process has become much faster and easier with the introduction of quick-change technology.

Adding features for quicker changeovers and automating some of the setup and adjustment processes can reduce the time required to complete changeovers and minimize the amount of film used during setup. This technology includes quick-release clamps, pre-set adjustments and tool-less changeovers. By simplifying the changeover process, bag-converting companies can significantly reduce their downtime and improve productivity.

Auto Splicing on Parent/Master Rolls

Another innovation in bag-converting equipment is auto-splicing on parent/master rolls. This technology allows automatic film splicing when the parent/master roll runs out. This eliminates the need for operators to stop the machine to splice the film manually, which can be a time-consuming and error-prone process. Auto-splicing technology uses sensors to detect when the parent/master roll is about to run out. The machine then automatically splices the new roll onto the end of the old roll, ensuring a continuous film feed.

This technology can significantly reduce downtime and improve productivity, as operators no longer need to manually stop the machine to splice the film.

Pack-Off Automation

Pack-off automation is a further advancement in converting equipment, aiding companies in enhancing efficiency and cutting costs. This innovation automates the process of packing bags, pouches and other types of flexible packaging into boxes or other containers – which significantly reduces manual labor and allows operators to focus on more diverse tasks. This technology also plays a crucial role in reducing repetitive motion, a major cause of stress and injury in the workplace. Automating the packing process eliminates the potential for human error and product damage, ensuring that products are delivered to customers in perfect condition.

Easy-to-use interfaces allow operators to input settings and specifications effortlessly, and visual indicators help operators monitor the machine's performance and adjust as needed. *Photos courtesy of CMD.*

Automated systems can perform packaging tasks much faster than manual labor, increasing overall productivity.

Utilizing automation can lead to substantial time savings. Automated systems can perform packaging tasks much faster than manual labor, increasing overall productivity. This allows businesses to meet higher production demands and reduce lead times, improving customer satisfaction and potentially increasing sales.

User Friendly Features and Training

Bag-converting machines should utilize user-friendly and intuitive features that streamline the

production process. Easy-to-use interfaces allow operators to input settings and specifications effortlessly, and visual indicators help operators monitor the machine's performance and adjust as needed. Overall, these user-friendly features increase efficiency and productivity in bag manufacturing processes.

Advancements in data analytics and connectivity enable real-time monitoring and control of bag making equipment. This in turn empowers converters with comprehensive insights and performance metrics, enabling them to make proactive decisions and drive continuous process improvement. By harnessing real-time data, stakeholders can swiftly identify operational inefficiencies, optimize equipment performance and leverage actionable insights to enhance overall productivity and quality control.

Training is crucial for ensuring that operators are proficient in the setup, operation and maintenance of bag converting equipment. Collaborating with an OEM that offers customized training programs can guarantee that the training aligns with evolving needs and enables operators to enhance their expertise and proficiency in utilizing technology and equipment.

Challenges of Implementing Labor-Saving Innovations

While implementing labor-saving innovations on bag-converting equipment has many benefits, companies may face some challenges. One of the biggest challenges is the cost of implementing these technologies. Labor-saving innovations can be expensive, and companies may need to invest in new or retrofit existing equipment to incorporate these features.

In conclusion, labor-saving innovations in bag-converting equipment are changing the industry. Quick change technology, auto splicing on parent/master rolls and pack-off automation are just a few of the innovations helping companies improve their efficiency and reduce their costs.

While implementing these technologies can be challenging, the benefits are clear. By investing in labor-saving innovations, companies can stay competitive in an increasingly fast-paced and demanding business environment.■

ABOUT THE AUTHOR

With an Electromechanical Degree from FVTC, Craig Mickelson began his journey at CMD in 2016. Starting in Technical Services, Craig demonstrated his expertise, leading to a transition to the role of Machine Upgrade Specialist in January 2020. In his current role, Craig works closely with all CMD customers, leveraging his technical and industry knowledge to enhance their machines and deliver tailored solutions.

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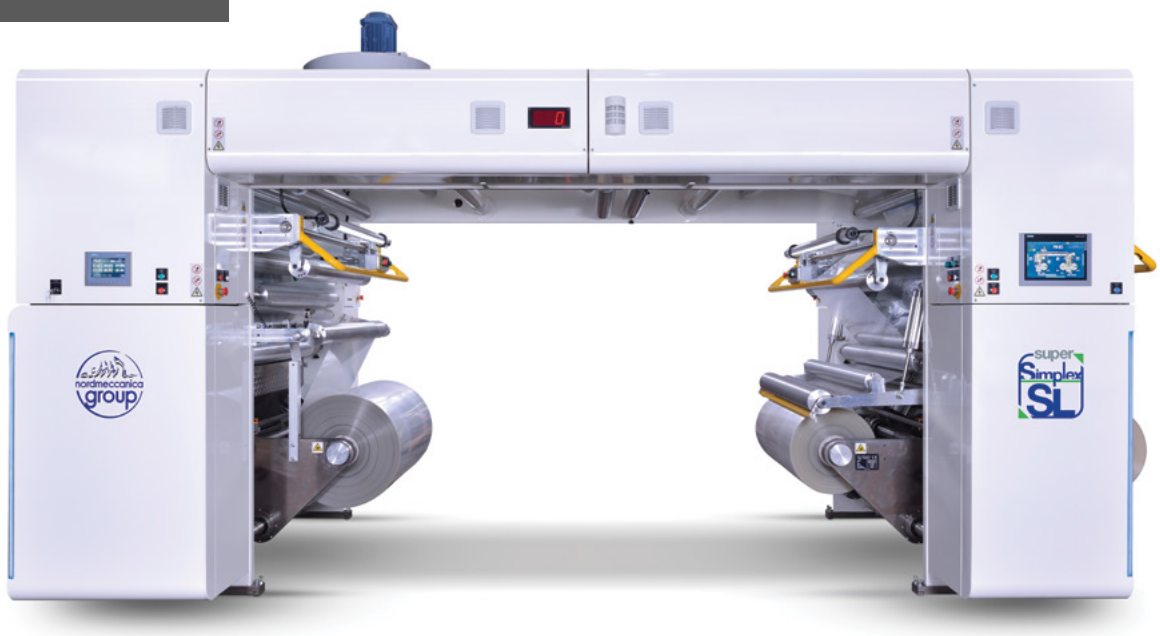

Sustainability

A Journey Through Coating and Lamination Technology

By **Giancarlo Caimmi**, Commercial Director, Nordmeccanica Group

The converting industry has had positive impacts on nature, developing technologies to reduce energy use in the packaging cycle, the overall carbon footprint and waste of food products (the largest contributor to solid urban waste), as well as to improve hygiene and eventually reduce overall costs.

On the other hand, our industry has room to improve toward converted products' end of life, the intensive use of energy and the emissions associated with the production processes. Attention to developing better and more sustainable technologies in our industry include the development of converted compounds that allow for higher rates of recycling such as mono-material structures — Compounds that can be recycled because they are made of a single polymer in a very high percentage.

Currently, each member of the value chain is contributing to new developments. The conversion of innovative substrates will require the machinery side of the value chain to set proper technologies, specifically on the web handling side. Similarly the development of new functional coatings requires

evaluation of proper coating technologies, selection and development of innovative ones.

The involvement of the machinery manufacturer consists in providing efficient hardware solutions aligned to the requirements of innovative compounds. This is critical in coating and lamination, with such machines particularly affected by energy consumption and VOCs-related emissions.

There is a large area of innovation exclusive to the machinery manufacturer. I am referring to the improvement in the energy efficiency of the production process. Equipment involved in the conversion process is suitable to be evolved to contribute to the sustainability of the production cycle. Carbon footprints associated with the conversion process can be significantly lowered as certain innovations and design solutions are implemented.

Technical solutions that have been implemented in coating and laminating machines are mainly targeting energy efficiency and emissions reduction. Energy is predominately used in the conversion process in two forms: Electricity and heat.

Electricity is needed to feed motors, devices and ancillaries involved in the process. Heat consumption is related to technological needs associated with process handling, thermal regulations during the process and drying systems.

The reduction of electric energy consumption can be approached by the OEM through smart design first. Dimensions of the equipment and size matter. A longer web path, longer than needed, contributes to passive inertia and consequently requires the use of larger motors, with the relative increase in energy consumption.

Another important contribution is the use of low passive inertia mechanical components: Low friction bearings, high-efficiency timing belts and gears will reduce energy consumption.

In the web path of a coater or laminator there is a large number of web supporting rollers. Each idle roller contributes several grams to passive inertia. When tens of idle rollers are involved, it is easy to reach passive inertia level in the size of several pounds.

In every process requiring significant amounts of thermal energy for process control, machine design has a significant impact.

In order to manage that inertia, a larger amount of power is required. Low inertia components are obviously more expensive than generic ones but the payback is quick. It is an important topic to evaluate at time of investment.

Good machinery includes those solutions as a standard. The benefit, projected to the life cycle of the equipment, will be relevant. Modern electronics provide energy-efficient solutions. Multiple classes of energy efficiency are available and this is another aspect that should not be overlooked.

One important technology to be considered is self-generation of electricity during the production run. This is the technology of the regenerative AC drives consisting with the conversion of the kinetic energy of the motor and the associated load into electric energy.

All modern equipment is designed with motors used as breaks at the unwinds. The use of motors is motivated by the higher accuracy provided in web handling. Most of the run time, those motors are in fact acting as breaks. This is the phase during which the regenerative drive converts, or regenerates, the kinetic energy of the compound motor-load (the unwound roll, actually) into electric energy. And that energy, in the most advanced systems, is used to feed other machine motors in actual higher demand.

The benefit to the process is that an estimated 20-25 percent of electric energy consumed by the equipment is self-generated. Once again, a technical solution that pays back quickly and generates savings during the entire machine life.

Emissions is another aspect of sustainability that can be positively affected through machine design.

Coating and lamination covers multiple technologies used within the industry: Solvent-less adhesives; dry bond compounds; wet bond compounds; energy cured compounds; thermoplastics …

The solvent-less adhesive class does not require drying, consequently there are no VOC emissions. The air that is exhausted at the coating head for safety reasons, consisting in "part per billion" of monomers, is considered by most regulations pure air. This is the reason why solvent-less lamination is growing in use in every area. A solvent-less laminator compared in efficiency to a wet or dry bond laminator may show up to 80

percent energy savings.

In the wet and dry bond processes the achievements in efficiency are connected mainly to oven design, with air ovens the most common solution. Air is heated at the process temperature and then the energy that comes with the air needs to be transferred to the coated compound to remove water or solvents during the drying process.

Here the efficiency of the drying process is associated with the oven design. The more the warm air is forced to remain in contact with the coated compound (mainly through forced turbulence) the higher the efficiency on the transfer of heat. This way the drying process will be accelerated and the oven can be reduced in length with advantages in web handling as well.

As for every heat-related process, thermal insulation is key to efficiency. A drying oven can disperse a lot of energy to the outside through radiation and convection. Thermal insulation will bring a significant contribution.

Oven air recirculation is also a contributor to efficiency. Forcing a portion of the exhausted air to circulate back to the oven under controlled percentages allows for significant energy savings. A heat exchanger down stream from the oven also increases efficiency. The use of recovered energy for secondary applications will be almost free of charge for the converter. Costs associated are always paid back very quickly.

In every process requiring significant amounts of thermal energy for process control, machine design has a significant impact. The more the energy is transferred efficiently, the lower consumption and associated costs will be.

In thermoplastics, thermal insulation plays a significant role. In machines for that conversion, thermal controls are used at every process step, starting with the melting process, continuing with the coating process and the chill roller. There will be thermal dispersions all over if the machine is missing insulations. The use of a melter-dispenser instead of large, heated reservoirs for the melted compound makes the process more efficient.

Investing in new hardware and improving energy efficiency in existing equipment through an analysis of the energy in use and the implementation of proper remedies benefits the environment and is a significant savings in costs for converters. Properly engineered equipment compared to basic alternatives may show energy savings of 50 percent or more. This not only means quicker pay back, but generates savings for the entire life of the equipment. ■

ABOUT THE AUTHOR

Giancarlo Caimmi holds a PhD in mechanical engineering by University Federico Secondo in Italy, and has over 35 years of experience in the converting machinery manufacturing industry. Giancarlo has been the author of articles for technical magazines and lectured worldwide in conferences on packaging, flexible packaging and converting equipment.

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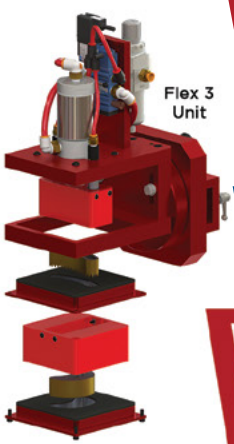

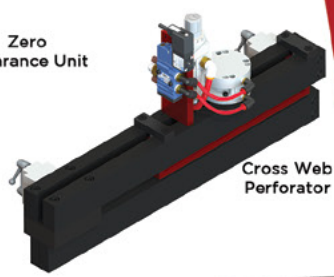

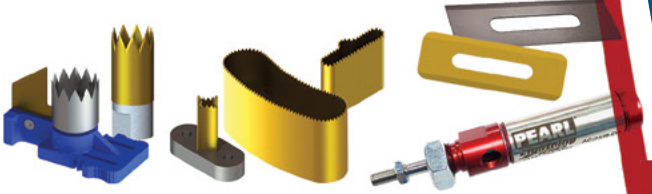

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A number of factors have impacted the ongoing growth of UV label printing. *Photos courtesy of Epson America, Inc.*

A Deeper Look at UV Inks in Label Production

By **Mike Pruitt**, senior product manager, Epson America, Inc.

The use of UV inks in flexo and digital production has continued to grow in 2024 for a variety of reasons. Low VOC content, high print speeds enabled by fast curing, UV compatible substrates readily available, low power consumption, high print quality and embellishment capabilities have all impacted the ongoing growth of UV label printing.

From the manufacturing front, UV inks are being updated regularly to comply with ever tighter European Printing Ink Association (EUPIA) safety standards. Coupled with digital advancements, inkjet technology has made significant strides, boasting features such as thin, precise flat ink laydown, sharper text, sophisticated dot placement, and registration capabilities that can produce G7 print quality and wide color gamut, reliably fast printing speeds, color repeatability and the jetting of clear inks for embellish-

Corona treating and priming can be used on materials that pose challenges with adhesion.

ment. Given all this, what's NOT to like about UV inks?

It is important to note that UV inks require careful consideration of the substrate material. Many substrate suppliers have adjusted their standard offerings with a universal topcoat that is UV compatible. This has greatly helped from an inventory and cost standpoint; now a converter is able to use the same material for both flexo and digital jobs. Although convenient, the substrate plays a critical role in ink adhesion, and it's up to the converter to assess ink and substrate compatibility to ensure proper ink adhesive and avoid chipping of the ink in the finishing process during die cutting and wear in normal transportation and use.

It is industry standard to laminate or varnish the label after printing to protect the surface print during the labeling, shipping, display and use of the product. However, in processes like UV clear ink embellishment, it's recommended to never apply the lamination or liquid vanish post-print as it can damage the embellishment effect. In these cases, ink adhesion is critical due to lack of surface protection which the lamination or varnish would provide.

Typically, printer manufacturers conduct tests to categorize adhesion into tiers. Tier 1 will pass a tape lift-off test with a small cut in the material, while tier 2 will pass without any cuts in the material. There are more advanced tests for critical applications that a converter can research. However, it's recommended a print provider should always strive to use a Tier 1 ink and substrate combination when available and is cost effective.

For those converters looking to utilize materials that pose challenges with adhesion, methods like corona treating and priming can be used to enhance adhesion. For materials without a topcoat, corona treatment can be used to improve adhesion. Corona treatment is a process that increases the surface energy of the material, it improves wettability affecting print quality and surface adhesion.

Corona treatment is typically done at the time of substrate production and supplemented inline on the press proceeding printing. Despite the automation of printing processes, setting the corona level is still an art and can be time consuming. An alternative is to coat the substrate with a water-based, or more typically, UV primer. Regardless of the preferred method, this adds a step to the printing process, necessitating priming either offline or inline with a flexo station.

UV ink typically performs best on filmic materials. Even a semi-gloss has some filmic properties. Uncoated substrates, such as Estate 8 used in the wine industry, lack these filmic properties. This can cause the UV ink spread to be uneven, and therefore won't match the classic look of a water-based ink. Thus, while UV printing on uncoated materials is feasible, it's best approached on a case-by-case basis.

Another area of development with UV inks lies in shrink film applications. Whereas UV inks demonstrate efficacy at a 30 percent shrink rate, reliably getting

Laminating or varnishing labels after printing protects the surface print.

digitally printed UV to resist cracking at 70 percent shrink can be a challenge. Ink manufacturers are actively working to develop thinner and more flexible ink formulations tailored for high-shrink and squeeze tube applications.

Ink manufacturers have already made significant strides in ink development, creating formulations that excel in low migration, low odor, ever thinner laydown and continued compliance with regulations such as EUPIA. Some manufacturers have gone as far as building their ink manufacturing plants to Good Manufacturing Practices (GMP), which not only ensures product quality but also aids converter customers in meeting stringent food safety regulations.

So, what about water-based inks? Water-based inks, particularly those used in digital printing, historically need a special coating for substrate adhesion. In the past decade, resin and latex encapsulated inks have been developed, and when heated after printing, fuse to even non-top coated films.

As remarkable as this is, the drying process for these inks consumes considerable time and energy, which influences print speeds, making it significantly slower than UV ink prints. Because water-based inks are favored by the food industry and perform remarkably well on most substrates, including the uncoated substrates where UV inks have issues, continued research efforts persist to develop more sophisticated drying methods and faster print speeds.

So, what is in the future? Automation is key, driven by factors like the shortage of skilled machine operators and cost considerations. Sophisticated printing and ink systems, whether digitally controlled on a flexo or inkjet digital press, will contribute to the stability needed to fully automate systems.

These systems meticulously manage inks for temperature, solid control, dot placement, spread and conversion to a final cured print. Such control is achieved consistently and without operator input, paving the way for systems capable of handling daily maintenance autonomously. ■

ABOUT THE AUTHOR

Mike Pruitt is senior product manager for the SurePress digital label press at Epson America, Inc. In his role, Mike is responsible for driving prime label printer activities within industries such as wine, nutrition and specialty food products.

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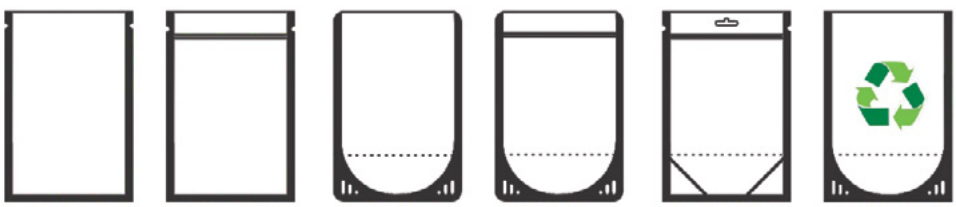
- Total footprint of **35 ft.**
- Mechanical speeds of **240 cpm**
- **Tool less** changeover of seal bars
- Option for **3 web print registration** for **narrow web printers**
- **Ultrasonic** zipper crush
- **Digitally** settable **double cut** as a standard feature
- **Independent servo controllers** for each seal station for seal time, seal pressure control
- Both **Top & Bottom reciprocating seal bars** for smooth processing of recycle ready mono-material films
- Option to run **regular or CR** Press to close zippers



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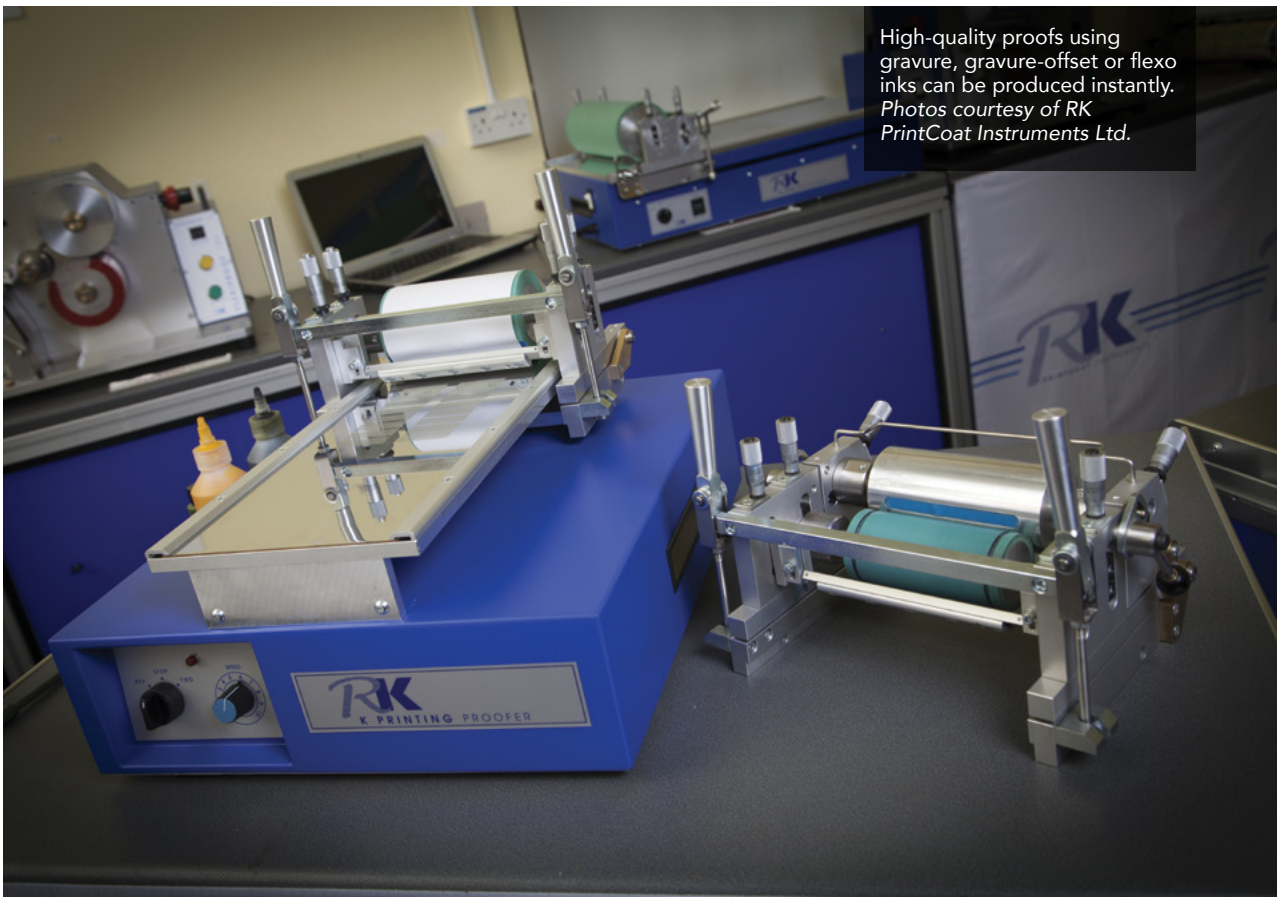

High-quality proofs using gravure, gravure-offset or flexo inks can be produced instantly. *Photos courtesy of RK PrintCoat Instruments Ltd.*

Converter Requirements Toward Inks and Printability

By **Tom Kerchiss**, Chairman, RK PrintCoat Instruments Ltd.

Benchmarking and shared goal setting have become more prevalent throughout the print and converting industries as all partners strive not only to make a profit but also survive in a time of many changes. While ink formulators and consumable suppliers pull out all the stops to make flexographic, gravure and other ink systems as versatile as possible, the fact remains that everyone prints and converts under different conditions, on different substrates and for different purposes.

Converters require many things from inks. For one thing, they'd like ink that adheres to the substrate, which conceivably could be pressure sensitive, carton board, flexible pouches and mono bio-based or laminate constructs. They'd like to be able to use inks that run at varying speeds without losing color strength; they may require inks that are water resistant, rub and chemical resistant.

Of course the converter is not the only one in the equation, the converter and ink supplier must consider that the customer may demand that inks have minimal environmental impact; no one wants components or chemistries that could migrate out and contaminate the product, especial-

A high speed, operator-friendly machine for the production of proofs using water, solvent or UV flexographic inks.

ly when the printed box, carton, pouch or wrap is a food item. Printing sustainably using inks made from renewable and eco-acceptable components that reduce or eliminate fossil fuel derivatives is the objective of manufacturers and customers alike.

Ink modification or adjustment and new product development is ongoing, enabling the converter to meet print buyer expectations with regard to quality and performance. Inks have been formulated for flexo that work at higher densities with finer screens and which are increasingly able to run at speeds of as much as 600 meters per minute or more. The development and manufacture of inks has also taken different turns with inks formulated for LED cure and speciality inks such as thermo chromic and photo chromic inks which require heat and light for color optimization.

Inks are applied to a wide range of substrates with differing surface structures. These surfaces may be porous or nonporous. Some surfaces must be made ink receptive such as film, but this does not always go to plan. Films may have different types of lubricants or varying levels of a lubricant that can affect ink performance. It is imperative therefore that ink and substrate compatibility is evaluated prior to printing. Quality control, proofing and other devices have a role to play in identifying the source of a problem and assist in determining a course of action.

Some filmic materials incorporate slip agents. While slip agents do an admirable job of modifying the co-efficient of friction, if they migrate to the surface of the substrate, the greasy nature of these substances can result in difficulties in ink adhesion and print defects. Some inks also contain slip additives which, when combined with filmic slip additives, softens the inks and increases the tendency for blocking to occur.

Consistency of color is essential, but one must remember that many factors, including the chosen substrate, can make it difficult to meet color targets. When we consider color, how it appears, we're looking at more than transparency, opacity and gloss, we're looking at the subtleties: Hue or shade, strength or saturation (Chroma) of a color along with how light or dark a color looks.

Amount of pigment can affect color strength, while the color of the substrate and the drying or absorption properties also impact print quality. Pigment is essentially any particulate solid, colored, black, white, fluorescent or other matter that is able to alter the appearance of a subject matter or object by the process of selective absorption and/or a scattering of light.

Ink density correlates closely to the percentage of pigment contained in the ink film, absorption, particularly in the case of many papers playing a lesser role. Ink film thickness — rather than ink density — can determine the gloss appearance of the ink. Two ink films printed to the same ink thickness but with different levels of pigment loading will produce the same level of gloss but will differ in density.

Even with lean manufacturing techniques and quality control initiatives the control of color and other elements of design can be difficult. Color matching and determining printability off-press is obviously desirable in that it minimizes production press-generated waste and goes some way to ensuring consistency of quality.

Batches of ink should be proofed on the same substrate as will be used on the production press. A simple decision to change paper stock, perhaps for reasons of cost, may have significant effect on how color appears. Paper brightness, surface quality and a deviance from color cast could affect printed color appearance.

Sophisticated presses, the introduction (albeit gradually) of bio-based, bio-degradable materials and filmic materials with a high recycled content — co-operative cloud-based involvement and the fine tuning of inks/coatings — are either already becoming available or are now poised for an entrance. These developments are guaranteed to keep pre-press departments, ink producers and converters engaged and far from complacent. ■

ABOUT THE AUTHOR

Tom Kerchiss is the chairman of sample preparation system and print/coat/laminating technology specialist RK PrintCoat Instruments Ltd. The company, which won an Innovator in Pre-Press Award for the FlexiProof 100, supplies printing ink manufacturers, both large and small, as well as printers, converters and other businesses with color communication devices for all of the major print disciplines.