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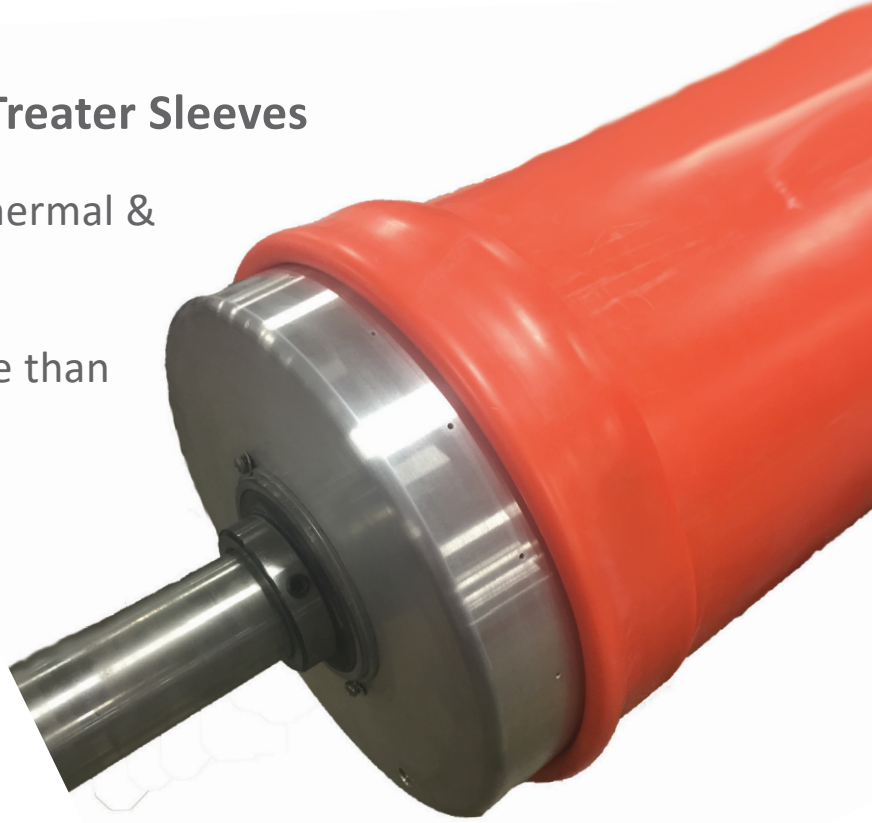


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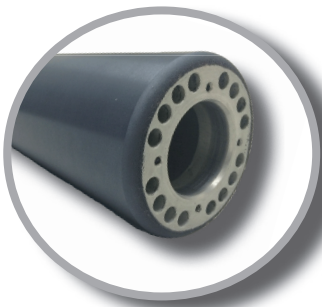
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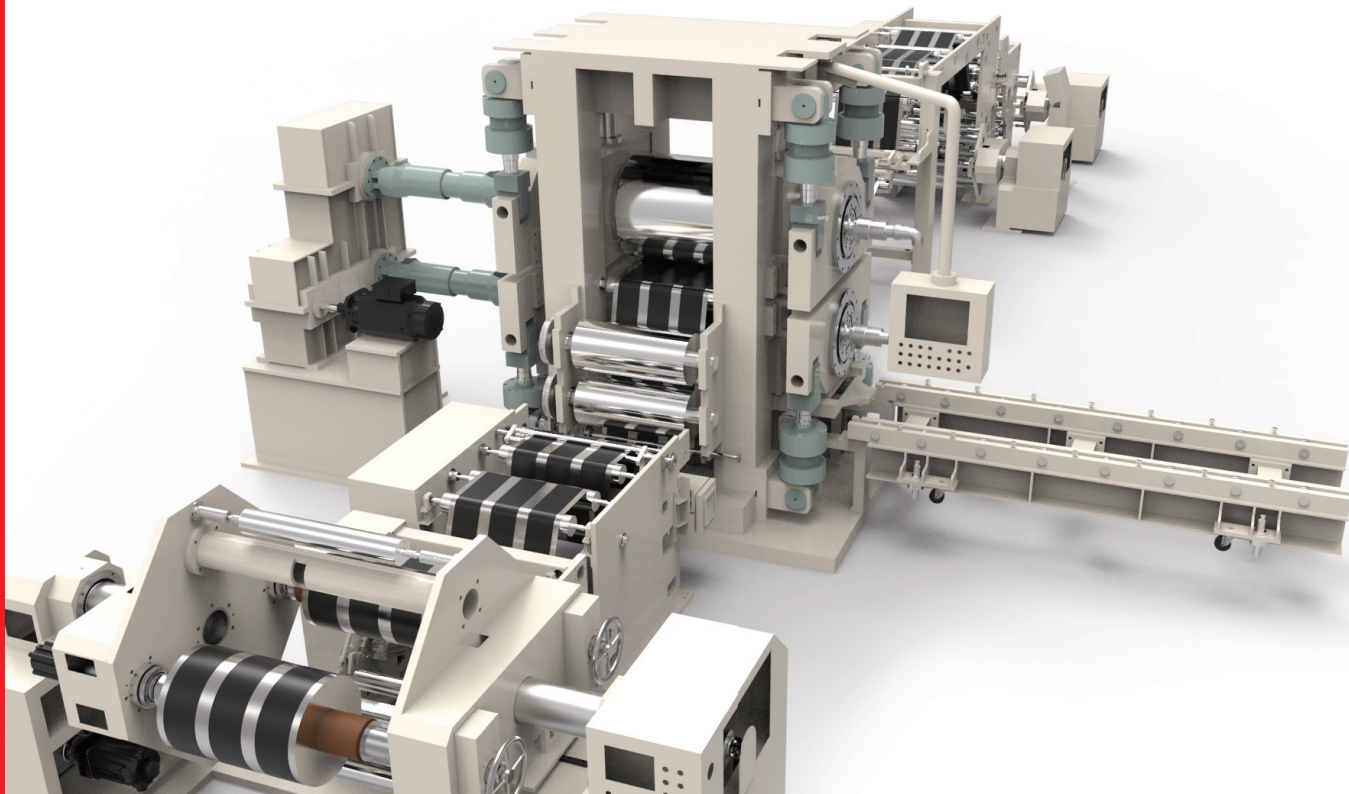
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The More Things Change



Angel Morris
Editor

I'll age myself by admitting I was editor of my high school newspaper back when our stories were drafted using pencil and paper, and we were just beginning to use fancy machines called word processors. A summer internship at my hometown newspaper forced me to embrace technology, where I learned not only to write stories on a computer, but to design pages as well.

While we formatted our stories on screen, we still printed them out and glued them to paper for delivery to a printer. That was the norm for a decade or so of my journalism career until we began uploading publications and sending them to a printer electronically. It may have been the beginning of the end for traditional newspapers, but this publication is proof that the paper industry, in all its various formats, has continued to adjust with the times. *PFFC* is produced both in print and digitally, bringing the latest technology, products and services, and marketing and management news to converters worldwide.

As the new editor of this publication, I recall what it was like to move from writing with pencil and paper to designing on the computer ... what seemed difficult at first opened up a world of possibilities. In this issue, industry experts address sustainability and converting, discussing green innovations in packaging in response to government legislation as well as consumer demand for more environmentally-friendly goods. While not without challenges, the pursuit of conscientious technologies will likely result in groundbreaking practices.

As the Greek philosopher, Heraclitus, said, "The only constant in life is change." Since 1927, *PFFC* has reported the changing business trends and technical innovations that shape the converting industry. I look forward to learning with you through every issue, as the paper, film and foil converter trades build on the past with an eye toward the ever-changing future.

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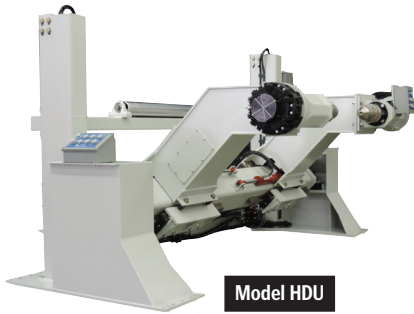
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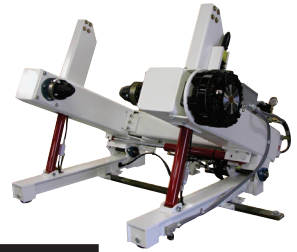
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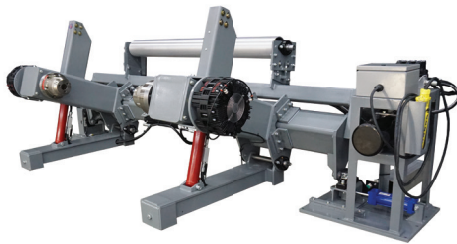
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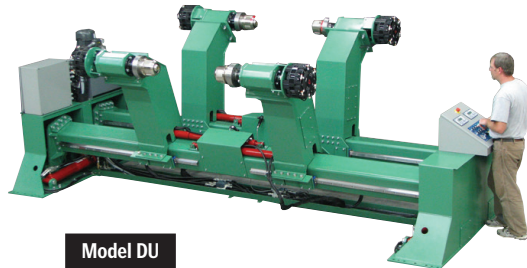
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Rust to Tech: Part 3

By **Susan Stansbury**, Industry Consultant

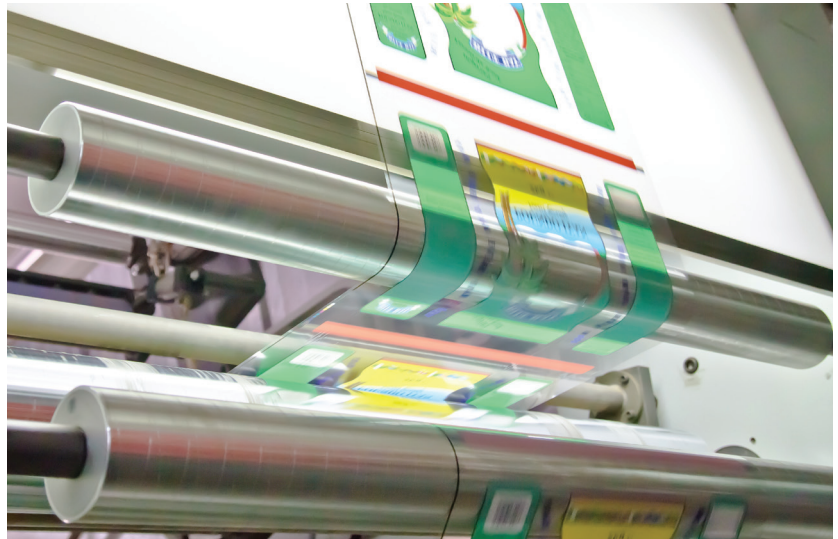
This is Part Three in a five-part series. Part I was a look at the rust belt image, concentrating on mills making substrates and related converting; Part II was a snapshot of converting examples with associated suppliers and technologies. This episode is a reminder that converting and associated industries have made a leap from the old rust belt days into a world of technology and forward motion.

Here are examples of the latest converting technologies with notes on their associated markets.

We cannot look at the state of the industry without first commenting on workforce issues. Manufacturing, like almost the entire U.S. labor force, is in dire need of workers. Both individual companies and organizations are working to bring in new employees.

Some companies are going to high schools and technical colleges themselves. Others work with groups to reach workers. According to Ann Franz of the NEW Manufacturing Alliance, "We are targeting both new workers and 'upscaling' workers for better jobs such as data analytics across industry in HR, IT, the plant floor and more." There are some 300 member companies.

In recent years, there was some irony in companies wanting to automate, eliminating certain workers, with accompanying negative news about fewer jobs available. Now, the combination of automation and a leaner workforce seems like a win-win. Automation and improved workflow steps por-



U.S. packaging machinery shipments rose 14.7 percent between 2015 and 2020, according to a state of the industry report.

tend a future with a smaller workforce. Being lean and productive has kept the Midwest converting hub globally competitive.

There is further encouraging news for the converting world which many say is "headquartered" in Wisconsin. Madison, with a population of 250,000, led a list of the top 10 cities that retained tech talent from December 2019 to May 2021, according to LinkedIn analysts. In addition, Green Bay, the scene of so much converting, is growing along with industry. The engineering talent pool in the Midwest is also a positive factor supporting manufacturing.

Looking at aspects of the converting industry, from slitting-winding, coating, printing, production processes, packaging and more, a major focus is on efficiency. In a recent webinar, web handling experts Maxcess Interna-

tional reported, "Optimizing your converting yields better quality output, faster speeds and decreased scrap. The key to optimizing converting is not simply proper guiding or tension, but it's about the interplay of all these tools."

According to Mary VanVonderen, marketing manager, The CMM Group, "Companies are spending money on new equipment and expanding production in many of our core markets. We also see an uptick in companies taking proactive steps for preventive maintenance and upgrading existing equipment." Providing industrial ovens, conveyorized dryers and pollution control equipment are key aspects of the company's business.

Like many others, The CMM Group is increasingly examining ways to cross-learn and develop between its diverse divisions. One

of its newest offerings grew out of the ovens segment. Now, for example, Infrared (IR) cheese pre-melters play a vital role in the frozen pizza manufacturing process, ensuring that cheese and toppings stay in place during the flash-freezing and packaging process.

For each converting process, providers are offering improved equipment. Beginning with slitting-winding, there is no standing still. Elite Cameron states its turreted slitter rewinders combine both efficiency and flexibility. In the spring of 2021, Elite Tape introduced its new CAT 729 fully automated surface rewind slitter. It was custom built to meet market demands. And others are doing their part with custom solutions.

A 2021 U.S. Packaging Machinery State of the Industry reports U.S. packaging machinery shipments rose 14.7 percent between 2015 and 2020, with a packaging order backlog increase of 22.3 percent and a converting order backlog increase of 12.2 percent in the same period. Welcome to backlogs!

Companies in health care disposables such as dry and wet wipes are rolling out new products like masks and reusable wipers. Associated raw materials have evolved with the unique product designs. In market niches ranging from pizza packaging to retail and automotive, growth and backlogs prevail in 2022.

Automation, RFID, lighting, recycling, intellectual property and sustainability are simultaneous factors during this period of innovation. Examples:

- Measuring sustainability at Menasha Packaging happens in many ways — including in number of trees saved!
- Menasha Corporation's Neenah, Wis., facilities, through upgrades to LED bulbs, save 375,000 kWh a year.
- Georgia Pacific's Palatka, Fla., paper mill earned the U.S. Environmental Protection Agency's (EPA's) ENERGY STAR Top Project for 2020. The mill's kraft papermaking department team achieved a 40 percent water reduction.

According to AdvisorSmith.com reporting, manufacturing strongholds are often in mid-sized and small communities, such as in Indiana and Wisconsin. The top five small cities they cite include Columbus, Ind.; Sheboygan, Wis.; Lima, Ohio; Decatur and Kankakee, Ill.. The "Converting Corridor" from Green Bay to Milwaukee, Wis., is the innovation hub of this important segment of manufacturing.

Next: Part IV of this series will include more aspects and upgrades in converting. ■

ABOUT THE AUTHOR

Susan Stansbury is a converting advocate with extensive experience in the paper, converting, printing and related industries serving in roles including sales and marketing management.



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Spectral Analysis of Color Worth the Investment

By **Robert Buongiorno**, President, BST North America

In the last 40-plus years, color quality demands have increased in every area of the printing industry. At one time, the best quality printing was only found on printed auto brochures, high-end jewelry and fashion brochures, and large corporation annual reports. Today we find these same demands for cereal boxes, packaging pouches and other packaging products.

Why has this demand grown?

One theory is the influence of electronic media. Ask yourself this: What did TVs look like 20 years ago compared to today? Early computers had an amber CRT screen, then advanced to a grainy color screen. Essentially, improvements in electronics have conditioned our eyes to see color better. These expectations have caused all aspects of the printing industry to deliver better color.

In the packaging industry, delivering this quality has proven considerably more challenging than in the commercial offset industry, since our primary printing process is flexo. Unlike offset, you can't just adjust the ink keys or the ink-water balance. While a job is on the press, all you can do is adjust the pigment strength of the ink (assuming the plate pressure is correct) and hope you haven't

missed your target.

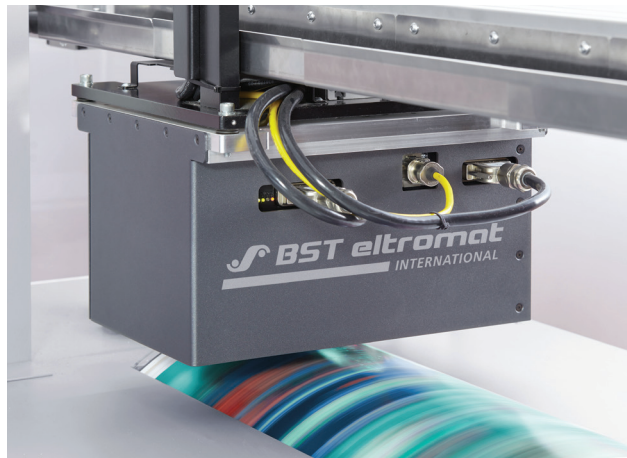
What can we do in the flexo packaging industry to consistently deliver the quality demanded by end users? Further, how do you ensure a product printed on one press, or in one plant, will be reproduced the same on another? For the answer, we need to look to the offset side of our industry where they have been using spectral color data as part of their quality control for years.

In web offset, the spectral data is read inline and automatically adjusts ink keys to hold the color to a predetermined target. In sheetfed offset, the data is generally read offline through sample inspection (while the press continues to run). However, some manufacturers offer inline systems, as well. In roll-to-roll flexo, we stop the press, splice out a sample, and complete a handheld analysis of the color, splice the web back together then restart the job; a cumbersome procedure that costs time and money.

Inspection systems that offer 100 percent product inspection are common. These systems have kept a lot of bad products from going out to your customer. Unfortunately, use of 100 percent inspection with spectral analysis of color is not common.

Most (not all) packaging printers today that use inline spectral have done so because their customers have demanded the spectral color data. However, this data can be much more useful for your own plant's quality control.

Understanding that the color you're printing is the color the client requested, or that the color printed on press: 1) appears identical to the color printed on press, and 2), that you can do this while the press is running, saves time



The iQ-Spectral fully automated, spectral inline color measurement system helps maintain prescribed color standards by carrying out an inline measurement inside one's printing machine.

and money on sample analysis. Understanding what you're printing throughout the run, not only at the beginning and finish of a roll, is the key to the future of color management.

The ability to save time, waste and provide real-time, quality color control is a major benefit to the printer. If this is the case, then why are so many packaging printers hesitant to embrace this technology? Frankly speaking, the answer is often, "We really don't have a problem. Why should we invest the money?"

The answer is, the avoidance of one rejected job or one lost customer makes the ROI for purchasing spectral color analysis simple

math. Quality control starts with a commitment to understanding data and using it to improve your processes. The biggest challenge is making the commitment and embracing the technology that is available today. ■

ABOUT THE AUTHOR

Robert Buongiorno is president of BST North America. BST North America has been serving customers in Canada, the U.S. and Mexico for over 30 years. For more information, visit www.bst.group or www.bst-northamerica.com.

Taking Control of Static

By Dr. Kelly Robinson, Founder, Electrostatic Answers

Why do products get static? What is static? And, how do we get rid of it?

Static is electrical charge just like the current that flows through wires. However, “static” means that the charge does not move, or, that it moves very slowly compared with current in wires. Atoms have electrons that have negative charge, protons that have positive charge, and neutrons that are neutral. Normally, the numbers of electrons and protons are equal so that there is no net charge.

Static is when electrons and protons are imbalanced. Negative static is an abundance of electrons. Positive static is an abundance of protons.

Tribocharging

This imbalance between electrons or protons is caused by tribocharging and in several other ways. When two different materials touch and separate, charges also separate. The Triboelectric Series in Table 1 is an ordered list where a material higher on the list charges positively after it touches and separates from a material lower on the list.

For example, when a polypropylene web touches an aluminum idler roller, which is typically covered by an oxide layer (alumina), the polypropylene web separates with negative static while the idler roller gains positive static. The charges on the two materials

are always equal and opposite. Since the idler roller is grounded through its bearings, the positive static charge flows to ground. Polypropylene is insulating, so the negative charge persists.

In Table 1, a category is assigned to materials in the Triboelectric Series to show that synthetic polymers usually charge negatively and that biological and inorganic materials charge positively. Exceptions identify materials that are in the wrong place. Nylon, for example, is a synthetic polymer that charges strongly positively. Exceptions suggest that charges separate in different ways. While electron transfer explains most charging, exceptions indicate different mechanisms, which is a



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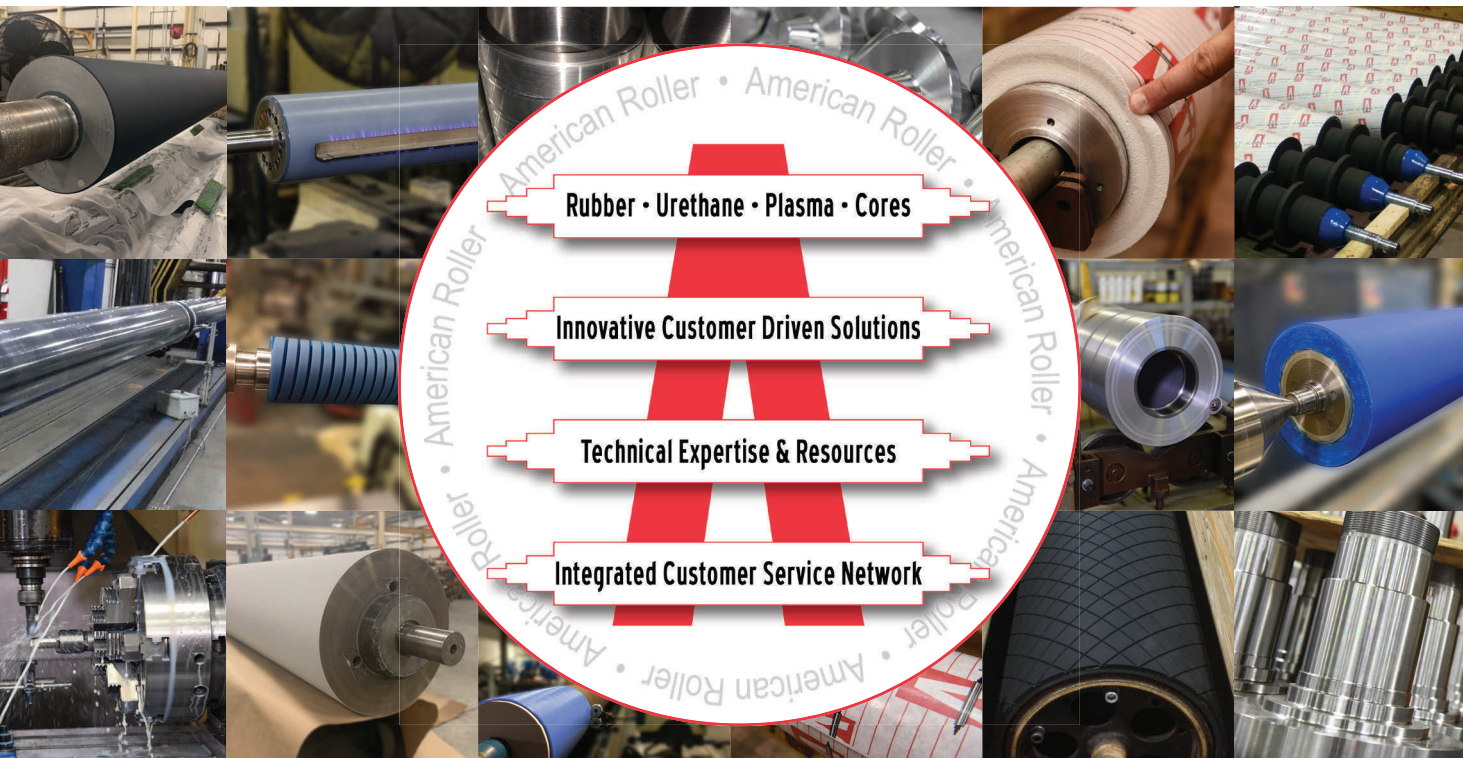
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topic of current research.

Organizations should control static in their operations for at least three reasons:

- Safety** – Preventing sparks that shock operators and ignite fires.
- Quality** – Preventing product damage and dissatisfied customers.
- Productivity** – Lessen high static which causes jams and machine downtime.

Static can be controlled with regular machine maintenance, proper operating set points, static dissipaters, regularly measuring static to verify performance, and including static in Management-of-Change (MoC) procedures.

Machine Maintenance

Rollers should be aligned, clean and have good bearings. When a roller is misaligned, in addition to causing conveyance problems, the web has sliding contact with the roller surface which increases static. So, a well-aligned roller minimizes static.

Roller surfaces should be clean. Contaminated rollers are a common cause of high static especially when starting a run with a different product.

And, bearing drag increases static especially on low-traction roller. When rollers turn slower than the line speed, the web has sliding contact with the roller that increases static. Measure the spin down time of idler rollers to check bearing operation (see: Web Lines: The Spin on Idler Roller Testing, Timothy J Walker, 6/1/2008).

Finally, keep the machine area clean. Scraps of material that rub on the web can increase static.

Table 1: Triboelectric Series

	Category	Material
Positive	biological materials	human skin human hair
	exception	nylon
	biological & inorganic materials	wool alumina paper cotton
Neutral	exception	steel poly(methyl methacrylate) (PMMA, Elvacite®)
	natural resin	latex
	metal	copper
Negative	exception	synthetic rubber (neoprene)
	synthetic polymers	polyurethane polyethylene polypropylene polyethylene terephthalate (PET, Mylar®, Estar®)
	chloropolymer	polyvinyl chloride (PVC)
	fluoropolymer	polytetrafluoroethylene (PTFE) (Teflon®)
	exception	polydimethylsiloxane (PDMS, silicone rubber)

Table 2: Static “Stop Light” Levels

Zone	Measured Level	Comments
Green Low	$E < \pm 5 \text{ KV/in}$	Static problems are unlikely.
Yellow Moderate	$\pm 5 < E < \pm 15 \text{ KV/in}$	Static problems possible. Improve static control
Red High	$\pm 15 \text{ KV/in} < E$	High static. Sparks occurs. Static problems are likely.

Operating Setpoints

Static increases with higher nip pressures, higher web tensions, touching polymer or rubber rollers, moving over spreader rollers, and with higher line speeds. Use the lowest nip pressures that still allow reliable operation. A common mistake is to think that if a little bit of pressure is good, then more is better. Keep nip pressures as low as possible to minimize static.

Static normally increases when the web tension is higher because the web has better contact

with rollers, which is good for reliable machine operation. Use the lowest web tension that allows reliable operation. Silicone rubber rollers are commonly used where temperatures are high. Of course, rollers that can tolerate the high temperatures must be used. For static control, avoid silicone rubber rollers if you can. Polyurethane rollers typically separate less static.

Spreader rollers including banana rollers and Mount Hope rollers work by having sliding contact with the web which increases static. Use the least aggressive

spreader roller that eliminates wrinkles.

High line speed usually increases static because the web often has more sliding contact with the roller. The web guides must work harder which increases static because the web has sliding contact with the guide rollers. To keep static levels down for higher line speeds, make sure that rollers are well aligned and use high quality, planar (not baggy) webs.

Static Dissipaters

Once the machine is set-up to run reliably with minimal static, use static dissipaters to ensure low static levels. The two broad categories of dissipater are passive and powered. Passive dissipaters in-

clude static brushes, needle points, tinsel and ionizing cords. These components must be grounded to operate. And, they need not touch the moving web. For brushes, tinsel and ionizing cords, light, intermittent contact is OK.

Powered ionizers include ionizing fans, static bars, and point ionizers. As the name implies, these devices require power and must be turned-on to operate.

All static dissipaters must be installed on web spans away from idler rollers and other grounded objects. Passive dissipaters can bring high static levels down to low static levels. These devices always leave a low level of static on the web. Powered dissipaters can bring static level all the way down to zero.

Measure Static

Control static means keeping static levels below the threshold where problems happen. Measure static levels using handheld static meters or using permanently installed on-line sensors. Most static meter display the voltage in kilovolts (kV). Convert the voltage into the nominal electric field by dividing the displayed voltage by the distance from the sensor to the web.

Management of Change (MoC)

Include static control in Management of Change procedures to ensure that static is well-controlled when machine are upgrades and processes improved. ■

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Model 3024 L Series

for long range static elimination up to 20" from web or roll; web widths 12" - 98"



Stand Up for Digitally Printed Pouches

By **Rodney Pennings**, Director of Sales-PCL

Stand-up pouches are appearing on more grocery store and e-commerce shelves than ever before. According to a recent study by Precedence Research, the stand-up pouch market is expected to be worth \$18.5 billion by 2027. These pouches can be made on converting equipment with attached digital printers, creating the package with graphics in one quick process. Increasingly, CPGs within the food and beverage industry are choosing stand-up pouches over rigid bottles, glass jars or

aluminum cans for high-quality packaging solutions.

Whether it's a new product launch, a seasonal addition or a limited edition item, stand-up pouches add value for packagers, carriers and consumers. Below are a few reasons to consider this an adaptable packaging option.

Quick Changeovers With No Tool Adjustments

Traditional printing requires highly skilled technicians who

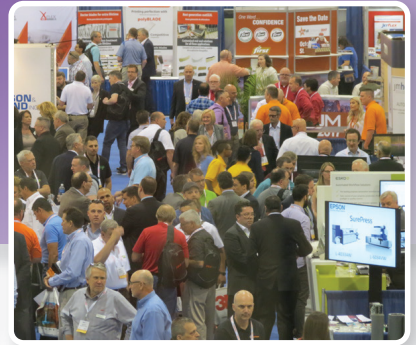
transfer artwork to plates, then use those plates to make thousands of identical copies. Setting up and printing a new design can take days or weeks, and the time involved makes small print runs cost prohibitive. Digital printers require limited machine setup and can be run by any employee with the right software training, saving significantly on print time and labor costs.

Imagine a customer who markets various berries all in the same size package. This customer



Digital printing for flexible packaging offers a variety of benefits, including improved short-run project capabilities and fast turnaround with lower labor costs.

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wants 2,000 packages for each type of berry with the same size pouch and different artwork for each. With traditional printing methods, there would be expected delays while technicians prepared the presses to produce each new design.

Now imagine that design is put on a pouch converting machine that is designed specifically for short runs, compact size, fast changeovers and digital printing. With digital printing, once artwork is submitted, that branded package can start being produced within minutes. In fact, that machine can produce pouches with three different designs without stopping. The savings in lead time, costs, inventory and time-to-market can offer a significant advantage

to packaging customers.

Shorter Runs Benefit New Products

Today's consumers look for variety in food and beverage offerings — new flavors, textures and products. In response, food product developers may come out with prototype or limited-edition products that are not produced in quantities that make traditional packaging practical. Packagers can differentiate their products using shorter runs of stand-up pouches with multiple designs and SKUs. Adding to their market effectiveness, stand-up pouches are distinctive in grocery stores and e-commerce sites.

And because digital printing is less expensive for short runs, it

can make high-quality packaging more affordable for small businesses. Digital printing produces smoother vignettes, more natural colors and improved product images than competitive print processes. Smaller producers can still get high-quality, eye-catching packaging without the large print runs that are required to make traditional printing cost effective.

Leveraging Existing Printing Equipment

Digital printing is changing flexible packaging in several ways. Traditional, large-scale printers and flexible packaging providers with pouch converting machines are retrofitting those existing systems with digital printing

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equipment, creating bold new product packaging with their current infrastructure. There are also hybrid setups that combine digital printing and flexographic printing on the same line.

A growing number of companies in the digital printing space are beginning to use pouch converting as another means to sell their digital printing. They can sell it as roll stock into packaging, use it on other promotional items or make pouches out of it. Often, these are narrow web or label-type printers who are now going into flexible packaging and making stand-up pouches — customers who are new to pouch converting. As the package becomes the label, printers are discovering that flexible packaging is a promising

and profitable way to use that extra printing capacity.

Seizing the New Paper Pouch Advantage

Some consumers perceive paper materials to have a lower carbon footprint than plastic, so the industry is seeing digital printing on stand-up pouches and other packages made from a paper-based substrate. In the past, packagers laminated polyethylene to paper to heat-seal it in packaging machines, but new technology allows a non-PE-based coating to heat-seal paper in traditional packaging machines. Stand-up paper pouches provide an advantage in a variety of markets and customers can now choose paper product packaging

that is certified as 100 percent compostable, recyclable and biodegradable.

Digital Printers Require Less Training

The printing and packaging industries have been hit by the same workforce shortage as around the world. Traditional printing press operators are highly skilled, in-demand individuals that require time to master the process. With digital printing, the process can be mastered by someone who is familiar with graphics on a computer — a much wider pool of people to recruit new employees. By using high-skill platemakers on traditional large run projects and making digital printing equipment

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Sustainability With Pouch Packaging

Flexible pouches offer sustainability benefits for both packaging customers and consumers. Flexible packaging is lighter weight, takes up less space on a truck or in a direct-to-consumer box, and requires less material to produce. Reducing weight and size makes better use of carrier space, which reduces the carbon footprint of the entire supply chain.

Post-consumer, flexible packaging also reduces the amount of landfill space compared to a rigid container. Pouches are also being made of more sustainable materials such as recyclable or compostable materials, and industry leaders are working to develop a more robust system and increase consumer education to recycle or compost at the community level.

Preserving Food and Beverage Quality

Flexible pouches can be both collapsible and resealable, keeping air away from products to preserve freshness. Maintaining the quality of food in flexible packaging provides a positive brand experience, ultimately helping the consumer make repeat purchases.

Digitally Printed Stand-Up Pouches Provide Solutions

Compared to rigid packaging, flexible stand-up pouches offer more eye-catching designs, preserve product freshness, reduce weight and save space for customers and consumers. Adding digital printing capabilities to pouch converting equipment creates opportunities to serve smaller businesses, accept short-run projects and provide fast turnaround with lower labor costs. ■

ABOUT THE AUTHOR

Rodney Pennings is the director of sales for Paper Converting Machine Company. PCMC is a leader in tissue converting, packaging, flexographic printing, bag converting and nonwovens technology. Learn more at www.pcmc.com.



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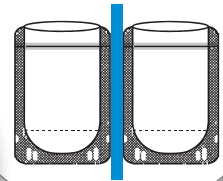
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5 Ways Pouch Converting Technology Can Protect Your Materials Investment

By **Scott Fuller**, Pouch Equipment Product Line Manager, CMD Corporation

Thanks to dazzling artwork and the latest in science and technology, from the extruder to the printer to the laminator, today's packaging film is eye-catching and durable.

But, stunningly beautiful also translates to expensive. In fact, by the time the parent-roll gets to the

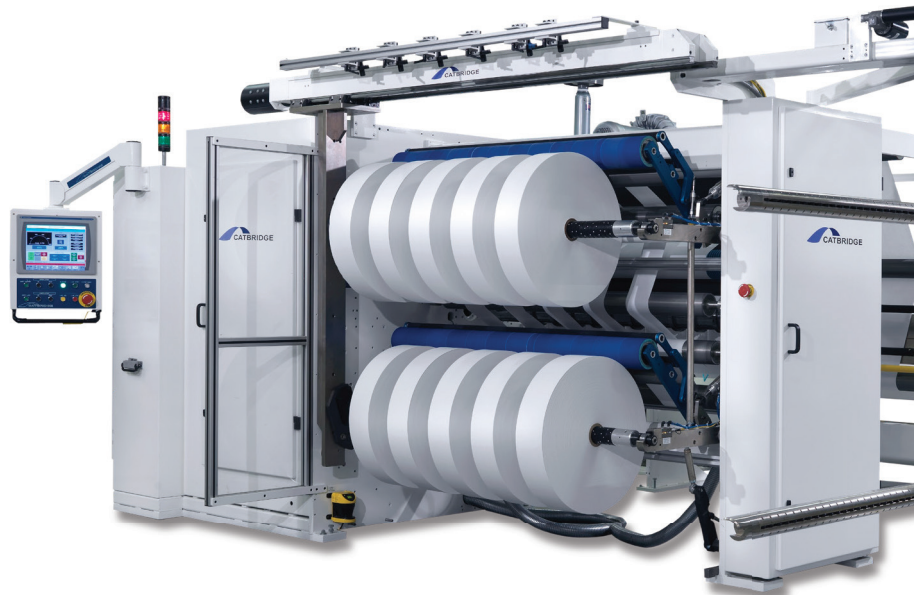
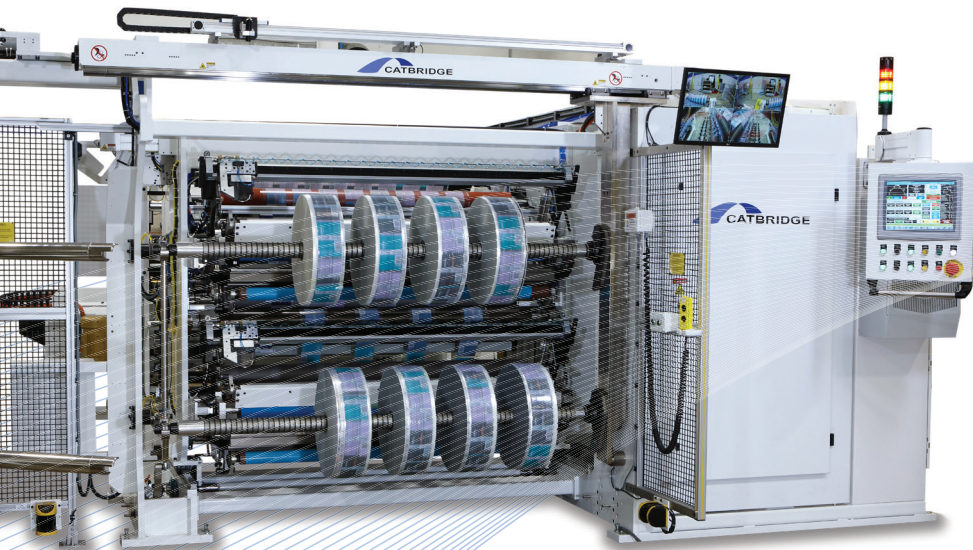
converting machine to be made into pre-made pouches, it is at the most expensive point in the film-making process. As much of that valuable film as possible needs to end up as a successful package and as little as possible in the scrap bin.

Pouch converting technology

has come a long way to preserve the investment that brand owners make in the materials which ultimately must protect and promote their products. Here are five suggestions to utilize that technology to get the best overall efficiency and least amount of waste in your

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POUCH CONVERTING

Pouch converting technology has come a long way to preserve the investment that brand owners make in the materials which ultimately must protect and promote their products.

pre-made pouch converting process.

1. Choose machines that **utilize a shorter footprint and reduced web path**. This results in less material needed at thread-up, better web control and less waste.

Pouch machines have historically been very long. Threading up the entire length of a 50- or 60-foot machine uses a lot of film, and when adjustments are made at the back of the machine, a lot of material can be wasted waiting for the adjustment to work its way to the front.

Reducing the machine length and shortening the web path, allows for better web control and more efficient adjustments.

2. Insist that the pouch system your pouches are converted on is **easy to use** so operators can competently dial in recipes for fewer mistakes, waste and downtime.

After years of consulting with customers, partnering in SMED events and collecting data, it became very clear that the amount of waste associated with difficult-to-dial-in-systems was much higher than originally estimated.

Today's machines offer sophisticated controls systems that are capable of automating much of the process. The unresolved step was not the capability of the machinery; rather, it was a matter of refining why and how the operator needed to interact with the machine. Simplifying the process and incorporating ease-of-use concepts were critical to closing this gap.

The updated design of stand-up pouch systems should focus on simple, fool-proof adjustments throughout the machine, and intuitive touch screen controls with

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data-rich reports to predict and prevent downtime. The system should include an on-board standard operating condition (SOC) worksheet that can be used to pre-set the machine so very little film

is wasted at changeover.

3. Your system should have **robust sealing technology** with **a wide operating window** and a methodology to confirm that the pouches you produce are not

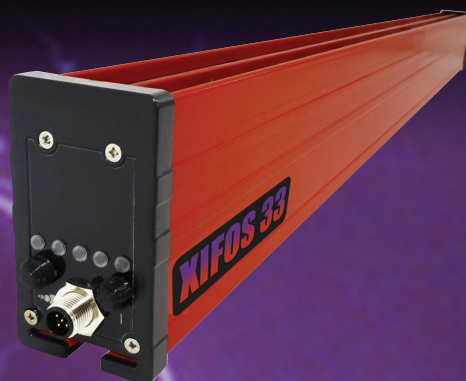
only beautiful, but strong, with no leakers. With today's technology, there is no reason you can't have verifiable data on your pouch quality, and with the price of the film being converted, it makes

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good sense to expect it. Data acquisition and IoT has evolved to produce real-time reporting, and powerful KPI dashboards that can be accessed on the machine or remotely.

4. A reliable system will consistently produce the same quality on each pouch in your production run – resulting in less waste and fewer complaints on final package quality.

“The reliability factor is huge,” says Fuller. “Your pouch machine should consistently produce the same results, without the need for constant minding or excessive readjustment.” Relying on the system to produce the same quality, pouch after pouch, means you can also rely on fewer adjustments and less waste.

With today's technology, there is no reason you can't have verifiable data on your pouch quality, and with the price of the film being converted, it makes good sense to expect it.

5. A system designed with flexibility in mind is helpful to add the finishes and function that today's convenience-conscious consumers demand – easy open/close, sturdy stand up properties for shelf appeal, etc... The pouch converting system should be designed to easily add the tooling needed for these extras.

While most pouch systems are designed to add these capa-

bilities, finding one with a design that flexibly moves tooling in and out while retaining robust process stability, is the best choice for consistent quality and less waste.

Much is invested in producing the perfect aesthetics for your packaging. Utilizing ever-improving converting technologies to ensure the most efficient use of that investment is a wise strategy for growth and success. ■

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MAXCESS VISION INSPECTION

The Benefits of Proper Vision Inspection

Print inspection systems are an easy-to-use solution that can be retrofitted to any printing press, enabling operators to setup and run faster, as well as locate and analyze defects before they become critical. Systems include 100 percent print inspection, color monitoring and integrated workflow options.

Conor O'Neill, business development manager for Maxcess Vision Inspection, recently shared some informative thoughts on vision inspection and vision systems.

Why is proper vision inspection so important in a converting application?

O'Neill: Often the process is too fast and repetitive to depend on humans to inspect products in converting applications. If inspected during the converting process, waste can be avoided by alerting the operator to process issues. Also, automated inspection enables converters to ship defect-free product to customers and thus avoid contract penalties, product return and rework.

Is 100 percent inspection worth the investment?

O'Neill: It depends on the cost: substrate cost, the cost of returns due to quality issues and the cost of rework. Typically equipment is purchased primarily to satisfy a customer's requirement for 100 percent inspection and the converter realizes the value and uses the ROI generated as a reason for subsequent purchases. Typical return on investment should be within a 24-month period.

What kinds of defects are



Conor O'Neill, business development manager for Maxcess Vision Inspection

vision inspection systems trying to find? What are the most critical?

O'Neill: Typically vision systems see all defects. Most users are not aware of how many defects they generate until they install their first vision system. The key to value is to then decide how to use the data to improve their process and what defects are OK to ship, if any.

How wide or narrow of webs can vision systems see?

O'Neill: Vision systems can be used on any web width. Often a single camera is not used on anything wider than 50 inches or so as it would need to be very far from the web. Inspection systems can be used to inspect threads for currency up to 30-foot paper webs.

How does one determine which vision inspection system they need?

O'Neill: The first thing is to determine the cost of returns, defects, etc., and then to understand the potential for a return. Once the potential return is determined, it's important to build user requirements and then look

at which vendor can meet those requirements.

What types of applications can vision systems be used in?

O'Neill: Vision systems can be used for quality control, key feature measurements on processes and also to automate processes that operators find difficult. Vision systems can inspect printed products, coatings, adhesives and converting issues such as seams, perforations and more.

What's unique about Maxcess Vision Systems?

O'Neill: Our vision systems are built using open system standards improving asset lifecycle and optimizing your investment. Optimized for the process, our systems guarantee that your investment is applied 100 percent. You don't pay for features that are not required. Plus, our systems are reliable and easy to use. Maxcess's advantage is that it supplies a wide variety of solutions and can most likely meet your requirements.

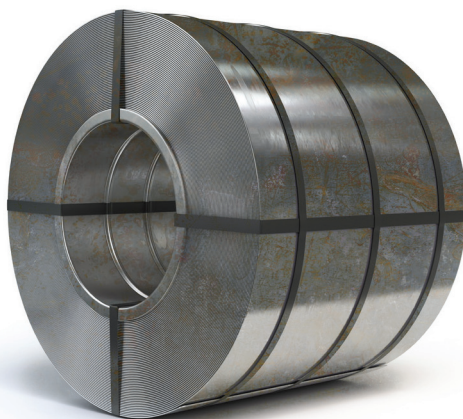
What does the future of vision inspection technologies look like?

O'Neill: Vision systems will continue to get smarter, in particular with new technologies like deep learning. They will be used to allow operators to improve productivity by dropping operator-to-line ratios.

Vision systems will become more automated and less obvious, as they will be built into the equipment and will become inherent in the operation of that equipment as opposed to being an add on. ■

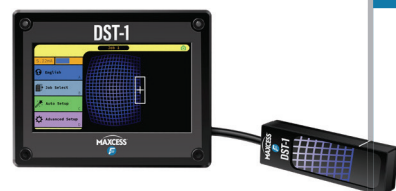


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How does in-house coating stand out from other technologies? A bit of historical background

Brought about in 2000, the concept of in-house coating has upheaved legacy production methods for label printers and converters. By literally deconstructing and rethinking how a label is fabricated, ETI materialized a novel idea and presented COHESIO—an all-in-one label printing, glueing, silconing and finishing machine. By eliminating the need to outsource label stock procurement, printing businesses suddenly acquired the capacity to truly produce, instead of just printing.

**For us, this now well-established, empowering approach stands as the only appropriate way to make a label—
From A to Z.**

Success factors

In the past two decades, in-house coating technology has established itself as the main alternative to traditional label-making methods. Not only is it a cost-effective solution—reducing adhesive material expenses—but it also boasts sustainability—with its capacity for linerless applications. And we're not even mentioning the automation gained by our clients, which can then freely express their creativity.

From its inception, ETI has been constantly innovating and developing state-of-art know-how unequaled in the industry. Rather than offering one-size-fits-all solutions, its multidisciplinary teams strive to grasp the client's unique wishes and needs, always taking in consideration the tangible end product. After the conception and configuration phases, our specialists make sure to pass along to the client all the knowledge needed to make educated choices about raw materials and production recipes. This made-to-measure, result-driven approach ensures maximum ROI for the customers and fosters their self-reliance.

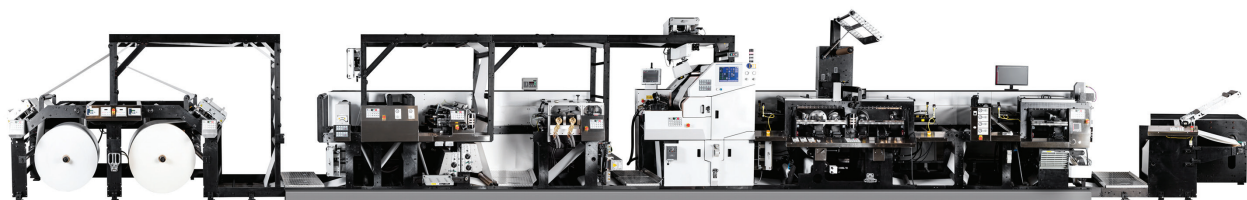
Support from our dedicated teams doesn't stop after the delivery of the equipment. Throughout its lifecycle, our people tag along when the client wants to evolve their system—whether it be a reconfiguration or the addition of a supplemental unit—or when it wants to go after a new niche and requires new production abilities.

New Technology Center

ETI's brand new service platform was launched in 2021 to producers and suppliers of the label industry looking to test out their creative ideas. Our Technology Center not only showcases ETI's vanguard solutions, but it enables the experimenting, improving, and benchmarking of new cost-reducing methods, with the help of our top-flight engineers and technicians. The schedule is now open for 2022 and our teams are ready to undertake new projects!

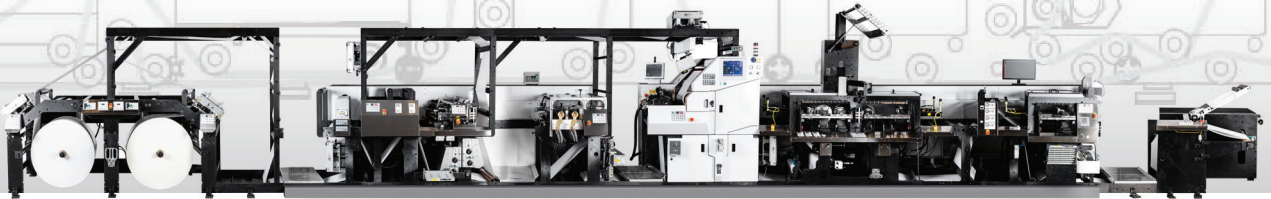


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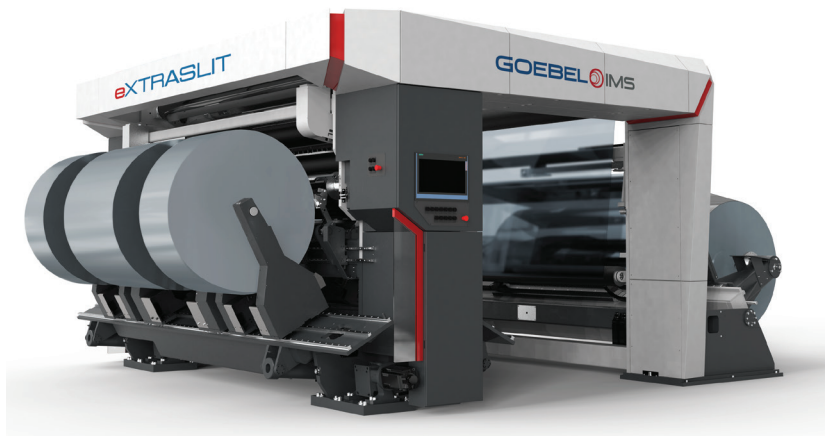


IMS TECHNOLOGIES: The Numbers Behind Remarkable Growth

IMS TECHNOLOGIES designs and manufactures slitter-rewinders for converting a vast range of materials. Through its **GOEBEL IMS**, **LAEM IMS** and **ROTOMAC** brands, IMS TECHNOLOGIES provides the global market solutions for slitting and rewinding plastic film, paper, aluminum, nonwovens, flexible packaging and other applications. All are defined by the highest standards of productivity, quality and precision.

There is no other company on the global market that can match IMS TECHNOLOGIES' level of experience and diversification in slitting and rewinding technologies. Through the combined strength of the group's brands and 170 years of history, IMS TECHNOLOGIES counts over 14,000 installations throughout the entire world. Its industrial capacity is spread over a total area of 21,000 square meters between the Italian plants of Calcinatè, Seriate — in the province of Bergamo — and Casale Monferrato. It integrates all processes of design, engineering, automation, component CNC machining, painting, assembly, testing, installation and after-sales service.

IMS TECHNOLOGIES operates globally through 400 direct employees with a widespread network made up of international branches and representative agents. The U.S. branch, IMS TECHNOLOGIES INC., was opened in New Jersey in 2019 and gives the North American market top-notch sales and technical-commercial support. Further investment is planned to



strengthen the branch and give it greater service autonomy.

2021: A record-setting year

The just past year was one of excellent economic performance for IMS TECHNOLOGIES. In 2021, there was a 70% increase in order intake over the previous year, which had already been one of major growth itself.

This market penetration ran on two main paths:

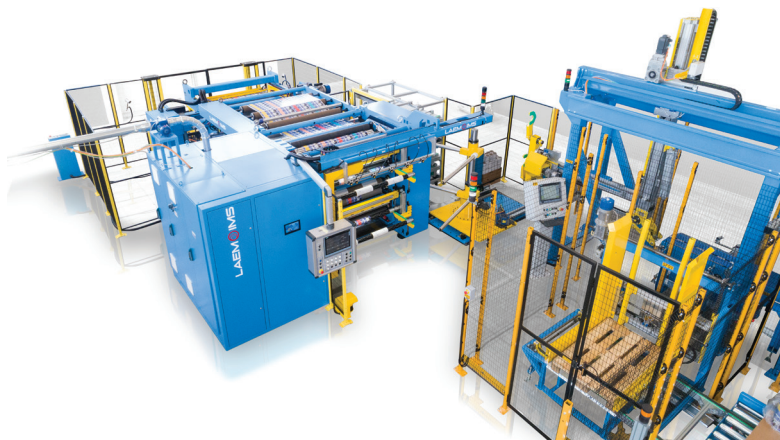
- **Entering new geographic markets** — such as India — and a business growth spurt in areas where it already has a high-potential presence: the U.S., China and Europe. In Europe alone, it saw a +40% increase in orders over the previous year;
- **Developing a new product line for converting nonwovens.** This range

immediately met with great market interest: indeed, the first sale was made through an agreement with one of the leading market manufacturers. This line adds to the group's already extensive range, with products that have all recorded double-digit growth.

An industrial strategy to support and fuel this growth

Over the last two years, under the leadership of new management, the group launched major internal reorganization processes, which are now in full swing after a run-up period. One key decision was to centralize manufacturing in the Italian plants, which has led to excellent levels of productivity, efficiency and competitiveness, needed to successfully operate on the global converting market.

On these solid foundations, IMS TECHNOLOGIES is poised to become a top international force in the converting industry.



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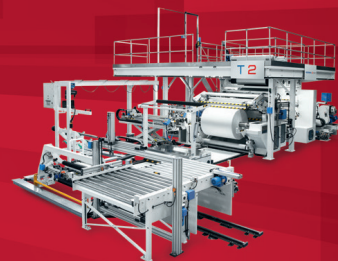
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Metlon Corporation

Since 1947, Metlon's record of consistent, quality production, service, and efficiency, coupled with its engineering prowess, have helped them weather economic downturns and pandemics - while keeping standards high and clients satisfied. Accepting precision, narrow width slitting jobs others haven't been able or willing to complete has resulted in many long-running relationships.

More than twenty years ago, Metlon acquired a new customer as a referral from a competing converter that was not interested in this specific job.

While Metlon has the capability of re-engineering its own machines if needed, this customer didn't require re-engineering. Instead, they required adherence to strict federal regulations, and the tedious process of sampling and carefully documenting each roll.

Essentially, this required cutting a 12"



long sample from the end of each coil slit from non-woven filter paper to 9mm and 22 mm widths being slit and labeled to match the coil's labeling, and inserting it into a plastic sleeve bag. The samples were sent to the customer for incoming QC testing. This sampling has doubled production time.

Metlon met the client's stringent demands and passed a rigorous on-site inspec-

tion initially, and again 15 years later, when production output had been critically ramped up. Demand for the product has tripled in the last 2 years alone. Nevertheless, Metlon has maintained its production efficiency, quality, and meticulous record-keeping with

the new volume mandate.

Meeting production and service needs has been a source of pride for Metlon, especially when its work addresses a critical need.



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Michelman has enabled advances in paper & film packaging sustainability since creating its first repulpable water-based coating over 50 years ago. Their experts develop new materials and coatings with sustainability in mind, prioritizing customers' health and safety during use and optimizing for sustainable packaging end-of-life outcomes. In addition, their water-based technology delivers critical package performance properties such as MVTR, OTR, and heat seal.

Utilizing a customer-intimate approach, they collaborate with customers and other members of the packaging supply chain to develop solutions that remove excess waste during package production and improve package functionality, utility, and performance in use.

Their **Michem® Flex** brand of sustainable, water-based technologies includes

primers, barrier coatings, topcoats, and specialized heat seal coatings optimized for flexible packaging. Designed to work together but flexible enough to work independently with existing coating systems, these solutions create superior packaging for food, medical, and consumer goods applications.

PFAS-free, recyclable, and repulpable, Michelman's **VaporCoat®**, **HydraBan®**, and **Michem® Coat** paper coating solutions can light-weight packaging by providing an alternative to wax and film lamination techniques. Additionally, specific **Michem® Coat** and **Hydraban®** solutions have recently complied with the specifications established by the American Society for Testing and Materials standards ASTM D6400 and D6868 per the terms and conditions of the Biodegradable Products Institute's (BPI) certification program for compostable products.

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DEVELOP COMPOSTABLE PACKAGING SOLUTIONS WITH OUR BPI* CERTIFIED COMPOSTABLE COATINGS.

* Biodegradable Products Institute

Michelman maintains production facilities in North America, Europe and Asia, product development and technical service centers globally, and a worldwide team of expert business development personnel.

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DEVELOP SUSTAINABLE PACKAGING SOLUTIONS

We help converters and brand owners replace existing petroleum-based solutions with water-based barrier and functional coatings.

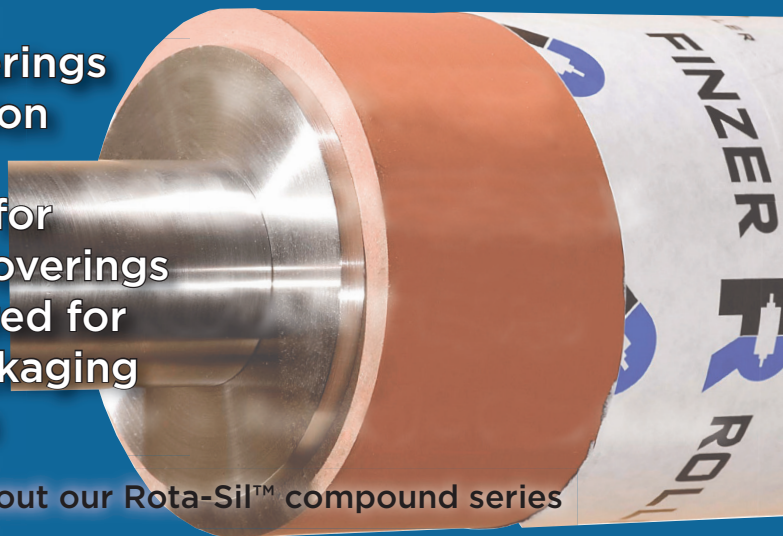
- Manage package end-of-life with repulpable, recyclable, compostable, and PFAS-free coatings.
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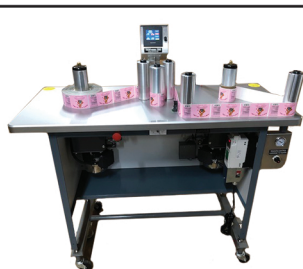
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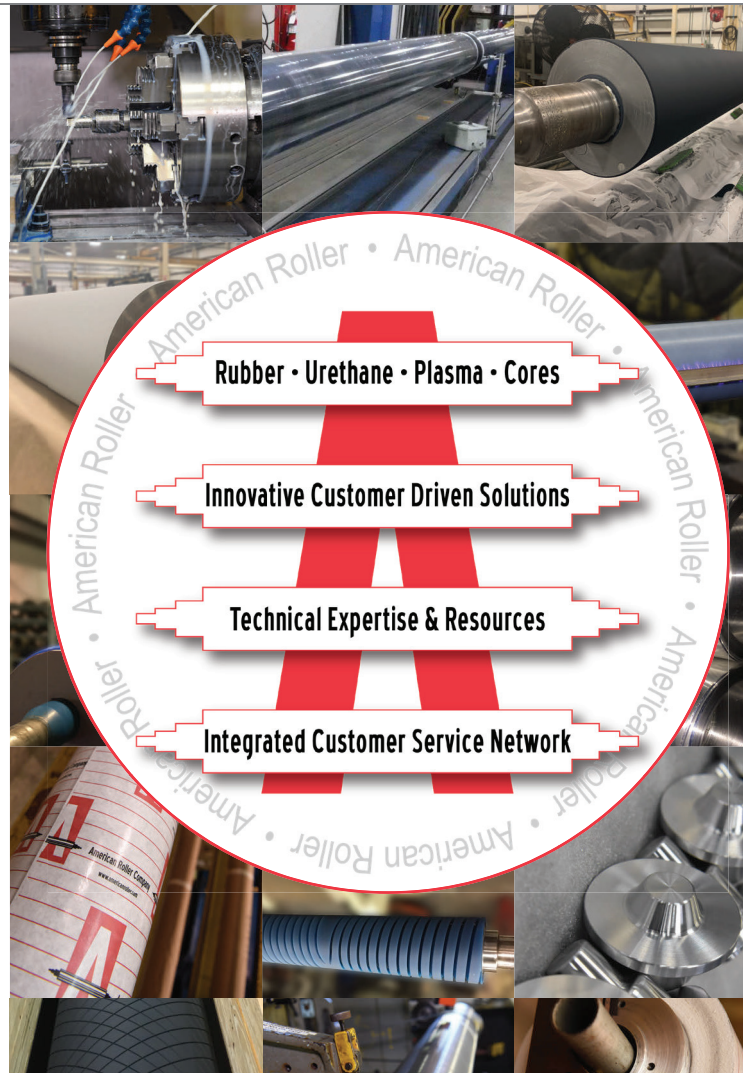
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