THE AUTHORITATIVE VOICE OF THE CONVERTING COMMUNITY

PFFC
PAPER, FILM & FOIL CONVERTER

95th ANNIVERSARY

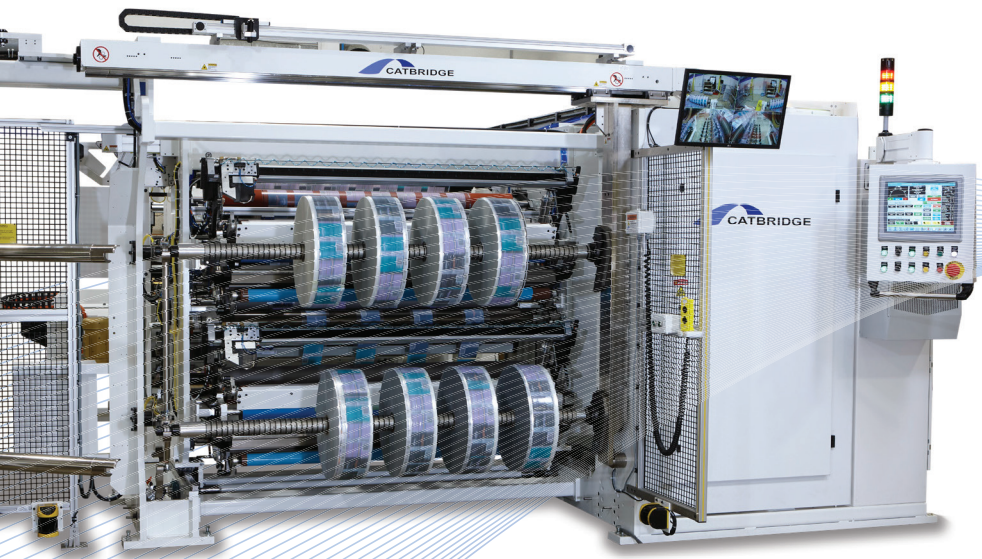
www.PFFC-Online.com

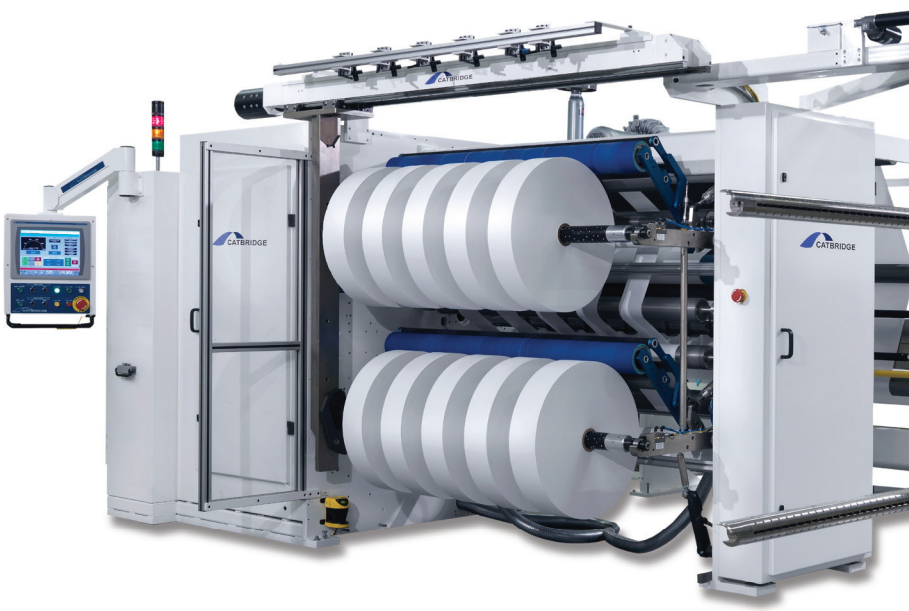
rdgmedia PUBLICATION

MARCH 2022

Converting Solutions
that get you results

Boost productivity, cut waste, reduce downtime, improve output quality: Catbridge delivers





CATBRIDGE

Catbridge Machinery | 973.808.0029 | www.catbridge.com | sales@catbridge.com

YOUR ONE SOURCE

for Coating, Laminating, Metallizing Machinery

nordmeccanica group

nordmeccanica N.A., Ltd.
a nordmeccanica group company

2002 - 2022
Twentieth anniversary of Nordmeccanica NA

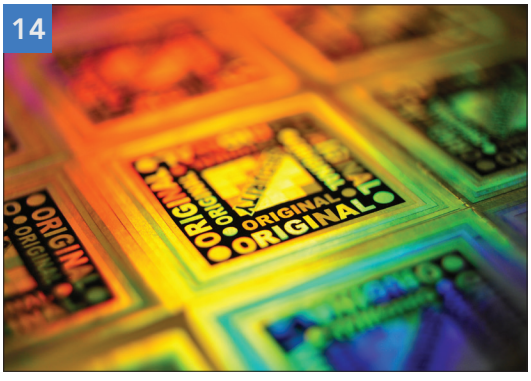
to learn more contact:

NORDMECCANICA Spa
Strada dell'Orsina, 16/A - 29122 Piacenza - Italy
phone +39 0523 596411 - telefax +39 0523 612051
nordmeccanica@nordmeccanica.com

NORDMECCANICA N.A., Ltd.
155 Ricefield Ln, Hauppauge, 11788 New York - Usa
phone +1 631 242 9898 - telefax +1 631 242 9899 - na@nordmeccanica.com
Nordmeccanica N.A. Ltd is a full service company for USA, CANADA and MEXICO

www.nordmeccanica.com

TABLE OF CONTENTS



DEPARTMENTS

ACCU DYNE TEST™ Marker Pens

- ***22 Standard levels, from 30 through 72 dynes/cm***
- ***Specifically designed for fast, accurate on-line use by printers, coaters, and laminators***

Also ideal for process control or field use by suppliers of film, sheet, coated board, inks, coatings, and adhesives

Spring loaded tip meters fluid feed and guards against contamination

Reliable enough for many R & D and lab applications

Hundreds of tests from each marker

Usable on virtually all smooth non-absorptive substrates

Six month shelf life; mix certifications provided with every order

Specify any combination of dyne levels and quantities you require (minimum order four pens)

Conveniently packaged in ready to use setup boxes

Total Qty.	Unit Price	Total Qty.	Unit Price
4 - 7	$10.20	32 - 47	$5.60
8 - 15	$7.80	48 - 95	$4.80
16 - 31	$6.40	> 95	$4.40

Unit pricing is based on total order quantity. We now ship via ground service prepaid at no charge. Standard dyne levels include all even numbers from 30 through 72 dynes/cm. Free samples available on request.

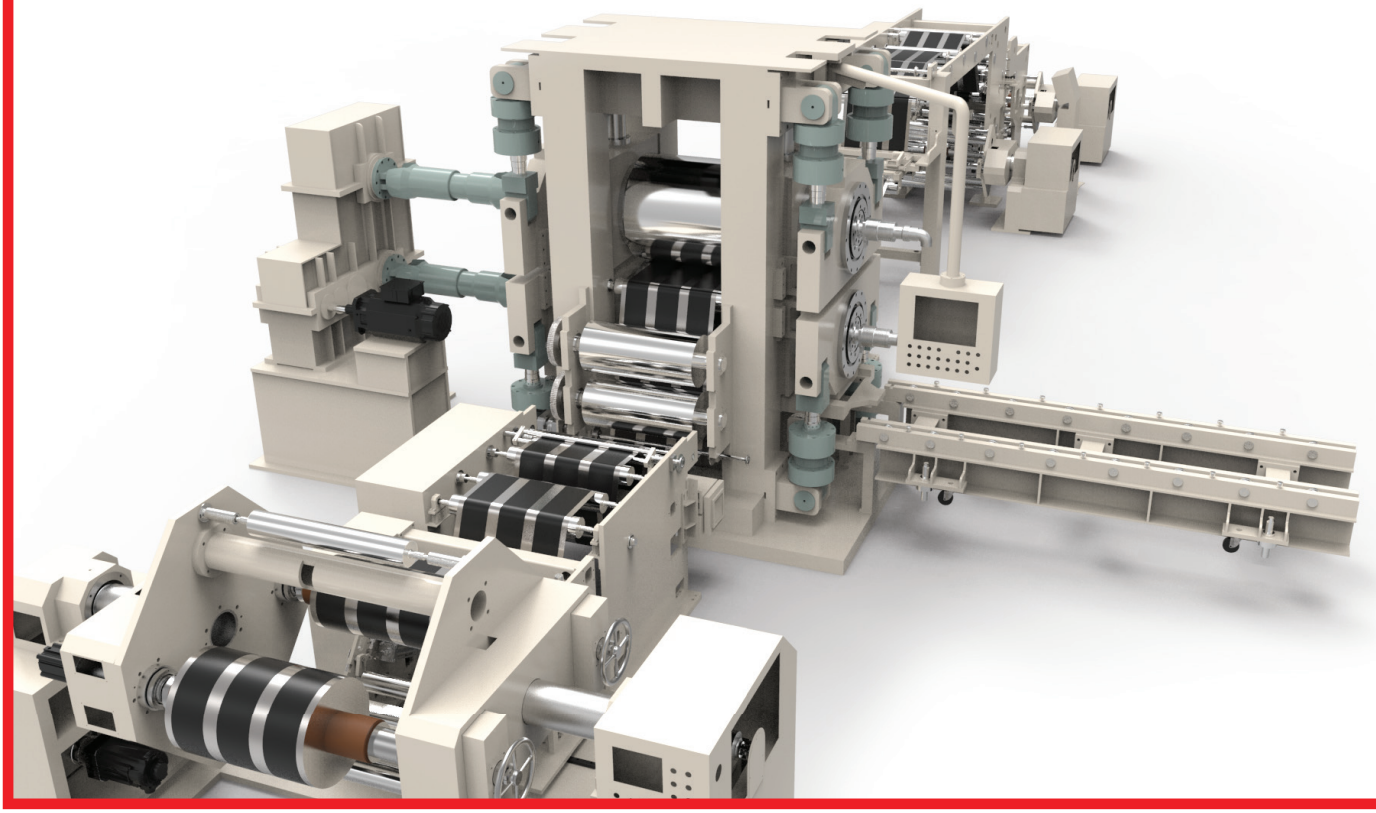
Diversified Enterprises 101 Mulberry St., Ste 2N, Claremont, NH 03743
800-833-4644 or 603-543-0038; Fax 603-543-1334 www.accudynetest.com

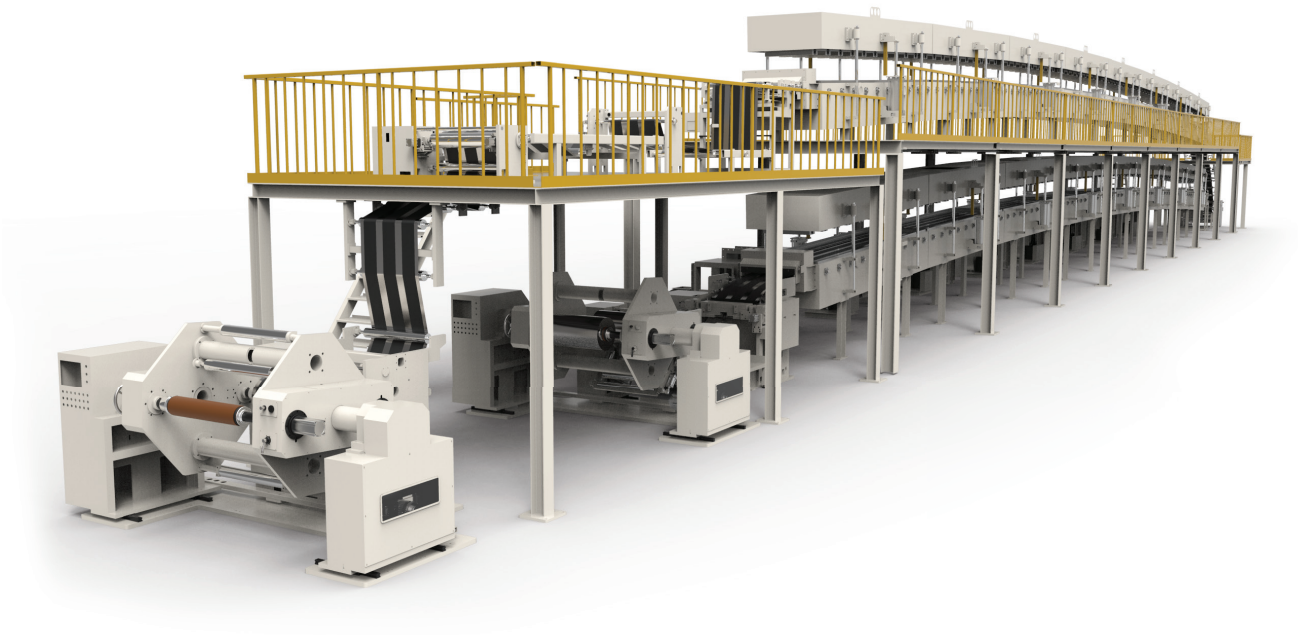
People & Technology

PNT Meets Market Demands Today and in the Future.

World class experts in roll-to-roll converting machinery

PNT, founded on 30 December 2003, is a Korean machine manufacturer specializing in roll-to-roll converting machines and automation machines.





PNT makes a wide variety of equipment: display optical film and composite sheet production equipment, roll-to-roll screen printing machine, secondary battery electrode wide coating equipment and pressing equipment, membrane coating equipment and slitting equipment, copper foil equipment, FPCB and flexible printed electronic equipment, MLCC manufacturing, water treatment equipment, and semiconductor automation module in-line assembly equipment, etc. We are leading the design and manufacturing paradigm of roll-to-roll equipment throughout the whole machine industry.

PNT's machines are used by more than 500 companies in 20 countries. We provide the best customer service with human networks and more than 10 years of experience in technical sales.

- **Expertise in mass production process**
- **Latest trends in secondary battery industry**
- **World class production capacity**
- **Continuous investment in R&D**

CONTACT INFORMATION
E-mail: pnt@epnt.co.kr
Web: epnt.co.kr/en
Phone: +82 31 627 5874
Address: 33 Cheomdangieop-ro, Gumi-si, Gyeongsangbuk-do, 39422 South Korea

Pivoting Beyond the Pandemic

Angel Morris
Editor

In my initial time here at *PFFC*, I'm learning this publication strives to give those within the converting and package printing industry resources to help them succeed. Since March of 2020 - which has become the generally recognized "start" of the global pandemic surrounding the coronavirus within the U.S. - these industries, like most others, have had to pivot accordingly.

The average person's awareness that something different was happening may have begun with the toilet paper shortage, as businesses within paper packaging and beyond had to adapt to reduced inventory and logistical interruptions as well. To say the least, paper mill manufacturing suffered and led to rising paper costs, hitting small producers and converters especially hard.

Fast forward two years into the lingering pandemic, and price increases and availability limitations continue. Some experts optimistically predict shortage improvements in the second quarter of this year, and although materials and workforce issues will undoubtedly continue to some degree, the hope is that companies have evolved enough to begin to meet changing consumer demands and the challenges of an unstable economy. No small task, indeed.

If there is an industry silver lining to be found within COVID-19 fallout, it is the proof that packaging and converting leaders are willing and able to adapt in order to meet challenges, however unexpected they may be. In the spirit of this stick-to-itiveness, we take a tangential look at corona vs. plasma surface treatments in this issue, starting with an understanding of adhesion. The best selection of surface treatment methods lies within that awareness, partnered with knowing how to modify surface layers of substrate to improve bonding. This edition also presents a fundamental look at adhesive coatings and how they are engineered to solve adhesion challenges.

From corona treatment to coronavirus and its resulting pandemic, successful outcomes seem to lie in modification, adaptation and the dogged persistence involved in simply sticking to something until you get to where you need to be. *PFFC* hopes to continue to play a helpful role, sharing the latest advances, equipment and techniques, as the industry pivots beyond the pandemic.

Angel Morris
972.533.7216
angelm@rdgmedia.net

PFFC
PAPER, FILM & FOIL CONVERTER

A RDG Media, Inc. Publication
P.O. Box 80915
Rochester, MI 48308
586.227.9344
www.pffc-online.com

President/Group Publisher
Randy Green
randy@rdgmedia.net

Publisher
Lori Pisano
lori@rdgmedia.net
814.616.8380

Editor
Angel Morris
angelm@rdgmedia.net

Accounting Manager
Kristin Green

Systems Administrator
Angi Hiesterman

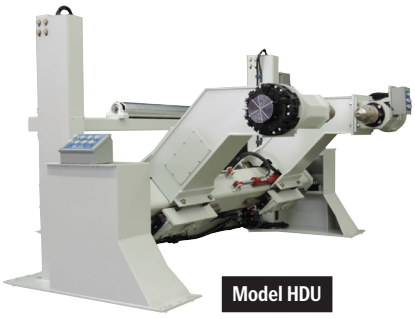
Operations/Customer Service
Jody Kirchoff

Web Design
Josh Scanlan

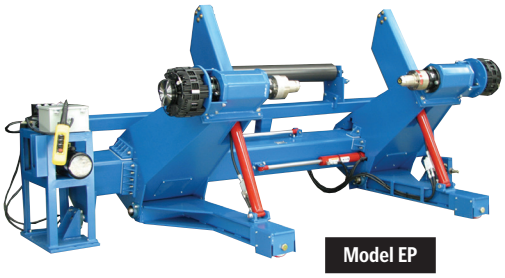
Auctions
Angi Hiesterman

rdgmedia PUBLICATION

Want More Production?

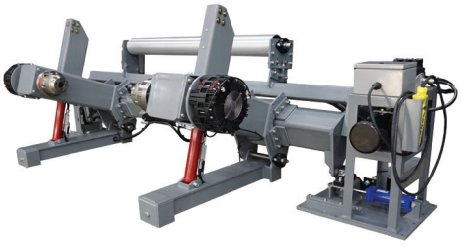


Model HDU

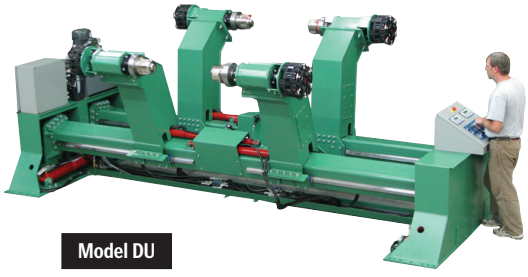


Model EP

Model EP Jr



Model MS2MA



Model DU

Keep your converting machines busy!

See why major corporations, small converters and OEM's prefer the proven and versatile shaftless unwind machines from Powell Engineering, Inc.

- **Proven to increase production**
- **Eliminates shaft related injuries**
- **Lifts rolls from floor or cart**
- **Proven quality and reliability**
- **Easy one-man roll changes**
- **Braked or spindle driven**
- **Widest range of options predesigned and available**
- **Reasonably priced**

ALSO AVAILABLE:

- **Cantilevered packaging unwinds**
- **In-floor roll trolleys**
- **Splice tables**
- **Dancer units**
- **Cast Grip™ series core chucks**

PEi *Machine design specialists*
POWELL ENGINEERING, INC.

Phone: 205-625-5444 • 800-213-4267
unwind@powellengineering.com
www.powellengineering.com

IN USE WORLDWIDE

Made in USA

Vetaphone's iCorona technology offers fine control of the electronic discharge.

Corona or Plasma – Which is Best for Your Process?

How the difference between surface treatment methods impacts selection

By **Kevin McKell**, VP Sales & Marketing at Vetaphone

To determine which surface treatment is best for your process, we first need to understand the basics of surface treatment – what it is, how it works and why it's important?

Surface treatment is all about adhesion – the ability of one medium (a liquid) to adhere securely to another medium (a solid), or in practical terms getting ink, lacquer or adhesive to stick to a non-absorbent substrate like film or foil. The word we use is "wettability" and this indicates how well the liquid will adhere – poor wettability means that it beads-up forming droplets on the material surface, while good wettability allows it to flow out (wet-out) much better.

Another term you will hear is "Dyne" and this is the way that the adhesive ability of the substrate is measured. In general terms, the higher the Dyne level, the better the adhesion. But you need to be careful, as it's not a linear scale, and if 40 Dyne gives the adhesion you need, then a higher figure will not improve the performance of the substrate.

So, how do we improve adhesion? The answer is by modifying the surface layer of the substrate to allow the liquid to bond. Take PE for example – it's popular as a

packaging material but in its raw state it offers poor adhesion. This is because the material strength comes from its molecular structure. The long molecule chains in PE and many other films give strength, but it is only at the end of these chains where there is an oxygen molecule that you get adhesion. The overall lack of oxygen molecules in the substrate gives it low surface energy. This means that the liquid doesn't wet-out, so the adhesion is poor, and shows that the Dyne level of the PE is too low.

The way to increase the Dyne level is by Corona treating the substrate. The two critical parts here are the electrodes, which create the corona discharge, and the air gap, which contains oxygen molecules as part of the ambient air. The corona discharge splits the oxygen molecules (O2) that are in the air gap. One of the molecules joins the remaining oxygen to form ozone (O3); the other accelerates onto the surface of the substrate breaking up its molecular chains (Fig 1).

By modifying the molecular structure of the substrate, we effectively change its surface energy and allow the liquid to adhere (Fig 2). Dyne level requirements vary for different substrates and different uses. For example, water-based ink requires a higher Dyne level than solvent-based, while coating and laminating can require even higher Dyne levels.

I mentioned earlier that the magic occurs in the air gap between the electrodes and the substrate, but this is only part of the story. What separates Vetaphone surface treatment technology from its rivals is the way in which our generators work to create the corona. This applies across all

Figure 1: The Corona Changes

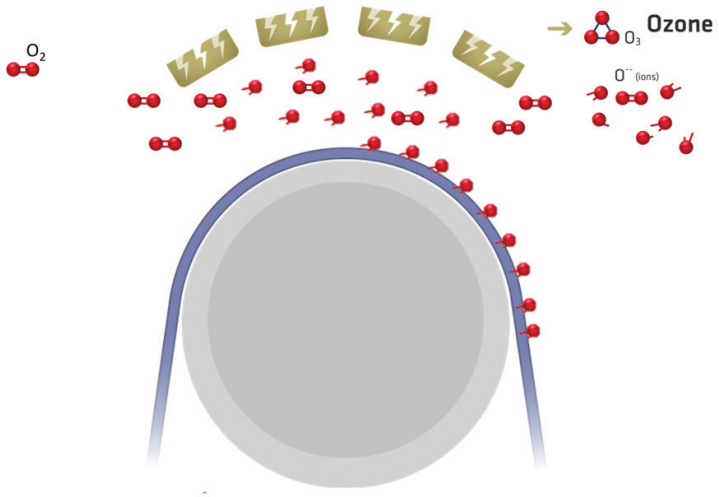


Figure 2: Surface Energy

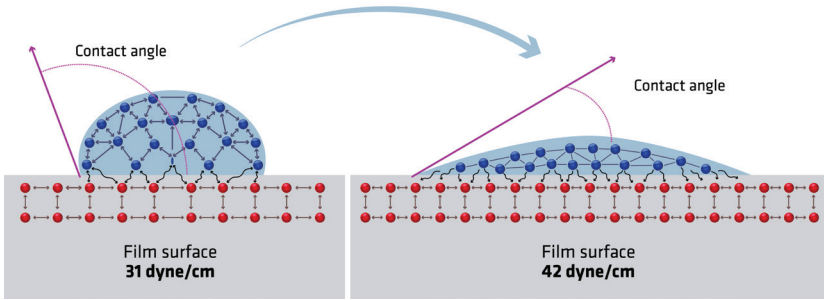


Figure 3: The Plasma Changes

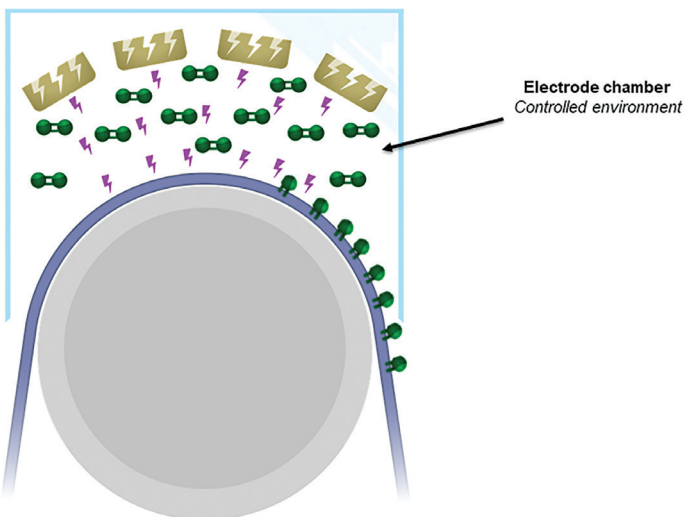
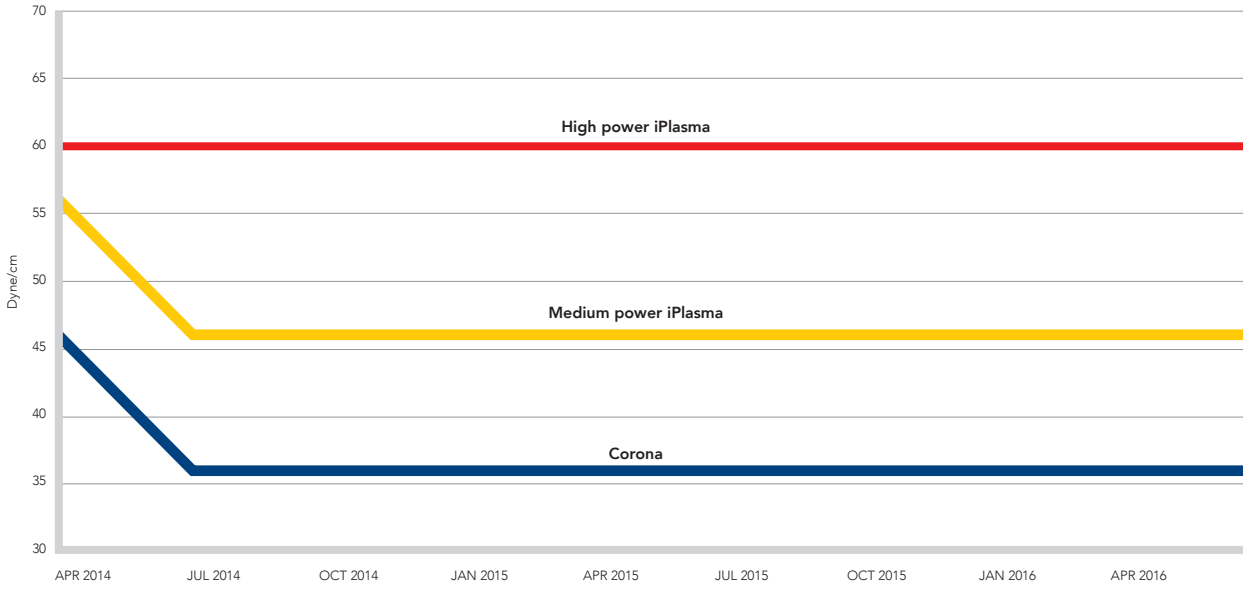


Figure 4: Dyne Level



applications from extruding to printing and from narrow to wide web and embraces Corona and Plasma treaters.

The key to this dates back to Verner Eisby's original patent in the 1950s which allows the generator to monitor the treatment process and optimize the correct frequency to ensure the most efficient discharge. This gives the best treatment to the substrate. The generator will automatically monitor the output and self-match to any material, altering the frequency to ensure an efficient discharge. One of the key benefits of optimizing this process is that it prevents excessive heat, which when you're dealing with sensitive substrates is vital.

So far, I've spoken only of Corona treatment – now I'd like to focus on Plasma and the way it differs. Perhaps the biggest and most notable difference is the controlled environment that we need for Plasma treatment. Where Corona treatment works perfectly well in ambient conditions, Plasma requires a controlled environment.

This allows us to introduce an inert gas (usually nitrogen) and remove the oxygen. The discharge from the electrodes then splits the nitrogen molecules so they adhere to the surface of the substrate, and this is the process known as plasma treatment (Fig 3). The key is the controlled environment, which allows the dosage level of the inert gas to be monitored and adjusted, as required – something you can't do with Corona treatment.

The nitrogen is also more in tune with the carbonyl groups Amine, Amide and Imide, which allows us to control the chemistry of Plasma treatment. Using different gases in different dosages we can fine tune the surface treatment to match the substrate to its exact intended use, whether it's a printing, coating or laminating process.

Another advantage of Plasma treatment is the higher Dyne levels it can produce. Take BOPP for example because it's notoriously difficult to treat. Using Corona, a typical Dyne level achieved might be 44 or 46 – while using Plasma, and changing the chemistry of the surface, a Dyne level of 60 is easy to attain.

Attaining and maintaining Dyne levels are also easier with Plasma. Again, using BOPP as an example, a typical Dyne level of 46 using Corona treatment will start to fall after as little as one month and the BOPP will return to just above its native level of around 36 Dyne. This is not because the treatment fades, but because the additives in the substrate migrate back to the surface covering over the treatment.

Even early Plasma treatment improved the treated level to around 56, but with a drop to around 46 after a short period. But the latest Plasma technology, using closely controlled inert gases that fine tune the surface chemistry, yields a Dyne level of 60 that is maintained over a period in excess of 18 months and counting! (Fig 4)

SONIC SOLUTIONS™

BIG

System that can clean sleeves up to 70" long

or

SMALL.....

System that cleans narrow and medium web rolls

...we can clean them all!

All our anilox roll and sleeve cleaning systems reflect:

- Preset functions that allow you to safely clean the highest line count anilox.
- Plug and play external power generators that can be easily replaced
- Stainless steel construction for longest durability
- Over 20 years of proven industry experience
- Fast friendly service that only a family run business can provide

Call or e-mail us for more information

877.654.7800

customer_service@sonicsolutionsusa.com

www.SonicSolutionsUSA.com

Graphics Experience Center
Alpharetta GA

Sonic Solutions has developed custom cleaning systems for the HP Indigo 20000, HP Indigo 30000 and Pagewide T240 exclusively for HP and their customers.

All of which prompts companies to ask us for the best Plasma technology available. If only it were that simple. The technology is largely the same, but the treatment has an almost infinite number of variations depending on substrate type, thickness, inks, lacquers and adhesives being used, not to mention the variety and dosage of inert gases available and power density. Plasma is definitely not one size fits all. Its controllability offers a precision solution – more sniper's rifle than shotgun.

Think of Plasma as an R&D process because it's not all about the Dyne level. The same material treated by Corona and Plasma to the same Dyne level will often require more power using Plasma. But, if you look at the peel strength, the situation changes especially according to the tape you're using – another case of needing to know the specifics of what you're dealing with before making a judgement.

It's why when we're asked: "Which is better, Corona or Plasma?" – the answer is: "Whichever works best for you!" And that's not being flippant – neither is it an over-simplification – because it's a complex question that needs careful investigation before coming up with the right answer. In most cases, Corona will do the job – it's adjustable and our "intelligent" generators will offer maximum production efficiency. But for more complex cases and specific requirements that justify the significant extra cost, it will be Plasma.

The best way to find out which is best for you is to work closely with us and make use of our Test Lab facility in Denmark where we can simulate production conditions and test the full range of variables involved in making the choice. Whether its's Corona or Plasma, Vetaphone can tailor a system that will work for you.

Vetaphone offers a unique knowledge of corona and plasma technology toward the perfect surface adhesion in the film and foil packaging industry. Learn more at www.vetaphone.com. ■

Web Guiding Equipment for Tomorrow's Demands

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

Web guiding systems seem like such a minor part of the manufacturing process. After all, they are made up of a controller, some sensors and a steering box with some rollers. Considering the importance it has on your manufacturing process, it's not very costly. So why waste extra money on a web guide that has superior features and benefits when all it does is steer the substrate?

I think for most of you reading this, the answer is simple: Web guiding is an integral piece of equipment to ensure the quality and success of the product you are producing. A cheap web guide could cost you dearly.

To outline all the products that guiding equipment is responsible in helping produce would take far to long for this article. But in short, guiding equipment assures the quality of the finished product is everything from what PFFC represents to new energy Lithium-Ion battery production.

Today, we see guiding equipment helping produce a wide variety of products more complex and faster than ever. Frankly, we see this trend increasing exponentially over the next few years and BST's R&D department is working to meet the demands of today and exceed the demands of tomorrow.

BST produces a wide range of products from our factory in Germany and our AccuWeb products at our factory in Madison, Wisconsin. When you combine our expertise in web guiding with our expertise in inspection, such as surface inspection, BST can offer a complete quality control for any manufacturing system. ■

Carolina Tape & Supply Corporation

If it's tape...WE DELIVER

Converting Services:

- Specialty Slitting
- Die Cutting
- Kiss Cutting
- Butt Cutting
- Perforating/Scoring
- Laminating

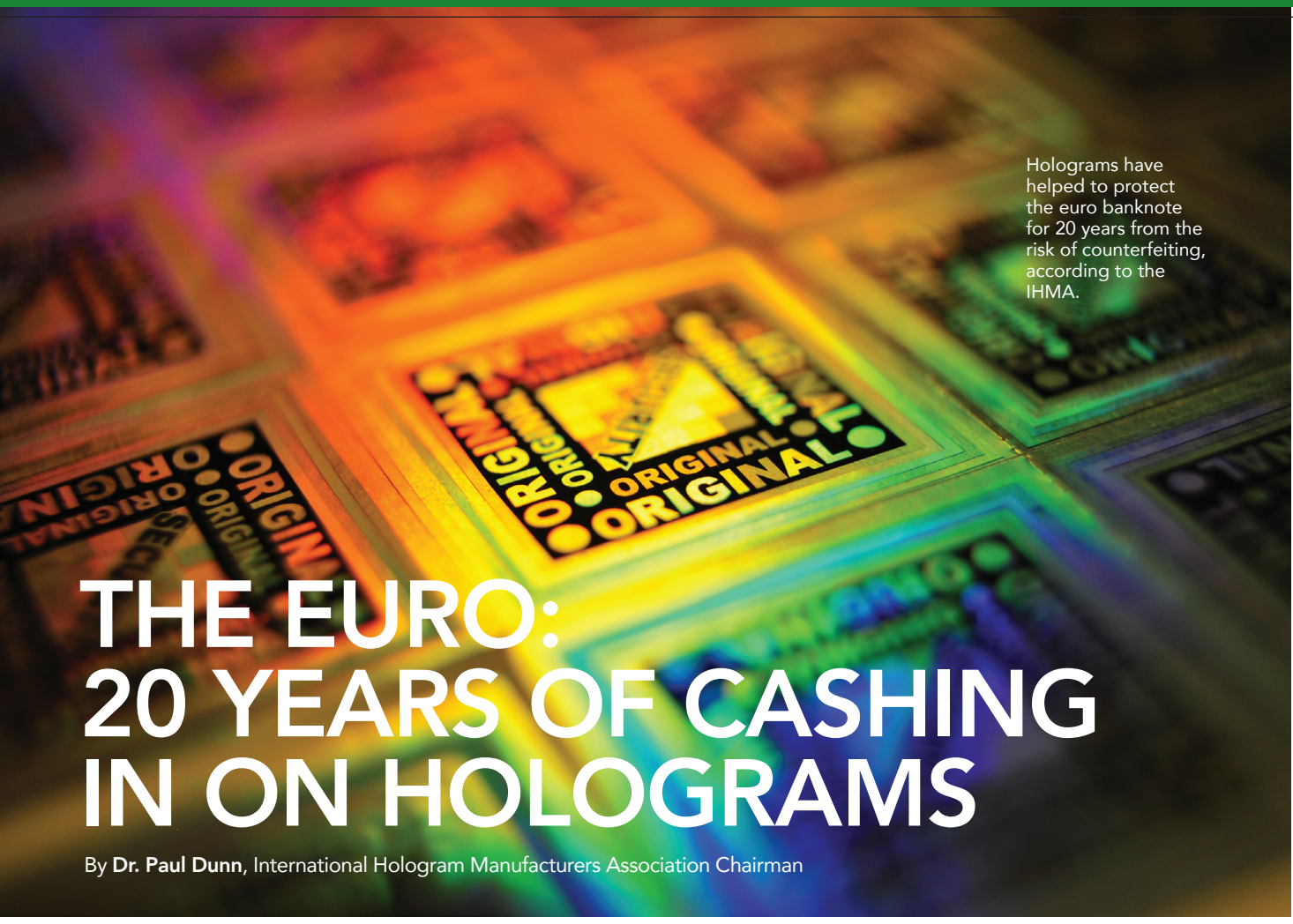
Custom slit Plate Mounting & Roller Wrap tapes.

We are a distributor for all major tape brands.

Call for a FREE Quote & Catalog 800-237-6079

If it's tape...WE DELIVER.

www.carolinatape.com • gsales@carolinatape.com



Holograms have helped to protect the euro banknote for 20 years from the risk of counterfeiting, according to the IHMA.

THE EURO: 20 YEARS OF CASHING IN ON HOLOGRAMS

By **Dr. Paul Dunn**, International Hologram Manufacturers Association Chairman

It's 20 years since the first series of euro notes became a reality for 300 million Europeans. To mark the occasion, International Hologram Manufacturers Association (IHMA), considers the anti-counterfeiting role holography has played and welcomes plans for the banknote's first redesign.

To understand why the European Central Bank (ECB) decided to place holograms onto the euro as an anti-counterfeiting feature, you have to go back to the first reports of color photocopiers being used to counterfeit banknotes, which came at Interpol's 6th International Conference on Currency Counterfeiting (Madrid, 1977). The resolution, contrast and color fidelity of office copiers had improved to the extent that casual counterfeiting of the printed features on a banknote had become a reality, forcing the security print industry to react .

The first diffractive optically variable image device (DOVID) to be used on banknotes was the Reserve Bank of Australia's note, in 1988, commemorating Captain Cook's discovery of Botany Bay and then the Austrian National Bank issuance of a new high denomination 500 schilling note. Following this, progress was initially slow as many technical challenges, as well as the reluctance to accept DOVIDs as secure features, had to be overcome.

The next significant development, in 1991, was the issue of the 20 Markkaa from the Bank of Finland with a 2 mm wide DOVID security thread using holographic film supplied by Applied Holographics PLC, and by 2000 the ECB had decided to use DOVID technology on the new euro. This raised the number of countries issuing banknotes with DOVIDs to 31, with a total of some 80 denominations in circulation.

Indeed, the most significant driver in the widespread adoption of DOVIDs on banknotes was the decision to include them on the euro, launched in 2002, as a security feature. This move has been heralded as the successful culmination of a very thoroughly researched banknote – from concept to design – followed by a well planned and executed production and distribution project.

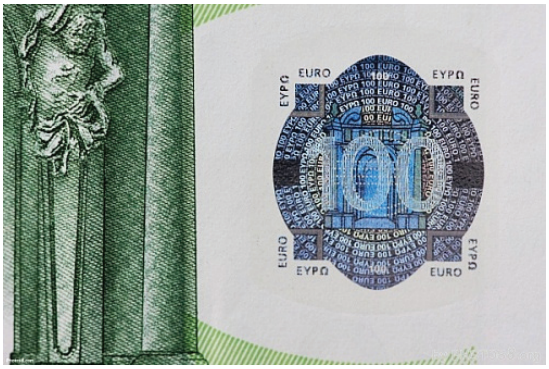
The presence and quality of holograms on the euro confirmed that the age of anti-counterfeiting technology for banknotes had truly arrived and in excess of 13 billion notes were issued in the first year alone with every domination featuring a DOVID with stripes on the three lower dominations (€5, €10 and €20) and patches on the four higher denominations (€50, €100, €200 and €500).

Dynamic imagery

The devices used on the euro are far more complex than the ones featured on the earlier banknotes. In addition to rainbow colors, these Kinegrams on the lower denominations and Alphagrams™ on the higher denominations, mastered by OVD Kinegram and Hologram Industries (now SURYS) respectively, contained dynamic imagery channeled to show different graphic designs at different angles.

Such complexity presents challenges in describing and explaining them to specialist examiners and the general public. The ECB communicated the salient visual features through an exten-

€5 Series 1 Hologram stripe.



A banknote featuring the 100 euro patch.

€50 in Europaseries.

sive public education campaign using the tagline 'Look, Feel, Tilt,' contributing to their success as a secure public feature, and the increasing complexity of imagery to provide high security has continued unabated. The simplicity of this message was so successful that it, or variations of it, are now widely used around the world by other issuing authorities.

At the 2002 physical launch of the currency, 12 countries with a total population of 308 million adopted the euro and the ECB's report on the 'Evaluation of the 2002 cash changeover' calculates that frontloading of banknotes by credit institutions to residents of the euro area required 13.25 billion notes. And as there was a DOVID on all of the denominations, this demanded a roughly five-fold increase in the European capacity for banknote quality devices - the largest use of DOVIDs to date.

In retrospect, the decision to use DOVIDs for the euro, their sophistication and their successful application on the banknotes at high speeds, must be seen as a huge vote of confidence in the technology, paving the way for other central banks to adopt holograms as effective anti-counterfeiting solutions for their own new banknote programs.

It is impossible to isolate the effect of the use of DOVIDs from all other factors, on the security of the launch of the euro. Prior to the currency's launch there were media scare stories warning of the risk of a wave of counterfeits of the new, unfamiliar, banknotes. However, up to the end of February 2002, a total of only 1,485 counterfeits, all of very poor quality, were reported by the national analysis centers of the participating countries. In the words of the ECB evaluation report "Clearly, the potentially serious risks posed by a flood of counterfeits at the start of the year [2002] did not materialize. The level, when compared with previous experience with the legacy currencies, has indeed been very low."

Redesign

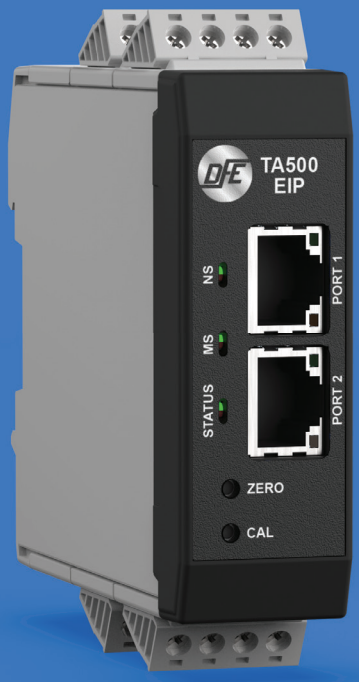
It is accepted best practice among banknote issuers to refresh or redesign banknotes every seven-10

TENSION MEASUREMENT & CONTROL SYSTEMS

TA500 Tension Amplifier

A next-generation load cell interface has arrived. DFE's newest tension amplifier provides simultaneous Ethernet, 0-10 VDC and 4-20 mA connections for easy integration with current and legacy PLC systems.

The TA500 also features Quik-Cal™ digital calibration, built-in diagnostics, web browser configuration utility, security lock-out, PLC configuration file support, remote zero & calibration, integral DIN rail mounting and DFE's industry-leading 5 year warranty.



Compatible with all DFE Load Cells

Upgrading control systems for Industry 4.0 has never been easier. Whether you're building an advanced slitter-rewinder with a Segmented Tension Roll® or refitting Model C transducers on a 20 year old web press, the TA500 is designed to integrate quickly and seamlessly.

The TA500 is backward-compatible with all DFE tension transducers manufactured since 1974, including: Universal Transducer, Model C, Model F, Model LT, Model RFA, Model RS, Model THN, Model UPB, Model SUPB, Model VNW, Narrow Web, Tension Roll® and Segmented Tension Roll®.

MORE INFO

years to keep ahead of counterfeits. After 10 years, euro banknotes underwent a refresh, with the addition of new imagery (notably in the form of a portrait of the eponymous mythical goddess Europa, after which the series was named, in the DOVID, watermarked to add a quasi-human touch) and enhanced security features, albeit that the overall design remained the same.

The DOVIDs on the two lowest denominations were replaced with registered diffractive stripes. In the other denominations, these were overlaid over an aperture in the substrate to create a window, with different holographic effects visible either side of the note. The first notes in the Europa series went into circulation in 2013.

"As we look forward to a new age for the euro, one thing is clear: the role of banknotes in any payments eco-system and the need for secure, cost-effective features that the public recognize remains as strong as ever."

Again, the fact that the ECB retained DOVIDs in this second series was a solid endorsement both of their value as first line security features, and the way in which the technology is continually being upgraded and enhanced to offer additional anti-counterfeiting and authentication capabilities. This has been borne out by studies, notably the Dutch central bank, that the feature is the second best in public recognition terms after watermarks.

Now, the euro banknotes are facing a redesign for the first time since their launch two decades ago, with a desire to make the currency "more relatable to Europeans of all ages and backgrounds." There's little doubt that holography will continue to feature in a move that signals a vote of confidence in the staying power of the euro by the ECB's Governing Council, which wants to see innovative and secure banknotes that connect with people right across Europe. Indeed, the latest Study on the Payment

Roller Solutions Uncovered

Effects of Cleaning Chemicals on Roller Lifespan

By **William Bradley**, American Roller Vice President of Business Development

Cleaning a roller's working surface is a critical aspect of regular machine hygiene but specifics of cleaning chemistry and methods are rarely reviewed and revised. Everyone knows that a clean roll produces higher quality materials and generates less scrap than a dirty roll; however, did you know that some cleaning chemicals and solvents may actually be doing more harm than good?

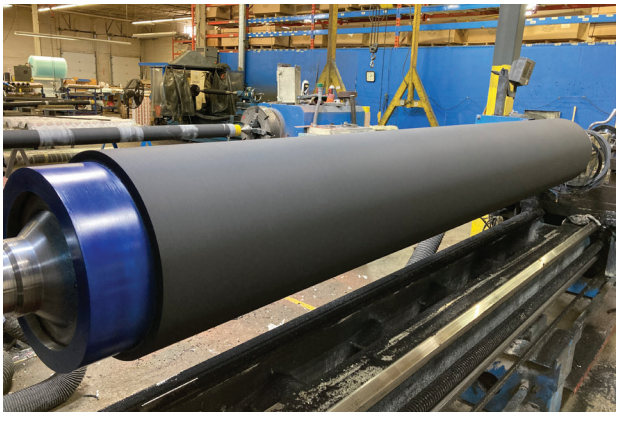
Despite the relatively short contact period with a roller's surface, incompatible chemicals and solvents can do a lot of irreparable damage to a roll's covering. Long-term chemical damages often fly under the radar because changes are not always rapid or obvious. Just because a cleaner is really good at cleaning residue off of a roll doesn't mean that it's necessarily good for the rubber, plasma coating, chrome plating, etc. on its working face.

Obvious chemical or solvent damages are realized quickly because it only takes an instance or two to determine that a particular chemical is clearly incompatible with a roll covering (use of that chemical is generally discontinued shortly thereafter). Less obvious changes in roll coverings such as durometer gains/losses, dimensional changes, changes to rebound properties, increased tackiness and other undesirable changes often present after a good period of run-time. The root cause of these symptoms affects production lines in many different ways and can be very difficult and expensive to track down.

Knowing what chemicals are safe is paramount to achieving a covering's full-service life and keeping processes running smoothly long-term. Cleaning chemicals and solvents may have been qualified for a roll covering used many years ago but may not be compatible with today's roll covering.

Example: Historically, a Nitrile roll covering was cleaned with deodorized kerosene which quickly removed the build-up and didn't harm the Nitrile rubber. At some point, the roll covering was changed to EPDM; however, cleaning methods weren't revisited and the roll position continued to be cleaned with deodorized kerosene. EPDM doesn't rapidly deteriorate or show obvious, rapid changes when exposed to deodorized kerosene so its use as a cleaning solvent was continued because it was on-hand and effectively cleaned off residue.

While deodorized kerosene doesn't rapidly damage EPDM, it is readily absorbed and the roll covering swells until it's saturated (dimensional changes). This increase in volume is directly associated with the decrease in hardness (durometer loss) and usually associated with ripples, waves and/or other undesired changes to the working face profile (profile changes compared to when it was new).



Proper roll covering cleaners are important for full-service life and long-term running processes.

Since deodorized kerosene does not readily gas-off at ambient temps, these EPDM covering changes are cumulative and permanent (contact period isn't a factor in this case). Someone may have noticed the EPDM coverings don't last nearly as long as the Nitrile coverings but since EPDM is needed for that position for other reasons, they live with more frequent recover cycles than necessary. Performance, longevity, scrap, etc. are all negatively affected because no one realized that the limiting factor for this EPDM roll covering's usable life is what it's cleaned with.

American Roller has resources to help you discover best practices and compatible cleaning chemistry for rolls in your process. In addition to cleaning chemistry, we can advise on compatibility with process chemistry (coatings, treatments, etc.). We often find that a particular cleaner or process chemical has a minor component that is incompatible with the roll covering used (reviewing an SDS is very useful).

American Roller can recommend different cleaners that are compatible with existing roll coverings and/or, if cleaning chemistry can't be changed, assist with finding a new roll covering that is fully compatible with your process and cleaning chemistry. ■

To learn more, visit www.americanroller.com.

Attitudes of Consumers in the Euro Area (SPACE) confirmed that cash was the most popular means for people to pay for retail items in-person in 2019.

And as part of its Cash 2030 strategy, the Eurosystem is taking concrete steps to ensure that cash continues to be available and accepted as a means of payment well into the future. The ECB Executive Board wants to develop euro banknotes that people can identify with and will be proud to use, with member Fabio Panetta adding: "The process to redesign the euro banknotes will run in parallel with our [ECB Executive Board] investigation on a digital euro. Both projects aim to fulfil our mandate of providing safe and secure money to Europeans."

The net number of euro banknotes in circulation stood at 28 billion pieces as of September 2021. The number of EU countries that have adopted the currency stands at 19 (with two more, Croatia and Bulgaria set to join in the next couple of years). At the end of the first year following its launch, when it was used by 12 member countries, the volume was 15 billion.

As we look forward to a new age for the euro, one thing is clear: the role of banknotes in any payments eco-system and the need for secure, cost-effective features that the public recognize remains as strong as ever. The difficulty holograms present to criminals and counterfeiters cannot be overstated - indeed, a third of all current banknotes in circulation (327 to be precise) now feature a DOVID. And that is why they will continue to be used by the ECB and other banknote issuing authorities for years to come.

The IHMA (www.ihma.org) is made up of more than 80 of the world's leading hologram companies. Members include the leading producers and converters of holograms for banknote security, anti-counterfeiting, brand protection, packaging, graphics and other commercial applications around the world, and actively cooperate to maintain the highest professional, security and quality standards. ■

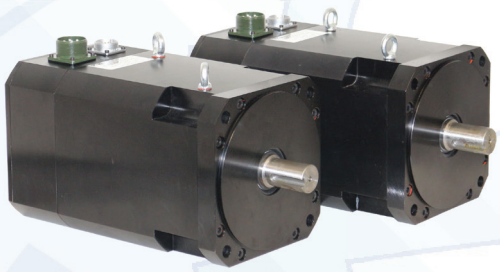
[1] https://estore.reconnaissance.net/product/diffractive-features-on-banknotes/
[2] https://www.ecb.europa.eu/pub/pdf/other/cashchange-overreport2002en.pdf

DUAL AXIS BACK-FOLDING CONTROL SYSTEM

Industrial Indexing Systems, Inc

Air-conditioned control system cabinet with a removable HMI operator station can be mounted in a position convenient for operator access

Touchscreen Operator Interface

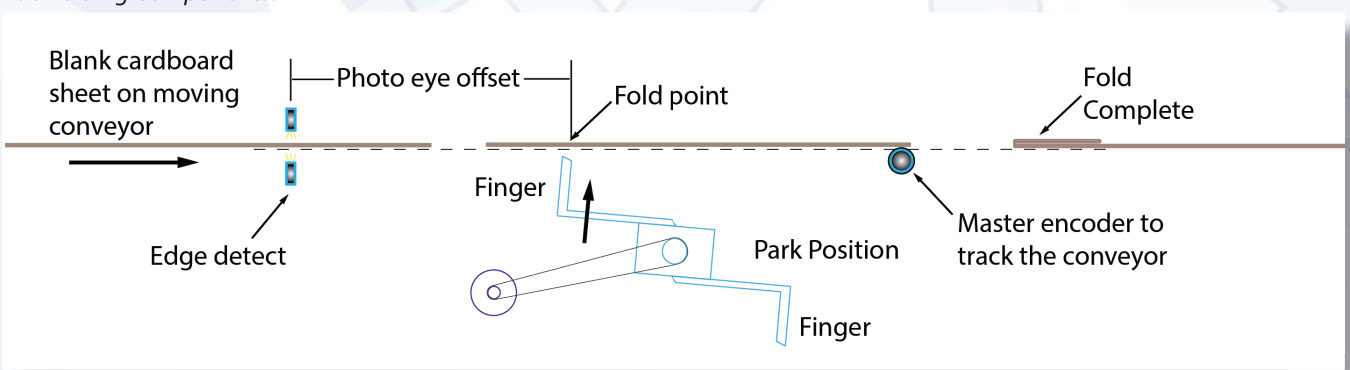


Dual 9100 watt servomotors used to drive the back-folding finger shafts

We provide servo solutions for all types of automation. One of our popular packages is the servo-controlled upgrade package designed for a high speed back-folding system. Used in the box-making process to accurately form, fold and glue the flaps on the back end of cardboard sheets. The back-end folding phase for a box accommodates different size flaps and box widths.

Easy setup sequences, presented by the touchscreen HMI operator interface, provide quick changeovers and adjustments for fine-tuning the back-folding process. Product run details reside in system recipes for future recall. Diagnostic screens and status messages that alert the operator minimize loss of production.

Backfolding Components:



For more details check out our Servo Technology at:

https://www.iis-servo.com/dual-axis-back-folding-control-system/

Call us today at (585) 924-9181 to discuss these products in greater detail

626 Fishers Run, Victor, NY. 14564 ~ info@iis-servo.com ~ www.iis-servo.com

The Fundamentals of Adhesive Coatings

By **Chuck Noll**, Vice President of Sales & Marketing at Kent Adhesive Products Company

Introduction

Many adhesive coatings are custom-engineered to solve limitless application challenges. The coating type and technique are carefully selected, often through extensive trial and error, to provide optimal results. Experienced coaters must account for a wide variety of variables and customer preferences before selecting and testing a solution. Adhesive coatings are common and used globally in a multitude of functions. Vinyl can be coated with pressure sensitive adhesives for use in signage, wall graphics, or decorative wraps. Gaskets and "O"-rings can be adhesive coated so they can be permanently affixed to various products and equipment. Adhesive coatings are applied to fabrics and non-woven materials so they can be laminated to hard substrates and provide a soft, protective, finish to secure cargo during transportation.

KAPCO's 80-inch coater.

Profitable Sustainability

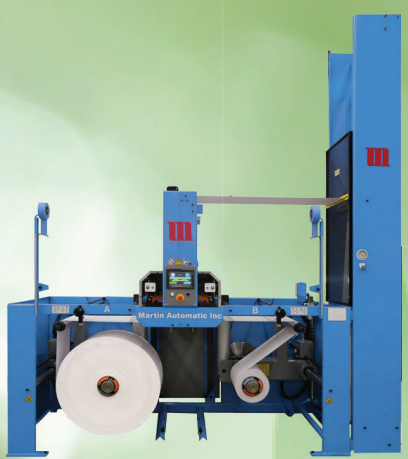
Stewardship for your bottom line and stewardship for the environment can work together. Adding non-stop unwinds and rewinds from Martin Automatic is good for your business and good for the environment too. Find your competitive edge, and improve your bottom line and environmental impact.

By adding Martins to two label presses we were able to reduce energy consumption on the presses by 23%.

Label printer in Europe

We have seen a 30% reduction in waste levels since adding the Martins.

Bag making company in USA



non-stop running non-stop running non-stop running

your press here

A cleaner, greener tomorrow through conserving energy, waste, and downtime with every splice.

Martin Automatic Inc

High Performance Splicing, Rewinding, and Tension Control Systems

OUR EXPERIENCE...YOUR ADVANTAGE

Variables

There are many factors that go into selecting a viable adhesive coating solution:

Substrates are often materials like paper, wall coverings, corrugated plastic, films and foils. Each has its own unique characteristics such as porosity, tensile strength and chemical resistance.

Release Liners are applied to protect the adhesive from contact and contamination before application. Liners can be made from a variety of materials and work in conjunction with the adhesive coating to control peel strength.

The **application surface** may be a concrete wall, carpeted floor, vehicle door, window, human skin or many others. The make-up of these surfaces must be taken into consideration when selecting/developing the right chemistry.

Environmental conditions like extreme temperatures, moisture, direct or indirect sunlight, exposure to chemicals, indoor/outdoor use, etc. will have some impact on adhesion and durability.

Green initiatives may determine selection of emulsion-based (water-based) adhesives over solvent (chemical-based) adhesives.

Other factors to consider are compatibility between the adhesive coating and a functional top-coat, type of printer/ink being deployed, and storage conditions.

Chemistry

There are numerous "off-the-shelf" chemistry options available in the marketplace. Sometimes, these chemistries can be used without modification. In many cases, they are modified with additives to optimize their performance.

Surfactants reduce surface tension to improve the rheology of the adhesive. This enables the adhesive to flow better and coat more evenly.

Defoamers may be added to reduce or eliminate the potential for air bubbles to occur within the coating.

Tints are often added to control opacity in white or clear substrates. This is a common practice for materials used for signage or back-lit displays.

Scents can be added for applications where the smell of the adhesive is scrutinized. Stick-to-skin cosmetic products sometimes require "scented" adhesive.

Methods

There are many types of coaters and coating methods. Basic requirements include choosing a coater that can accommodate the size and weight of the web (roll of raw material). State-of-the-art coaters typically have superior speed and tension controls necessary to handle a variety of substrates. Precise tension control is critical when applying coatings to thinner materials like films and foils. Coater selection is contingent on much more than just the physical fit. Different coating methods can be deployed depending on the intended result:

Gravure coating utilizes engraved cylinders that apply a specific amount of coating to the web depending on their engraved volume and the characteristics of the coating fluid. The cylinders

are metered with a doctor blade which enables the user to apply precise and consistent coating weights across the web. Gravure coaters are most often used to apply thinner coatings to a web. Gravure coaters can be used for full web coating or pattern coating.

Reverse roll coating incorporates a pickup roll that is partially submerged in a coating pan. The coating fluid is applied to the pickup roll that, in turn, applies the chemistry to an applicator roll. The applicator roll applies the coating fluid to the web. The coating weight is controlled by roll speeds and the gap between the applicator roll and the pickup roll. A third roll, the backup roll, engages the web to the applicator roll and also controls the coating width. This method of coating is most often used to apply medium to heavy coating weights to the web.

Meyer Rod coating is often referred to as "Rod Coating". This method of coating uses either an engraved rod or wound rod to meter off excess coating that has been applied to the web via an applicator roll or directly out of a pan. The larger the engraved or wound gaps in the rod, the thicker or heavier the coating weight that is applied to the web. This type of coating offers the ability to do a wide range of coating weights and is very flexible when it comes to the characteristics of the coating chemistries used.

Dahlgren coating is most often used to apply a very thin coating to a web. A metered roll applies the coating to the web. Coat weights are normally controlled by the speed of the roll. This type of coating is very commonly used to add moisture back into a web, especially papers, to control the curl of the finished product.

In **Knife-Over-Roll** coating, the web has an excess amount of coating fluid applied to the surface. A knife is situated directly against the surface of the web with a specific gap that meters off excess coating fluid. This gap controls the coating weight. In a similar technique called Air Knife coating, instead of a steel or polymer blade, a focused stream of impinged air is used to meter off the excess coating fluid from the surface

of the web. The coat weight is controlled by adjusting the velocity of the impinged air and the distance of the impingement gap from the surface of the web.

Slot Die coating method pumps the coating fluid through a precisely machined gap in a die and on to the surface of the web. The coating weight is controlled by changing the amount of flow through the die or the thickness of the gap in the die. This method of coating is used when precise coating weight control and consistency is required.

Immersion coating is sometimes referred to as "dip coating". The web is immersed or dipped into a pan or reservoir containing the coating fluid. The web is then passed through two rolls that meter excess coating off the web. The coating weight is controlled by the gap between the two rolls and the speed of rotation of the rolls. This method of coating is often used when saturation of the coating chemistry into the web is required.

Curtain coating uses a precisely slotted coating head that creates a curtain of coating chemistry that falls onto the web traveling perpendicular to the falling coating fluid. This type of coating is used when precise coating weights are required and is also useful for applying multiple wet layers of coating fluid onto the web. This is accomplished by using multiple slots in one coating head, each with separate coating fluids flowing through them.

Finishing

Now that the chemistry has been engineered and the coating method is dialed in, drying is the next part of the process. Most coaters have in-line ovens designed to dry or cure the adhesive. Temperature, speed and oven length are all accounted for when optimizing the drying process. Infrared heat is applied in air flotation ovens for even coverage without contacting the web. Type of liner, adhesive, humidity and ambient temperature all have some impact on the drying process. Drying times and speeds are often adjusted during the trial process. Adhesive coatings are initially applied to the liner instead of directly to the substrate. This process is called transfer coating. When the drying process is complete, the substrate is then laminated to the adhesive/liner to produce the finished product.

The process for developing adhesive coatings begins with a concept. From there, a design-of-experiments (DoE) is created as a roadmap toward success. Often, multiple trials are required to perfect the chemistry and application of that chemistry. The end result is a highly engineered solution designed for success. ■

Let's talk safety!

By **Tanya Becker,** Sales & Marketing Coordinator at Catbridge Machinery

There have been published incidents recently of catastrophic injuries related to slitter rewinders. While this news is devastating, we must use it as an opportunity to talk about what we can do as an industry to prevent future occurrences. Three things come top of mind when I think of the stories I have heard over the years.

1. Complacency - Never let your guard down! It can be so easy to forego the details because you've done a task hundreds or thousands of times. In an instance, a not pressed safety switch or instinctively reaching for trim or disabling a guard "for this run" can have devastating consequences.

2. Training - It's no surprise that the converting industry has seen a significant boom during the pandemic and finding skilled/experienced labor to keep up with the demand has certainly been a challenge. This is NO EXCUSE for improper training! Companies need to be even more diligent, taking the time and money to ensure new operators are trained fully. Additionally, not all machines are alike, being trained on one slitter doesn't necessarily qualify you to safely run any other slitter.

3. Integrated Safety - Machine builders must also do their part to ensure that machinery leaving their plants has the highest degree of safety integrated into the slitter. Safety is not an area to cut corners. Older equipment needs to be evaluated regularly for necessary/available safety upgrades.

We work in a dangerous environment but we must strive to control every parameter we can when it comes to the safety of our people. Safety protocols must be in place and more importantly maintained as the highest priority.

Where else do we need to take this conversation?

Learn more about Catbridge Machinery at www.catbridge.com.

AIMCAL Membership
A Smart Business Decision!

CONVERTING SCHOOL COURSES Technical Training	AIMCAL TV NETWORK Technical Videos
R2R CONFERENCES Networking/Technical	CONVERTING QUARTERLY MAGAZINE Advertising/PR
PRESENT PAPERS AT AIMCAL R2R CONFERENCES Industry Expert	ANNUAL TECHNICAL TOPICS Technical Articles
PRESENT LIVE WEBINARS IN AIMCAL TV Industry/Expert/Leads	FREE JOB POSTINGS Website/E-mail
AIMCAL EXECUTIVE LEADERSHIP CONFERENCE Executive Networking	INDUSTRY RESEARCH Reports
AIMCAL SOURCEBOOK Directory/Leads	AIMCAL FUNDAMENTALS COURSE Technical Training
RESPONSE REPORTS/ANALYTICS Online Results	ANNUAL AWARDS Market Leadership
ASK AIMCAL Technical Help	LOGO ON AIMCAL WEBSITE Branding/Link
SEND US YOUR COMPANY NEWS Awareness	AIMCAL TECHNICAL COMMITTEES Knowledge

Basic Memberhip = $2,250/yr
Premium Membership = $2,750/yr

Total Value = $10,900

Note: Values developed by AIMCAL membership committee

For Membership Questions, Call Tim Janes: 1 (803) 948-9469 OR Tim@Aimcal.org - Aimcal.org – Click Membership

AD INDEX

PFFC
PAPER, FILM & FOIL CONVERTER

PFFC
An RDG Media, Inc. Publication
P.O. Box 80915
Rochester, MI 48308

Presorted Std
US Postage
PAID
RDG Media, Inc.