THE AUTHORITATIVE VOICE OF THE CONVERTING COMMUNITY

PFFC
PAPER, FILM & FOIL CONVERTER

95th ANNIVERSARY

www.PFFC-Online.com

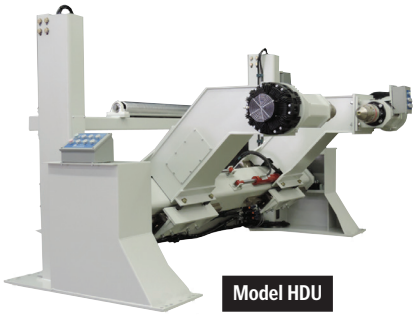
rdgmedia

MAY 2022

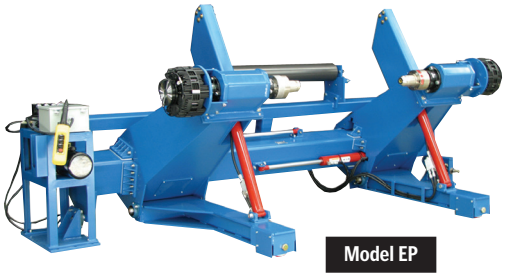
OPTIMIZING CONTACT CLEANING FOR NEW WEB APPLICATIONS 6

ALSO IN THIS ISSUE

Want More Production?

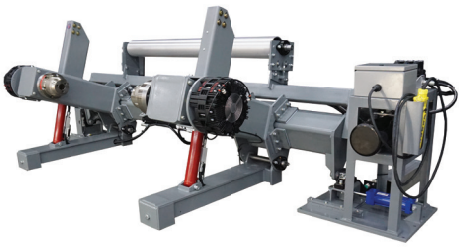


Model HDU

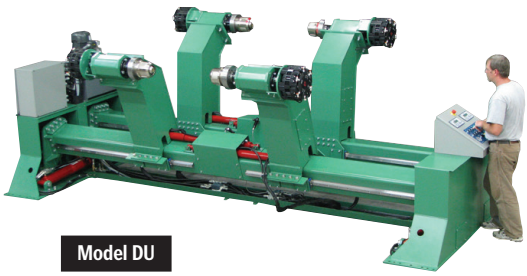


Model EP

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

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

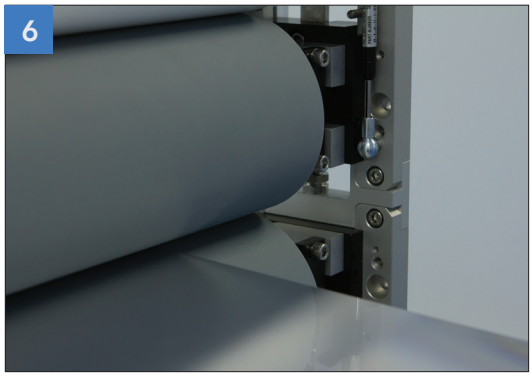
to learn more contact:

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

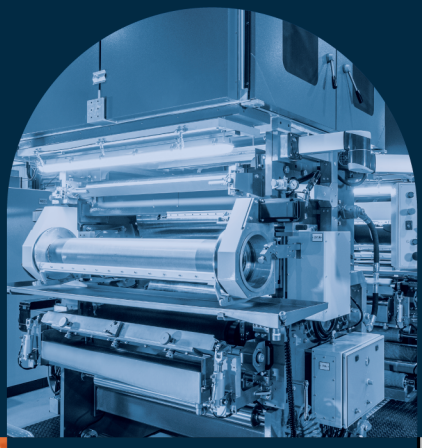
TABLE OF CONTENTS

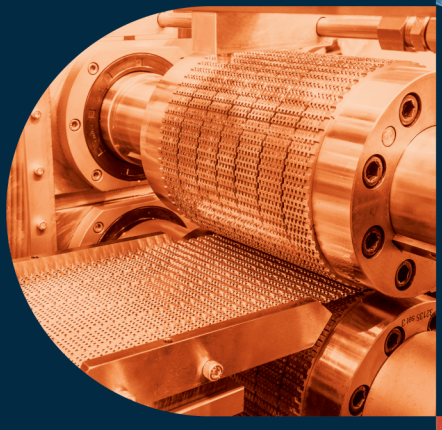


DEPARTMENTS

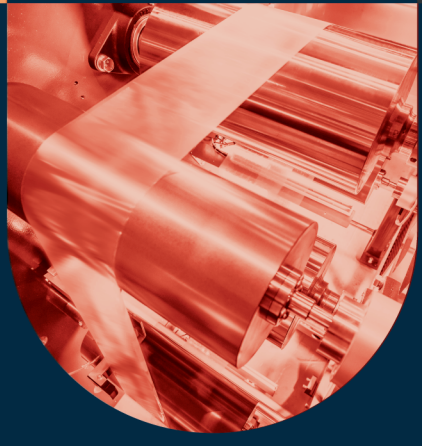
Innovation and Industry

E+R | GROUP





100+
Years of global innovation, growth and partnership



E+R | PRINT E+R | FORMING E+R | COATING E+R | VACUUM

Emerson & Renwick Ltd.
Peel Bank Works, Church, Accrington, BB5 4EF England
t: +44 (0)1254 872727 e: sales@eandr.com

visit our new website:
www.eandr.com

The Princess and the Particle

Angel Morris
Editor

In this month's cover story, *Optimizing Contact Cleaning for New Web Applications,* an industry expert discusses the importance of getting rid of defect-causing particles in order to gain higher yields. To optimize contact cleaning systems, one must evaluate the force of adhesion between particles and surfaces, then respond accordingly. And while the article addresses the relation of particle adhesion to cleaning performance, the concept is not exclusive to web applications. Here me out …

Do you remember the story, *The Princess and the Pea*? The Hans Christian Andersen fairy tale depicts the troubles of a young prince trying to find a suitable wife. He discovers something wrong with every candidate, until one stormy night when a woman claiming to be a princess seeks shelter in his family's castle.

To verify the woman's royal ancestry, the prince's mom sneaks a pea in the guest bed, then covers it with multiple mattresses. If the young woman is a princess, she will surely be sensitive to even this slightest discomfort.

The next day, the woman explains she had a sleepless night, thanks to something hard within the bed. A bruised back serves as proof of the woman's sensitivity and thus her status as a genuine princess. She and the prince go on to marry and, presumably, live happily every after, as the pea is preserved in a museum.

While the comparison to web applications may be loose, the story used a defect-causing particle — the pea — toward a higher yield — finding a princess wife. And while few of us can claim royal roots, we all must sometimes overcome small obstacles to prove ourselves. The trick is understanding how best to remove the unwanted bit to optimize our efficiency.

Industrially, this requires force greater than what is holding a particle to a surface, without so much force as to damage that surface. Personally, it may mean finding ways to overcome life's hurdles without injuring ourselves in the process. Either way, the goal is higher production.

In this issue, we also look at leveraging the supply chain organization in times of crisis, and the challenges press bounce causes in flexographic printing — again addressing issues that must be overcome to best succeed. As the prince's mother proved, a little ingenuity goes a long way. Here's to eliminating little things that keep us from optimizing our lives!

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
Angi Morris
angelm@rdgmedia.net

Accounting Manager
Kristin Green

Systems Administrator
Angi Hiesterman

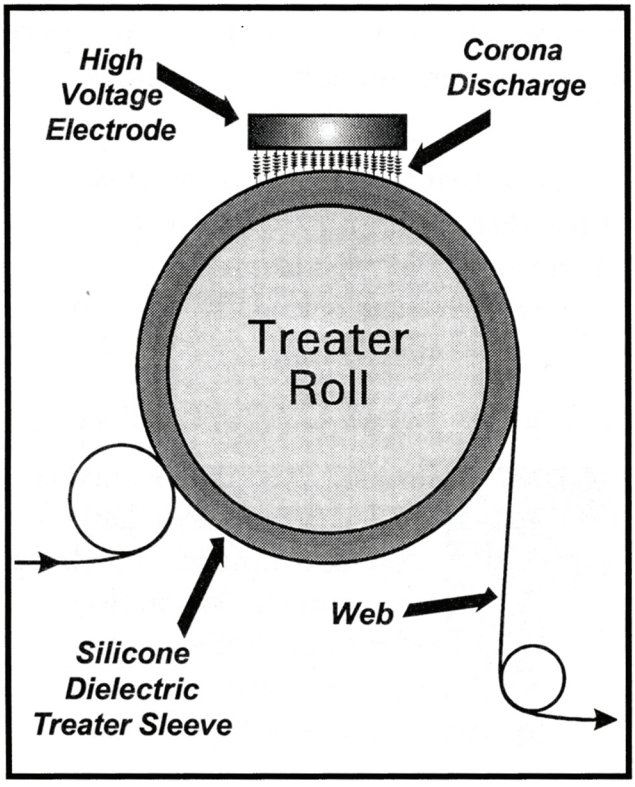
Operations/Customer Service
Jody Kirchoff

Web Design
Josh Scanlan

Auctions
Angi Hiesterman

rdgmedia PUBLICATION

SILICONE Treater Sleeves



Life inside a corona treater is hell.

Dielectrics must withstand high frequency, high voltage discharge, plasma-induced ion bombardment, elevated temperature, and concentrated ozone. Even the slightest defect can result in premature failure.

We closely inspect each and every sleeve that goes out the door, and we guarantee our sleeves against immediate blowout on your treater. *That's why we can say, with full assurance...*

"Our silicone sleeves are equal or superior to those supplied by the world's leading treater manufacturers."

We've been selling these treater sleeves for over 25 years now — in that long period of time, we have had only one or two sleeves fail on installation. 100% visual inspection is, indeed, very effective!

We guarantee these are the same high quality treater sleeves sold by OEMs worldwide — all at significant savings!

Product Code	Fits Roll OD* English	Fits Roll OD* Metric	Actual ID	Color	Wall Thickness	Price per Linear Inch
96152	1.5"	38 mm	35 mm	Orange	.080" (2.0 mm)	$1.15
96202	2.0"	51 mm	46 mm	Orange	.080" (2.0 mm)	$1.35
96252	2.5"	64 mm	59 mm	Orange	.118" (3.0 mm)	$1.85
96302	3.0"	76 mm	70 mm	Orange	.080" (2.0 mm)	$1.85
96402	4.0"	102 mm	95 mm	Orange	.080" (2.0 mm)	$2.25
96602	6.0"	152 mm	141 mm	Orange	.095" (2.4 mm)	$3.15
96802	8.0"	203 mm	190 mm	Orange	.102" (2.6 mm)	$4.55

*These sleeves will fit any treater roll OD within +/- 0.125" (3 mm) of listed size.

Wall thickness variance: +/- .006"
Hardness (Shore A): 70-80

Dielectric Constant: 4-5
Dielectric Strength: 250 v/mil

www.accudynetest.com
Diversified Enterprises, 101 Mulberry St., Suite 2N, Claremont, NH 03743
Phone 800-833-4644 or 603-543-0038; fax 603-543-1334; email rsmith@accudynetest.com

Optimizing Contact Cleaning for New Web Applications

By **Sheila Hamilton**, Teknek Director of Research

For every coating process, removing particles which result in defects, is key to achieving high yields. As new applications involve thinner substrates and innovative types of coating materials the requirements placed on cleaning systems are much more stringent and increasingly scientific analysis is required to optimize contact cleaning systems for different applications.

In order to remove a particle of contamination from a surface, a force greater than that holding the particle onto the surface must be applied. However, the force must not be so great as to distort or damage the surface and so cause a defect in the product being cleaned. For contact cleaning this means that the adhesion of the particle to the elastomer roller must be larger than the force holding the particle onto the substrate and the adhesion of the particle onto the adhesive roll must be higher than onto the elastomer roller. However, the forces of adhesion vary considerably depending on the combination of the particle properties and substrate properties.

Because of the importance of particle adhesion to cleaning performance Teknek sponsored two off 3-year PhD research programs with the University of Huddersfield and the University of Sheffield which aim to scientifically quantify some of the major variables impacting the adhesion forces between particles of contamination and elastomer cleaning rollers. The modelling of the forces of adhesion between particles and surface is key to understanding how best to remove the particles and so optimize the cleaning efficiency.

When particles are large, gravity is the major force holding them onto the surface and the modelling of the forces involved is relatively simple. However, as particles which cause defects get smaller, as is the case in many new applications, surface effect forces play a larger part in holding the particle to the substrate.

Below 10 micro particle size neither gravity nor static play any significant part in particle adhesion. The forces that do affect adhesion are related to the chemical and electrical properties materials of the particle and the substrate. While the material of the substrate may be known, the makeup of the particles of contamination is random and much more varied leading to substantial variations in the adhesion forces both to the

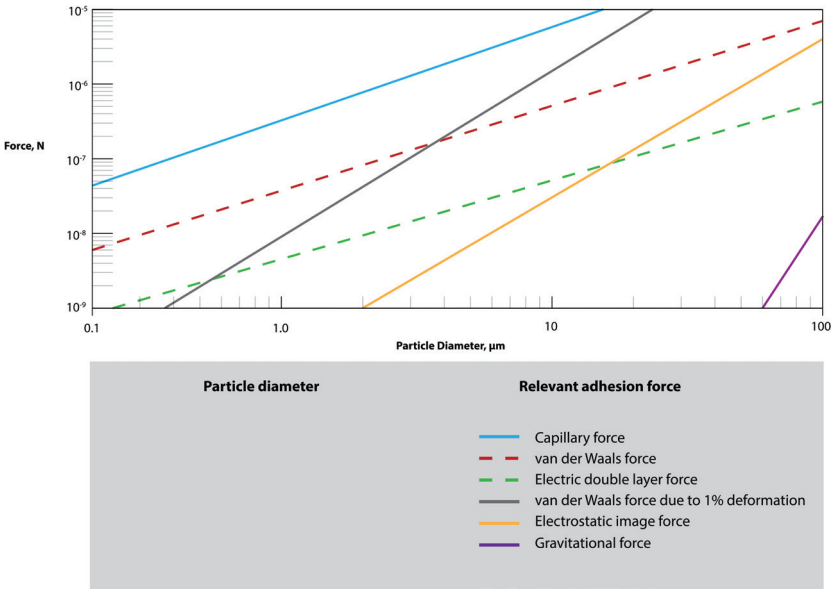


Figure 1 Relationship between particle size and adhesion forces

substrate and to the elastomer cleaning roller.

The total adhesion applied to a particle also depends significantly on the area of contact between the particle and the surface, which in turn depends on the shape of the particle and the surface topography of the surface.

This is illustrated in Figure 2 where maximum adhesion is where the particle shape fits neatly within the surface roughness maximizing the contact area. Particle shape must also be considered; for example, a flat platelet has much higher adhesion than a spherical particle of the same material on the same substrate because of the increased contact area.

One of the newer applications for cleaning is in the manufacture of EV batteries where contamination is a major cause of defects such as short circuits and poor performance. Short circuits are often caused by metal contamination piercing the separator film between the electrodes. The metal contamination is usually from slitting of the metal foil of the electrodes. The photograph in Figure 3 shows a Teknek Cleaner on electrode foil after slitting showing the build up of contamination at the edges of the foil on the adhesive roll.

In contrast any contamination, either conductive or nonconductive, on the electrode surface itself causes a local disparity in the charge transfer mechanism due to dewetting of the electrolyte. This causes a reduction in both charge capacity and in the number of charge/discharge cycles the battery can sustain resulting in a shortened battery life. The forces of adhesion are different for the

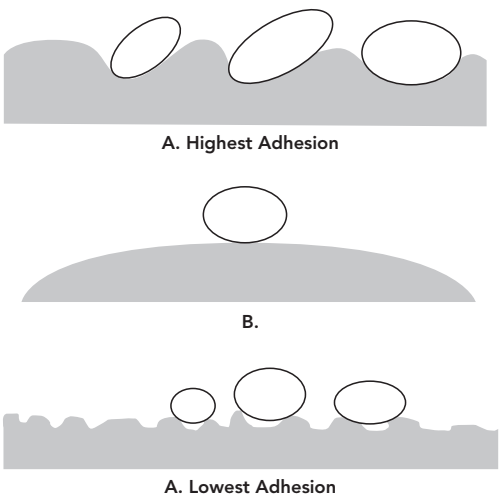


Figure 2 The effect of contact area on adhesion

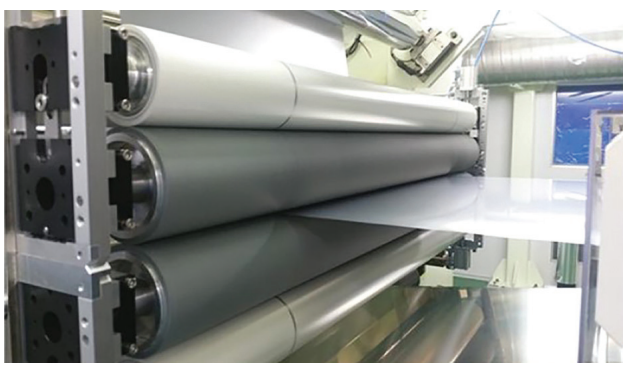


Figure 3 Cleaning metal foil after slitting

metallic and non-metallic contamination and may require two different types of cleaning roller to optimize the cleaning performance of the system.

In addition to optimizing particle removal without causing damage to the increasingly thin substrates, some new applications require additional functionality from the cleaning rollers. Some examples of the additional functionality are given below.

Some applications such as metal sputtered or thin conductive films used in displays are static sensitive in that discharging a build-up of static charge can evaporate the thin conductive layer destroying the functionality of the product. By default, when rollers run on a surface, they tribo charge the surface generating a high static charge. By incorporating a range of conductive additives into the elastomer formulation the build up of charge is dissipated.

For cleaning applications within a vacuum environment, it is essential that no outgassing occurs from the roller during use.

Where coating, printing or lamination is done after cleaning, any changes caused by cleaning to the surface energy of the film should be negligible to avoid dewetting of the coating.

Food and medical packaging applications, especially after the COVID pandemic, are concerned not only with particle removal but also with the elimination of microbes at all stages of production.

New applications for coated films and laminates require a much more scientific approach to cleaning to ensure that defects of all types are minimized while providing the additional functionality that emerging applications require. ■

ABOUT THE AUTHOR

Sheila Hamilton first joined Teknek in 1987 as technical director. She is a recipient of two Smart Awards in Electromagnetic Interference. She has also been involved in government funded research projects looking at the suitability of materials for use in Printed Electronics, particularly for use inside high vacuum environments.

AWA

Conferences & Events

GLOBAL RELEASE LINER

INDUSTRY CONFERENCE & EXHIBITION 2022

13-15TH JUNE 2022 - BARCELONA SPAIN

REGISTER NOW

Shaping a Collaborative & Sustainable Industry

MORE ABOUT AWA:

www.awa-bv.com

info@awa-bv.com

Leveraging the Supply Chain Organization in Times of Crisis

By **Larry Silverstein**, Now Plastics CEO

Recent global challenges have touched every product imaginable, including the staple of the packaging world – converter-grade alu-foil. Converters coping on their own in these times may feel like they are navigating endless hurdles, alone, in the dark – yet with its strength, network and access to a range of options, a supply chain organization can make all the difference in such a tough market.

There's no denying that the situation on the ground for alu-foil has changed. The industry is in a state of chaos, experiencing cracks at multiple points along the chain that create quandaries with no consistency and a general environment of triage.

What Has Happened?

Social distancing, lockdown measures and societal adjustments designed to reduce the spread of Covid-19 has caused a much higher demand for packaged goods and food delivery services which, along with a greater interest in product sterility, brought about increased demand for alu-foil. At the same time, producers of converter foil have struggled to keep plants running efficiently with raw material shortages, worker shortages and more.

Then, adding to that, power shortages in Chinese factories continue to impact production of raw materials "foilstock" and converter foil, and a dearth of shipping containers and truck drivers to the equation. The collective impact has been enormous – a more than doubling of the ingot cost and much higher production costs, an average increase in transit times of more than a month, an astronomical rise in shipping costs, and significant instability and fluctuation, such that customers may be quoted only an estimated price when ordering, finalized at the time of shipment – the only point at which there is any certainty of costs.

The aluminum market has also evolved. As the world works towards a reduced carbon footprint and improved environmental conditions by replacing fossil fuels with renewable energy sources, alu-foil is now a key component of certain state-of-the-art batteries such as those used in electric vehicles, whose market is exploding. This specialized foil is hard to produce but carries premium pricing and better return on investment than converter foil.

The Political Landscape

Recent shifts in global politics are complicating matters further. The onset of the Russia-Ukraine war led to limits on Russian producers importing raw materials and exporting finished products – along with a global resistance to Russian products emerging and adding more uncertainty to an already

IMS TECHNOLOGIES

CONVERTING THE FUTURE SINCE 1851

Excellence in Converting

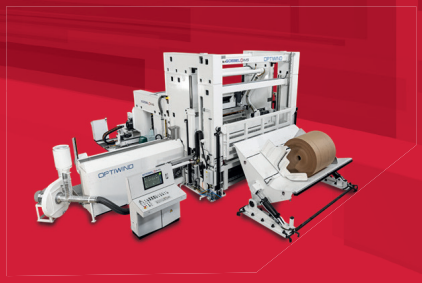
THE WIDEST RANGE OF MATERIALS

GOEBEL IMS LAEM IMS

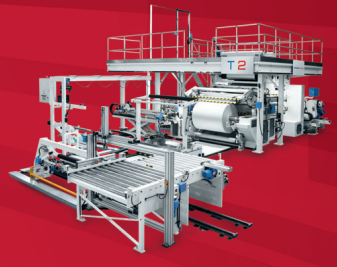
No matter what kind of material you have to process
IMS TECHNOLOGIES has the **right converting solution**

PAPER & BOARD | FLEXIBLE PACKAGING | FILM | ASEPTIC PACKAGING | TOBACCO | NONWOVEN | ALUFOIL

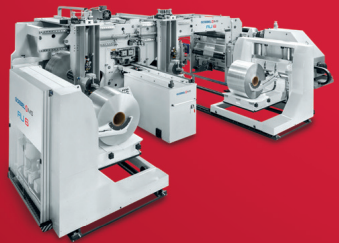
Primary slitter rewinders for packaging, technical and special **films**



Slitter rewinders, two-drum winders, doctor machines and automatic winding machines for **paper&board**



Slitter rewinders, pope winders, doctor machines for **aseptic liquid packaging** material



High-end foil slitting machines for **aluminium** industry

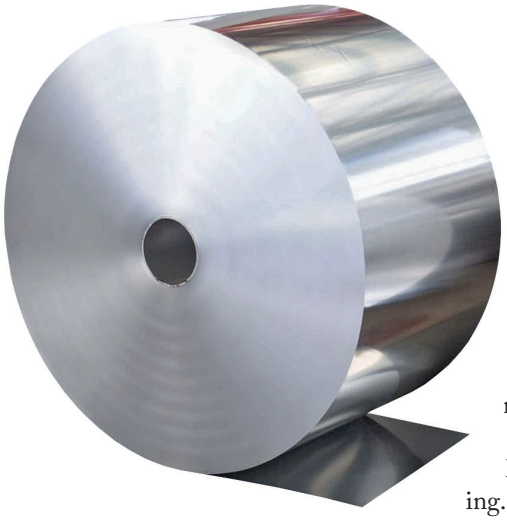
Twin-shaft, high productivity turret machines and compact slitter rewinders for the **flexible packaging** industry and for converters

Inline winders and offline slitter rewinders for all the main types of **nonwoven** products

www.imstechnologies.com

1851 2021 PIONEERING YEARS

sales@imstechnologies.com



Working with a supply chain organization delivers multiple benefits to producers.

challenging market. This gap cannot be filled by Chinese alufoil producers, which are subject to anti-dumping duties in the EU, USA, India and other markets.

Shortages and tight supplies are expected periodically, but there is an ominous feeling that this current state of supply shortage is different and will not be disappearing anytime soon. In fact, it will very likely worsen before improving. It's a perfect storm of grim conditions, in which flexible packaging manufacturers are forced to absorb continually higher prices even after making commitments to customers. They have no choice but to extend lead times and reduce supply to their customers. Most have no safety stocks of foil and are waiting for the next delivery to arrive.

Savvy converters understand that they will fare better with the right alliances, and they are therefore linking up with supply chain organizations – with decades-long working relationships across vast networks, only these entities have enough clout to evade the very worst of it.

The Force Multiplier Effect

Working with a supply chain organization delivers multiple benefits to producers. Financially sturdy, supply chain organizations provide a cushioning that shores up the whole system. With

stronger buying power, they are able to meet challenging payment terms, helping suppliers deal with their own challenges in sourcing requirements for raw material.

In terms of global logistics, vast networks of committed supplier relationships make a supply chain organization much more limber than any single entity. As well as being able to access untapped opportunities and even open global markets to producers that have previously been focused only on domestic supply, it can overcome regional geographic restrictions on imports from specific countries. And, of course, a supply chain organization also utilizes its own logistics network and vast experience to manage logistical challenges, creating elasticity that enables

better efficiency, both by reducing the risk of reliance on a single source and by reducing product sourcing time.

Generally, converters who work with supply chain organizations are accustomed to 'forward planning,' and alu-foil producers are at maximum capacity prioritizing them. This extends lead times for others even more, but better safeguards those converters who are in the loop.

Furthermore, the warehousing capabilities of supply chain organizations enable converters to order and secure products for the future, optimizing their production plans and avoiding product shortages through their stock programs. In cases where alu-foil really cannot be acquired, or not in the right quantities or time frame, they can offer a variety of suitable alternative products, such as other high-barrier films that might be more readily available.

The Bottom Line

In these unprecedented conditions, alu-foil converters find themselves presented with critical challenges, decisions and also opportunities. Many have not established resilient supply chain models, so for those that have or still can, there is opportunity to take market share from their competitors. Supply chain organizations bring different tools and talents to the party, with a broader global knowledge and international relationships, diversity of supply, capacity allocations that are especially helpful in tighter market conditions and more. Those who manage for the long run likely already know this but many do not.

While some commercial climates reward the rogue spirit and 'going it alone,' we are living through a point in history when even the large, global players can best survive – and thrive – by linking with more extensive networks that provide them with greater strength, flexibility and alternatives. In hard times, joined forces will fare better than any one individual. ■

ABOUT THE AUTHOR

Lawrence Silverstein joined Now Plastics in 1997 as Executive Vice President and CFO, and since 2000 as one of the two shareholders. He has been CEO for over a decade and is responsible for all aspects of the company's operations. Mr. Silverstein is a fully licensed CPA, has a bachelor's degree in business administration and a master's degree in Accounting, both earned from the University of Massachusetts at Amherst, Massachusetts.

MAMATA

Total Solutions For Flexible Packaging

Vega

Bag Machines for E-Commerce / Security / Bubble Poly Mailer Bags

- E-Commerce mailer bags
- Security / bank envelopes
- STEB duty free bags
- Courier bags
- Bubble / PE envelopes

Applications are endless...

marg 05/2019

Ease of operation and consistent high output

For more information :

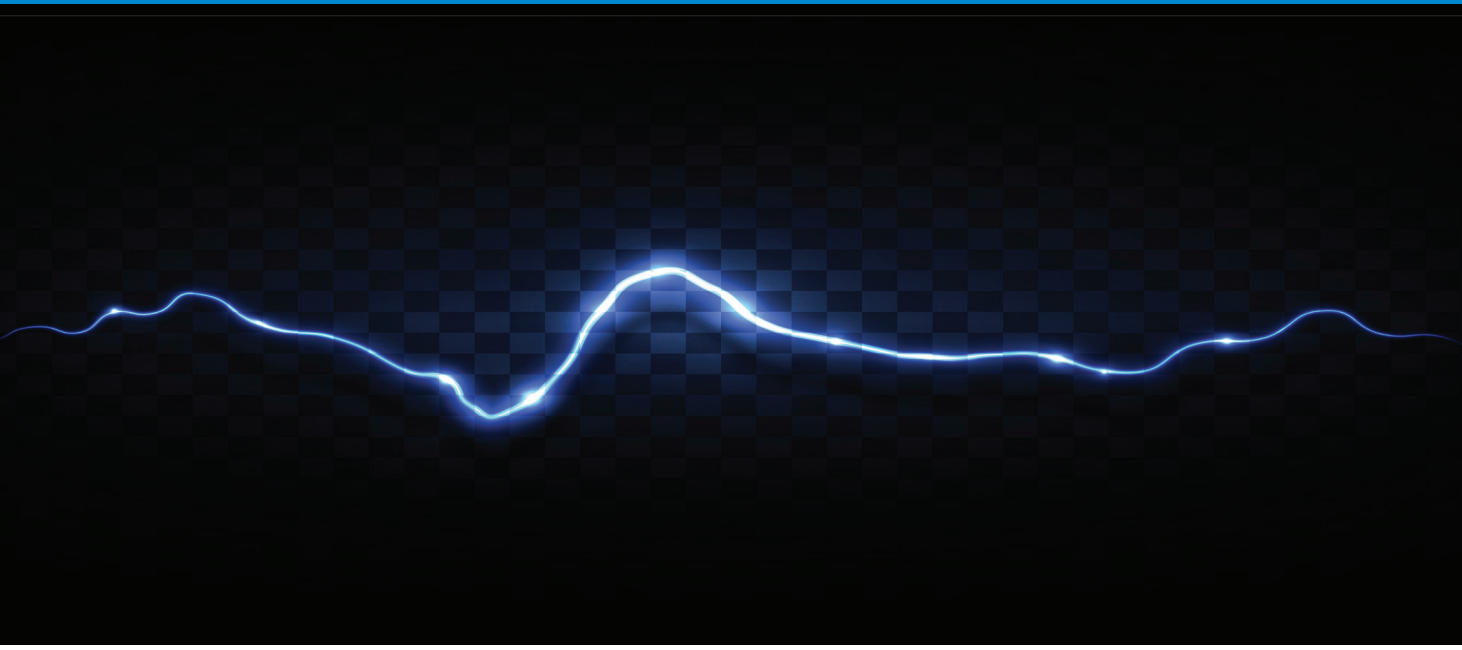
MAMATA ENTERPRISES, INC.

✆ +1 941 205 0227 / +1 630 801 2320/21

✉ sales@mamatausa.com

MEMBER Since 2012 PMMI

www.mamatausa.com



Static Measurements Guide Problem Solving

By **Dr. Kelly Robinson**, Founder, Electrostatic Answers

How do we solve static problems? What is the root cause of the problem?

Finding a static problem is easy. Operations run smoothly and efficiently when there is no problem. We have a problem when static damages the product (quality defect), causes a material jam (downtime), shocks an operator (injury) or ignites a fire (very bad!).

Finding an effective solution for a static problem is hard. The sage advice is to attack the root cause. I've heard this advice many times in problem-solving lectures and seminars. Finding the root cause is the hard part. How can we find the root cause of a static problem?

The material flow in many production operations is long, complex and typically crosses organizational boundaries. When the material is polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET) or another electrically insulating material, static charges on the material persist through many operations and through transportation between operations. Because static charges persist for so long (sometimes weeks or months) on insulating materials, the root cause may be far upstream of the problem, perhaps even in another country.

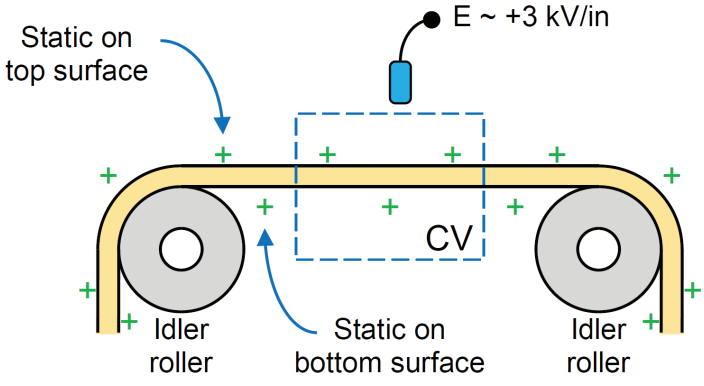


Figure 1 Measure static on a span midway between idler rollers

Find the root cause of a static problem by completing a static survey, which is a series of static measurements along the material

ZONE	STATIC READING (KV/IN)	COMMENTS
Green – Low Static	E < ±5	Static problems are unlikely
Yellow – Moderate Static	±5 < E < ±15	Static problems possible. Improve static control
Red – High Static	±15 < E	Sparks occur. Static problems are likely.

Table 2 Static Stoplight Levels

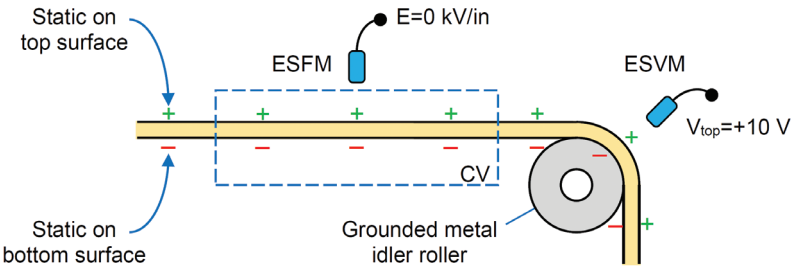


Figure 3 The web has balanced charges. The ESFM reads 0 kV/in while the ESVM indicates positive static on the top surface.

flow in your operation. Use the handheld electrostatic fieldmeter (ESFM) in Figure 1 to read static on a web span midway between two idler rollers. The electrostatic fieldmeter responds to all of the static charges inside control volume CV. Since there are 3 positive charges inside CV, the reading will be +3 kV/in.

An electrostatic fieldmeter (ESFM) measures the average static over a relatively large area of the web that is typically a 4-inch diameter circle (or larger, depending on the measurement location) on the web. To make reliable, repeatable measurements, follow the three "GeeZE Rules" (see Static Beat | 'GeeZE' Rules for Static Readings).*

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 (see Static Beat | Assess Static Risks Using Electric Fields). Use the static stoplight levels in Table 2 to evaluate your readings.

Static problems are unlikely when readings are low. Good static control systems keep measured levels in the Green – Low Static zone. As you move along the material flow, when you see a reading jump into the Red – High Static zone, you have found a root cause, which is a significant source of static charging. Install a static dissipater to bring the reading down into the Green – Low Static zone.

If static is high on incoming materials, the root cause of the problem is upstream of your operation. While we will certainly do our best to deal with this delivered static, talk with your supplier about attacking the problem at the root cause in their operation. Ask your supplier to track the static performance of their operation by auditing static on their finished goods before shipping them to you. This will ensure that problem-free materials are delivered to you.

Unfortunately, our electrostatic fieldmeter readings cannot find the root cause of all static problems. High static on winding and on unwinding rolls may be caused by balanced charges on the web in Figure 3 where there are positive static charges on one surface of the web and there are an equal number of negative charges on the other surface of the web. The electrostatic fieldmeter (ESFM) responds to all of the charges inside control volume CV, so it reads 0 kV/in. The electrostatic voltmeter (ESVM) responds only to the charges on the exposed surface, so it indicates positive charges on the top surface.

Use an ESVM to measure the static on one surface of the web at the beginning of the material flow in your operation. Then, measure static again on the same surface near the end of your material flow. With good static control, the voltage on the surface should increase no more than ±0.5 V/mm (±10 V / 0.001 inch) of web thickness.

Perform a static survey to find the root cause of a static problem. Once we find the source of static charging, we know where to install a static dissipater to solve the problem. ■

For more information, contact: Kelly.Robinson@ElectrostaticAnswers.com.

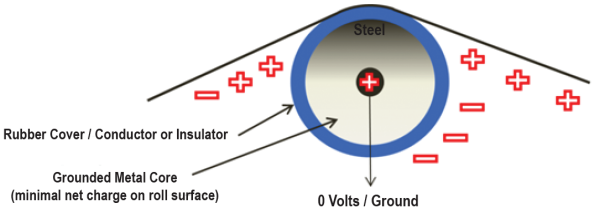
*https://www.pffc-online.com/static-beat/14478-static-beat-geeze-rules-for-static-readings

Do Conductive Rubber Coverings Help Reduce Static?

Source of Static Generation

When a web contacts a roller surface, electrons can transfer from one material to the other. The electron has a negative charge. The molecule the electron departed from is left with a positive charge. This happens because of the chemical structure of the materials. Some molecules want to gain electrons and some want to lose them. The number of electrons transferred is very small; perhaps one molecule in a million gives up an electron. This process is called Triboelectric Charging (or effect). Every time the web touches something, it potentially can gain or lose charges of either polarity depending on the interaction with what it touches.

As long as the web and the roller cover are in contact, (assuming neither web nor roller previously had any charge) the voltage is zero, there is no static generated. Static is generated when the materials are pulled apart and the charges cannot return to origin.



The volume of charges produced can be affected by factors such as web tension, nip pressure, web wrap angle, speed, rubber hardness, and rubber surface roughness. These factors all have to do with the intimacy and area of contact between the two surfaces which directly affect the number of charges produced.

Dangers of Static Electricity

- Shock hazard to operator
- Web damage from spark discharges
- Web contamination, dust
- Fire hazard using flammable solvents
- Discharge effects on computers, PLCs, controllers
- Wind-up roll or stacking problems

Reducing Web Static?

You would expect that a grounded metal roller with a conductive rubber covering would remove static from a charged web, but sometimes that is not the case. The main reason is most likely that the web is two-sided; each side can have a different polarity and magnitude of charge. The charges on the side of the web contacting the roller may flow to ground when the web first touches the roller, but the charges on the opposite side of the web pull charges up from ground when the web is departing the roller so that the net charge on the web does not change much or at all.

The goal of "electrically conductive rubber coverings" is two-fold:

1. Eliminate additional static that can occur on the covering surface by not being an insulator.
2. Reduce in most cases, the charge that is present on the rubber covering.

Application Example

S-wrap assemblies are notorious for building static where both rubber rollers have the same rubber covering. In this case, the triboelectric interaction with the first roller which contacts one side of the web is the same as the second roller which contacts the opposite side of the web. The charges generated by both rollers are the same polarity and can be additive. Here a conductive rubber, along with a channeled path to ground (brush assembly/conductive grease/bearings) can help reduce the static created.

Conclusion

In static environments, using a conductive, grounded, rubber covered roller can only help in the ever ending battle with static build up. This will minimize charge, and help to keep web voltages down to acceptable levels.

William R. Bradley Jr., Vice President, Business Development
info@americanroller.com

Eliminating Bounce

On a Flexo Press There's No Such Thing as Good Vibrations

By **Garrett Taylor**, SOMA US and Canada Sales Director

Although modern flexo presses print at such high speeds, there is still a phenomenon that won't allow the operator to reach desired printing speeds or production of great work economically: press bounce. Bounce, or vibration, is one of the biggest challenges that we face in flexographic printing.

More common in older flexo presses, press bounce often happens when the plate hits and bounces off the substrate, and then returns to print. Most of us recognize this as banding. The lines will seem to show up across the web direction, but not necessarily in the same place on the design every time. Depending upon the graphic design, it could happen with all printing units, or may be visible on one color only. Very simply, flexo presses are less productive because the speed must be adjusted, or in worst case decelerated to avoid bounce.

Plate bounce could be caused by the working condition of the press, printing form design or repeat length. Beyond adjusting the press speed, there are a number of workarounds, but they are usually temporary. They include working with designs or imposing plates to reduce the effect of bounce, or experimenting with tape, the plates or anilox. Some people even suggest that special cylinders will help reduce bounce effects. Another possibility that could help is changing the doctor blades.

While reduced print quality is the immediate effect, often complete print failures occur. If this persists, it may even harm the printing system. Neither is desirable and, in the worst short-term scenario, the entire job may have to be reprinted. There can be increased wear of ancillary parts, which subsequently costs printers even more money in the long run. To make a long story short, bouncing makes printers lose money.

On the other hand, controlling bounce on a flexo press maintains job consistency — particularly when using high definition plates — at very fast speeds during the press run. It can also assure that the press can hold stable highlight dots with exceptional registration.

This opens the door for new print process ideas, such as expanded gamut printing —which, as we know, limits the need for washouts between jobs.

One obvious way to resolve bounce is to produce a press that is inherently stable. There are ways

to do this with hardware and software solutions.

Everything is Solid

In terms of a printing press, there are several systems that can guarantee consistent printing — mainly mechanical press properties. Done right, they can guarantee maximum speeds and minimize bounces. Thus, it maintains dynamic stability during the printing process, resulting in a perfect dot, with exceptional registration.

Some presses are built with an important objective of reducing vibration in the print deck. It starts with a solid foundation. The best way is to build two cast-iron single-block side frames, where the complete side of the print module is cast, annealed, machined, painted and assembled as a whole. This provides optimal rigidity and damping capabilities. It may also have a reinforced insert for drum mounting. Printing unit frames are key press parts developed and designed with great emphases on optimal dynamics, rigidity and damping. Some of these frames can be nearly 8 inches thick in places.

Some presses are built with an important objective of reducing vibration in the print deck. It starts with a solid foundation.

Decks with print and anilox cylinders can be designed with emphasis on firmness, precision and reliability. The bounce reduction capabilities of composite carbon

fiber are well known. Innovative mandrel housings for the print and anilox decks can sit on a 'slideway' guide, positioning the printing deck design directly on the frame, and not a separate rail. This ensures that there is rigidity and minimum vibration in the printing decks.

With these features, a press can reliably and consistently hold highlight dots with perfect registration, minimizing bounces at high speeds. It also delivers optimum vibration damping for HD quality print.

Ready for a Tune-up

Flexo presses have become very sophisticated digitally. The drive mechanisms already analyze performance. Other components include software that tunes the drive motors to minimize the bouncing effect while reaching perfect registration.

Using a specially designed software algorithm performed during job set up, print properties are analyzed and the bouncing effect can be minimized for each particular design. It takes into consideration the dynamic effects of the bridge, the sleeve, the tape and the design itself. This leads to less vibration and bounce while reaching better registration.

It's quite a revolutionary technology that can bring control of printing stability to higher level of precision. By addressing the majority of concerns for bounce, this assures exceptional quality — at extremely fast speeds.

This is, of course, the ultimate objective of a flexo press — outstanding quality at extremely productive speeds. It helps a package printer deliver eye-catching products for the shelf, while offering quick time-to-market without the fear of re-dos. That will promise good vibes to the brand owner. ■

ABOUT THE AUTHOR

Garrett Taylor, SOMA US and Canada Sales Director, can be reached at taylor@soma-eng.com. Learn more about SOMA, producer of flexographic printing presses, plate mounters, laminators and slitter rewinders at www.soma-eng.com.

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

MATERIAL PROPERTIES, TESTING & APPLICATIONS: PART 2

By **Neal Michal**, Principal, Converting Expert, LLC

Introduction

Previously we discussed tensile testing and how your material properties relate to common customer complaints. This month we will discuss 12 aspects that will directly impact your tensile testing results.

Strip versus Grab Tensile Method

There are two tensile test methods: Strip and Grab. Strip method — The complete width of the sample coupon is gripped in the jaws of the testing machine. Grab method — Only the center portion of the sample is gripped in the jaws. Grab tensile tests only provide reliable results for ultimate tensile strength. Strip tensile tests are preferred because they can provide all of the material properties.

MD versus CD

Machine direction (MD) tests are more common. The coupons are oriented along the MD. Cross machine direction (CD) tests are oriented across the width of the process. It is normal to see significant differences in MD versus CD tensile values due to how the web was formed. In general, the ratio of MD to CD modulus will increase with the speed of the web forming process.

Length to Width Ratio (L/W)

A cursory review of standardized tensile tests reveals that the length to width (L/W) ratio can range between 0.75:1 to 4:1. Shorter L/W's will increase the measured values for modulus. This is due to the "end effect" of the grips. The web is effectively stronger adjacent to the grip. Longer L/W's will allow one to detect fine distinctions between different populations of materials as shown on Figure 1.

Coupon Size

There are an infinite number of coupon sizes that can be tested for a given L/W ratio. Figure #2 shows two set ups with the same 4:1 ratio. Note that the coupon must be long enough to extend past the top and bottom grips to facilitate ease of inserting and alignment to the grips. Toughness and deformation energy will vary ~ linear to the area (L x W) of the coupon tested.

With the highest quality, longest running, and lowest maintenace, Totani's pouch making machines provide

Safety and Convenience

Quick Changeover Machines with Recycle Ready Materials

Totani is committed to the wise and efficient use of our natural resources

TOTANI

The World Leader in Pouch Making Machinery

TOTANIAMERICA.COM **920-632-7319**

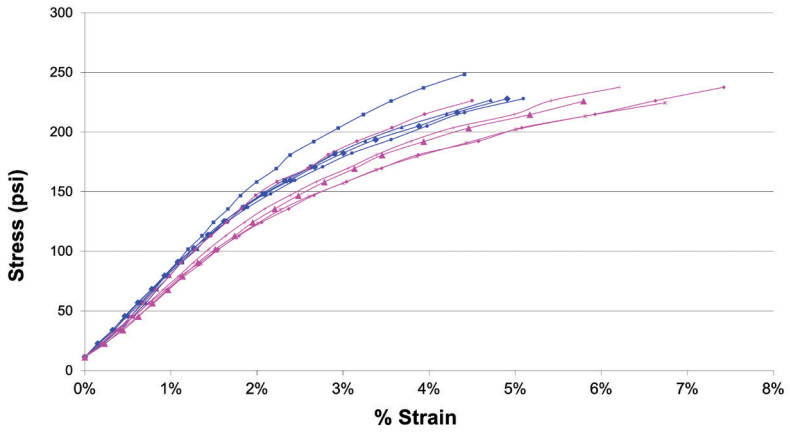


Figure 1: Stress vs Strain

Slippage

There are many styles of grips. They are often selected based on ease of loading and unloading. Grips take a beating and are often worn out or damaged. Any slippage in the grip will render your data suspect at best. One can strike a line across the coupon next to the grips and look for any slippage. A better technique is to download and graph the load versus elongation data. Look for an offset of elongation with no change in load. Use grips that will not slip.

Slack versus Pretension

It is common to see slack in the coupon after it has been clamped. Any slack will cause significant variation in your results — particularly elastic limit and deformation energy. The repeatability of your tensile tests will improve if you pre-tension the coupon. This can be done manually if the operator can see the displayed load before closing the second clamp. Many tensile testers will allow one to set a low pretensioned value before the test begins.

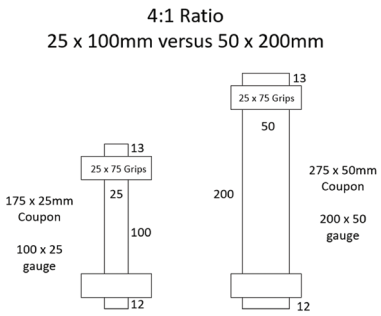


Figure 2: Two coupon sizes with a 4:1 Ratio

Strain Rate

Standardized tensile tests require the crosshead to move at a constant rate of elongation. Typical units are mm/min. It is helpful to evaluate your tensile test(s) based on strain rate. Strain rate is defined by: Crosshead speed / Gauge Length / Time with units of mm/mm/min. It is common to see ultimate tensile strength, toughness and deformation energy vary with strain rate.

Cross Deckle (CD) Mass Profile

Your physical properties will vary as a function of mass. Mass

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.

will vary across the width (CD) of your process. Some processes can vary more than ten percent. It is helpful to weigh the sample before they are tested. This additional step will provide insight to the variability of your material across the width of the process.

Thru-Roll Radial Position

Material samples are typically harvested from the outside of the roll. However, your customer will consume all of the material. Your material properties will vary as a function of the stored stress and strain within the roll. Thru-roll tests are required to understand the magnitude of change. For a given roll density your physical properties will display a unique thru-roll profile that should be repeatable from one campaign to the next.

Harvest versus Test Time

The physical results for elastics, oriented films, nonwovens and tissue will be directly impacted by the dwell time from when the coupon was harvested to the time it will be tested. It is a best practice to select a convenient time to test the samples that can be reliably held constant.

Aging

Your physical properties may change significantly over time. For example, many nonwovens become brittle over time. - elastic limit, toughness and elongation at failure will drop significantly, while modulus will increase with aging. Aging studies are required to document how your material properties will change.

Registered versus Non-Registered

Testing elastic webs can be challenging. Often the sample is removed from the roll and loaded into the tensile tester relaxed. You can dramatically reduce variability in your test results by marking the gauge length on the web before removing the sample from the roll. These marks are then used to register the coupon to the clamps.

Conclusions

Strip tensile tests with L/W at or greater than 4:1 will improve your ability to detect important shifts in your material properties. The values of your test results will vary as you change the coupon size, L/W ratio, or strain rate. Use pre-tension to reduce variability in your results. Audit your grips for any slippage. You should correlate the relationship between coupon mass, cross deckle & thru-roll position to fully understand your physical properties. Special care should be used when testing viscoelastic or hygroscopic webs as it relates to testing time and roll aging. Coupons of elastic webs should be registered to reduce testing variability.

Next time, we will discuss practical applications for tensile testing with real-world case studies. ■

ABOUT THE AUTHOR

Neal Michal of Converting Expert is a well-known authority in web handling, process design and optimization. He worked with the Web Handling Research Center for 20 years. Currently serving as a technical advisor with AIMCAL, he can be reached at neal@convertingexpert.com or through www.convertingexpert.com.

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.

Eliminate Spare Corona Treater Rolls

With diameter's up to 10 inches, Jemmco's JemmTron™ Corona Treater Sleeves are the perfect alternative to expensive spare ceramic treater rolls.

Increasing your bottom line is as easy as 1-2-3!

1. Send Jemmco your treater roll to be recovered with our custom, long-lasting ceramic coverings
2. While your roller is being recovered, use our economical JemmTron™ Corona Treater Sleeves over an inexpensive roll core
3. Save money by eliminating the costly expense of shipping and recovering a secondary, spare treater roll

Jemmco, LLC | 262-512-9559 • sales@jemmco.com