

## Coatings Keep Converting Lines Humming

### Engineered surface treatments increase line speed and yields

*By Corey Wesnitzer, General Magnaplate Corp.*

Whenever you drive fabrics, films or paper goods at high speeds, tearing and sticking can create all kinds of engineering and productivity headaches. One way to get rid of these headaches is by applying the right type of engineered coatings to key machine components.

Over the years, coating suppliers have developed a number of engineered surface treatments that combine different materials and processing techniques to impart surface

properties that commodity coatings can't match. These engineered coatings can resolve all of the most common converting equipment problems — including release, lubrication, corrosion, abrasive wear and contamination.

When selecting an engineered coating for converting applications, it usually pays to focus first and foremost on the release properties. Release is usually the fundamental surface requirement, since converting by definition requires the close contact between machine components and fast-moving, often-sticky products.

Release, however, is just a starting point. Most converting applications will have additional technical requirements that must be met. For example, the coating may have to deliver not just release properties, but also withstand high operating temperatures and abrasive wear. And in many cases, the coating will have to deliver particular physical characteristics while also offering compliance with FDA or USDA standards.

The ability to strike a balance between all the other surface requirements is what sets a good engineered coating apart from a





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lower-performance commodity coating. With that warning in mind, here's what to look for in coatings that can help improve the performance of your converting machines.

### Release Is Fundamental

Converting machines have no shortage of components that come in contact with fast-moving product. And whenever that product sticks to the machine, productivity and yields will suffer. By lowering the coefficient of friction of machine components and creating an anti-stick surface, engineered coatings can ensure that even the stickiest product will release from rollers, folding bars, dies and more. Optimizing the release properties requires more than a low COF.

The best engineered coatings can also deliver different surface qualities depending on the type of converted product. A coating can't be so smooth as to grip the product or so rough as to mar the product. This balancing act in surface finishes means that coatings used in converting need tight surface finish tolerances, usually within a few RMS.

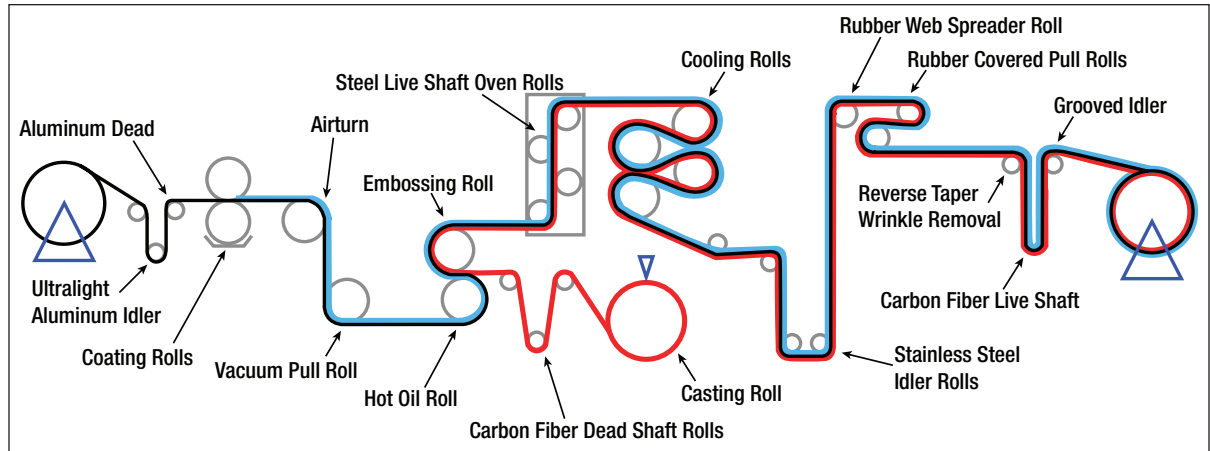
Some anti-stick coatings are even good enough to use in direct contact with the adhesives used in laminating processes or as part of the finished converted product. Our Plasmadize® composite thermal-spray coating, for example, is often used in contact with hot-melt glues and other adhesives (see sidebar). Based on a multi-material matrix of ceramics, metals and polymers, Plasmadize provides customizable textures to optimize the release properties against converted products ranging from laminated films to non-wovens.

### Converting Applications

- Engineered coatings are used throughout the converting industry to solve grip and release problems such as:
  - Rolls for web transport and processing
  - Folding bars
  - Heat staking and heat sealing
  - Rotary dies, slitters and cutting knives
  - Turn bars
  - Polypropylene filter fabrication

### Plasmadize

- Highly resistant to corrosion and wear.
- Enhanced thermal spraying technique produces a coating more ductile than chrome plate.
- Coating thicknesses from 0.002 – 0.010 inches
- Available with a release or gripping surface.
- Ideal for protecting or restoring all types of parts.
- Some Plasmadize coatings withstand 1,300°F operating temperatures.
- USDA and FDA-compliant formulations.
- A superior alternative to other common industry coatings such as thermal spray, plasma spray, HVOF, metalizing, twin arc, wire arc, thermal powder deposition.

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### Beyond Release

As important as release can be, it typically goes hand in hand with a collection of other surface requirements in converting applications. Among them are:

**High-temperature performance** — Many converting applications have continuously high operating temperatures. In one recent job, we coated rollers for use in progressive film annealing ovens. Plasmadize was used in this case because it combines high-temperature performance with a low COF and the ability to dial-in a specific surface profile. To take another example, manufacturers of printed and non-printed envelopes use Nedox® MR3 to prevent paper build up and strong static charge in machines as the envelopes pass over the rollers. Benefits include FDA compliance, superior release properties and the ability to withstand temperatures up to 600°F without significant thermal degradation. For applications such as chill rolls that require lower temperatures, Nedox SF-2 removes heat from the sheets while still providing necessary release.

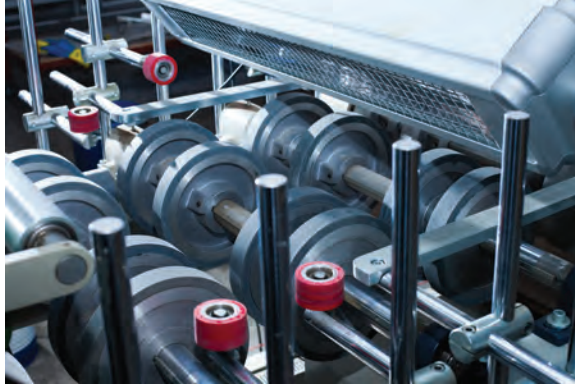
**Abrasion Resistance** — Fast-moving converting systems have no shortage of abrasive wear problems that can shorten the life of machine components. The wear can come from metal-on-metal contact between rotating or translating machine components. It can also come from contact between the machine and the converted product itself.

### Magnaplate TNSF

- Prevention of adhesive residue buildup on tape, labeling and lamination equipment.
- FDA compliance (21 CFR 175.300)
- Withstands temperatures up to 600°F without thermal degradation.
- Can be applied on a Nedox, Plasmadize or Tufram platform.
- Durable coating has a slight rubbery feel for traction control, yet offers excellent release properties.
- Chemical resistance.



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Non-wovens in particular can be extremely abrasive. In one recent application, our Magnaplate HMF® coating replaced a conventional electroless nickel coating on the steel folding boards used in a non-woven line. HMF imparted a low-friction, 4-Ra surface to the folding board while taking its hardness up to 68 Rc from 50 Rc.

**Product integrity** — Engineered coatings don't just protect the machine components. They can also play a role in protecting converted components from marring, tearing and other types of damage. Plasmadize TNS, for example, is often used to impart texture and grip to drive rolls while offering enough release to avoid torn product. Nedox SF-2 plays a similar role in applications that require less grip and a low coefficient of friction.

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To learn how surface enhancement coatings can eliminate problems in your next converting application, contact technical representatives at General Magnaplate Corporation, call (800) 852-3301, e-mail [info@magnaplate.com](mailto:info@magnaplate.com), or visit [www.magnaplate.com](http://www.magnaplate.com)

### Nedox

- Dramatically increase surface hardness - up to Rc 68.
- Resists corrosion, chemicals and acids.
- Prevent abrasive wear, galling and seizing.
- Self-lubricating for extended wear.
- Superior mold release.
- Permanently dry-lubricated for very low COF.
- USDA and FDA-compliant formulations.
- Speeds cleanup and sanitation maintenance.
- Eliminates sticking and product "hang-up."
- Withstands temperature from -250°F up to 1000°F.
- Prevents galvanic corrosion with incompatible metals.
- Will not chip, peel or flake off like "paint-ons."
- Non-porous surface eliminates the potential growth of mold and bacteria.
- Minimal surface buildup from 0.0002" - 0.002" ( $\pm 10\%$ ).
- Non-wetting.
- A superior alternative to other common industry coatings such as nickel plating, electroless nickel, sulfamate nickel, co-dep electroless nickel, polymer impregnated electroless nickel.