

**TREATED**



**UNTREATED**

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**Improve Print Quality &  
Productivity by Controlling  
Substrate Surface Energy**



Poor ink adhesion affects print quality, creates downtime, and leads to lost customers. In many cases the cause is rooted in complications from the substrate surface. The good news is that surface variables can be eliminated with the proper use of a corona treater.

## Understanding the nature of pretreated films



Polymer films have chemically inert and non-porous surfaces with low surface energy causing them to be non-receptive to bonding with substrates, printing inks, coatings, and adhesives. When films are originally extruded on either Cast or Blown Film lines they are almost always pretreated with corona treaters. This increases the surface energy of the film which is measured in dynes.

***“The best way to guarantee ink adhesion consistency is with a corona treater.”***

- Steve Utschig , Fox Valley Technical College -

One dyne equals a centimeter-gram-second unit of force. Most converters will have a target dyne level range that works well for their specific process. While dyne levels do not guarantee adhesion, generally speaking higher dyne levels produce better adhesion results than lower dyne levels.

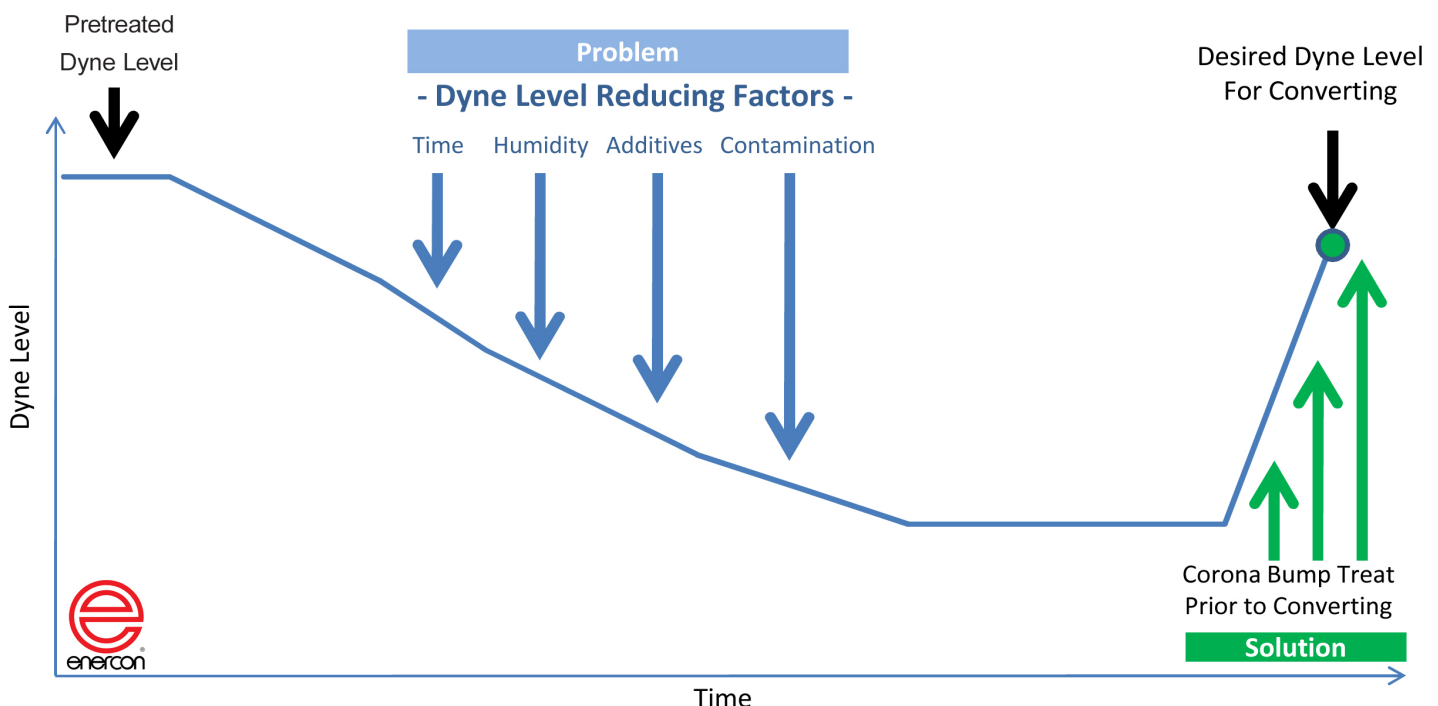
A common misunderstanding is that pretreated films eliminate the need for additional in-line treatment. It's important to recognize that dyne levels decay over time and many factors accelerate dyne level decay including:

**Additives:** additives are included in a film extrusion recipe for a variety of reasons such as enabling better film handling. When a film is freshly corona treated organic and inorganic contaminants are removed from the surface layer which activates the surface and increases its surface energy. Over time additives will migrate to the surface of the film which will diminish the effects of the corona treatment.

**Contamination:** handling of the film or exposure to dust, debris or oils after corona treating can impart contaminants on the film's surface

**Environment:** high levels of humidity are known to accelerate dyne level decay

**Natural decay:** even without additives, external contamination, or environmental factors dyne levels





will decay over time. The precise level of decay will vary based on many factors including the specific substrate and original level of treatment. Under normal circumstances dynes levels will decay and eventually level off.

### **Best Practices call for an in-line Corona Treater**

Smart converters check dyne levels before attempting to print on a substrate, but it is impossible to know if the entire roll of film has been successfully treated to that level. That's why industry experts recommend in-line corona treating.

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***"The best converters take control of their operation. They understand their printing processes and use all the tools available to them to make the best product possible."***

- Tom Gilbertson, Enercon Industries -

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Take the experience of industry veteran and Flexographic Printing Instructor at Fox Valley Technical College Steve Utschig, "Whether you're using water or solvent based printing you want to ensure the surface energy of the substrate is as consistent as possible. The best way to guarantee ink adhesion consistency is with a corona treater."

The same is true for Digital Printing applications; "Initially customers unfamiliar with the technology may not see the need for corona treatment. During our sales process, we utilize a series of prints on the same material with different levels of corona applied. Customers quickly understand the importance of incorporating a corona unit in-line," says Kelly DiMarco, EFI Jetrion Product Manager.

The image to the right shows an actual printed sample in which the corona treater was turned off in the middle of the run. Ink adhesion was far better when the corona treater was turned on than when it was turned off. While this example shows an application where corona treating was required for printing, there are many times when simply having a corona treater provides an operational advantage.

### **How a corona treater on your press makes you more competitive**

In addition to helping improve ink adhesion on print

jobs that would otherwise be impossible, consider the additional benefits a corona treater offers.

You may be able to convert materials that arrive out of specification. Imagine you have a big job for your best customer and the film arrives at a dyne level less than expected. Without a corona treater on line you will likely reject the shipment as you will be unable to print on it. But if you have a corona treater, you can use the treater to increase the dyne level of the substrate to printable levels.

"The best converters take control of their operation," says Enercon's VP Application Engineering Tom Gilbertson. "They understand their printing processes and use all the tools available to them to make the best product possible."

Brian Bishop, President of Gallus Group sees a trend in the way printers are viewing in-line corona treatment, "Customers understand that having corona treatment in-line allows them successful print and adhesion on a greater range of materials. Corona treatment also helps ensure consistent performance of a job across multiple shipments of material."

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Versatility on any press is key and adding a corona treater increases the capabilities of a printing operation. This is particularly important as label printers evolve into converters of flexible packaging substrates. Because the corona treater can be an equalizer when it comes to surface energy consistency, the converter's sales team can seek out new types of business. In many cases the treater can expand the capability of a specific ink formulation.

"Corona treatment and digital printing work hand in hand. Due to the non-impact nature of digital printing, corona treatment is one of a limited amount of levers we can manipulate to control output. While a single ink set cannot be formulated to print well on every substrate, corona treatment expands the ink's ability to perform well on a multitude of stock types," says Kelly DiMarco, EFI Jetrion Product Manager.

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***"We find our customers with corona treaters have improved print quality and print density."***

- Colin Price, Siegwark -

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The importance of corona treating is recognized by ink suppliers as well. When Siegwark opened a Center of Printing Excellence in Iowa they were sure to include a corona treater on their press. The press is capable of printing with solvent and water based inks with both flexographic and gravure technologies, "We find our customers with corona treaters have improved print quality and print density," says Siegwark Senior Project Manager Colin Price.

### **Understanding Corona Treater Basics**

Many OEMS are moving towards the standardization of including corona treaters with their presses. For example at Gallus Bishop says, "We will recommend corona treatment in-line on all presses that will be used to print on films or foils." Of course, whether you add a corona treater to your press or if it came with one, you still need to know how to operate it.

A corona treating system is designed to increase the surface energy of plastic films, foils and paper in order to allow improved wettability. Wettability and surface energy alone do not guarantee adhesion, but are indicators for successful adhesion.



A corona treating system consists of two major components: the power supply and the treater station. The power supply accepts standard utility electrical power and converts it into single phase, higher frequency power that is supplied to the treater station.

The treater station applies this power to the surface of the material, through an air gap, via a pair of electrodes at high potential and roll at ground potential which supports the material. Only the side of the material facing the high potential electrode should show an increase in surface tension. The voltage buildup ionizes the air in the air gap, creating a corona, which will increase the surface energy of the substrate passing over the electrically grounded roll.

Once the basics are understood, your operators should become well versed in how to properly measure dyne levels and calculate applied treatment measured in watt density.

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To learn more about corona treaters and the corona treating process please contact Enercon Industries.