



## UV Curable Laminating Adhesive

### INTRODUCTION

This technical bulletin is designed to enhance the understanding of the application and processing of Northwest Coatings' UV curable laminating adhesives.

### PRINCIPLE

UV curable adhesives are used to laminate clear poly films to printed substrates such as paper, foil or plastic. The physical properties of these laminating adhesives are outlined in their respective Data Sheets.

### APPLICATION

Typically the laminating adhesive is applied to the substrate in-line, at the last station on the press. The film is then brought in contact with the adhesive through the nip rollers. The film/substrate lamination is then passed under the UV lamp. The clear poly film allows the light to pass through, curing the adhesive.

Radiation curable laminating adhesives provide enhanced performance in two ways: high cure rate and excellent bonds. The high cure rate translates to improved productivity. The crosslinking achievable with UV curable compounds provides high bond strength, chemical resistance and heat resistance. Conventional laminating presses can be adapted for radiation curing by replacing drying equipment with a smaller UV lamp unit.

There are a number of important considerations with respect to the application that should be observed.

### VISCOSITY

In order to accommodate different processing conditions, Northwest Coatings UV curable laminating adhesives are available in standard viscosities ranging from about 150 to 1,500 centipoise. Variations in viscosity do not affect the bond strength.

### ADHESIVE LAY-DOWN

It is difficult to predict the amount of adhesive to be applied. One to two-tenths of a mil is typical, but the amount required to achieve the desired bond strength will depend on the type of ink used, the print coverage, and the porosity of the substrate. For estimating purposes, a 1/10-mil application of adhesive requires 1.35 pounds of adhesive per ream (3000 square feet).

### ANILOX ROLL

The cell volume and line count of the anilox roll and whether or not a doctor blade is used will determine the amount of adhesive that is applied to the substrate. Variations in press speed, viscosity, substrates, desired bond strength, and other factors make it impractical to recommend a specific anilox for all applications. As with any coating process, it is necessary to select a pickup roll based on operator experience and make adjustments as testing progresses.

### NIP ROLL

A nip roll with a low durometer is desirable. We have found that with high durometer rolls, some delamination of the poly film from the substrate may occur. UV laminating adhesives have low-pressure sensitivity or green tack in the liquid state. Therefore, a strongly bonded, uniformly laminated product will best be achieved by nipping with a low durometer roller and curing immediately afterwards.

The clear film and the printed web may also be nipped together between the plate roll and the impression roll on a flexo press station. See our Technical Bulletin TB-06 for details on this Roll Wrap Method.

### FILM TENSION

Care should be taken to avoid stretching the poly film by applying too much tension on the unwind roll. Stretched film may not relax uniformly as it is laminated to the substrate, resulting in curling, delamination, or an unsatisfactory surface.





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## FILM

Standard UV curable laminating adhesives are formulated for use with treated polypropylene due to its wide use as a laminating film. The adhesive may also be used with other films such as polystyrene, polyester, and polyethylene, but it is important that samples of the actual films be tested before their use on a production basis.

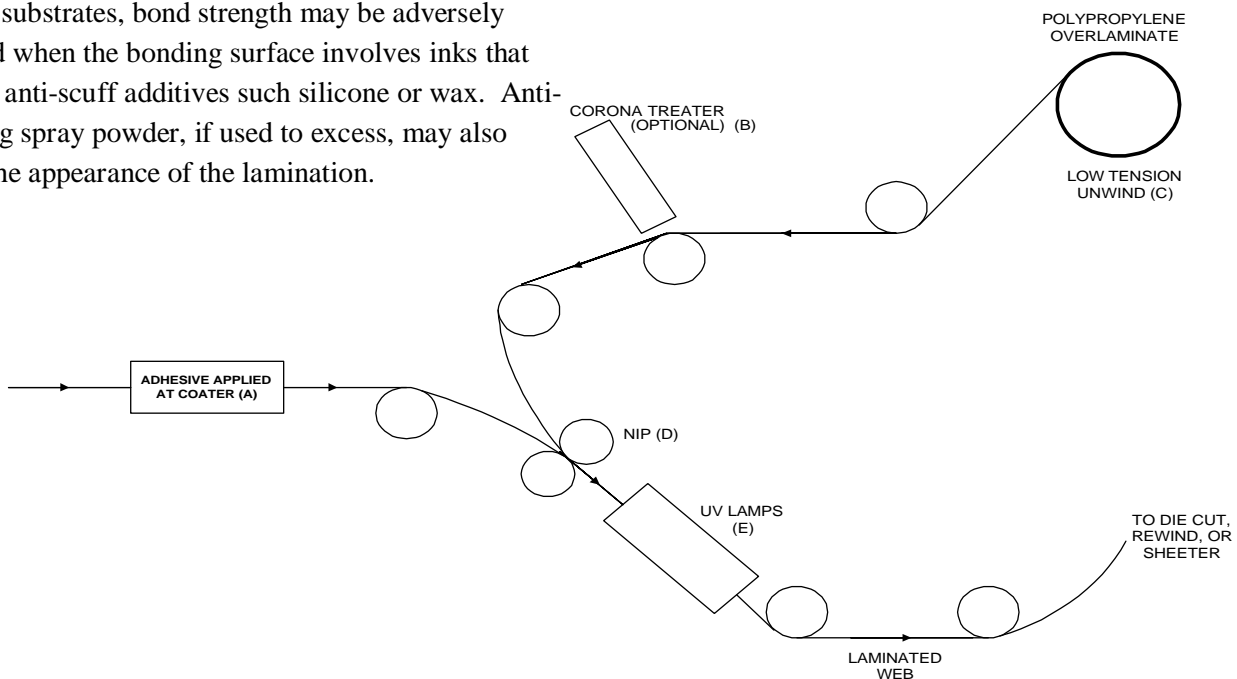
The polypropylene or other poly film surface must be treated to achieve the desired bond strength. It should be noted that Corona treatment degrades with time. Film should be purchased from a reliable supplier and should be used promptly. Incoming quality control should be conducted to confirm that the film surface has a treatment level of 42 dynes per centimeter or greater. In-line Corona treaters are recommended for converters to diminish age related treatment degradation.

## OTHER CONSIDERATIONS

Although the UV laminating adhesives bond to most printed substrates, bond strength may be adversely affected when the bonding surface involves inks that contain anti-scuff additives such as silicone or wax. Anti-blocking spray powder, if used to excess, may also affect the appearance of the lamination.

## FOOD PACKAGING APPLICATIONS

UV curable laminating adhesives are widely used in the construction of labels for food and beverage packaging applications. Northwest Coatings does **not** recommend the use of UV curable adhesives in the construction of pressure sensitive paper labels for high density polyethylene (HDPE) containers with food products that have long shelf-lives and are subject to storage under non-refrigerated conditions (such as bottled water). The absorptive nature of paper label stock can increase the potential for any uncured adhesive to “wick” into the paper and continue into the pressure sensitive adhesive which is in direct contact with the container. UV laminated pressure sensitive paper labels should only be used on packages where there is a “functional barrier” between the label and the food product. HDPE may not have adequate barrier properties under non-refrigerated conditions.



## NOTES:

- A. For a flexographic press 100 to 600 line anilox may be used for the application of adhesive.
- B. If an in-line Corona treater is not available, pretreated film with a minimum dyne level of 42 dynes/cm is recommended.
- C. Excessive film tension may result in undesirable finished product properties (eg. label curl, fish eyes, etc.)
- D. Low durometer upper nip roll should be used.
- E. Line speed may be up to 300 feet/minute with one 300-watt/inch UV lamp.