



## LESS IS MORE, AGAIN

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*Today, A Perfect Combination of Application, Technology and Performance Exists for the Use of Hot Melt Adhesives in the Packaging World; A Growing Market in Need of Optimization, the Technology to Do it and an Attainable-Level of Performance Requirements.*



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## INTRODUCTION

In late 2010, I wrote an article titled “Less is More”<sup>1</sup>, *Waterborne Adhesives Can Become Even More Environmentally Friendly When the Proper Practices Are Applied*. This article explored three main areas that affect the “greenness” of a waterborne adhesive product; the chemistry of the adhesive, the production process, and the overall use of the adhesive. Today, a similar combination exists for a “Less is More, Again” scenario for hot melt adhesive use in the packaging industry.

Recent developments in hot melt adhesive chemistries and adhesives delivery equipment technology have catapulted the “Less is More, Again” method for adhesive use, to even greater heights. The “Less is More, Again” method includes three main criteria:

- **Application**  
There must be a driving force to use less product; be it efficiency, economics or other driving forces. High volume adhesives usage and growing demand are key factors.
- **Technology**  
Innovations must exist that allow for a reduction in usage.
- **Performance**  
Unless the product application is able to provide sufficient properties on its own merits, using less adhesive is a feudal attempt. Adhesive performance simply cannot suffer and performance requirements must be met.



## GROWTH OF HOT MELT ADHESIVE USE IN THE PACKAGING INDUSTRY

At about the time the Allied troops were storming the beaches in Normandy, the commercialization of water-based Polyvinyl Acetate (PVAc) and its copolymers were just being invented. By the 1960's innovation for improving mass quantization of goods, especially in the packaging arena, led to the development and commercialization of hot melt adhesives. Olefins, especially the metallocene catalyzed types - mPE (metallocene catalyzed polyethylene and mPP (metallocene catalyzed polypropylene) or combinations thereof - gave rise to significant innovation in improved runnability and usability versus the incumbent ethylene vinyl acetate (EVA) based hot melts and even polyethylene (PE) based hot melt technologies. As with most inventions, at first there are major innovation breakthroughs, followed by incremental gains, followed by more innovation breakthroughs. Older technologies are replaced with new and better means of providing a solution, typically having a superior advantage in performance and ultimately economic benefit. The "Less is More" method, followed by "Less is More, Again" are at the heart of incremental gains for hot melt adhesives used in the packaging arena.

**Application:** The packaging industry continues to grow at greater than gross domestic product and is a top five adhesives usage industry worldwide. Innovations to how populations use packaging continue to grow; innovations on how manufacturer's market and deliver product are also contributing factors to growth.

**Technology:** The advent and use of lower density, higher performing olefin products have led to a reduction in the tonnage of adhesives used for packaging. Innovations in pattern application adhesive delivery equipment have contributed significantly in lowering the amount of adhesive used for a given application.



**Performance:** Many packaging applications lend themselves to better optimization. This optimization has led to innovation and reduction in adhesive usage – while not suffering loss of performance.

The trilogy has been achieved. A growing market in need of optimization, the technology to do it and performance requirements at an attainable level. Taking charge of the status quo by revisiting the application and, what truly are, the performance criteria, then matching the performance requirements to the appropriate technology for the right application.

Packaging adhesive conservation was not only needed, but foreseeable and necessary to offset the growing demand in a world where packaging has and is becoming more and more significant. In the age of exploding cyber technology, old school brick and mortar consumption is rapidly being replaced by new-school brick and mortar consumption where giant amounts of repackaging of goods is adding to the mountain of packaging needs making “Less is More” even more critical in the supply chain of wholesalers and retailers, Again.



## **WHAT DOES “LESS IS MORE, AGAIN” REALLY MEAN?**

### **ADHESIVE TECHNOLOGIES FOR PACKAGING**

For many years, and still to this day, EVA based hot melt adhesives made up the lion's share of the packaging adhesives market. EVAs can be used for all types of packaging applications. PE based hot melts offered a cleaner running, lower density product versus EVA. Olefin's mPE, mPP and mPE/mPP offer nearly the best of all worlds – better mileage, runnability, adhesion and an advantage in cost/unit of packaging. Strides continue to be made with olefin-type adhesives including better mileage via lower density, and wider application range. Using olefin's for packaging applications embraces the “Less is More” method of using less, reducing the carbon footprint, meeting cost saving and other economic criteria such as being equipment friendly and providing leading-edge technology.

THE TABLE BELOW SUMMARIZES THE VARIOUS TYPES OF PACKAGING HOT MELT ADHESIVES AND THEIR “LESS IS MORE” APPLICABILITY.

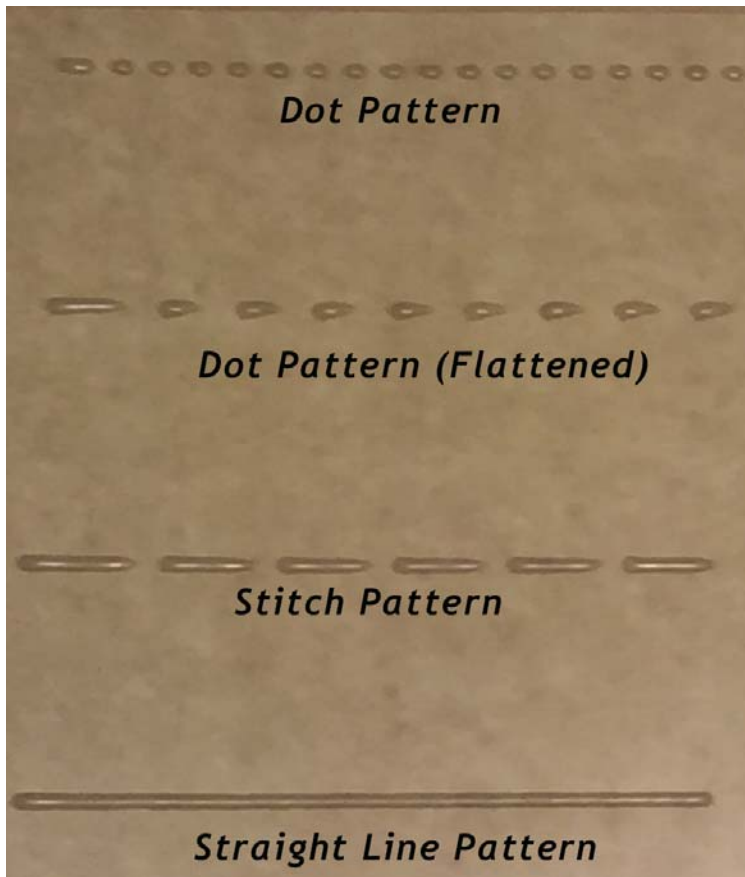
<b>“Less is More” Hot Melt Adhesive Technologies Comparison</b>				
<b>Adhesive Technology</b>	<b>Type</b>	<b>Key Assets</b>	<b>Key Liabilities</b>	<b>Less is More Acceptance</b>
<b>EVA</b>	Ethylene Vinyl Acetate Based	Traditional, Highest Exposure	Often Higher in Mileage Requires Multiple Products	Golden Oldie
<b>PE</b>	Polyethylene Based	Improved Mileage vs. EVA	Middle of the Road Performance	Mileage is Good, Garden-Variety Performance
<b>Olefin (mPE)</b>	Metallocene Based	Machinability + Mileage, Standardization on Few Products	Limited Range of Formulability	First-String Player
<b>Olefin (mPP)</b>	Metallocene Based	Improved Mileage	Newest of All	New Arrival
<b>Hybrid Types</b>	Based on a Blend of Technologies	Properties and Economics Linear to that of the Blend	Properties and Economics Linear to that of the Blend	Second-String Player

As with all technologies there are exceptions to the rule; products can be formulated to meet criteria not generally thought to exist for such technologies. Material suppliers continue to innovate and provide the latest materials to adhesive manufacturers. Users and end users are becoming better equipped to make buying decisions based on performance as a cost per unit of packaging – in the end the only true measure for such endeavors.

## **PATTERN APPLICATION EQUIPMENT BREAKTHROUGH**

Hot melt pattern applications, be it dot or stitch, have existed for decades. However, only recently breakthroughs by many adhesive delivery equipment manufacturers have greatly improved the usability of pattern application. Pattern application types for hot melts, used on lap and joint seals for paper and paperboard cartons, trays, cases and boxes, can readily lead to a reduction of up to 50% usage of the adhesive. Savings are undeniably significant and do not affect performance.

**BELOW ARE TYPICAL PATTERN APPLICATIONS OF HOT MELT  
ADHESIVES INCLUDING DOT (CIRCULAR) AND STITCH (LINE)**

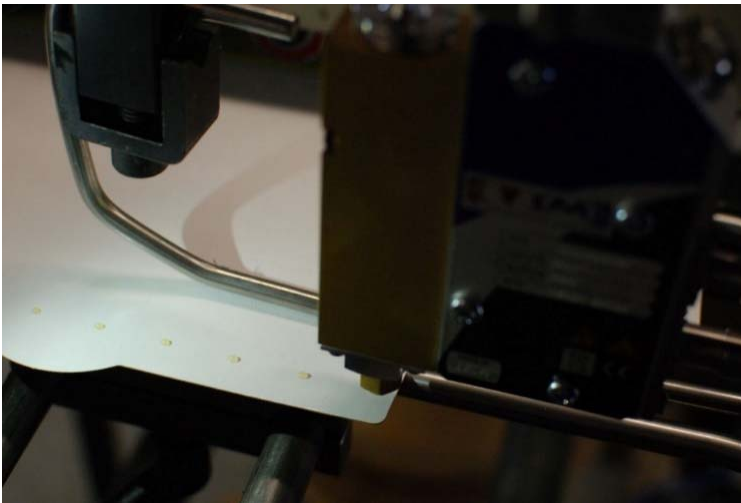


*Photo Courtesy of Chicago Glue Machine & Supply Co., Itasca, IL*





The most common types of equipment delivery technologies are focused on rapid speed and reliability of use. Pneumatic and electronic deposition technologies, by Valco Melton, ITW Dynatec and Nordson Corporation, have advanced the reliability of the pattern application to the point of essential equalization of non-pattern application units.



EcoStitch™ Electric Adhesive Dispensing System by Valco Melton  
*Photo courtesy of Pak-Tec Industrial Product Packaging, Lake Wylie, SC*



THE TABLE BELOW SHOWS BOND STRENGTH OF ADHESIVE APPLIED USING PATTERNS ON CORRUGATED BOXES AND SBS CARTONS

<b>Bond Strength of Adhesive Applied Using Pattern Application</b>				
<b>Adhesive Technology</b>	<b>Type of Adhesive Application Pattern</b>	<b>Substrates Used (End Use Application)</b>	<b>Typical Adhesive Coating Weight</b>	<b>Bond Strength (Fiber Tear)</b>
mPE Olefin (Metallocene Based Hot Melt Adhesive)	Straight Line	Corrugated (Box)	<b>100%</b>	<b>100%</b>
mPE Olefin (Metallocene Based Hot Melt Adhesive)	Stitch Pattern	Corrugated (Box)	<b>70%</b>	<b>100%</b>
mPE Olefin (Metallocene Based Hot Melt Adhesive)	Straight Line	SBS (Carton)	<b>100%</b>	<b>100%</b>
mPE Olefin (Metallocene Based Hot Melt Adhesive)	Dot Pattern	SBS (Carton)	<b>50%</b>	<b>100%</b>

Pattern application, coupled with olefin technology, optimizes the amount of adhesive used and meets the performance requirements of the packaging application. Room temperature end-use applications and highly automated applications lend themselves to “low hanging fruit” for less is more, but it doesn’t end there. Virtually any and all applications can be optimized for pattern application.



## CONCLUSION

For hot melt adhesives packaging applications, the “Less is More, Again” approach is a reality and should top the continuous improvement list. Selecting the appropriate application, technology and performance requirements are key to taking “Less is More, Again” from a concept to a practical solution. Working smarter not harder<sup>3</sup>.

A decade from now, what will adhesive innovations look like? It is likely that the Amazon-like principles of speed, economics and technology will still be at the top. My best estimation is that “Less is More, Again and Again” for adhesives will be on top as well.

“Less is More, Again” is a well-underway hot melt adhesives path and “Making Adhesives Great Again”.

## REFERENCES

<sup>1</sup>“Less is More”, Adhesives Magazine, published November 2010.

<sup>2</sup>“Wisdom Adhesives Creates its Own GreenBond Scorecard”, Box Score Magazine November 2009 and available at (<http://www.wisdomadhesives.com/sustainability/greenbond-sustainable-adhesive-scorecard/>) – Titled “GreenBond Scorecard”.

<sup>3</sup>“The Wisdom Way”, by Tom Rolando – Wisdom Adhesives, published October 2014.



## ABOUT TOM ROLANDO

### ABOUT WISDOM ADHESIVES WORLDWIDE:

Since 1875, Wisdom Adhesives Worldwide has been advancing the technology of adhesives. Today Wisdom is a leading global manufacturer of packaging and converting hot melt and water-based adhesives and the longest continuously operating adhesives manufacturer in the world. The company's exceptional leadership has been headed by five consecutive generations of the Wisdom family, still exceeding the expectations of worldwide customers at an unparalleled pace. In this age of global entities, Wisdom Adhesives Worldwide stands out as a company of real people working person-to-person in order to respond to the needs of each and every industrial adhesives customer—and doing it fast.

As the Chief Operating/ Technical/Strategy Officer at Wisdom Adhesives Worldwide, Tom combines his technical adhesive industry knowledge with managing Wisdom's day-to-day operations; production, distribution channels, customer service and human resources run smoothly under Tom's leadership. In addition, Tom is at the forefront of all new technology developments that benefit Wisdom Adhesives Worldwide's customers by improving products, business, and customer satisfaction. In addition, Tom championed the Wisdom Total Quality Management (WTQM) LSS-FAST and ECO<sup>2</sup> business programs.

Tom is a technical expert in the adhesives industry. With over 30 years of experience in adhesive, coating, and sealant technologies, Tom continuously upgrades the Wisdom Adhesives Worldwide product line portfolio. Some of his latest innovations include Super WizBond, polymer-olefin adhesives, WizAssure metallocene adhesives, GreenBond Sustainable adhesives, and ClearBond adhesives.

Prior to joining Wisdom Adhesives Worldwide, Tom ran H.B. Fuller's Flexible Packaging Program in a dual role as technical and business manager. He also has worked as Technical Director at both Akzo Nobel and Cargill. Tom is the author of *The Wisdom Way*, *Pooner: A Legendary Fish Tale*, *Friedel-Crafts Polymerizations of Carbazole and N-alkylcarbazoles*, as well as other chemistry-related books published by RAPRA; he is also currently working on his next book, *Going Fore Broke*.

Tom Rolando holds a M.S. in Organic Polymer Chemistry from the University of North Dakota, Grand Forks, ND and a B.A. in Chemistry from the College of St. Scholastica, Duluth, MN.



## THANK YOU.

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