

Emerging Hot Melt Technologies for Case and Carton Sealing



WHITE PAPER

Abstract

Hot melt adhesive has played a key role in the packaging process for decades, but traditional technology utilizing heated tanks is less efficient when compared to new tank-free systems available today. Traditional melters are more prone to plugging from char. Long startup times, nozzle plugging and labor-intensive maintenance all cost businesses thousands of dollars each year.

New technology has eliminated many of the drawbacks of the previous generation of hot melt adhesive equipment. This has increased the working uptime of packaging lines and improved the efficiency of hot melt adhesive applications. Advances in material usage monitoring and system performance result in better management of adhesive costs.

Traditional Challenges

Package and container sealing is a key component of today's complex manufacturing processes. Manufacturers require a system that quickly delivers consistently applied adhesive while fitting into streamlined packaging lines.

Many companies turn to hot melt adhesive delivery systems for their packaging needs.

Traditional hot melt systems that feature heated tanks often possess limitations that impact the efficiency and cost-effectiveness of packaging lines. These limitations include:

Slow heating: Heated tanks for hot melt adhesive are slow to warm up. They can take more than 35 minutes to heat adhesive pellets to a deliverable state. This means that the packaging facility spends more time waiting for the system to heat up and less time in operation.

Charring: Tank systems maintain large volumes of molten adhesives for hours or days. This long heat soak leads to glue charring. Charring also happens when the level of molten glue is allowed to vary widely. The glue on the side walls, exposed to the atmosphere, chars very quickly. The charred material will cause plugging in nozzles, leading to downtime on the packaging line. This excessive charring can also lead to premature failure of fluid seals in pumps and guns.



Charred hot melt adhesive causes nozzle plugging, leading to downtime on the packaging line.

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Contamination: Traditional tank systems do little to protect against contamination of hot melt adhesive. Exposure to the environment, combined with the continual need for manual filling allows dust, debris and materials from the facility to enter the tank. Foreign material contaminates the adhesive, thereby reducing its effectiveness and increasing the chance of nozzle plugging.

Plugging: Nozzle plugging represents one of the most detested elements of traditional tank units. Plugs cause unplanned downtime and are costly. As a plugged nozzle is typically repaired when hot, it may be a dangerous task.

Time-consuming maintenance: Heated tank systems require routine cleaning and maintenance to avoid adhesive char buildup. These cleanouts can be labor intensive and time consuming, further impacting production line uptime. Large tank sizes result in a significant amount of wasted material whenever flushing is necessary.

Danger to operators: Filling and cleaning traditional hot melt tanks puts operators in close proximity to hot adhesive and hot system components. Manual filling of adhesive tanks also exposes operators to pungent fumes.

Changing Technology Eliminates Drawbacks

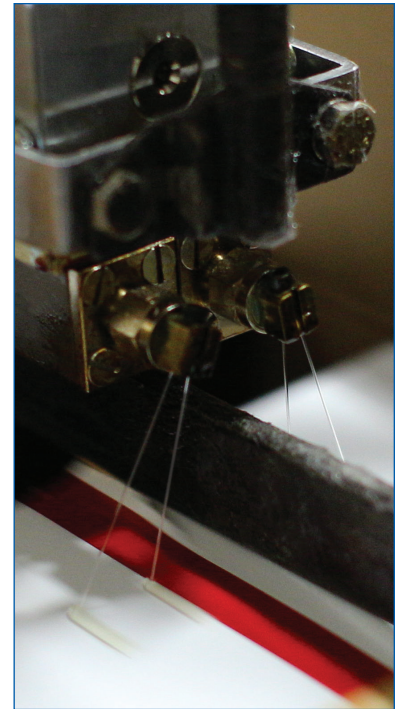
Recent advances in hot melt equipment technology have dramatically improved upon the overall efficiency of traditional adhesive systems. The elimination of heated tanks, increased attention to material consumption statistics, and a focus on reliability has limited or removed many of the drawbacks of the previous generation of hot melt adhesive dispensing systems.

Tank-Free Systems


One of the most apparent weaknesses of traditional hot melt systems lies in the tanks themselves. These tanks take a lot of time to heat material, generate adhesive char, and expose operators to hot adhesives.

Now, tank-free systems utilize a vacuum feed to draw adhesive pellets into specially designed heating chambers. Pellets are melted on demand and are dispensed quickly and without overheating.

The elimination of heated tanks improves hot melt equipment performance dramatically. By reducing the amount of adhesive exposed to heat, the tank-free process allows for faster heating times – the Graco InvisiPac™ Hot Melt System warms adhesive to a deliverable state in less than 10 minutes.



Reduction of char leads to fewer nozzle plugs and less production line downtime.



The shortened exposure of the adhesive to heat also reduces the amount of char formation within the system. Quite simply, less time at temperature results in less adhesive char. With a minimal melted volume, hot adhesive is dispensed quickly and replenished with a fresh supply. The reduction of char leads to less material waste, fewer nozzle plugs, less overall system maintenance, longer fluid seal life and less production line downtime.

Finally, the use of a vacuum feed system keeps the ambient adhesive contained and closed from the outside environment. This dramatically reduces the chances of material contamination. Barring contaminants from the adhesive improves the dispensing process and helps to ensure consistent adhesive application.

Intelligent Monitoring

Traditional hot melt tank systems lack intelligence in terms of material usage monitoring. This information is vital to tracking expenses related to the packaging process and calculating the ROI of an equipment system and hot melt adhesive. With material costs at the forefront of the manufacturing industry's mind, monitoring solutions are becoming increasingly more important.

Emerging hot melt technology offers the detailed material usage information many manufacturers desire. The Graco InvisiPac, with its intuitive user interface and USB downloadable operating data, makes it possible to clearly track material usage throughout a given period of time. This allows packaging managers to examine the amount of adhesive used over a single shift, a product run or a set amount of time. The increased tracking information leads to improved record keeping, better understanding of adhesive consumption and needs, and better control over costs in the packaging process.

In addition to material consumption, users now have the ability to track a number of other important factors, including fluctuations in material temperatures, system errors and key event history. This information is invaluable; running routine reports can pinpoint inconsistencies in the process, optimize the packaging line and identify cost saving opportunities. The process control and reporting data that the customers of many packaging companies are demanding is now available.



Increased Material Options

Some packaging companies find themselves transitioning to more expensive, temperature stable adhesives in an attempt to negate some of the drawbacks of hot melt tank equipment. While these adhesives have value to offer in their own right, adhesive choice should not be dictated by the capability of the processing equipment. New tank-free hot melt systems have been designed around the broad spectrum of adhesives traditionally used in the market. All packaging grade adhesives are available for use, including metallocene, EVA and others, expanding the options for packaging managers. Customers now have a broad range of adhesive choices with the Graco InvisiPac system.

Additionally, adhesive materials once viewed as incompatible with traditional heated-tank systems due to their brief pot life stability or tendency to char have now become viable options for use with emerging tank-free systems. The viability, and often increased affordability, of these materials further expands the number of adhesive options accessible to the manufacturer.

Tank-Free Technology Improves ROI

The advancements in hot melt dispensing technology offer many potential benefits for manufacturers and packaging managers, including:

Reduced downtime: The elimination of lengthy heating times, combined with the reduction of charring and plugging, increases the uptime of production lines, thereby increasing the packaging line yield.

Lowered material costs: The expansion of viable adhesive options and more efficient adhesive use may lead to reduced material costs. By exploring additional material options, packaging managers may find savings in both the cost per pound of inventory ordered and the actual amount consumed per unit produced.

Improved operator experience: The elimination of the heated tank and reduced operator interaction with the system decreases the chance of burns and other injury. Reduced odor provides an overall better operator experience.

Improved information management: Information relating to material usage and line errors is important to tracking expenses, inefficiency and adhesive performance issues. This information is key to making adjustments to the system and maximizing the efficiency of the line. Each of these factors may dramatically improve your packaging ROI and your bottom line.

Summary

Traditional hot melt adhesive dispensing systems, while playing a large role in the packaging process, suffer from inefficiencies and weaknesses that can impact the effectiveness of the line. Emerging technologies, including the Graco InvisiPac System, eliminate many of the drawbacks of traditional heated tank systems and vastly improve the efficiency of the packaging process. These improvements generate a dramatic ROI for tank-free hot melt delivery systems.



Tank-free hot melt technology on the InvisiPac System improves packaging line efficiencies.

For more information, contact us at 1-800-458-2133 or visit us at www.graco.com/invisipac

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