

Adhesive Efficiency Audit

Date:	2/10/2017
Audit Conducted By:	RS Industrial Sales and Technical Personnel

Objective:

- Identify potential areas of cost savings
- Benchmark existing application standards and identify any potential improvement areas
- Compare consumption to previous audit to identify any inconsistencies

Summary:

- Overall, maintenance, production and management are doing an excellent job with the gluing processes, and the current adhesive is performing very well across each line that was audited. Adhesive consumption is extremely consistent with what was seen during the previous audit; however we did identify some areas for improvement as well as cost savings.
- This audit was facilitated by maintenance and production personnel to ensure proper use of equipment and to get accurate data. Cartons with current adhesive applied from each running line were brought back to the RS Industrial lab for the consumption to be calculated.

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Observations/Feedback:

Lines	Observations/Feedback
Line 1	<ul style="list-style-type: none"> • Tank, line and nozzle temperatures are within the recommended running temperature range of 245°F-265°F • Adhesive bonds are excellent • Adhesive beads are wider than normal at 0.14" wide. Investigate reducing nozzle size to reduce bead width to 0.11" • Hot melt equipment is well maintained, tank is full and free of char
Line 2	<ul style="list-style-type: none"> • Un-molten glue in tank <ul style="list-style-type: none"> ○ Causing tank temperature to read 10°F below set temperature • Tank, line and nozzle temperatures are within the recommended running temperature range of 245°F-265°F • Adhesive bonds are excellent • Hot melt equipment is well maintained, tank is full and free of char
Line 3	<ul style="list-style-type: none"> • Maintenance reported boxes sticking together in humid months, causing box feed issues and occasional adhesion issues <ul style="list-style-type: none"> ○ RS will visit plant during summer months to evaluate • Maintenance removed in-line filter before nozzle <ul style="list-style-type: none"> ○ This is not recommended as it results in clogged nozzles • Tank, line and nozzle temperatures are within the recommended running temperature range of 245°F-265°F • Adhesive bonds are excellent • Hot melt equipment is well maintained, tank is full and free of char
Line 4	<ul style="list-style-type: none"> • Line and nozzle temperatures are within the recommended running temperature range of 245°F-265°F <ul style="list-style-type: none"> ○ Tank temperature is set at 280°F, above the recommended running temperature range • Adhesive bonds are excellent • Hot melt equipment is well maintained, tank is full and free of char

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Data:

Lines	Dates	Tank Temp (°F)	Line Temp (°F)	Nozzle Temp (°F)	Pressure (PSI)	Adhesive (lb.)/1000 boxes	Adhesive Cost/1,000 boxes
Line 1	2/10/2017	265	265	265	48	5.60	9.52
Line 2	2/10/2017	260	260	250	28	4.91	8.33
Line 3	2/10/2017	255	255	253	60	3.33	5.66
Line 4	2/10/2017	280	250	255	35	2.54	4.32

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Recommendations

- **Cost savings:**

- **Line 1**

- Investigate reducing nozzle size to reduce volume of adhesive applied. Chart below shows **38%** potential savings per 1000 units.

	Current bead thickness (0.14")	Reduced bead thickness (0.11")	Savings
Pounds	5.60 lbs.	3.46 lbs.	2.14 lbs.
Dollars	\$9.52	\$5.88	\$3.64

- **In-process adjustments**

- **Line 2**

- Un-molten adhesive in tanks - Often results in a decrease in adhesive temperature, which can lead to reduced adhesive performance
 - Frequently add small amounts of fresh adhesive to tanks to reduce the amount of un-molten adhesive

- **Line 2**

- Tank temperature below recommended running temperature range - Can lead to reduced adhesive performance
 - Maintain all temperatures within the recommended running temperature range of 245°F-265°F

- **Line 4**

- Tank temperature above recommended running temperature range - Can result in increased pop opens and char formation
 - Maintain all temperatures within the recommended running temperature range of 245°F-265°F
- Reducing air pressure incrementally could help reduce adhesive consumption to closer to what is seen on Line 1