

Learn how Accora Glue and Meter Sets could save your business, lost profit and increase efficiency

The true cost of out of round and out of parallel glue rolls

It isn't hard to understand that glue rolls with excessive TIR (total indicated runout), or glue rolls that aren't parallel, will cause your corrugator to consume more adhesive. It's trickier to calculate how much and when it makes economic sense to correct the problem. As long as board quality, productivity, and waste are acceptable, it is tempting to postpone maintenance. Reducing the question to a comparison of costs helps managers make informed decisions.

When the glue roll is out of round, the gap with the metering roll changes with every revolution. As a result, the adhesive film thickness on the glue roll changes from thick to thin as the roll turns. The gap between the lower corrugating roll on the single facer will also change every evolution, which affects adhesive application. To compensate for these variations, the operator usually adjusts the metering gap so there is enough adhesive applied where the film is thinnest.

The effect is to increase overall adhesive consumption; this increase is proportional to the TIR or the distance the rolls are out of parallel. This proportion, or ratio, can be used to calculate the additional cost to the box plant that defective rolls create.

EXAMPLE

On a finger-type single face machine, with a glue system in good condition, the actual glue film thickness on the glue roll will average about 0.007" in normal operation. If the glue roll has a TIR of 0.006", the gap must be increased by this amount to maintain a 0.007" where the film is thinnest. Allowing for the film split between glue roll and metering roll, the film thickness will increase by some two-thirds of that gap increase or about 0.004".

The result will be a glue film thickness ranging from 0.007" to 0.011". The total volume of adhesive available is the same as we would have with a uniform thickness of 0.009". On a 10" roll, the increase in glue volume calculates to 27%. About three-fourths of that ends up on paper, for an effective consumption increase of 20% with a TIR of 0.006". So as a rule of thumb, we can conclude that every 0.001" of TIR will increase adhesive consumption almost 3.5%.



EXAMPLE

If the metering gap is 0.006" out of parallel, the change in film thickness across the machine would be about 0.004" or $\frac{2}{3} \times 0.006"$. Assuming a 0.010" minimum glue film (fingerless machine), the film changes from 0.010" to 0.014", and the volume would be the same as if there was a uniform film thickness of 0.012". So, 0.006" TIR and 0.006" out-of-parallel result in the same increase in adhesive consumption.

What about double back glue machines?

On double back glue machines, we need to consider the cell count and size of engraved rolls. Glue rolls with cell counts of 16 or fewer cells per inch carry most of the adhesive in the cell. These rolls have a very thin surface film thickness, so the application rate is not increased dramatically when there are small changes in the TIR for this type of roll. Glue rolls with higher cell counts (25 quad and up) are affected by TIR at about the same rate as the single facer rolls or about 3.5% per every 0.001" TIR.

The Bottom Line

With today's modern equipment and high run speeds, it is possible to produce large quantities of board, consuming great quantities of adhesive in a short period of time. Out of round or out of parallel rolls increase adhesive application rate significantly.

A formula can be derived from the information in this study to reveal the true cost of glue-roll TIR or out of parallel conditions:

$$\text{Cost per 0.001" of TIR} = (\text{TIR} \times 1000) \times 0.035" \times \text{Dry Pound Cost} \times \text{Average web width factor}$$

Example:

$$\text{TIR} = 0.005"$$

$$\text{Dry pound cost} = \$0.18/\text{lb example}$$

$$\text{Average web width} = 80"$$

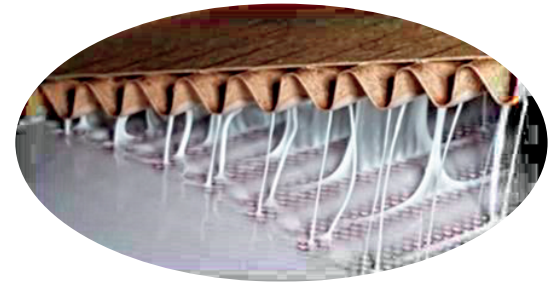
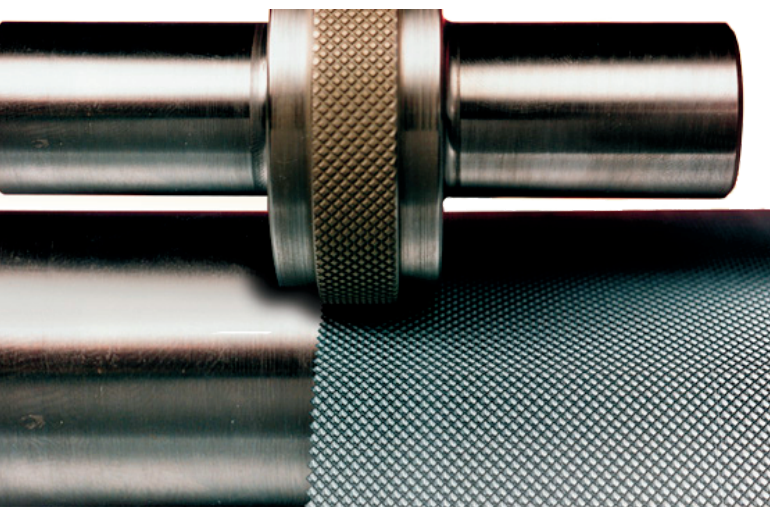
$$\text{Average web factor} = 80/98 = 0.816$$

$$\text{Cost} = (5) \times (0.035") \times (0.18") \times (0.816")$$

$$\text{Cost} = \$0.0257 \text{ per MSF}$$

For a plant producing 50 MMSF per month, the TIR would cost \$1,285 per month in excess adhesive application for only 0.005" of roll runout.

Daily checks of the glue roll gap with feeler gauges are imperative to ensure board quality and even application of adhesive. It is not uncommon for plants running high speeds or small flutes to check gaps once or twice per shift. This ensures the rolls are parallel and the glue film thickness and subsequent application is even across the web. In any case, the TIR should be checked for all stations at least once per week.



Why Apex ACCORA Sets?

Apex Glue and Meter Sets are manufactured to the highest tolerances within the industry. Using our AST stainless steel glue rolls paired with a ceramic meter roll allows for a much tighter gap due to the unique roll processing.

Roll tolerances of 20 microns, which is 0.0008" max, are achievable saving on the above example figures by approx. 80-90% per month of wasted adhesive cost. Now times that by multiple plants and corrugators. The savings are huge combined with better efficiencies.

Our Glue sets will also allow for a much higher quality board (perfect bonding, no warping, good printability) with increased efficiencies within the drying speeds allowing for the corrugator to run at its optimum speeds.



For more information on
Apex Accora Glue and Meter Sets
please contact your local Apex
representative or visit
www.apexinternational.com

