

Headbox Audit Helps Reduce Wet Strength Usage by 20%

Machine: Multi-ply Liner
Grade: Linerboard

Opportunity

This machine is a multi-ply linerboard machine with a base headbox and 3 secondary headboxes. The operations team desired to improve performance in the following ways:

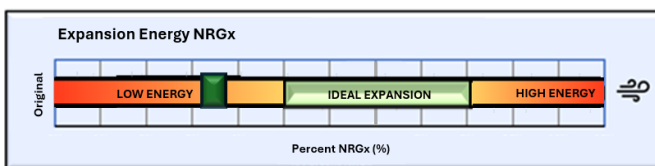
- Top layer: Formation
- 2nd layer: Strength
- 3rd layer: Strength
- Base layer: Strength

BTG's Approach

After reviewing what had been done to date with minimal success, BTG recommended conducting a headbox energy audit. A headbox that does not have a tailored headbox sheet arrangement may struggle to achieve strength properties due to an ineffective fiber orientation.

The BTG engineer collected the necessary information about the mill's process and current headbox sheet arrangement and set-up. Each of the 4 headboxes were analyzed for their contribution to the sheet as a whole. The largest impact was in the base layer as it contributed to more of the total sheet grammage.

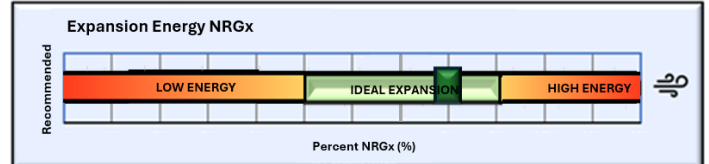
An analysis of the data revealed the headbox energy was too low for the grades being produced. The following graph shows how the expansion rate of the original arrangement compares to the "ideal" range generally seen on similar linerboard machines.



BTG's Recommended Solution

The solution proposed was to increase the energy with a different sheet configuration. Typically, liner grades achieve the best paper properties when operating at higher expansion energy ratios. Higher expansion rates generate increased turbulence in the headbox nozzle resulting in a more randomized fiber orientation at the jet. A more randomized fiber orientation creates a sheet with higher cross direction strength properties.

The figure below shows the expansion rate of the recommended sheet arrangement as compared to the "ideal expansion" range identified for liner operations.



Financial Benefit

The customer reported that the change in the headbox sheet arrangement generated improved burst properties and a 20% reduction in wet strength chemical addition. This has a financial impact for this mill of \$1.6 million USD/year.

If you would like to verify if your headbox sheet arrangement is optimized for your process, please feel free to contact your local BTG account manager or NRGx@BTG.com