

How Does One Relate ECT and Basis Weight?

The immediate and direct answer to the question would be: very carefully. Much like the solid fibre paperboard/boxboard grades used in the folding carton and rigid box segments of our industry with the increase in substance/mass/basis weight/bulk we should expect an increase in box compression strength. My associate Roman Popil, research scientist at the Renewable Bioproducts Institute has written extensively on this subject. In corrugated we look to ECT or vertical compression strength of a small sample to predict, via McKee's 1981 formula, the initial top-to-bottom compression of a corrugated box. **HOWEVER...**

Almost every issue of *BoxScore* (six times a year) over the last seven years has dealt with the wide differential between the strength of the component raw materials, linerboard and medium as measured by cross directional ring crush, and the expected ECT of the combined board after combining and converting via Whitsitt's 1983 formula. We know that a corrugator's ability to transfer the inherent strength from the roll stock into a predicted ECT varies by 40 percent. Add to this amount of variation the converting losses which can possibly run as high as 35% and we begin to understand that basis weight is really a very poor indicator of combined board strength.

Adding basis weight to the medium, an economical alternative to more expensive liners, also transfers the load sharing of the three components in a singlewall structure, for improved ECT, but messes up our neat and clean trend line trying to relate basis weights and medium. Next, a designer would have to consider the destruction of the medium at different contact points on the corrugator and crush points on the converting equipment.

Knowing about these degradation elements during the manufacturing process prompted us to bring forth to your knowledge the Chalmer's Korutest Dynamic Stiffness Tester. Because of the unique way the sample is "twisted" without its destruction, there is a force measurement to determine the loss of strength in the fluting at several points in the corrugating operation. Once again, be cautious about trying to compare the amount of fibre and an expected ECT outcome. We didn't even discuss in this article the various strength differentials that occur within any given containerboard grade/basis weight, that awaits another article.

Below are some hot links to significant articles that will support this article and provide additional understanding.

Additional Thoughts on Board Crush:

<http://www.aiccboxscore.org/2014/03/additional-thoughts-on-board-crush/>

Setting Seven Performance Standards With Your Sheet Suppliers:

<http://www.aiccboxscore.org/2014/11/setting-seven-performance-stands-with-your-sheet-suppliers/>

What ECT Does Not Tell Us About Box Performance:

http://www.aiccbox.org/boxscore/ZMag/Sep_Oct_2013.html

Updating Your Library:

http://www.nxtbook.com/ygsreprints/AICC/g42038_aicc_mayjun2014/#/26

ECT Application and Reference Guide:

<https://www.fibrebox.org/store/Cart.aspx>

Understanding the Key Characteristics of Linerboard and Medium and Their Impact on Combined Corrugated Board:

<https://www.aiccbox.org/store/description/Linerboard.html>

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