

SELECTING COMPONENTS TO BUILD A 44# ECT CORRUGATED STRUCTURE  
 COMBINING FOR STRENGTH WITH THE LEAST COST CONTAINERBOARDS

- The Edge Crush Test of combined board is dependent on the *cross direction ring crush/Short Colum Test* of the various paper components. This includes the quality of the fluting process and the bonding between the components.
- Structurally speaking, the strongest board combinations balance the vertical compression load sharing of the corrugated structure between the facings and the fluting(s). Therefore, the best engineered design puts 50% of the strength in the two liners and 50% into the **fluted** medium. In this example we will assume a C flute with a take up factor of 1.435. (Can vary)
- Total combined board, two liners and one fluted medium, must have a minimum sum of the cross direction ring crush/SCT values of all the components of **236#/PLI or 69.8 SCT**
- This theoretically places 118# of ring crush/SCT into both liner facings and 118# of **fluted ring crush/SCT** into the medium. Dividing the 118# by 2 suggests that each liner needs to contribute 59# of ring crush or 16.2 **SCT**.
- Dividing the 118# of **fluted ring crush/SCT** by the take up factor suggests a medium with 83# of static ring crush or 23.2 SCT, but this structure is not practical.
- PLEASE NOTE THERE IS NO REFERENCE TO BASIS WEIGHTS HERE

MINIMUM CD RING CRUSH LINER STRENGTHS	MINIMUM CD SCT LINER STRENGTHS	MINIMUM CD RC MEDIUM STRENGTH	MINIMUM CD SCT MEDIUM STRENGTH	TOTAL COMBINED RING CRUSH or SCT	RELATIVE COSTS* INDEXED
126/126	31.2/31.2	32	11.8	286/79.3	100% Base
70/125	18.4/30.9	45	14.6	255/70.1	21% Less
70/125	18.4/30.9	55	17.0	269/73.6	19% Less
70/90	18.4/22.6	55	17.0	239/65.3	27% Less
120/120	29.6/29.6	32	11.8	286/76.1	12% Less
56/120	15.8/29.6	45	14.6	241/66.2	23% Less
90/90	22/6/22.6	45	20.8	245/66.0	25% Less

\*Note: Costs are based on openly published monthly prices from Pulp and Paper Week

$$ECT = 0.63 [\sum SCT \text{ (liners)} + TU \times SCT \text{ (medium)}]$$

$$ECT = 0.217 [\sum RC \text{ (liners)} + TU \times RC \text{ (medium)}]$$

- REFERENCES: TAPPI 839, FBA's "Edge Crush Test", AICC "Understanding Box Performance," AF&PA Semi Annual Continuous Baseline Study