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To: Alisa R. Hoffee  
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Report: 2124 Pactiv Tuff Stuff

**Request and Purpose for Analysis**

Puncture Resistance evaluates the force required to penetrate aluminum side, and bubble side of the laminated product at slow impact.

**Results and Data** Puncture Resistance : ASTM F1306 performed on Instron - 4465

**Specimen Results: Aluminum side**

3x12

Specimen	Displacement @ Max. Load (in)	Load at Max. Load (lbs)	Stress at Max. Load (psi)	Load/Thick @ Max Load (lbf/in)	Thickness (in)	% Strain @ Max. Load (%)
A	1.077	15.030	404.85	50.61	0.2970	67.31
B	0.765	11.870	319.73	39.97		47.98
C	1.113	16.350	440.40	55.05		69.61
Mean	0.985	14.417	388.33	48.54	0.2970	61.63
Std. Dev.	0.191	2.302	62.01	7.75	0.0	11.88

**Specimen Results: Bubble side**

3x12

Specimen	Displacement @ Max. Load (in)	Load at Max. Load (lbs)	Stress at Max. Load (psi)	Load/Thick @ Max Load (lbf/in)	Thickness (in)	% Strain @ Max. Load (%)
A	0.425	13.290	357.98	44.75	0.29700	26.60
B	0.451	14.090	379.53	47.44		28.19
C	0.477	14.170	381.68	47.71		29.81
Mean	0.451	13.850	373.06	46.63	0.29700	28.20
Std. Dev.	0.026	0.487	13.11	1.64	0.0	1.61