



# **M55J/CE3 Laminate Engineering Data Verification**

**Prepared for  
Stanford Linear Accelerator Center  
May 29, 2003**



# Test Specimen Fabrication



- ◆ **Material: M55J/CE3 Prepreg with a Cured-Ply-Thickness of .0025”**
  
- ◆ **Laminate for Strength and Modulus Testing:**
  - » **Fiber Orientation:** (0, 45, 90, 135)<sub>S8</sub>
  - » **Nominal Thickness:** .160”
  - » **Resin Content:** 31.24 %
  - » **Fiber Volume:** 57.1 %
  
- ◆ **Laminate for Tensile Bearing Specimens:**
  - » **Fiber Orientation:** (0, 45, 90, 135)<sub>S12</sub>
  - » **Nominal Thickness:** .240”
  - » **Work-In-Progress Test Results (3 WIP Coupons):**
    - **Tensile Strength (KSI):** 90.95; 88.77; 83.66
    - **Tensile Modulus (MSI):** 15.10; 15.25; 15.11
  
- ◆ **All Specimens Are Fabricated and Tested in 0° Direction**



# V-Notch Test ASTM D5379



<b>Specimen</b>	<b>Shear Strength (Ksi)</b>	<b>Shear Modulus (Msi)</b>
<b>01</b>	<b>26.78</b>	<b>5.183</b>
<b>02</b>	<b>31.09</b>	<b>5.537</b>
<b>03</b>	<b>31.72</b>	<b>5.275</b>
<b>04</b>	<b>31.74</b>	<b>5.311</b>
<b>05</b>	<b>30.93</b>	<b>5.132</b>
<b>06</b>	<b>30.03</b>	<b>5.250</b>
<b>07</b>	<b>27.69</b>	<b>5.383</b>
<b>08</b>	<b>30.96</b>	<b>5.440</b>
<b>Average</b>	<b>30.12</b>	<b>5.312</b>
<b>B-Basis</b>	<b>25.29</b>	<b>NA</b>



# Flatwise Tension Test ASTM C297



Specimen	Peak Load (lb)	Strength (psi)
01	4226.4	4282.0
02	3885.0	3928.2
03	4316.7	4369.2
04	4171.7	4218.1
05	3297.4	3344.2
06	4089.4	4134.9
07	3680.2	3743.8
08	3336.3	3366.6
Average	3875.4	3924.4
B-Basis	2844.4	2882.5



# Tensile Test ASTM D3039



Specimen	Strength (Ksi)	Modulus (Msi)
01	93.96	14.70
02	88.00	14.33
03	92.61	14.62
04	95.66	14.54
05	88.99	14.61
06	88.69	14.99
07	87.67	14.39
08	93.76	14.74
Average	91.17	14.61
B-Basis	83.01	NA



# Compression Strength Test ASTM D695



Specimen	Peak Load (lb)	Strength (Ksi)
01	3942.95	49.68
02	3910.5	51.22
03	4027.1	51.76
04	3895.6	49.70
05	4062.1	52.74
06	3998.6	52.13
07	3883.8	50.45
08	4092.6	52.65
Average	3976.6	51.29
B-Basis	3770.7	48.09



# Compression Modulus Test ASTM D695



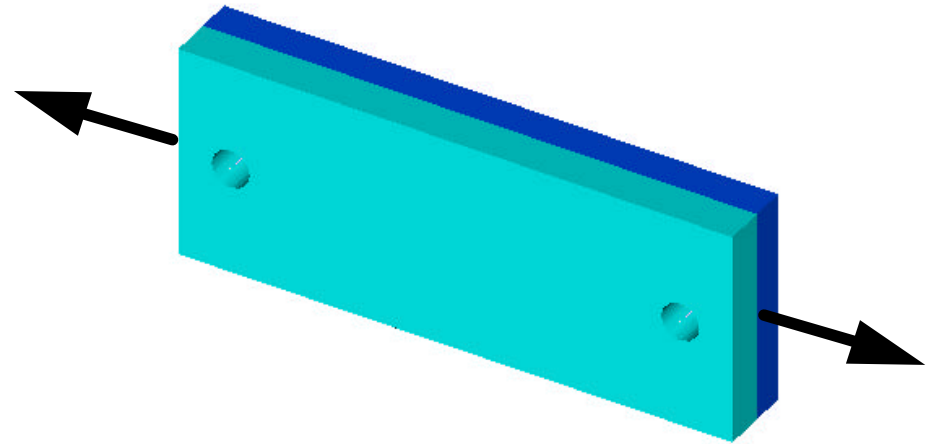
Specimen	0°-Direction (Msi)	90°-Direction (Msi)	Average (Msi)
01	14.689	15.685	15.187
02	13.357	14.314	13.836
03	14.666	14.403	14.535
04	14.188	14.106	14.147
05	14.251	14.080	14.165
06	14.498	14.008	14.253
07	13.699	14.879	14.289
08	15.242	14.835	15.038
Average	14.324	14.539	14.431



# Joint Test ASTM D953



Specimen	Peak Load (lb)
01	3336.1
02	2793.3
03	3439.3
04	3552.9
05	3150.0
06	3361.2
07	3177.8
08	3218.9
Average	3253.7
B-Basis	2658.3



## Test Specimen Nominal Dimensions:

Hole Diameter: 5.7mm (.224")  
Hole Center to Edge: 7.77mm (.306")  
M55J Thickness: 6.1mm (.240")  
C-C Thickness: 5.38mm (.212")  
Bond Line Thickness: .25mm (.010")  
Overall Size: 82.5 X 31.7 (3.25 X 1.25)