

FEMech Engineering

FRP Laminate Testing Laboratory

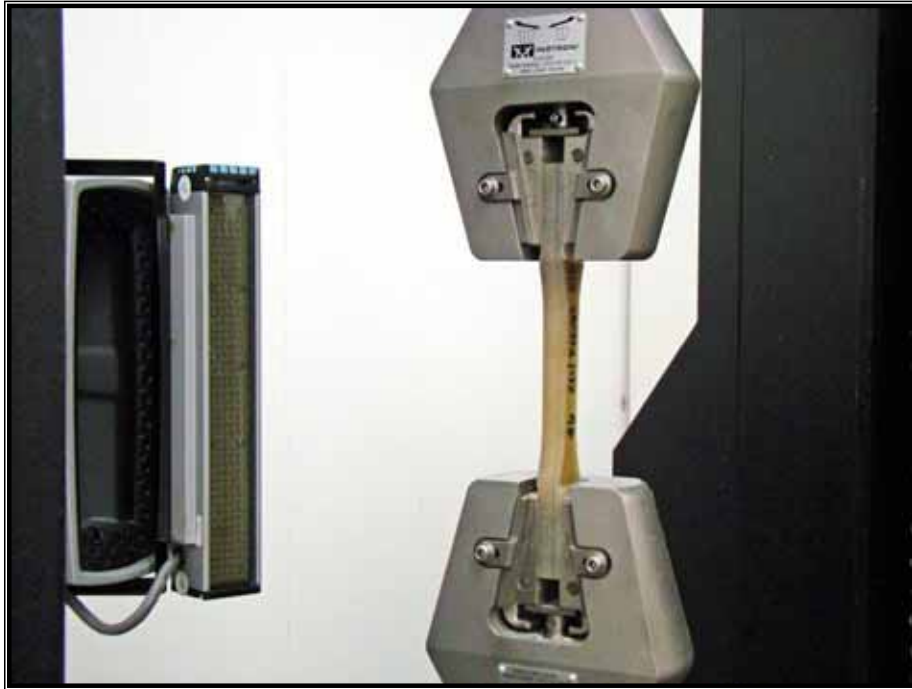
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ahutcheson@femech.com
lab@femech.com***

Tensile Strength & Modulus FEMech's State of the Art Instron Testing Machine



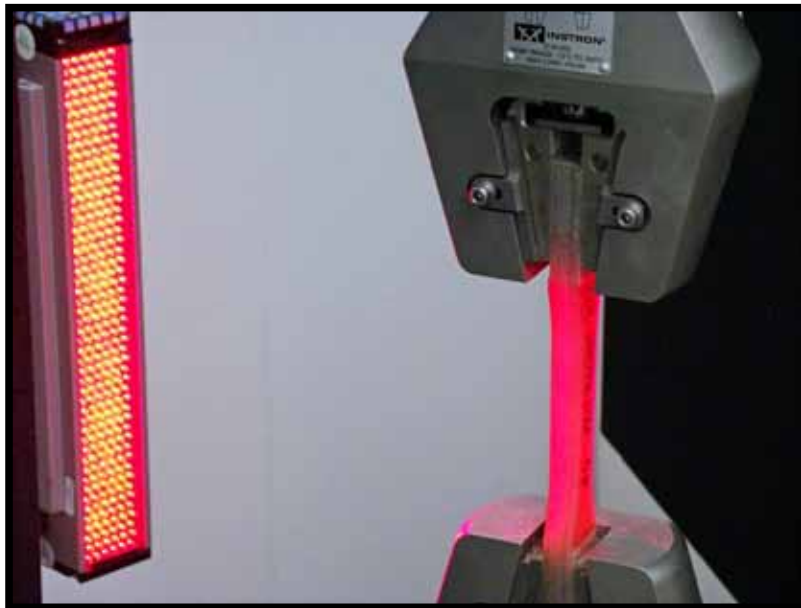
Tensile Strength & Modulus

ASTM D638 – Test Ready -- Extensometer Not Yet Active



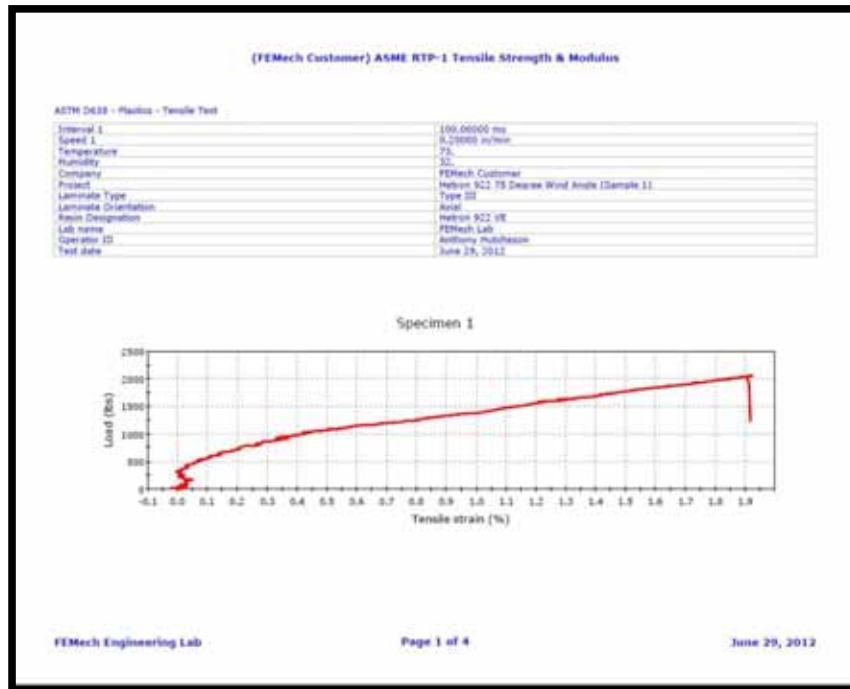
Tensile Strength & Modulus

FEMech's State of the Art Video Extensometer



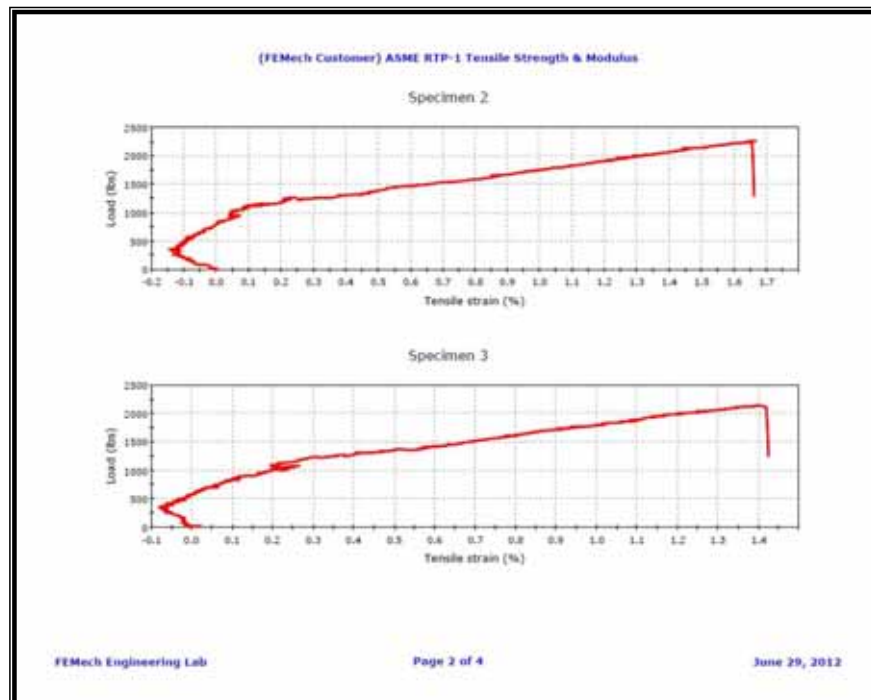
Tensile Strength & Modulus

ASTM D638 Bluehill 2 Test Report



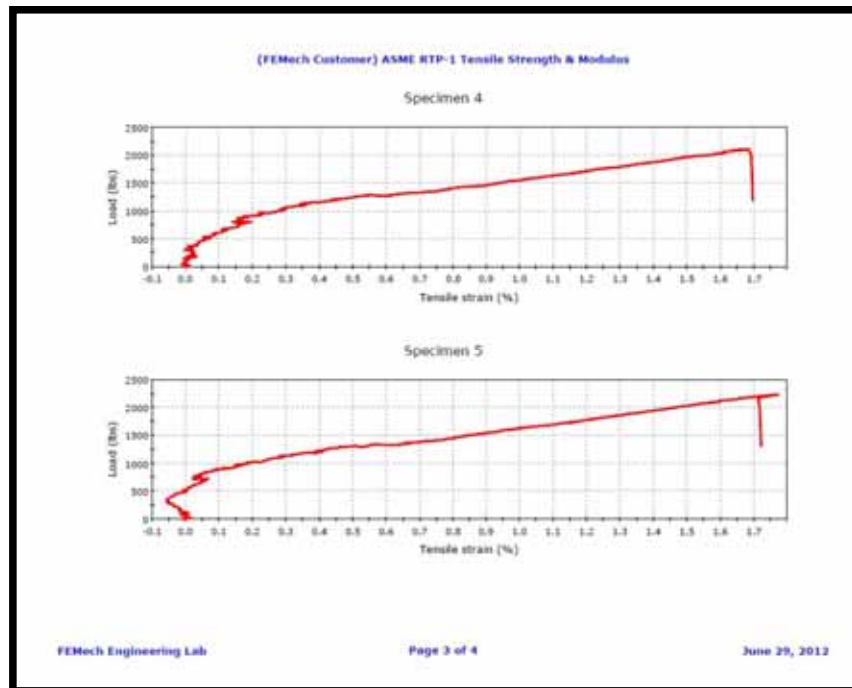
Tensile Strength & Modulus

ASTM D638 Bluehill 2 Test Report



Tensile Strength & Modulus

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Tensile Strength & Modulus

ASTM D638 Bluehill 2 Test Report

(FEMech Customer) ASME RTP-1 Tensile Strength & Modulus

	Specimen name	Thickness (in)	Width (in)	Area (in ²)	Tensile Strength (ksi)
1	1	0.290	0.430	0.125	28.32
2	2	0.287	0.418	0.122	27.88
3	3	0.275	0.413	0.120	28.47
4	4	0.271	0.413	0.120	28.33
5	5	0.268	0.414	0.121	27.98
Mean		0.274	0.415	0.120	28.05
Standard Deviation		0.009	0.010	0.002	0.716
Minimum		0.267	0.410	0.120	27.88
Maximum		0.290	0.413	0.120	28.47
Range		0.023	0.045	0.005	1.36

	Yield Elongation (%)	Break Elongation (%)	Modulus of Elasticity (ksi)
1	1.50	1.91	1944
2	1.40	1.65	2422
3	1.49	1.42	2310
4	1.51	1.68	2607
5	1.51	1.71	2116
Mean	1.50	1.67	2261
Standard Deviation	0.043	0.173	293.174
Minimum	1.40	1.42	1944
Maximum	1.52	1.93	2607
Range	0.12	0.45	763

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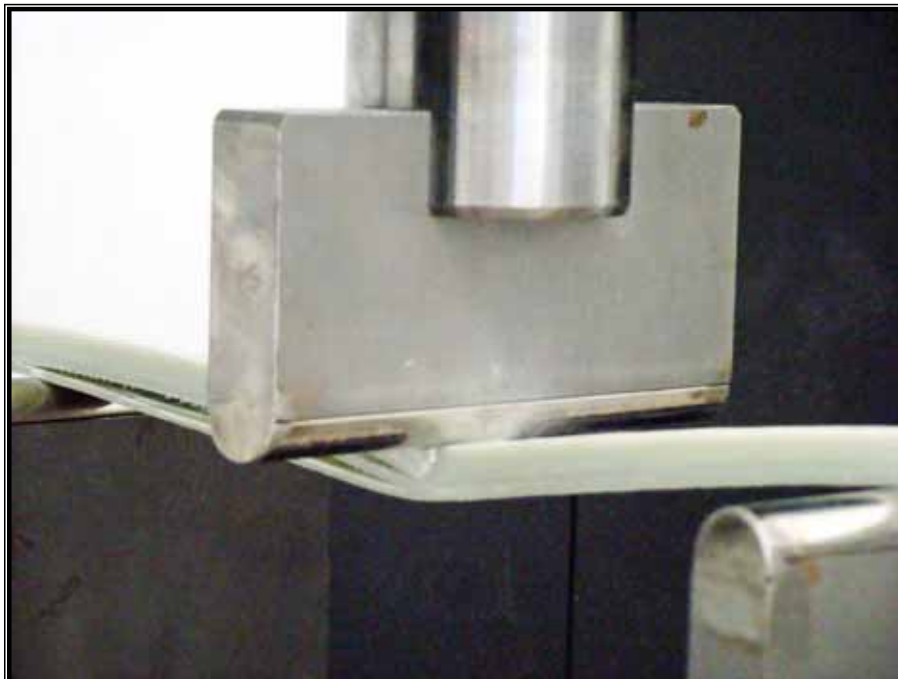
Flexural Strength & Modulus

FEMech's State of the Art Instron Machine
Set Up for Flex Testing



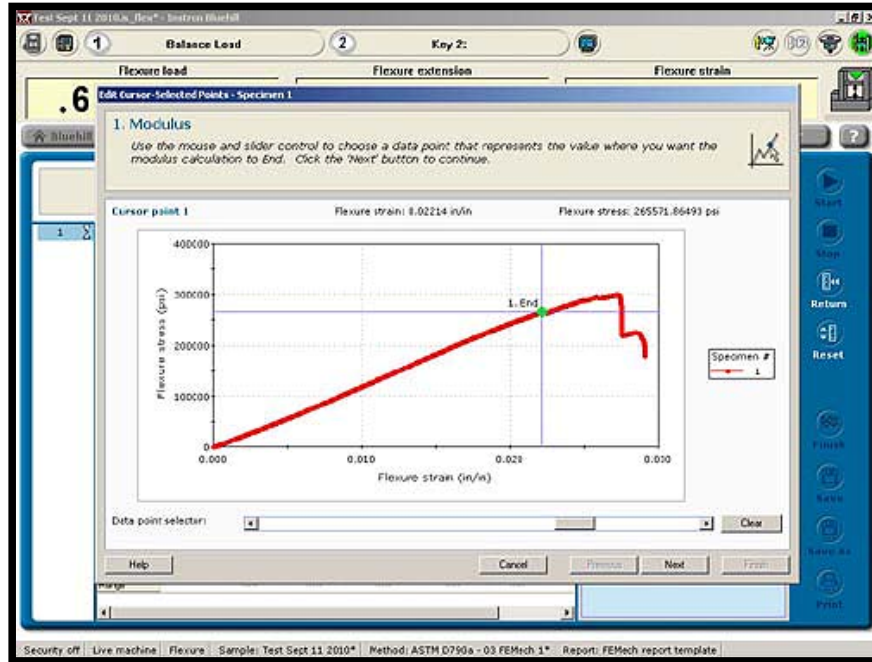
Flexural Strength & Modulus

ASTM D790 Test at Point of Failure



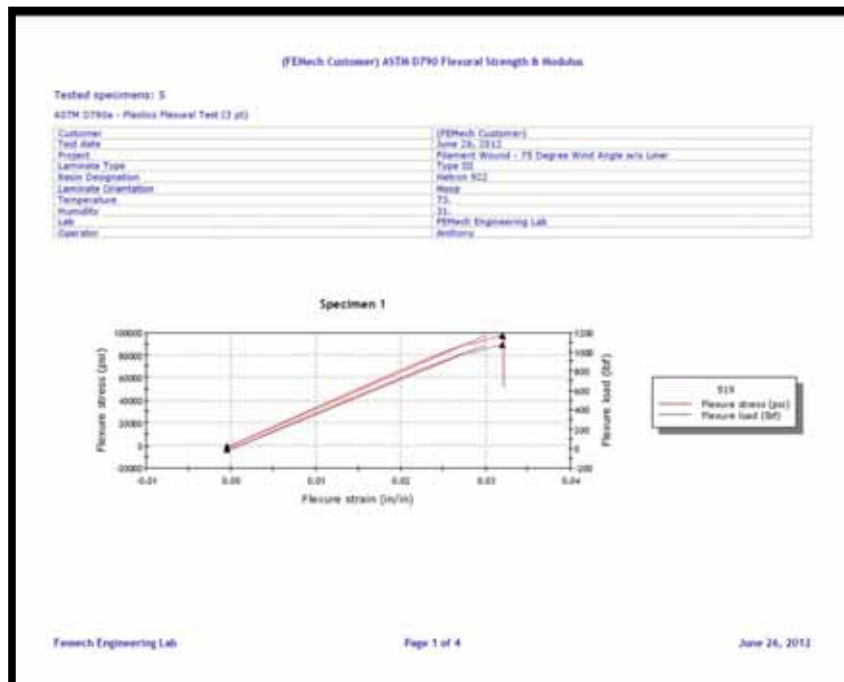
Flexural Strength & Modulus

Bluehill 2 Software Screenshot



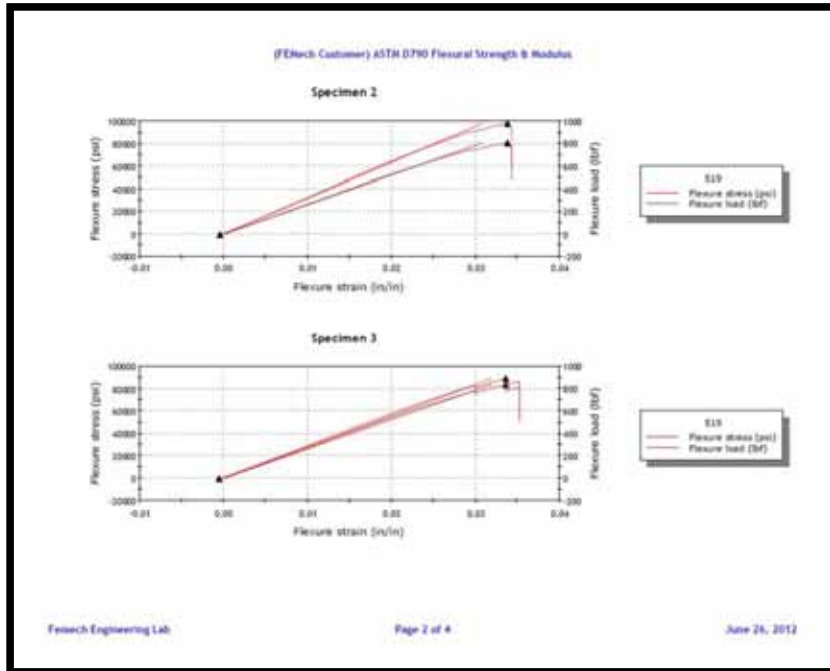
Flexural Strength & Modulus

ASTM D790 Bluehill 2 Test Report



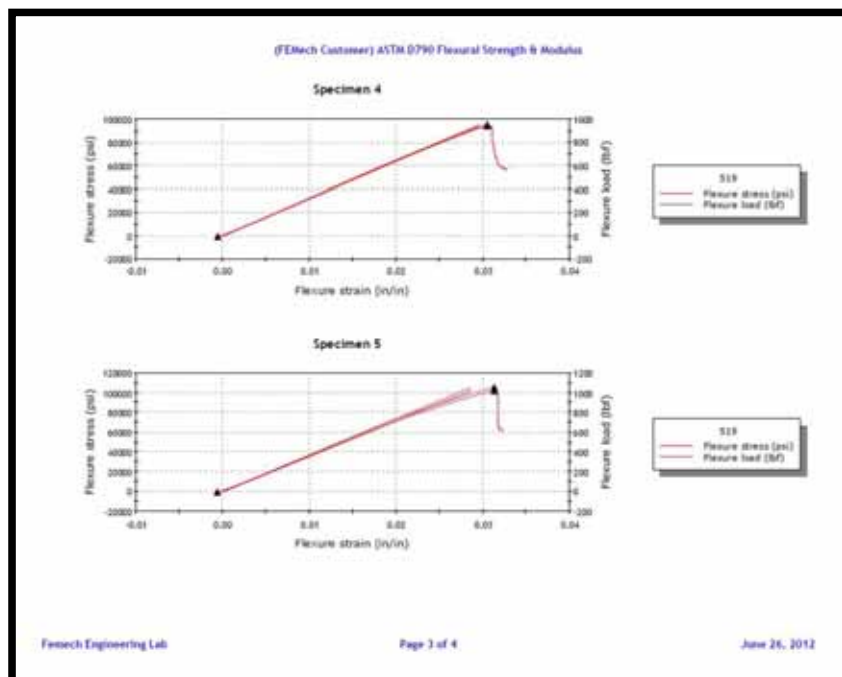
Flexural Strength & Modulus

ASTM D790 Bluehill 2 Test Report



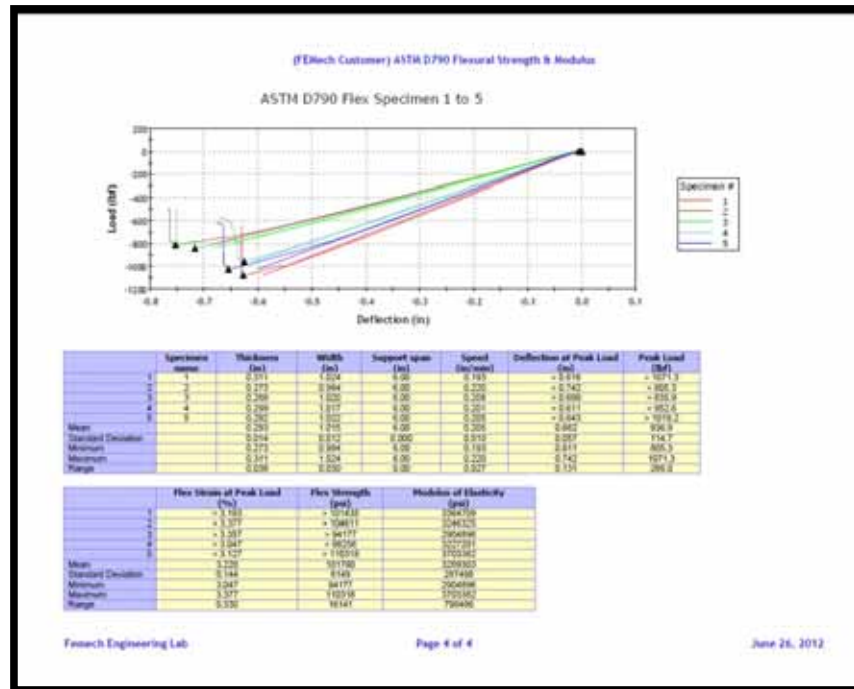
Flexural Strength & Modulus

ASTM D790 Bluehill 2 Test Report



Flexural Strength & Modulus

ASTM D790 Bluehill 2 Test Report



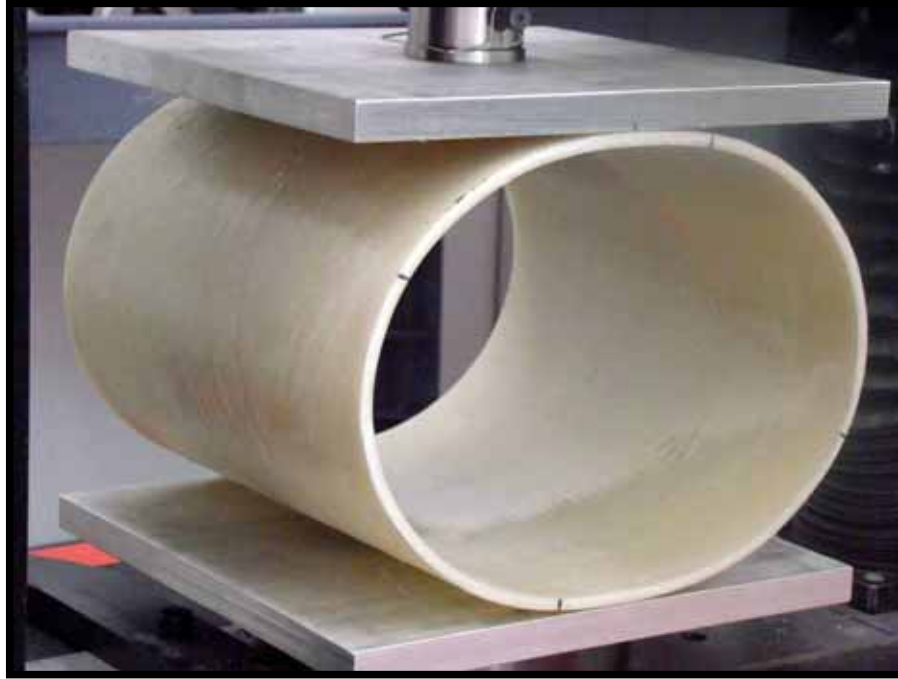
Parallel Plate

ASTM D2412 – Testing a 30" Ø FRP Pipe



Parallel Plate

ASTM D2412 – Testing a 12" Ø FRP Pipe



Parallel Plate

ASTM D2412 – Testing a 20" Ø FRP Pipe



RTP-1 Secondary Bond

FEMech's Instron Machine Set Up for Shear Bond Testing



RTP-1 Secondary Bond

RTP-1 M-5 Secondary Bonder Qualification



RTP-1 Secondary Bond

RTP-1 M-5 Secondary Bond Specimen Before Test



RTP-1 Secondary Bond

RTP-1 M-5 Secondary Bond Specimen After Test



Glass & Resin Content

FEMech's Ohaus Scale -- Accurate to 0.001 Grams



Glass & Resin Content

FEMech's Custom Designed Pre-burn Oven



Glass & Resin Content

Programmable Digital Muffle Furnace

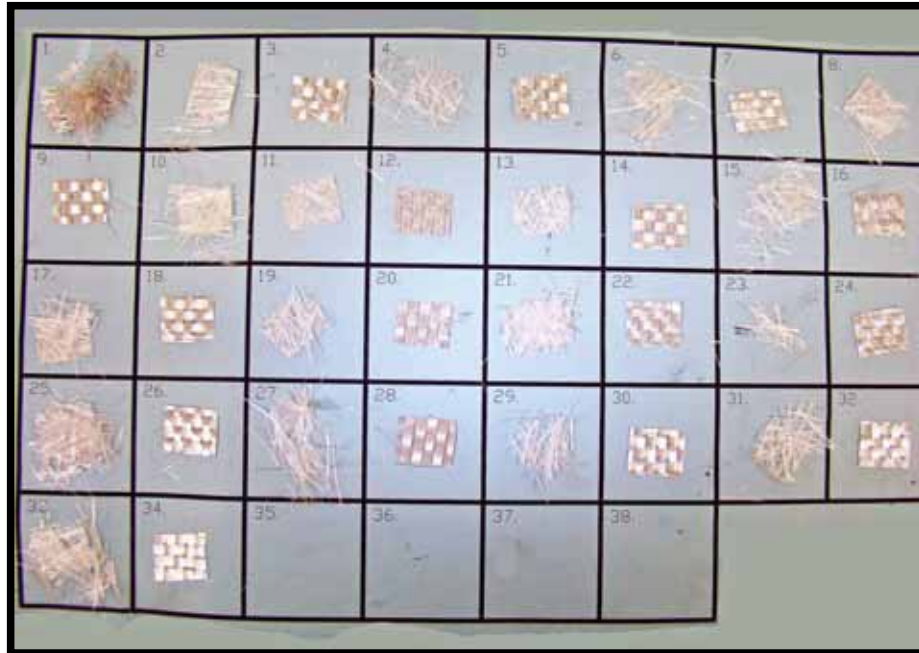


Glass & Resin Content

Programmable Digital Muffle Furnace



Laminate Layer Schedule & Autopsy



Laminate Layer Schedule & Autopsy

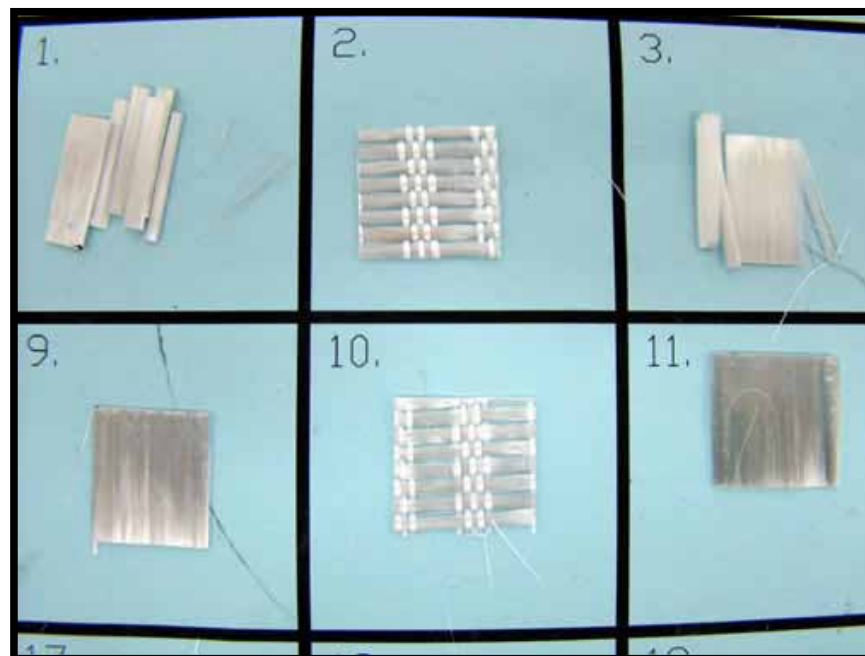


Photo Micrography

FEMech's Amscope Video Microscope



Photo Micrography

FEMech's Amscope Video Microscope



Photo Micrography

6.7X Microphotograph of Thin Sliced Laminate

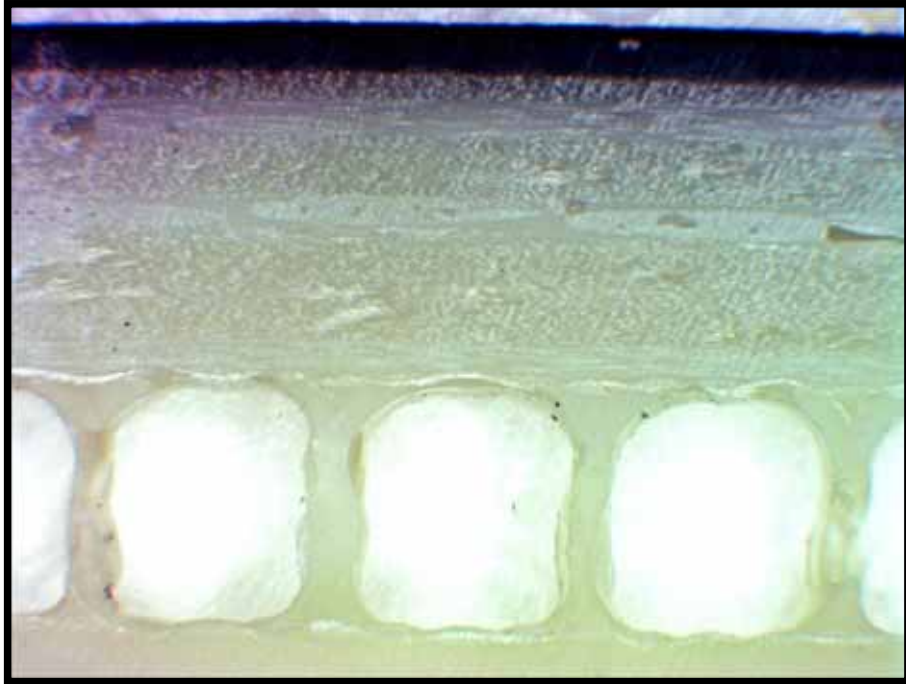
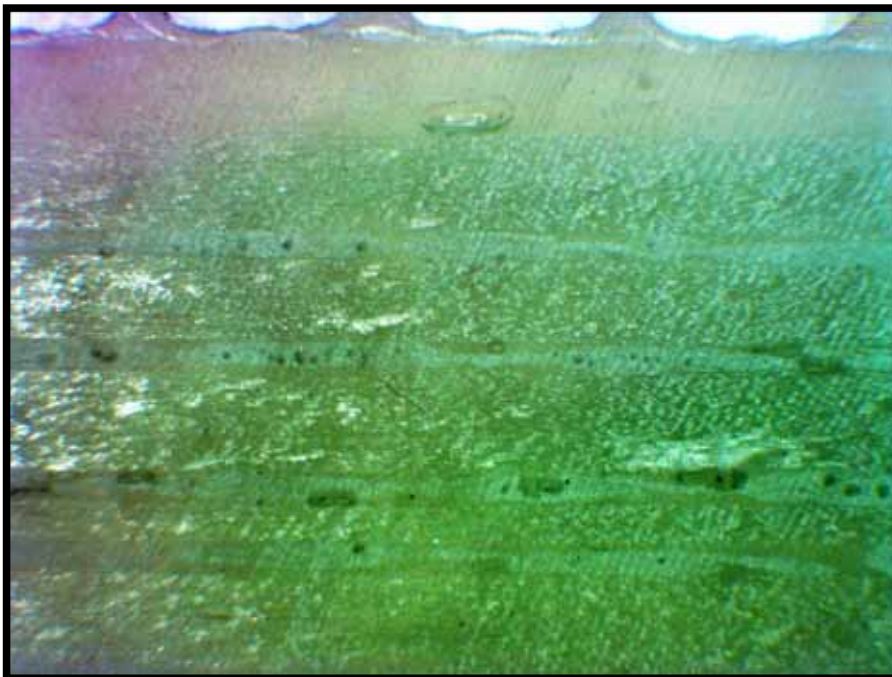


Photo Micrography

6.7X Microphotograph of Thin Sliced Laminate



Calibration

We Calibrate our Equipment Using Gauge Blocks and Weights Traceable to the National Bureau of Standards



Calibration

We Calibrate our Equipment Using Gauge Blocks and Weights Traceable to the National Bureau of Standards



Calibration

We Calibrate our Equipment Using Gauge Blocks and Weights Traceable to the National Bureau of Standards



Calibration

We Only Handle Our NBS Blocks and Weights with Gloves



Calibration

Calibration Label Showing Calibration Date

