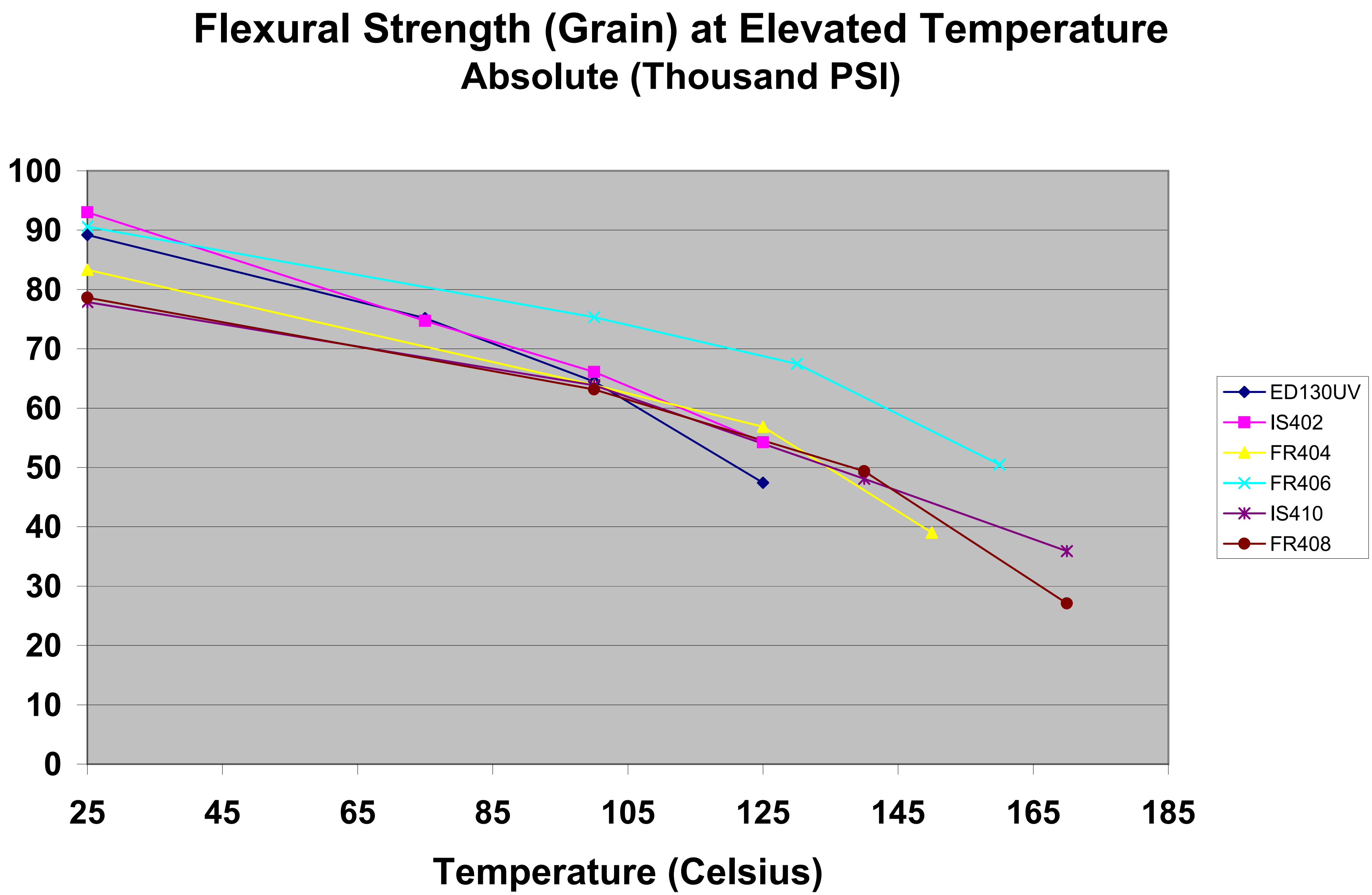
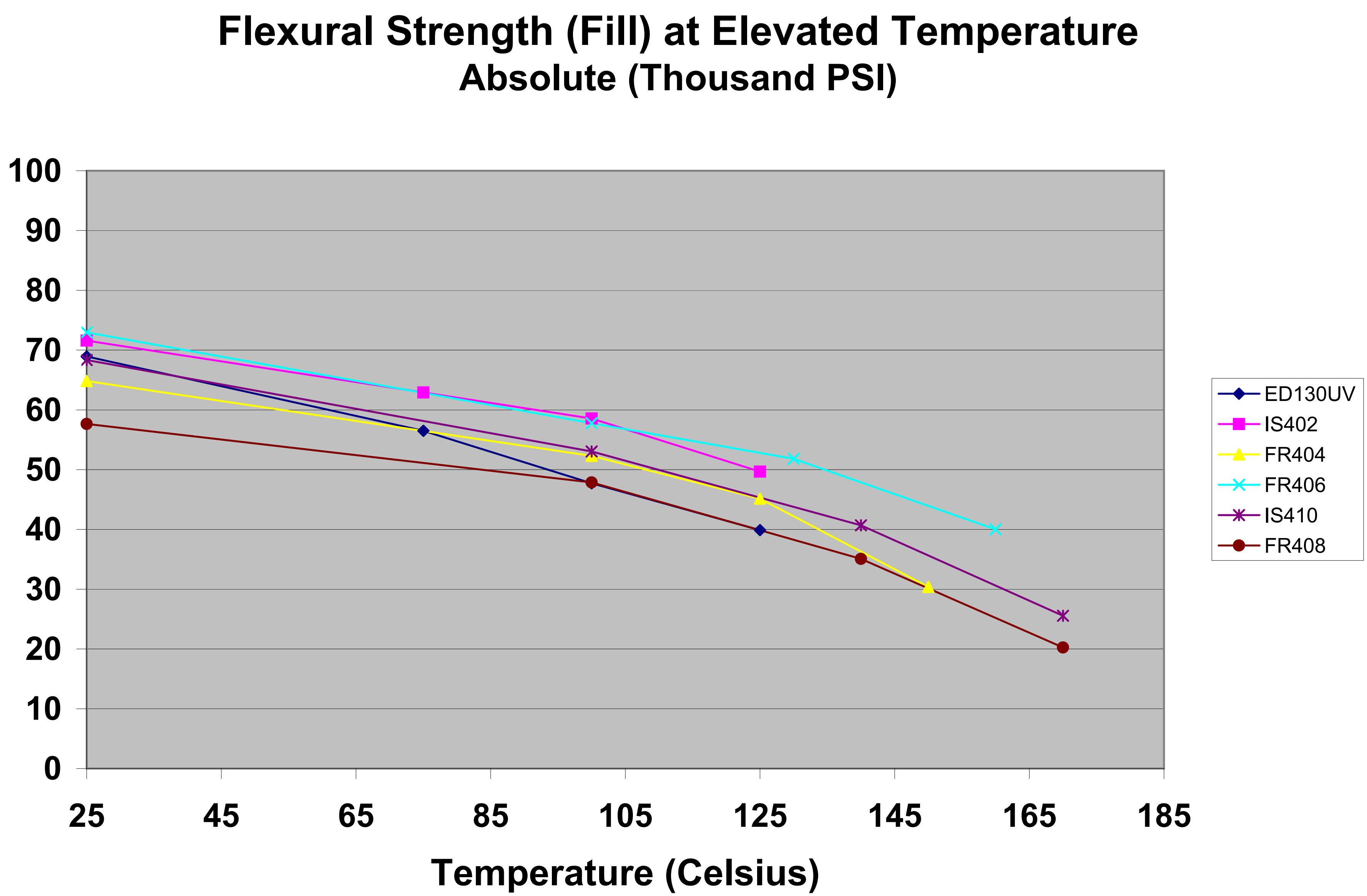
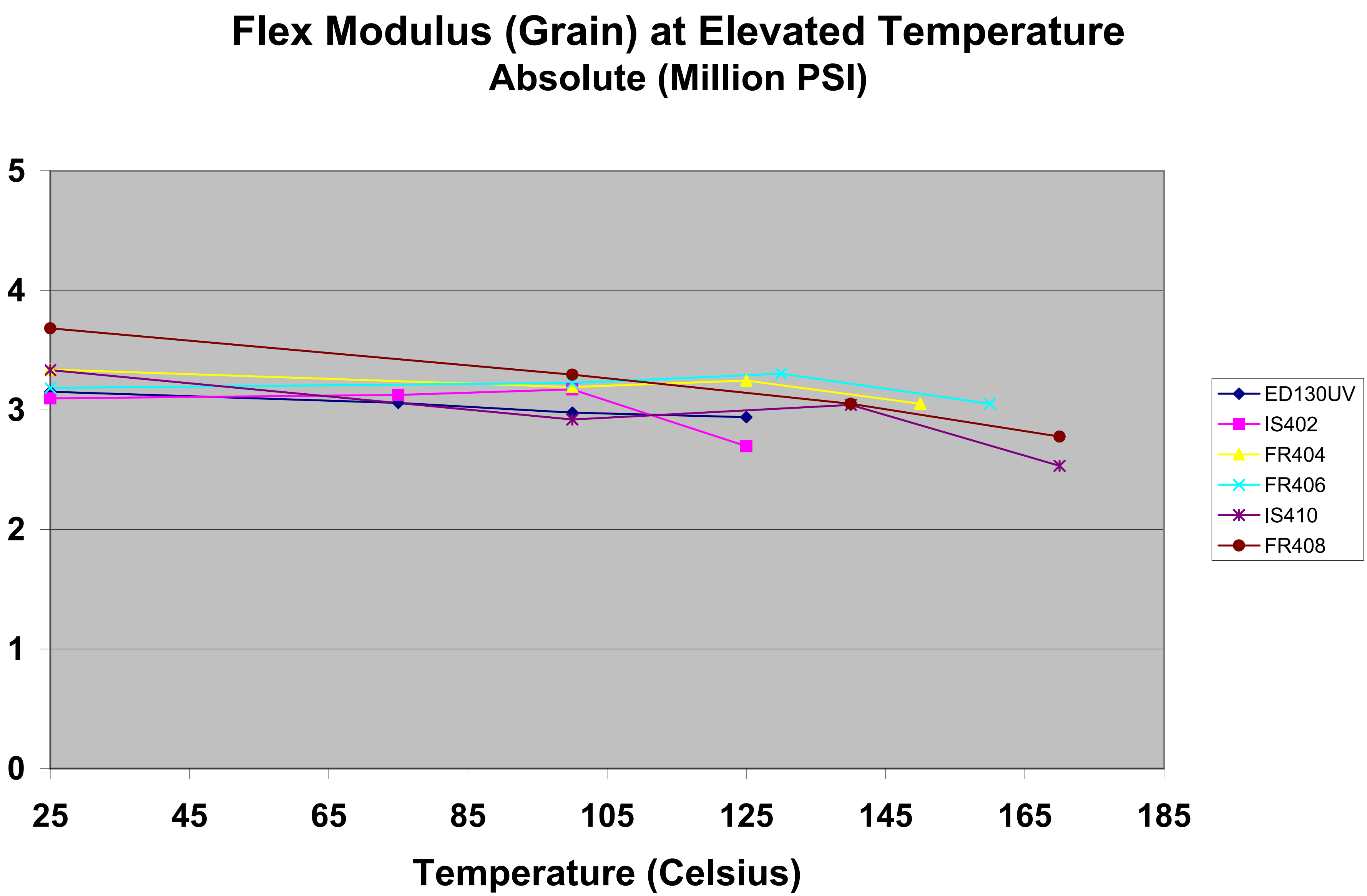
Mechanical Properties By Isola Grade											
Grade	Temperature (Celsius)	Flexural Strength (Thousand psi)		Tensile Strength (Thousand psi)		Poisson's Ratio		Young's Modulus (Million psi)		Taylor's Modulus (Million psi)	
		Grain	Fill	Grain	Fill	Grain	Fill	Grain	Fill	Grain	Fill
ED130UV	25	89	69	55	40	0.136	0.118	3.5	3.0	3.2	2.8
	75	75	56							3.1	3.1
	100	64	48							3.0	2.6
	125	47	40							2.9	2.2
FR402	25	93	72							3.1	2.8
	75	75	63							3.1	2.9
	100	66	59							3.2	2.7
	125	54	50							2.7	2.4
FR404	25	83	65							3.3	3.0
	100	64	52							3.2	2.8
	125	57	45							3.2	2.5
	150	39	30							3.1	2.5
FR406	25	91	73	55	40	0.147	0.117	3.5	3.0	3.2	3.0
	100	75	58							3.2	2.7
	130	67	52							3.3	2.6
	160	50	40							3.1	2.7
IS410	25	78	68	52	38	0.129	0.114	3.6	3.0	3.3	3.0
	100	64	53							2.9	2.6
	140	48	41							3.0	2.6
	170	36	26							2.5	2.0
FR408	25	79	58	50	37	0.155	0.132	3.4	3.0	3.7	3.0
	100	63	48							3.3	2.7
	140	49	35							3.1	2.5
	170	27	20							2.8	1.7
G200	25	87	61	55	38	0.153	0.128	3.9	3.7	3.5	3.0
P95	25	76	54	45	34	0.148	0.135	3.7	3.3	3.6	3.1
IS620	25	77	50	44	31	0.148	0.106	3.8	3.2	4.0	3.1

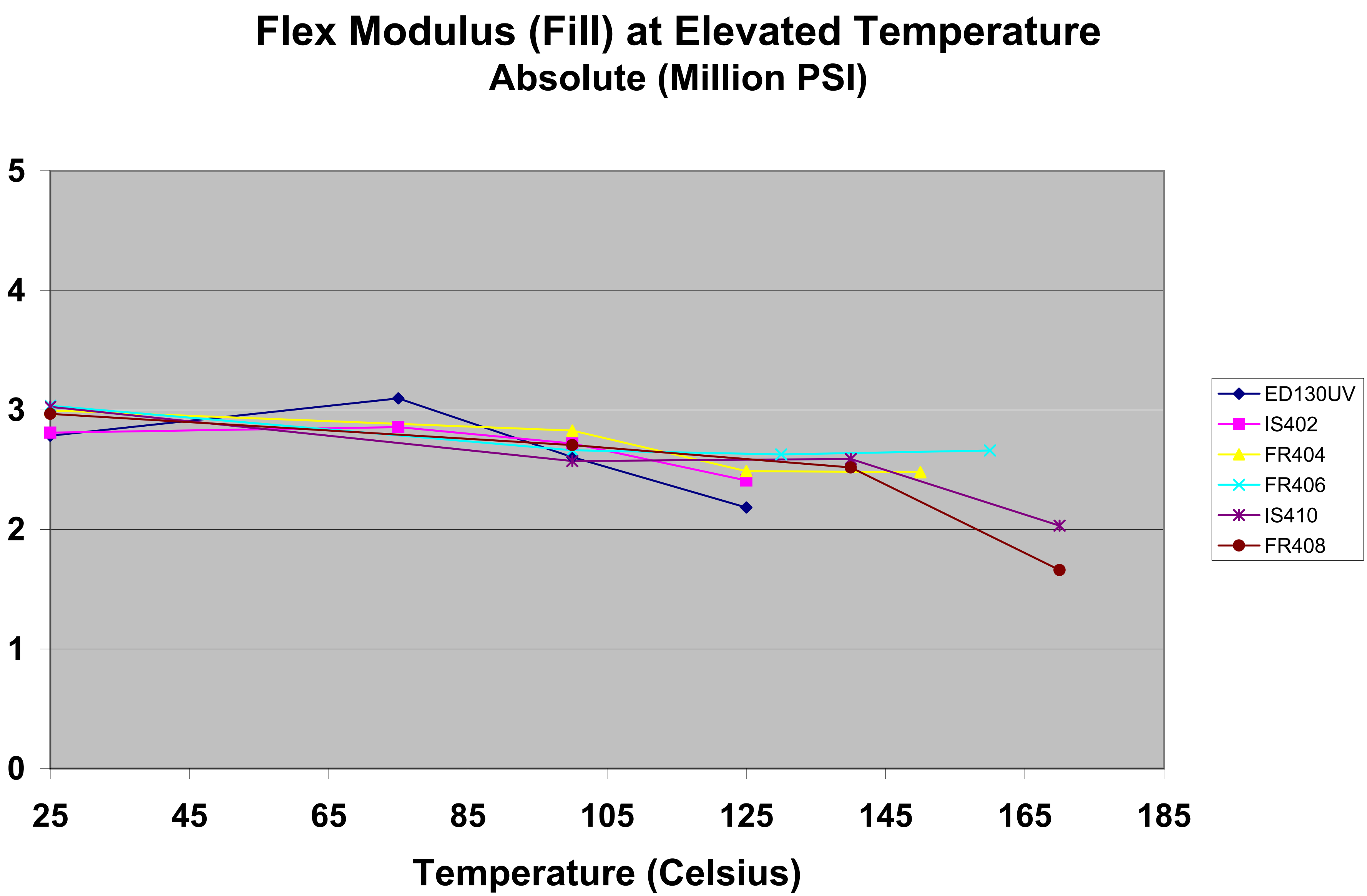
Note: Sample thickness = 0.031" to 0.062"



Flexural Strength (Grain) at Elevated Temperature
Absolute (Thousand PSI)
100
90
80
70
60
50
40
30
20
10
0
25
45
65
85
105
125
145
165
185
Temperature (Celsius)
ED130UV
IS402
FR404
FR406
IS410
FR408


Flexural Strength (Fill) at Elevated Temperature
Absolute (Thousand PSI)
100
90
80
70
60
50
40
30
20
10
0
25
45
65
85
105
125
145
165
185
Temperature (Celsius)
ED130UV
IS402
FR404
FR406
IS410
FR408


Flex Modulus (Grain) at Elevated Temperature
Absolute (Million PSI)
0
1
2
3
4
5
25
45
65
85
105
125
145
165
185
Temperature (Celsius)
ED130UV
IS402
FR404
FR406
IS410
FR408



Flex Modulus (Fill) at Elevated Temperature
Absolute (Million PSI)
5
4
3
2
1
0
25
45
65
85
105
125
145
165
185
Temperature (Celsius)
ED130UV
IS402
FR404
FR406
IS410
FR408

Flexural Strength and Flexural Modulus Over Temperature (Isola USA)

Flexural Strength - Grain (Thousand psi)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	89	93	83	91	78	79
75	75	75				
100	64	66	64	75	64	63
125	47	54	57			
130				67		
140					48	49
150			39			
160				50		
170					36	27

Flexural Strength - Fill (Thousand psi)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	69	72	65	73	68	58
75	56	63				
100	48	59	52	58	53	48
125	40	50	45			
130				52		
140					41	35
150			30			
160				40		
170					26	20

Flex Modulus - Grain (Million psi)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	3.2	3.1	3.3	3.2	3.3	3.7
75	3.1	3.1				
100	3.0	3.2	3.2	3.2	2.9	3.3
125	2.9	2.7	3.2			
130				3.3		
140					3.0	3.1
150			3.1			
160				3.1		
170					2.5	2.8

Flex Modulus - Fill (Million psi)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	2.8	2.8	3.0	3.0	3.0	3.0
75	3.1	2.9				
100	2.6	2.7	2.8	2.7	2.6	2.7
125	2.2	2.4	2.5			
130				2.6		
140					2.6	2.5
150			2.5			
160				2.7		
170					2.0	1.7

Percent of Ambient Value

Flexural Strength (Grain)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	100	100	100	100		
75	84	80				
100	72	71	77	83		
125	53	58	68			
130				74		
140						
150			47			
160				56		
170						

Flexural Strength (Fill)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	100	100	100	100		
75	82	88				
100	69	82	81	79		
125	58	69	70			
130				71		
140						
150			47			
160				55		
170						

Flexural Modulus (Grain)						
Temp (C)	ED130UV	IS402	FR404	FR406	IS410	FR408
25	100	100	100	100		
75	97	101				
100	94	102	96	101		
125	93	87	97			
130				104		
140						
150			91			
160				96		
170						

Flexural Modulus (Fill)						
Temp (C)	ED130UV	IS402	FR404	FR404	FR404	FR404
25	100	100	100	100	100	100
75	111	102				
100	94	97	94	88	85	91
125	78	86	83			
130				87		
140					86	85
150			83			
160				88		
170					67	56

Mechanical Properties Descriptions

Tensile Strength: A measure of how strong the material is under tension. The value is determined by measuring the maximum pulling force per unit of cross-sectional area that the material will withstand without breaking. The procedure is to strip a rigid laminate of copper, make a dogbone specimen per ASTM D 638 and pull lengthwise until the material fractures.

Young's Modulus (also known as Tensile Modulus or Modulus of Elasticity): A measure of a material's resistance to being stretched. The value is determined by taking the ratio of the pulling stress applied per cross-sectional area to the associated strain, or percent change in length. Using an ASTM D 638 dogbone specimen of stripped rigid laminate, a graph is created of stress versus strain and the ratio is calculated from the steepest part of the curve.

Poisson's Ratio: A measure that compares, under tension, a material's change in length with its change in width. The value is determined by dividing a material's change in length by any resulting contraction in width. The procedure is to create a dogbone specimen per ASTM D 638, pull lengthwise and measure both the stretch in length and narrowing in width.

Taylor's Modulus (also known as Flexural Modulus): A measure of a material's resistance to being bent. The value is determined by taking the ratio of the bending stress applied per cross-sectional area to the associated sag in the material. The procedure involves creating an etched rigid coupon per IPC-TM-650 2.4.4, sitting it in a fixture that supports it horizontally at both ends, adding weight to the center and dividing the force by the sag at its maximum value.

Flexural Strength: A measure of how much weight a material can support before bending to the breaking point. The value is calculated for a specimen of specific dimensions per IPC-TM-650 2.4.4 based upon thickness and the amount of weight it holds before breaking. The procedure involves creating an etched rigid coupon, sitting it in a fixture that supports it horizontally at both ends, and adding weight to the center of the span until it breaks.