

TA4003B

Test Report

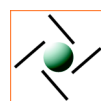
TA4003B

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Address	3066 Sidco Dr. Nashville, TN 37204 United States
Sample Received	5/18/2017
Sample Source	Advanced Composites
Report Prepared	6/6/2017
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This data is available in True Digital format

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Tensile Properties: -30 °C, 1 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.31 mm
	thickness	2.94 mm
	gage length	8 mm
Parameters	test temperature	-30 °C
	laboratory humidity	53 %RH
	crosshead speed	480 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes: True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = ln(1+engineering strain).

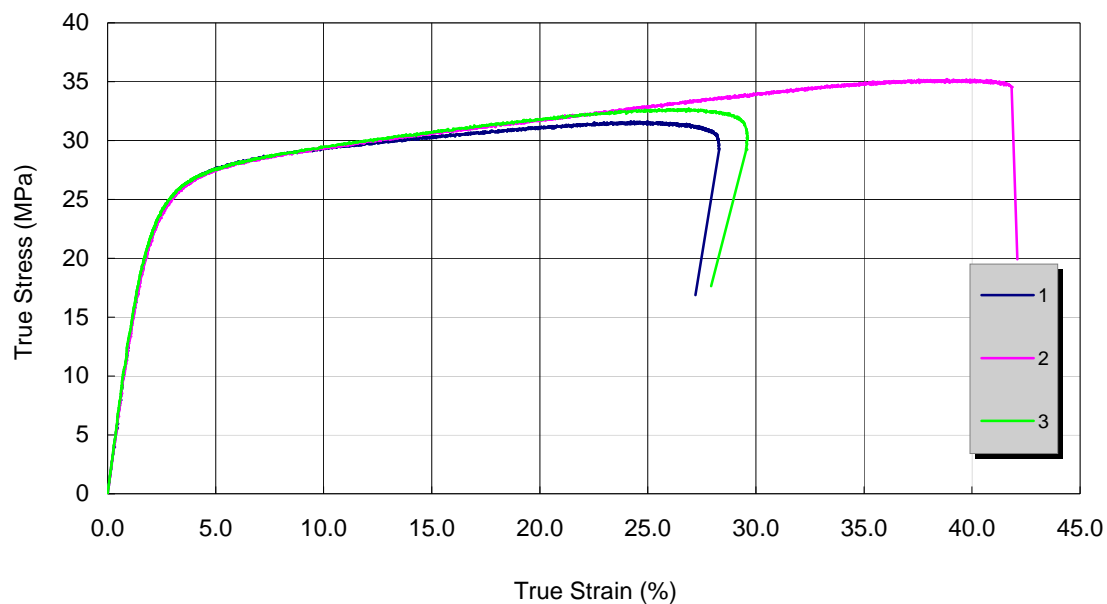
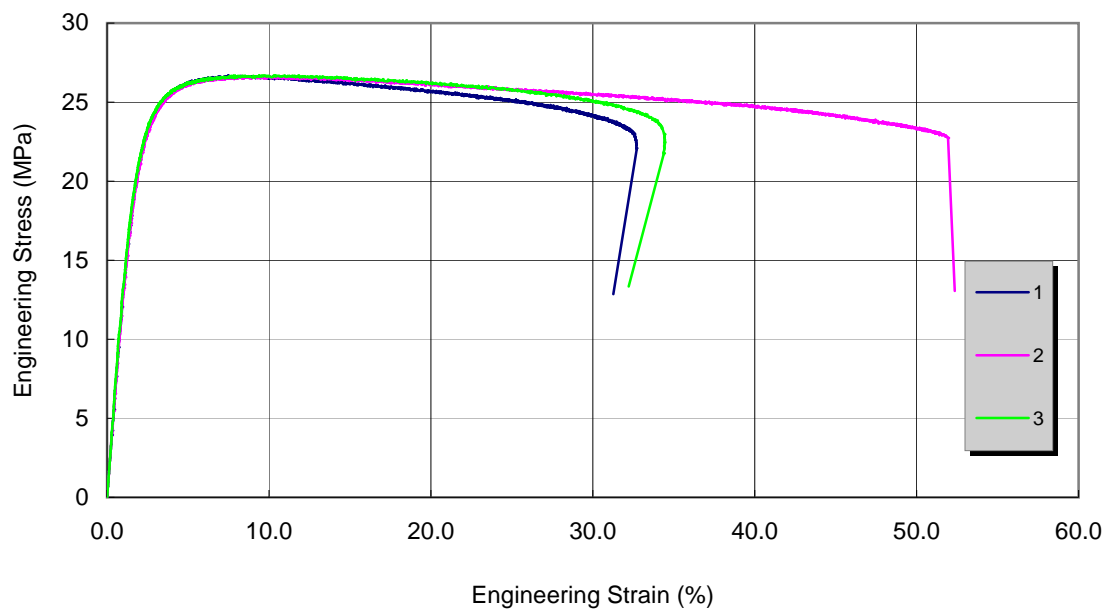
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	1329	18.7	1.61	26.7	7.49
2	1323	18.3	1.58	26.6	11.78
3	1370	18.7	1.56	26.7	10.38
Mean	1341	18.6	1.58	26.7	9.88
Std Dev	26	0.2	0.03	0.0	2.19

Tensile Properties: -30 °C, 1 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: -30 °C, 10 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.23 mm
	thickness	2.96 mm
	gage length	8 mm
Parameters	test temperature	-30 °C
	laboratory humidity	53 %RH
	crosshead speed	4800 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

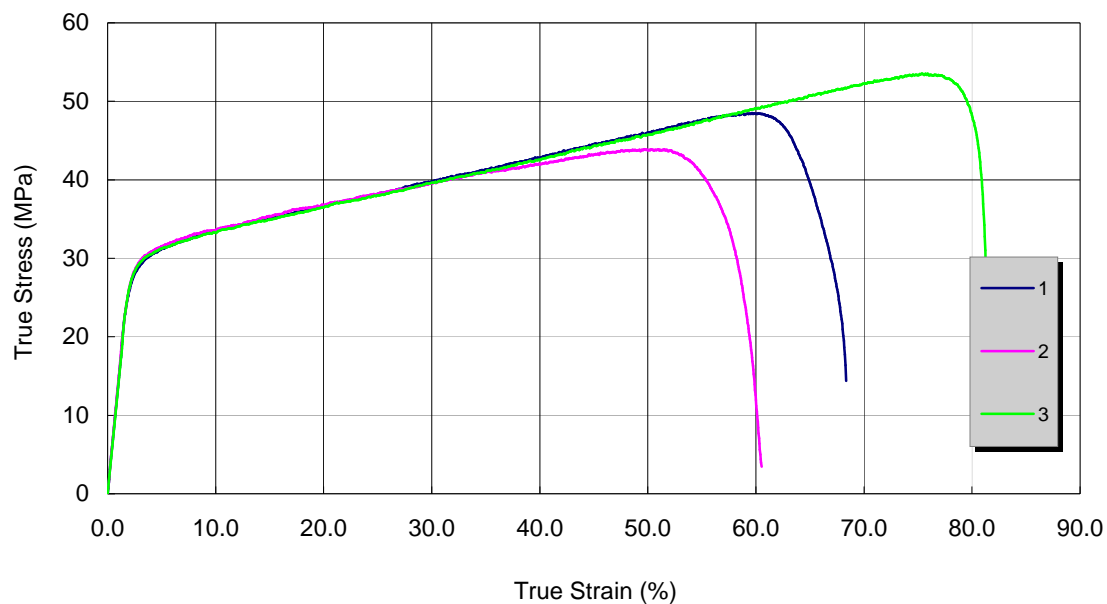
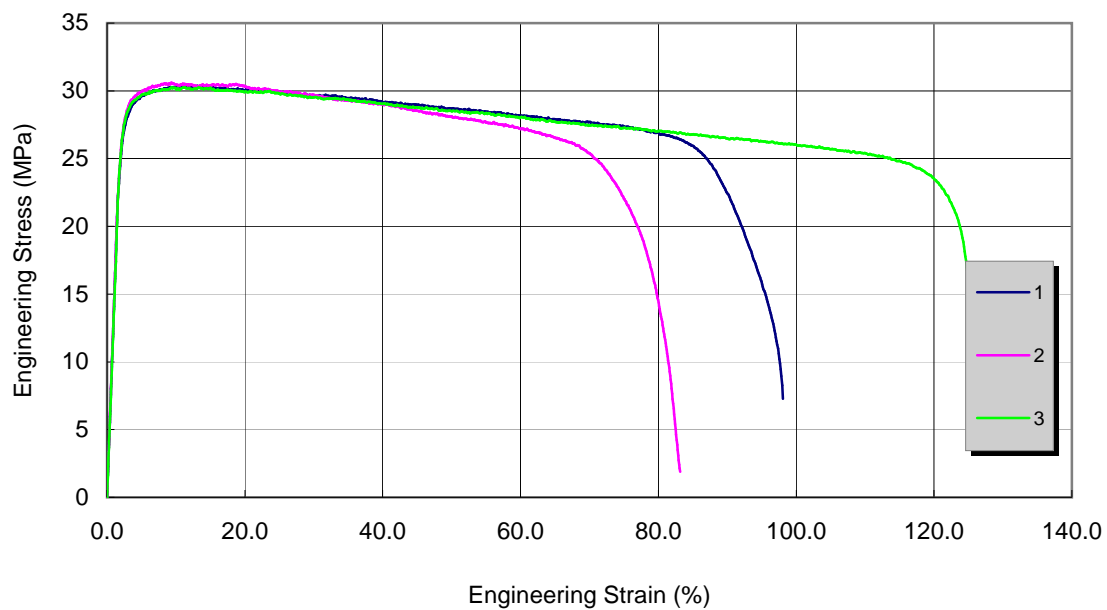
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	1405	24.7	1.94	30.4	14.64
2	1433	25.0	1.94	30.6	9.35
3	1378	25.9	2.07	30.3	11.22
Mean	1405	25.2	1.98	30.4	11.74
Std Dev	28	0.6	0.07	0.2	2.68

Tensile Properties: -30 °C, 10 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: -30 °C, 100 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.26 mm
	thickness	2.96 mm
	gage length	8 mm
Parameters	test temperature	-30 °C
	laboratory humidity	53 %RH
	crosshead speed	48000 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	none
	extensometer class	none
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

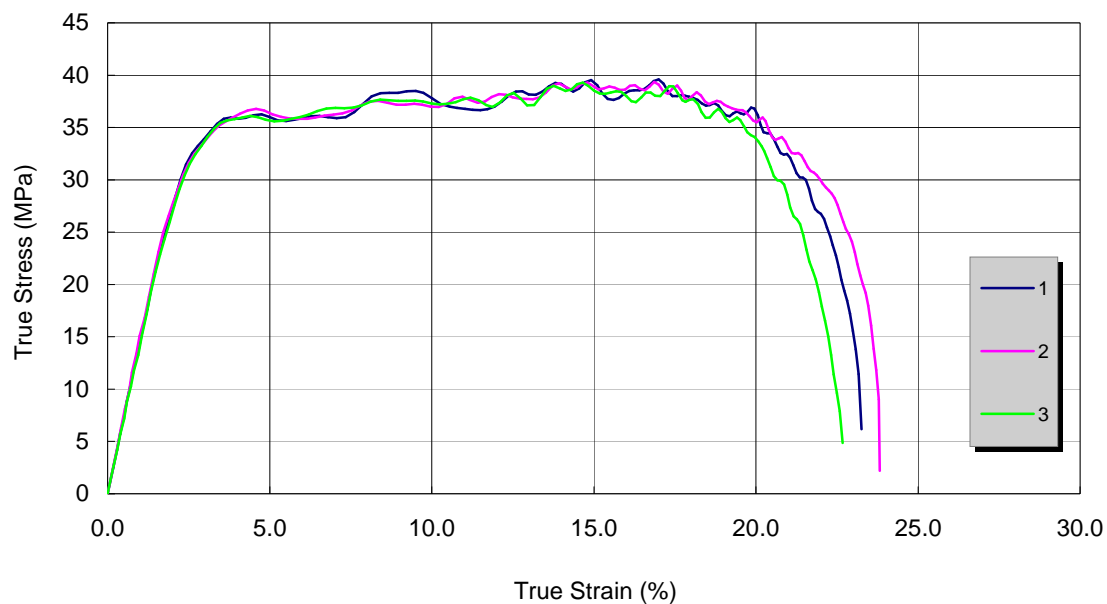
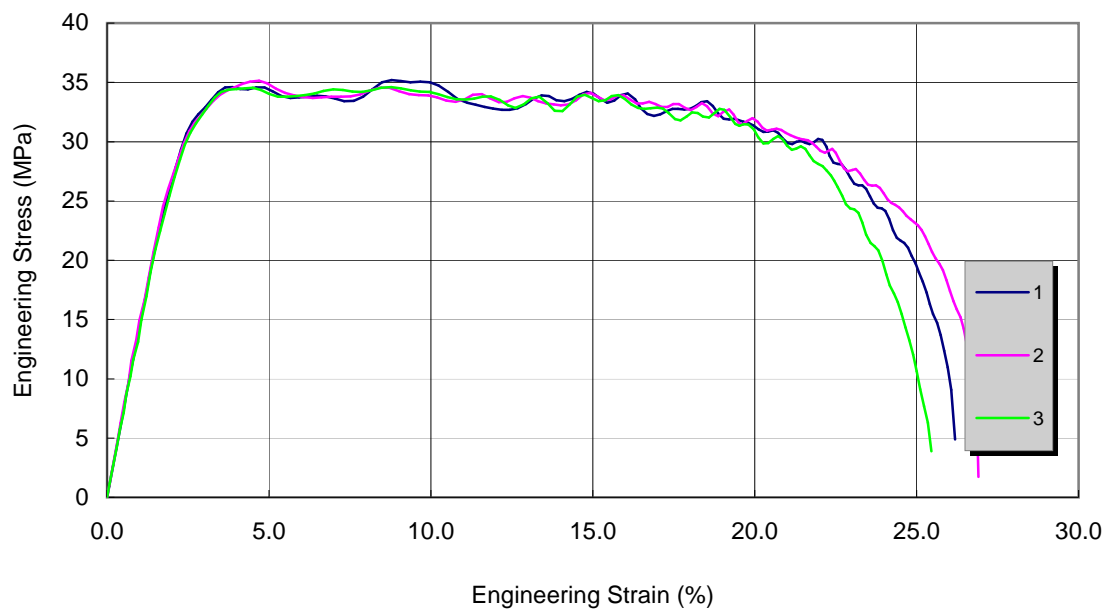
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	1454	26.4	1.97	35.2	8.78
2	1498	26.0	1.89	35.1	4.69
3	1426	27.0	2.08	34.6	8.77
Mean	1459	26.5	1.98	35.0	7.41
Std Dev	36	0.5	0.10	0.3	2.36

Tensile Properties: -30 °C, 100 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 23 °C, 1 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.28 mm
	thickness	2.97 mm
	gage length	8 mm
Parameters	test temperature	23 °C
	laboratory humidity	53 %RH
	crosshead speed	480 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes: True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = ln(1+engineering strain).

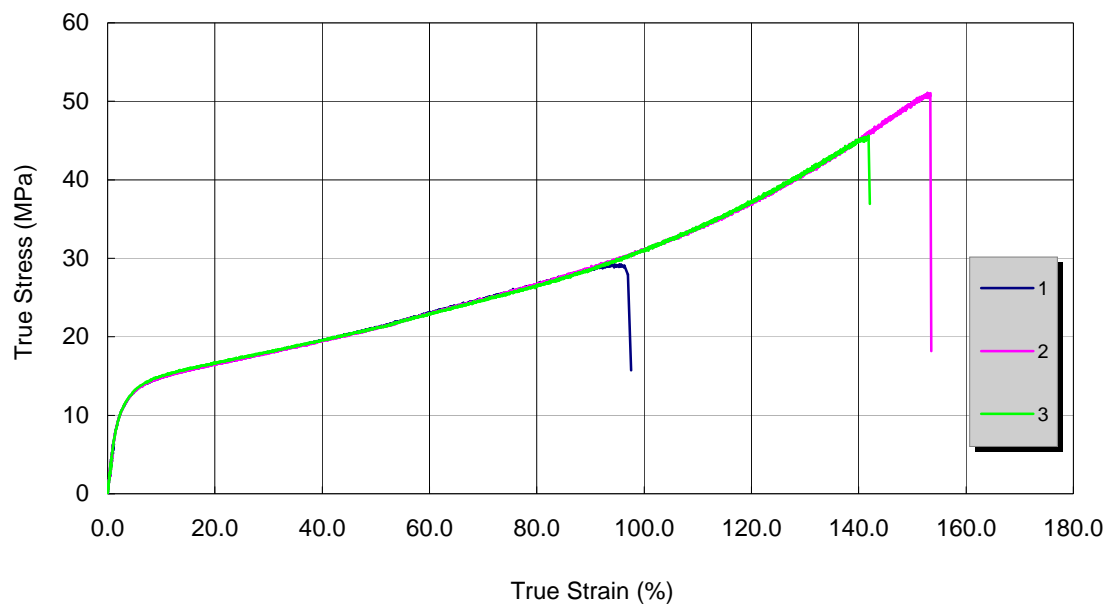
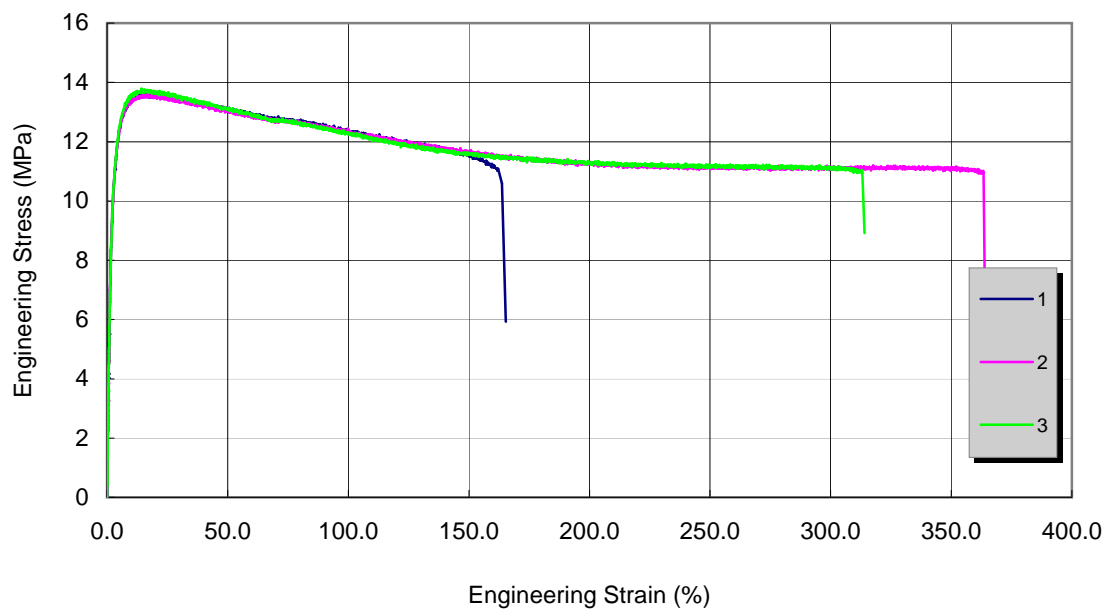
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	670	6.9	1.22	13.6	16.23
2	665	7.0	1.23	13.6	16.74
3	634	7.3	1.35	13.8	14.21
Mean	656	7.1	1.27	13.7	15.73
Std Dev	19	0.2	0.07	0.1	1.34

Tensile Properties: 23 °C, 1 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 23 °C, 10 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.23 mm
	thickness	2.98 mm
	gage length	8 mm
Parameters	test temperature	23 °C
	laboratory humidity	53 %RH
	crosshead speed	4800 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

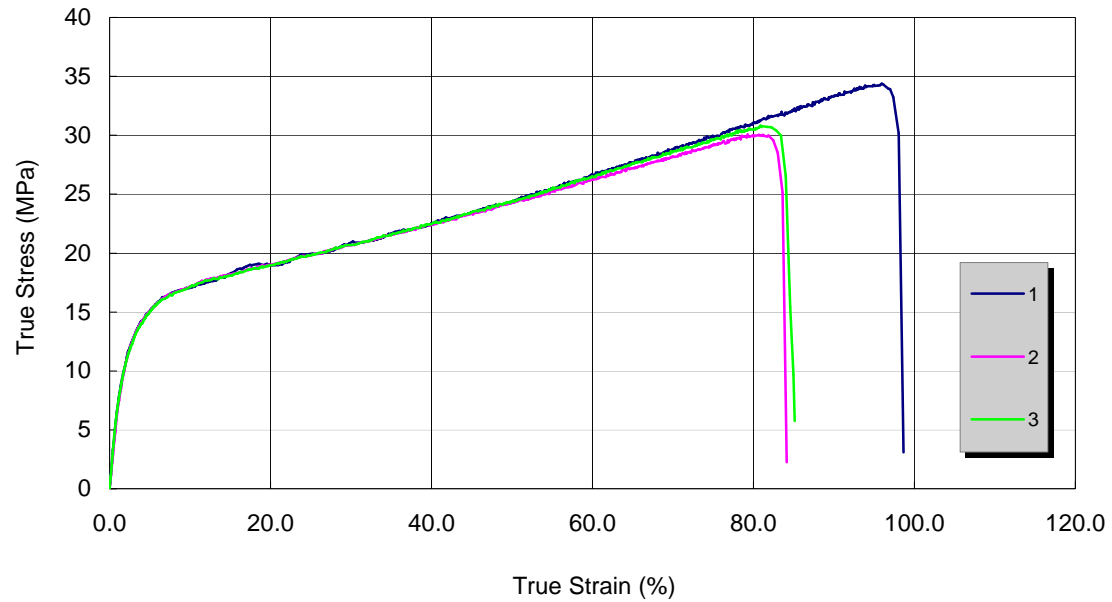
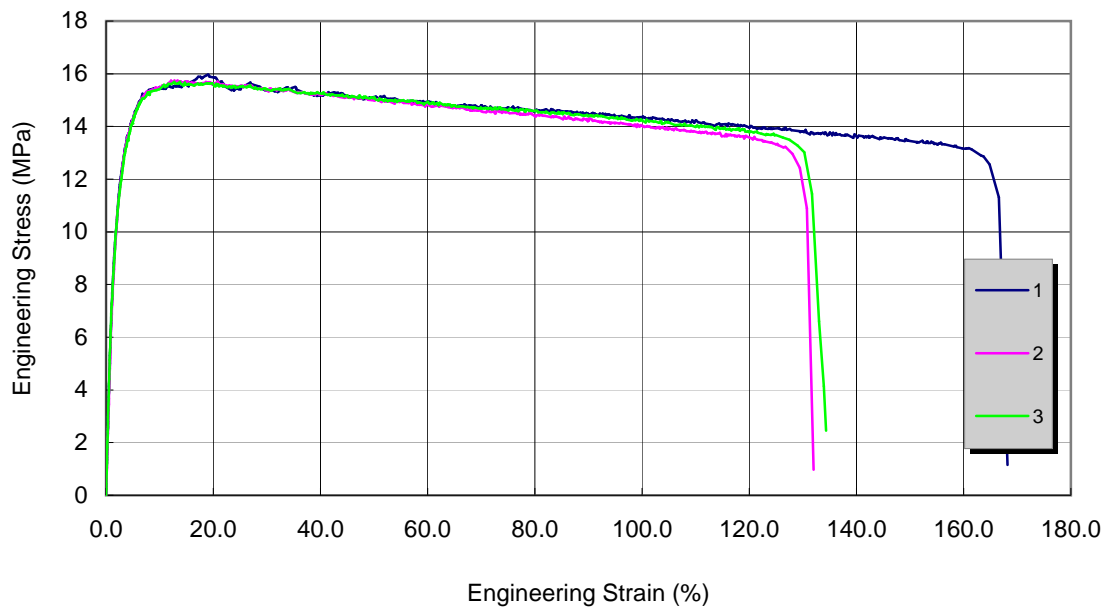
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	779	7.9	1.21	16.0	19.06
2	683	8.4	1.42	15.7	13.32
3	778	7.6	1.17	15.7	12.69
Mean	746	8.0	1.26	15.8	15.02
Std Dev	55	0.4	0.14	0.2	3.51

Tensile Properties: 23 °C, 10 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 23 °C, 100 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.26 mm
	thickness	2.99 mm
	gage length	8 mm
Parameters	test temperature	23 °C
	laboratory humidity	53 %RH
	crosshead speed	48000 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	none
	extensometer class	none
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

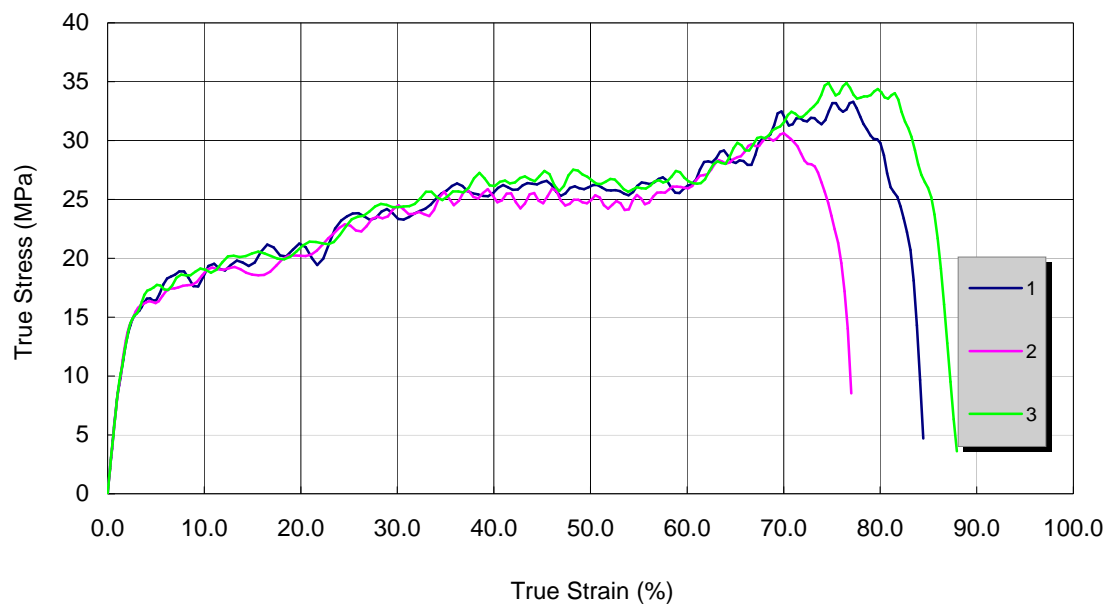
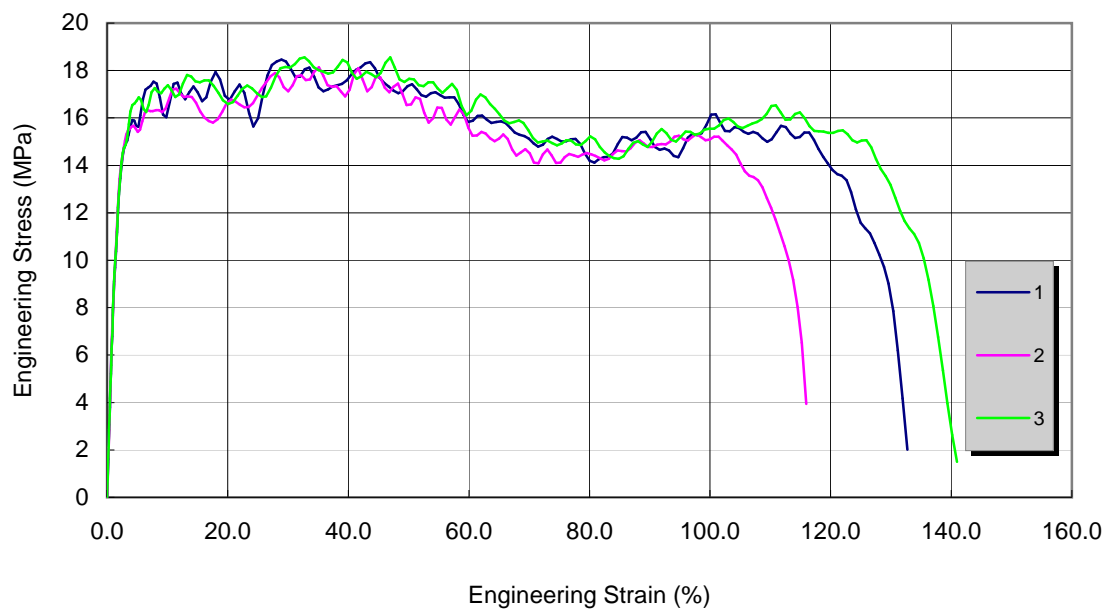
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	837	9.7	1.33	18.5	28.90
2	820	10.3	1.44	18.1	35.13
3	845	10.1	1.37	18.6	32.72
Mean	834	10.0	1.38	18.4	32.25
Std Dev	13	0.3	0.06	0.2	3.14

Tensile Properties: 23 °C, 100 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 85 °C, 1 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.28 mm
	thickness	2.95 mm
	gage length	8 mm
Parameters	test temperature	85 °C
	laboratory humidity	53 %RH
	crosshead speed	480 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes: True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = ln(1+engineering strain).

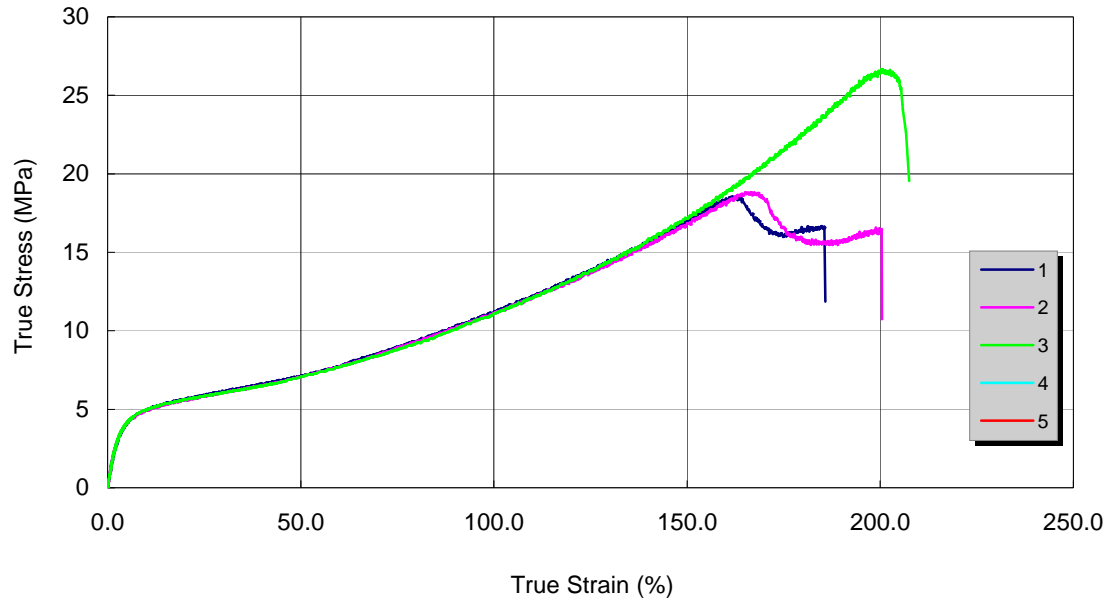
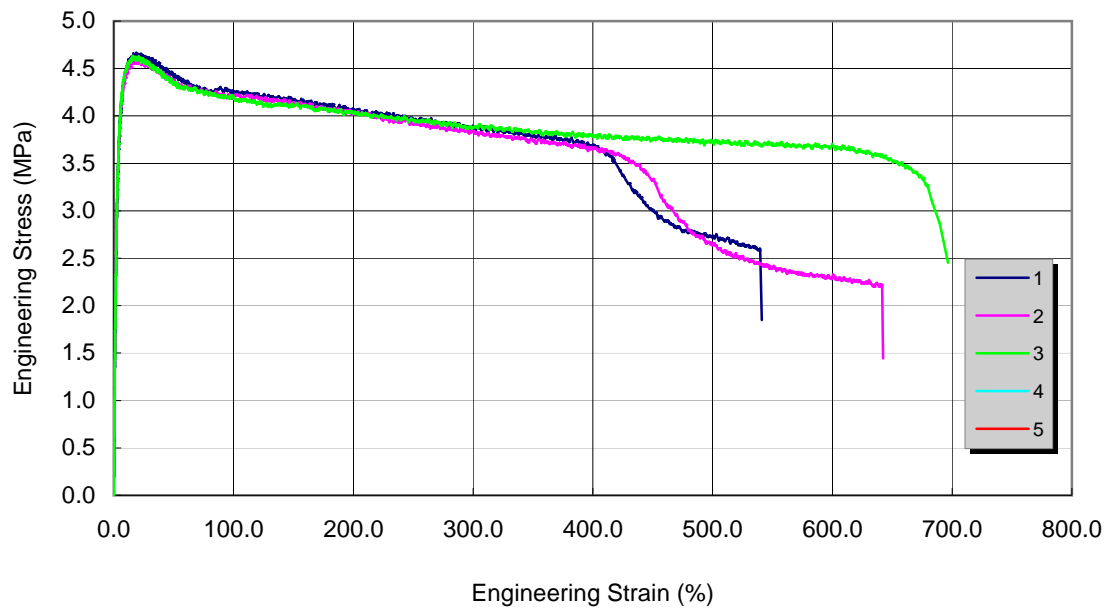
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	144	2.4	1.87	4.7	18.63
2	164	2.1	1.50	4.6	17.93
3	152	2.3	1.71	4.6	15.86
Mean	153	2.3	1.69	4.6	17.48
Std Dev	10	0.1	0.18	0.0	1.44

Tensile Properties: 85 °C, 1 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 85 °C, 10 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.22 mm
	thickness	2.97 mm
	gage length	8 mm
Parameters	test temperature	85 °C
	laboratory humidity	53 %RH
	crosshead speed	4800 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	contact, 8mm gage
	extensometer class	B-1
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

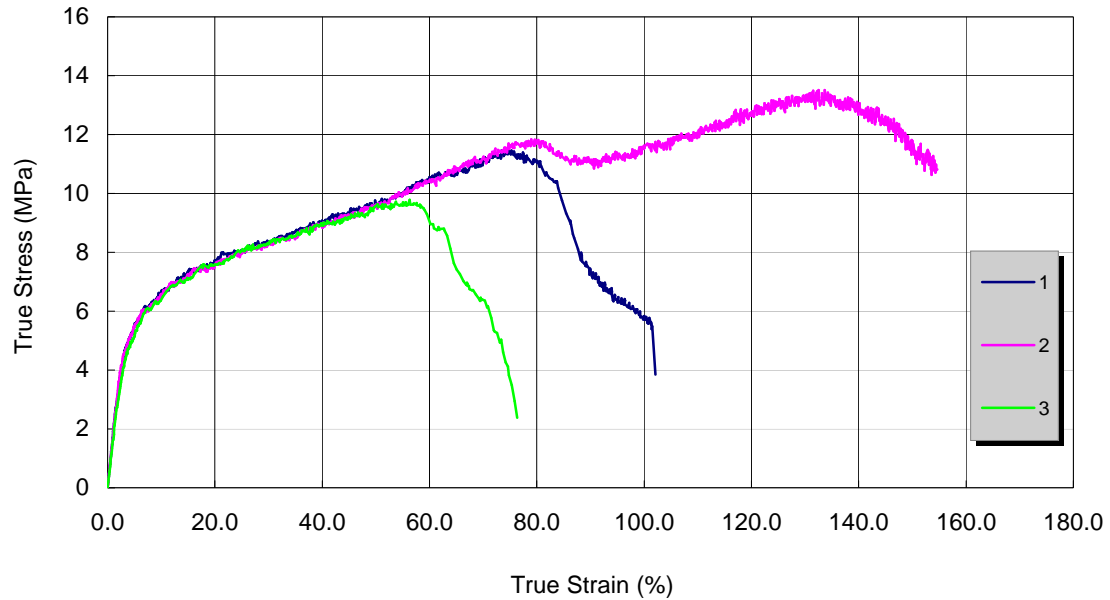
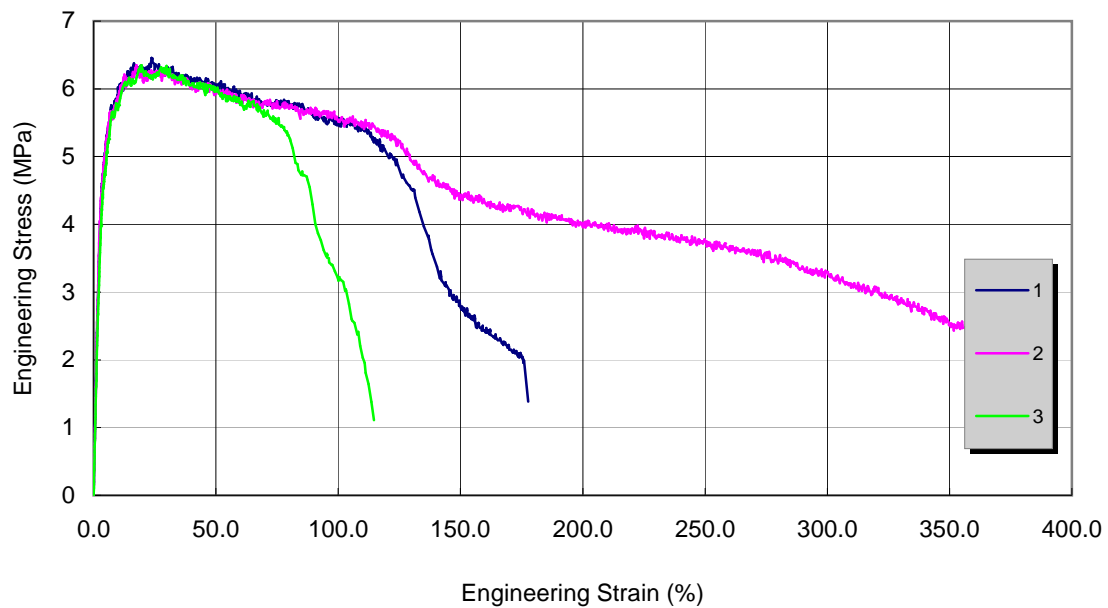
Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	179	3.0	1.90	6.5	23.66
2	173	4.0	2.53	6.3	17.52
3	157	3.0	2.07	6.3	19.62
Mean	170	3.3	2.17	6.4	20.27
Std Dev	11	0.6	0.32	0.1	3.12

📁 Data in Matereality as

Tested By: JL
 Certified By: JB
 Test Date: 6/5/2017

Tensile Properties: 85 °C, 10 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**

Tensile Properties: 85 °C, 100 /s



Method	ASTM D638-14 Standard Test Method for Tensile Properties of Plastics	
Instrument	Instron 8872 Servohydraulic UTM1	
Specimen	form	ISO type 3 tensile bar
	conditioning	40 hours, 23°C, 50%RH
	other specimen preparat	none
	width	10.28 mm
	thickness	2.97 mm
	gage length	8 mm
Parameters	test temperature	85 °C
	laboratory humidity	53 %RH
	crosshead speed	48000 mm/min
Calculations	strain range for E	0.05 - 0.25 %
	offset condition	0.2 %
Extensometry	axial	none
	extensometer class	none
Uncertainty	per standard	

Technique Notes:

Based on ASTM D638-14, test speed higher than listed in standard.

True stress-true strain data are calculated using true stress = engineering stress * (1+engineering strain); true strain = $\ln(1+\text{engineering strain})$.

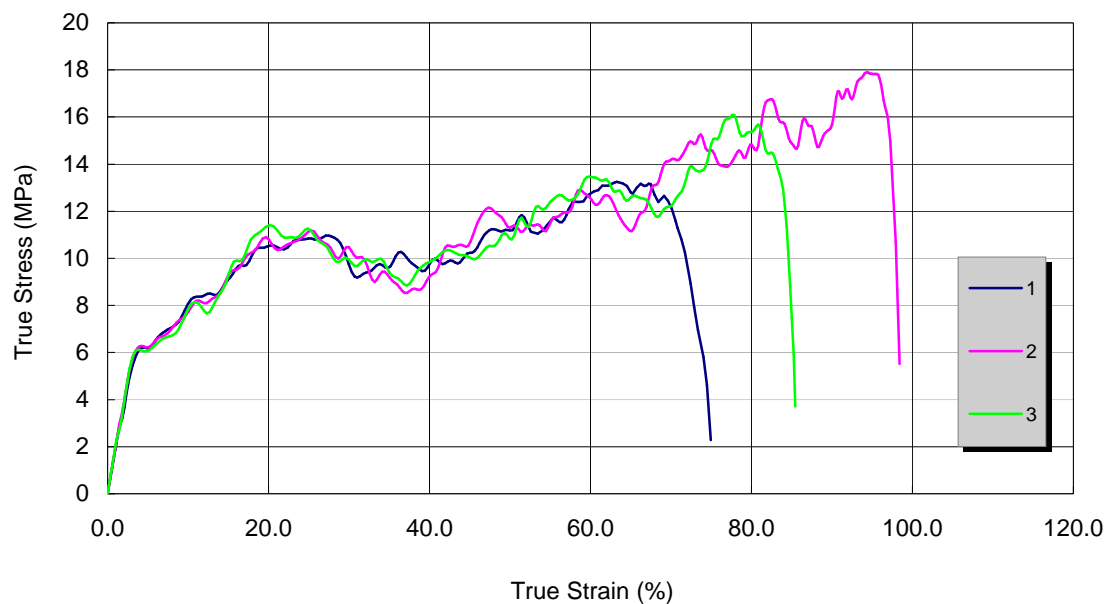
Elastic modulus is defined as the slope of the initial linear portion of the stress versus strain curve.

Testing Notes:

Properties

Replicate	Modulus E MPa	Offset Yield Stress MPa	Strain at Offset Yield %	Tensile Strength at Yield MPa	Strain at Yield %
1	194	3.2	1.83	8.7	20.55
2	199	5.0	2.71	9.0	21.75
3	206	2.7	1.52	9.3	22.33
Mean	199	3.6	2.02	9.0	21.54
Std Dev	6	1.2	0.62	0.3	0.91

Tensile Properties: 85 °C, 100 /s Continued

True Stress-True Strain Curve**Engineering Stress-Strain Curve**